Do Staff Rides Help Move The Forest Service Toward Its Goal Of Becoming A Learning Organization?

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ABSTRACT

The Forest Service has declared its intention of becoming a learning organization. As a means to that end, the Forest Service has borrowed and adapted the staff ride concept from the military. This paper describes the staff ride product and compares it to what scientific research tells us about the nature of learning. Focus group sessions were conducted to ascertain the strengths and weaknesses of staff rides.

This research is intended to provide a scientific and argument basis for the digitalization of the staff ride environment for a particular organization. As such this thesis is a much a design document as it is a piece of empirical research. Designing "into the future" especially for the Forest Service's requirement, requires designing for an organization whose learning and organizations needs are quite broad and sometimes contradictory. Further sorting out of real world teaching events like the staff ride that should be transferred to digital environment at this point in time rests more on intuition than science.

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INTRODUCTION

The Forest Service has declared its intention to become a learning organization. "The USDA Forest Service's 2005 National Forest System Land Management Planning rule states that organizational learning is a requirement to meet the needs of Forest Service lands" (Federal Register, 2005, p. 1030 as cited in Salk, 2008, p. 1). In 2005 the Forest Service was one of two land management agencies within the United States Federal Government to cite organizational learning as a means of accomplishing its mission (Salk, 2008). Learning how to become a safer organization is a primary focus within the Forest Service (FY 2014 Budget Overview, 2013, p. 20). In 2010, the members of the Forest Service's National Leadership Council (NLC) demonstrated their commitment to learning how to become a safer organization through embarking on eight learning journeys. They broke up into groups of 4 to 6 council members and visited organizations they considered to have outstanding safety cultures. They "highlighted core insights from their experience, and committed to next steps for engaging the entire agency in dramatically improving safety outcomes" (NLC Safety Session, 2010).

These learning journeys contributed to the creation of the Forest Service's Safety Journey program. Every Forest Service employee was required to attend a Safety Journey session. One of the assertions of the Safety Journey was "By becoming a learning and reporting organization with a just culture, we will become a zero fatality organization" (Baca et al, 2010).

The staff ride is a tool that has emerged within the Forest Service in recent history and has been embraced within the wildland fire division as a means to enable the Forest Service to both become a learning organization and to become a safer organization. The focus of this paper is to determine why the staff ride has the reputation as "one of the most powerful instruments available for the professional development of wildland fire service leaders" (Wildland Fire Staff Ride Guide, 2010, p. 10), how it stacks up against what research suggests about the nature of the learning process, and what, if anything, can be done to improve the staff ride learning product.

Staff Ride Concept

"The sole purpose of a staff ride is to further the professional development of leaders," (Wildland Fire Staff Ride Guide, 2010, p. 2). The staff ride concept comes from the military (Roberson, 1987), and, as instituted by the wildland fire service, has three requirements: pre-reading, an instructor facilitated site visit, and an instructor facilitated dialogue session known as "integration". Roberson states (P. 5):

> A staff ride consists of systematic preliminary study of a selected campaign, an extensive visit to the actual sites associated with the campaign, and an opportunity to integrate the lessons derived from each. It envisions maximum student involvement before arrival at the site to guarantee thought, analysis, and discussion. A staff ride thus links a historical event, systematic preliminary study, and actual terrain to produce battle analysis in three dimensions. It consists of three distinct phases: preliminary study, field study, and integration.

A staff ride is, by design, a learning product that is limited to (ideally) 20-25 participants in an effort to build an intimate setting that invites dialogue throughout the process. Anecdotal evidence indicates that staff rides are highly valued by participants as learning experiences (Black et al, 2012). However, due to the need for both participants and staff ride facilitators to travel to the actual site and the limitation on effective size of a staff ride, these are expensive efforts. It seems prudent to look to what scientific research has to say about the learning process in order to identify strengths and weaknesses of the staff ride product.

> Staff rides are planned learning events that recreate significant historical incidents while engaging participants in open reflection and discussion" (Becker & Burke, 2014). The origin of staff rides can be traced back to the Prussian Army in the late 1800s. The United States military adopted the use

> of staff rides in 1906. The practice fell into disuse after World War II, and was somewhat resurrected in the 1960s and 70s. In 1982, after a 73-year hiatus, staff rides were formally reintroduced into the curriculum at the Command and General Staff College in a new and updated format by William G. Roberson (Robertson, 1987, preface).

The Forest Service adopted the concept of staff rides in 1999 to study tragedy fires (fires in which fire suppression personnel are mortally wounded) in an attempt to avoid such tragedies in the future. The first staff ride organized by the US Forest Service was based on the Dude Fire (Fire Management Today, 2002). Since then Useem, Cook, and Sutton (2005), and Becker & Burke (2012 and 2014), have published papers that analyze the use of staff rides within the Forest Service and other organizations.

The Phases of the Staff Ride

Becker & Burke (2012, p. 320-321) describe the three phases of the staff ride in detail.

> The purpose of the preliminary study is to provide a systematic review of all background material, including an outline and chronology of significant episodes, and the development of initial theoretical arguments and expectations…Note that hypotheses developed during the preliminary stage are viewed as tentative, with the understanding that they will be critically examined during the remainder of the staff ride.

They contend that the field visit is aimed at facilitating public reflection about the actions of those being studied grounded firmly in context. The facilitator should focus on "allowing the atmosphere to remain open and the field visit to be controlled equally by participants" meaning the instructor cadre should not try to direct the focus of the discussion but rather let the discussion emerge from the group. At the same time they should focus on not letting people with strong personalities dominate the conversation. A skilled facilitator will find ways to ensure everyone has a chance to add to the conversation. They describe the public reflection process as being "reflection-in-action" (p. 321) which occurs spontaneously and is fundamentally different from "coached reflection" which is purposefully more structured in its design. The public nature of the reflection allows peers to detect other participants' biases and untested assumptions.

And finally, they describe the integration phase as an exchange of ideas and observations that aims to integrate the preliminary study and field visit phases. "Here, questions focused on lessons learned relative to contextual, organizational, and personal factors" (p. 321). While the first two phases concentrate on the case study, the integration stage focuses on the application of what was learned into the future. Here the facilitator may offer information and reflections of past groups who have attended the same staff ride at earlier times.

LITERATURE REVIEW

The literature included in this review was selected to provide better insight on how learning occurs. Topics researched include individual learning theories and learning styles, pedagogy, change theory, organizational learning theory, and accident prevention theory. The review was conducted to gain a better understanding of how humans learn and identify new ways of learning, doing business, and how best to implement any changes that were identified in the learning and identification process.

Conventional Learning Theories

Individual learning theories vary according to what their adherents (or developers) consider important factors. For instance, environmental stimuli (Dunn & Griggs, 2000 as cited by Arthurs, 2007), or ways people seek/assimilate information (Kolb, 1984 as cited by Arthurs, 2007). The following section summarizes key attributes of learning theories reviewed, and evaluates them for utility in this study.

Individual Learning: Much has been written about individual learning (Bandura, 1971; Kang & Gyorke, 2008; Robertson, 1987; Manolis et al, 2013). Theory generation has primarily been focused on discerning *how* individuals learn. The view of all students being "identical empty vessels" (Manolis et al, 2013, p. 44) is giving way to a more nuanced view of students who contribute to the learning process (Manolis et al, 2013). Different theories (Kolb, 1984; Dunn & Dunn 1993, 1999; Fleming & Mills, 1992) acknowledge differences among students and try to identify learning styles that attempt to account for the differences.

Bandura (1971) contrasts trial-and-error learning with observational learning in a work titled Social Learning Theory. He notes that some theories cite inner drives as the main driver of behavior and other theories cite the external environment as the main driver of behavior. He instead postulates that there is a two-way control mechanism, which is to say that the environment affects the learner, and the learner affects the environment. Humans' unique ability to learn from trial and error as well as observation makes it increasingly complex to determine causal links. Cognition plays a role in the speed at which trial-and-error lessons are learned. In other words, once the learner identifies the pattern between his or her actions and the subsequent success or failure of accomplishing a particular goal, successful exchanges become much more frequent. Once those patterns are recognized, they can be communicated to other humans. Thus socializing with other humans and learning from them greatly increases the speed at which learning occurs

While Bandura attempts to put to bed the assertion one has to choose between inner drives and the external environment when trying to ascertain the driving force behind the learning process, he still relies on the linear nature of cause and effect relationships to explain the nature of the learning process. Staff rides aim to build context around conditions (external environment) and understanding (arguably partially formed by inner drives) to understand the relationship between actions/decisions and outcomes. This paper argues that increased understanding of these relationships constitutes an instance of learning.

Arthurs (2007) conducted a meta-analysis of three individual learning theories and offered suggestions as to how to manage different learning styles. She highlights Kolb's Experiential Learning Model (1984), Flemming and Mills' Sense-based Model (1992), and The Dunn & Dunn Learning Style Model (1993, 1999).

Kolb's Experiential Learning Model is based on four stages that represent the way individuals perceive, think, feel, and act when faced with new experiences (Arthurs, 2007, p. 3):

- Concrete experience
- Reflective observation
- Abstract conceptualization
- Active experimentation

An analysis of the combination of these for stages resulted in the classification of four different learning styles, which are (Arthurs, 2007; Kolb, 1984; Manolis et al, 2013):

- Accommodators
- Divergers
- Convergers
- Assimilators

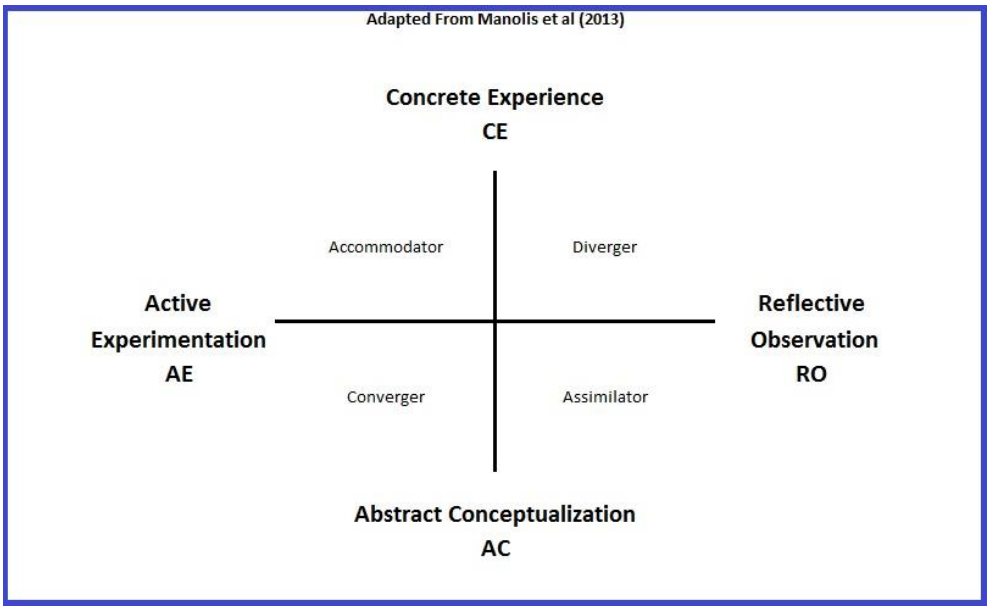

Figure 1: Kolb's (1984) Experiential Learning Model as listed in Manolis et al (2013).

According to Kolb, people with different learning styles learn better when information is presented in a manner that is consistent with their own individual style. Newer research further refines the model, and classifies nine learning styles as opposed to four (see Figure 2).

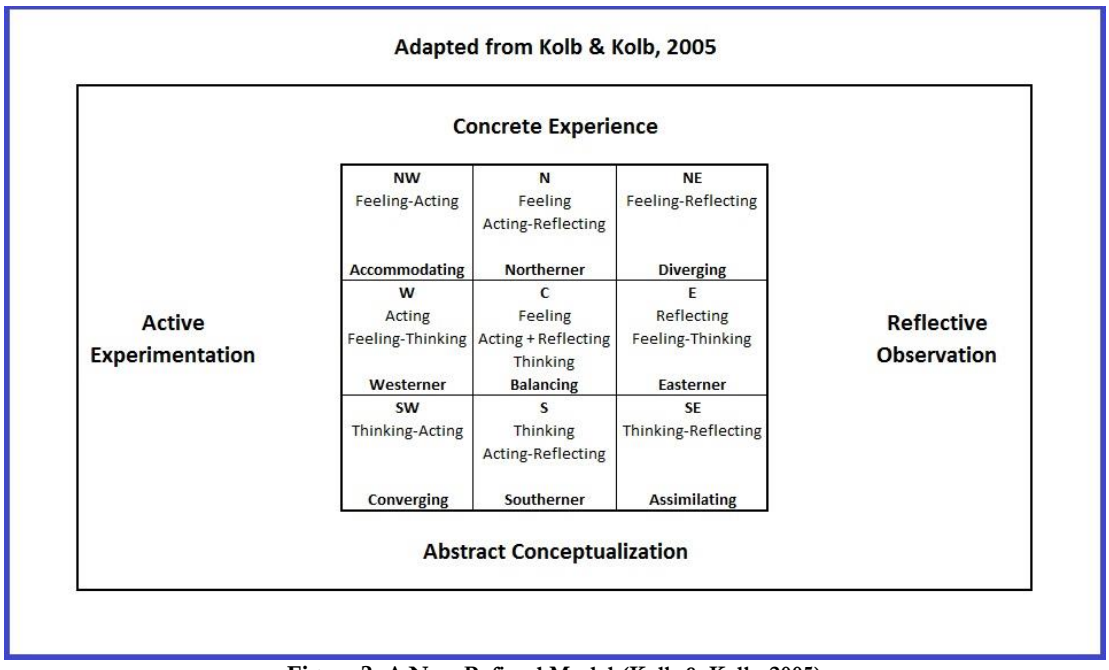

Figure 2: A New Refined Model (Kolb & Kolb, 2005)

Notice that the four original learning styles are still present in the newer model, however the new model shows an additional four hybrid learning styles and one balanced learning style. These new learning styles are labelled C (for Center), and N, S, E, and W, for each of the cardinal directions (North, South, East, and West respectively). Learning is defined as "the process whereby knowledge is created through the transformation of experiences. Knowledge results from the combination of grasping and transforming experience" (Kolb, 1984 as cited in Kolb & Kolb, 2005, p. 194). A major tenet of the Experiential Learning Theory is that "Learning requires the resolution of conflicts" (Ibid, p. 194). These conflicts arise out of the interplay among the four stages of learning. For example, a concrete learner may experience tension when trying to grasp abstract ideas. This tension can lead to relating the abstract ideas into more

concrete metaphors, which may lead to more effective learning. According to Kolb, the tension between abstraction and concreteness can drive the learning process.

Kolb's work is a continuation and consolidation of work from Dewey, Lewin, and Piaget (Kolb, 1984, p. 20). Kolb also defines learning as the interplay between expectation and experience (Kolb, 1984, p. 28), and also as "the major process of human adaptation" (p. 32). He views the role of an educator "is not only to implant new ideas, but also to dispose of or modify old ones" (Kolb, 1984, p. 28). Elkind "has identified two mechanisms by which new ideas are adopted by an individual—integration and substitution" (Elkind as cited in Kolb 1984, p. 28). Kolb (1984, p. 28) states that the process of integration leads to more stable change while the process of substitution lends itself to a reversion to earlier understanding. He also describes learning is "by its very nature a tension and conflict filled process" (p. 30).

Staff rides could incorporate Kolb's model by having students (in a dialogue setting) devise a list of conditions that were present in the case study. Students then could be asked to arrange the conditions in such a way as to attempt to capture why the event happened. In the beginning, the abstract conceptualizers in the group would emerge to identify the conditions. The reflective observers in the group would then emerge to reflect on how those conditions might influence the outcome. The concrete experiencers would begin to organize the conditions in a concrete way to explain the outcome, and the instructor could ask students to tap into active experimentation to try to offer up alternative interpretations of the conditions and events. Students can then be asked to think of ways to integrate any lessons learned into the current system of thought in an effort to increase the probability of permanent change.

Fleming and Mills' (1992) Sense-based Model is based on the physical senses, and postulates that people prefer some physical senses over others, and therefore learn better when they receive information through the preferred physical sense (Arthurs, 2007). The acronym VARK was used to differentiate the categories of preferred senses: Visual, Auditory, Read/write (digital), and Kinesthetic. With a little pre-planning, staff rides could be designed to incorporate Flemming and Mills (1992) Sense-based Model (VARK).

The Dunn and Dunn Learning Style Model is based on the idea that five categories (italicized below) of stimuli impact a person's ability to learn (Arthurs, 2007). The five categories and their elements are listed below.

> *Instructional Environment*:
> Loud vs. quiet, low vs. bright light, warm vs. cold temperatures, formal vs. informal seating
>
> *Emotional Elements*:
> High or low motivation, persistence, responsibility (conformity vs. non-conformity), structure vs. choices
>
> *Sociological Inclinations*:
> Variety vs. patterns, alone or groups
>
> *Physiological Characteristics*:
> Auditory, visual, tactual, kinesthetic strengths; time of day preference; intake (snacking during study time); mobility while learning
>
> *Processing Tendencies*:
> Global vs. analytic approaches to learning

The preliminary study phase has traditionally been a solitary activity, but not explicitly mandated to be so. Attendees could be encouraged to experiment with these concepts to find what works for them. If

Arthurs' (2007) conclusions are correct (see below), attendees should be encouraged to vary their exposure to all of the elements included within this model to the extent possible.

There is a high degree of controversy concerning the usefulness of learning styles (Coffield et al, 2004a; Coffield et al, 2004b). While there are many studies that show that different people prefer different learning styles, there is very little empirical evidence to support the notion that people actually learn better when matched to a particular learning style (Ibid). Coffield et al (2004a) performed an in depth analysis of the most influential learning style theories, and recommended against using many of the different metrics available. Of the metrics in which he did see value, he could only recommend that they be further studied.

Coffield (2004a) cites three "linked areas of activity: theoretical, pedagogical and commercial" (p. 1) that present "a host of conceptual and empirical problems" (p. 1) concerning the idea of learning styles. Instances of "intellectual trench warfare" (p. 1), commercial interests (p. 2), and the fact that different models are produced for different purposes (p. 2) have resulted in a field that is "much more extensive, opaque, contradictory and controversial than [they] thought at the start of the research process" (p.2).

Coffield et al (2004b) concluded after an analysis of the available learning style models that Dunn & Dunn, 1993, 1999; Gregoric, 1985; and Riding, 1991 are poorly designed and should not be used (p. 37). Coffield et al (2004a) and Coffield et al (2004b) did identify what they considered to be well designed models, but were reluctant to endorse them. Rather they concluded that the models "deserved to be researched further" (2004a, p. 138). Indeed Coffield et al (2004a) found that for some models "for every negative study, a positive one [could] be found" (p 66).

However, Arthurs (2007) argues that maximum retention rates were measured when multiple learning styles were instituted in the training environment (Nilson, 2003; Bowman, 1997 as cited by Arthurs, 2007). This suggests that although matching learning styles to students may not have strong empirical support for effective learning, making an effort to incorporate a plethora of learning styles into the educational process has been shown to improve retention rates in students. Perhaps there is a need to ensure that instructors need to vary their delivery methods in order to increase effectiveness. A different line of research conducted by Hailan et al. (2007) shows that "emotion can facilitate learning and memory formation" (p. 160).

Arthurs (2007) cites research from Bowman (1997) and Nilson (2003) that claims retention rates of students vary from 10-20% in pure lecture settings to up to 97% when "auditory, visual, and experiential modes" (Arthurs, 2007, p. 4) are used. She also concedes that instructors may not have the time to incorporate learning environments that cater to each different learning style in the same setting. She suggests a number of teaching strategies to manage learning styles given the constraints teachers may face.

Coffield (2004b) acknowledges that "even some of the fiercest critics of learning styles concede that a particular [learning style] test can safely be used as a means of facilitating a discussion about learning" between teachers and students (p. 39). The Staff ride learning product can potentially incorporate multiple learning styles in an effort to maximize retention as well as be used as a means to facilitate a discussion on learning.

If the emphasis on learning is defined as acquiring knowledge, it would make sense to educate teachers and trainers about the different learning style models available in order to give teachers tools to work with when trying to frame learning in productive ways. Clues can be drawn from the different models to aid in instructional design to ensure a variety of teaching methods are employed in an effort to facilitate learning among students.

All Forest Service instructors of wildland fire classes are required to take a class called M-410: Facilitative Instructor. This class gives each student (and therefore potential future instructor) an assessment that measures learning styles as defined by Gregoric's Four-Channel Learning Style model. The assessment is called the Gregorc Style Delineator (GSD). The literature I researched (Coffield et al, 2004a, p. 17) states "we conclude that the GSD is flawed in construction" and later (p. 18) "its use cannot be recommended."

The wildland fire service can benefit by outlining the strengths and weaknesses of different learning models instead of picking one model to focus on, especially if the model they pick raises in some researchers "serious doubts about the psychometric properties [of the model]" (Coffield et al, 2004a, p. 16).

As a part of this research effort, focus groups of staff ride attendees were conducted to ascertain the strengths of the staff ride learning product. It is interesting to note that the staff ride attendees did not seem to have the vocabulary to describe their own particular learning style or preference. Participants did not express that they were visual/audio/kinesthetic learners, or a concrete/sequential—abstract/random, or really any other academic means to describe their learning preference. This suggests their lack of familiarity with different learning styles available in scientific literature.

The entire field of learning styles seems to assume that the key to learning is knowledge transfer. And in some instances that may be the case. This paper argues that in terms of learning how to become a safer organization and learning from accidents and unintended outcomes, knowledge transfer is important but should not be the overriding goal of the training curriculum.

McDaniel (2007) postulates that when we are dealing with systems involving humans interacting with each other (an instance of a Complex Adaptive System (CAS)), the focus needs to shift "from learning to know, to knowing to learn" (p. 31). He states: "In traditional views of organizational life, knowledge is the key but in a complexity view, learning is the key" (p. 31). McDaniel characterizes CAS as having: "diverse agents that learn, …interact with each other in nonlinear ways, and…self-organize" (p.22).

Learning and Emotion

Research suggests that emotion plays a heavy role in learning and memory. Antonacopoulou and Gabriel (2001) cite Piaget (1981), Snell (1988), and More (1974) in stating that

> …the role of emotion is to provide motivation for cognitive processes and to assist in development…emotion organizes feelings, thoughts and existing knowledge, providing the motivation (desire and will) to make sense of experiences one comes across…before learning can take place an individual must resolve some kind of emotional conflict…Learning then is itself a deeply emotional process—driven, inhibited and guided by different emotions, including fear and hope, excitement and despair, curiosity and anxiety, organized in relatively long-lasting clusters (Antonacopoulou and Gabriel, 2001, p. 444).

Felten et al. (2006) citing a study focused on students learning about domestic violence in the classroom found that

> …explicit acknowledgement of student emotion…leads students both to more rigorous academic analysis of the structural factors behind domestic violence and deeper engagement with activism outside the classroom (Felten et al., 2006, p. 42).

Richter & Levin (2003) found that

> It is suggested that the amygdala, activated by an emotionally charged event, signals to other brain structures that an emotional experience has occurred that is worth storing; this leads to the reinforcement of consolidation of that event. The amygdala "marks" an emotionally charged experience as important by strengthening of synapses located on neurons that have just been activated in another brain memory system that is engaged in the learning situation.

McGaugh (2000, p. 249) states that

> Subjects given a placebo before presentation of the pictures and story remembered best the pictures presented during the most emotional part of the story. In contrast, in subjects given a β-adrenergic receptor antagonists [taken as a medication], memory for those pictures was not enhanced.

The combination of research showing increased levels of retention, strengthened synapsis in the memory system, and increased motivation both inside and outside the classroom due to emotional encounters and research showing certain medications can block the effect of increase retention of emotional events presents a pretty compelling argument that emotions do play a role in retention and learning.

Adult Education

Knowles et al. (2011) contrasts pedagogy with andragogy. Knowles argues that our current educational paradigm was developed for teaching children (pedagogy), and is not ideal for trying to educate adults (andragogy). He argues for less hierarchy and more facilitation from educators when working with adult learners. Perhaps incorporating Knowles et al.'s shift in thinking allowing students to have more power and influence over their learning environment will help instructors to wade through all of the complexity that comes along with trying to devise teaching methods that account for all of the different learning styles. Allowing the instructor to switch from being responsible for developing the entirety of the course content and treating students as though their experience and input is of little value, to merely being responsible for the facilitation of the class's learning and allowing students to interact and give real-time feedback relating to the structure and content of the course will allow for a customized learning environment that fits the needs of a particular group of students.

The staff ride learning product structure seems to parallel the Knowles et al.'s view of learning. Participants' experiences are the central focus of the staff ride, and much energy is exerted in cultivating and sharing that experience for the rest of the group's benefit. The instructor is viewed as a facilitator that tries to create the conditions necessary to allow idea sharing to happen.

The ability of the staff ride to lend itself to the use of Knowles notion of andragogy could negate much of the confusion about how to make good use of the learning style models discussed in the literature review. By placing students in the driver's seat through giving them the flexibility to design much of their own learning environment, instructors relieve themselves of the responsibility to ascertain which learning environment will yield a satisfactory setting for their students. While staff ride instructors do provide background knowledge on the case being studied, they also are responsible for drawing out the knowledge of the students for the benefit of all involved. This paper argues the primary duty of the staff ride instructor should be to teach students how to engage in interactions and dialogue that aims to draw out conditions and context (knowledge). The primary focus of the instructors then becomes teaching the students how to learn (McDaniel, 2007) by modelling respectful interactions between all staff ride attendees.

McDaniel (2007, p. 32) states that when working in a CAS environment, "The real time, as-you-go learning is missed in the assumption of linear cause-effect relationships that, in fact, are not the real relationships in the system." Instead of causal relationships, outcomes are brought to bear as a result of networks of influence (Pupulidy, 2015). If the staff ride cadre conducts the staff ride as an exercise in identifying nodes (specific influences) located within the network, the creativity of the group can be unleashed as they strive to identify influencing factors. It is not the instructor's job to transfer the knowledge of the existence of each specific influence (or node on the network of influence). It is the job of the instructor to teach the students how to set the stage so that a conversation centered on identifying influences can occur. The instructor does not need to research out whether an identified influence is still relevant. The collective body of students in the class can determine that through dialogue. Rather the instructor's job is to model how to facilitate those kinds of discussions. Particular nodes on the network come and go in a dynamic system. The real pay-off comes in becoming skilled in learning how to identify nodes or influences within the network.

In order to understand if staff rides can help the U.S. Forest Service reach its goal of becoming a learning organization, a clear definition of learning organization is required. Is a learning organization an organization that is composed of learning or educated individuals? Is it a self-contained complex organism that is capable of learning from the interaction with and among its subunits and surrounding environment? Is it preferable to seek out top performing individuals? Individuals that have an aptitude for working in team environments? Should the goals of individuals who want to learn parallel the goals of organizations that want to learn?

According to McDaniel (2007), "the quality of relationships may be more important to systems performance [in a Complex Adaptive System (CAS)] than the quality of the agents" (p.35), and "having the best workers may not always be a very clever strategy for improving performance" (p. 34). Through a CAS lens the goal of managers in an organization should shift from "giving commands to enabling learning in real time…from controlling what is going on to making sense of a world characterized by an unpredictable dynamic" (p. 37). The next section of this literature review focuses on organizational learning.

Organizational Learning

It is important to understand that it is possible that organizations learn differently from individuals. Individuals have the capacity to learn for themselves, via trial and error or original thought. Groups can influence individuals through modeling and serving as a body to observe (vicarious trial and error). Once a group gets big enough to employ divisions of labor (Smith, 1776), tension can form between groups of specialists (Schein, 1984). For the purposes of this paper, groups are composed of individuals who are working toward a common goal, are connected by time and space in such a way that the individuals can directly observe one and other, and are operating from a shared set of assumptions. Organizations are composed individuals who are working toward a common goal who are not in a position to directly observe one and other, and do not necessarily have a shared set of assumptions.

Since groups of specialists may not be able to see the others' point of view (the right hand sometimes doesn't know what the left hand is doing) tension is a natural outgrowth of specialized groups. A new, higher-level entity needs to emerge in order to manage this tension. This often results in what we call, following Durkheim, an organization. Organizations are needed to manage specialized groups, because specialized groups often can't see the big picture. Organizations fill the role of big picture oversight. Specialists know more about the details of their job than people above them, but the reason the people above them exist is to ensure the specialized groups don't unexpectedly crash into each other.

According to Schein, none of the various entities have all of the pertinent information and have a tendency to form their own cultures (Schein, 1984). Further, these cultures can clash. As the specialists attempt to locally optimize (Rasmussen, 1997) they may head down a trajectory that clashes with another specialized group. People at the organizational level interpret that the reason for their existence is to manage these types of situations. Specialized groups sometimes see people operating at the organizational level as a hindrance to progress and optimization. It is reasonable to expect tension as a natural outgrowth of any body of people that engage in a division of labor. As organizational people lack sufficient detailed knowledge to ascertain the competency of specialists, bureaucracies emerge to fill that role for the organization.

Schein (1993) argues that organizations operate better and more learning occurs when an emphasis is placed on having a dialogue between the different internal cultures, and offers that learning occurs when basic, pre-conscious assumptions are brought to the surface and challenged as to their validity. He argues that pre-conscious assumptions are the drivers of culture creation and ultimately overt behavior. Schein's (1996a, p. 11) very definition of culture is:

> A culture is a set of basic tacit assumptions about how the world is and ought to be that a group of people share and that determines their perceptions, thoughts, feelings, and, to some degree, their overt behavior.

Schein (1996a) argues that in most organizations there are distinct cultural groups that do not understand each other very well and can end up working against each other in trying to accomplish their goals (p. 11). Rather than picking one cultural group to dominate the rest, Schein argues that an emphasis should be placed on gaining a mutual and shared understanding between the groups whenever intergroup conflict is observed or predicted to occur.

These conflicts often hamper organizational learning. In order to overcome these conflicts, deep assumptions need to be identified and vetted among conflicting cultural groups. Once a common set of deep assumptions is adopted, conflict tends to dissipate as organizational structures (such as policies and procedures) are modified to reflect these new, common assumptions. This literature suggests that a good way to facilitate organizational learning is through careful attention to the existence of, and common understanding between, intra-cultural groups within the organization.

Staff rides can be set up to accommodate this emphasis on the importance of fostering a shared set of assumptions if careful attention is paid to the recruitment and selection of attendees. Care should be taken to make sure the participant list includes a representative sample of the cultures that exist within (in this case) the Forest Service. The 2010 version of the "Wildland Fire Staff Ride Guide" makes no mention of the need to incorporate different internal cultures within the staff ride.

As stated above, the goal of the Forest Service is to become a learning organization. One of the metrics in place to measure whether the Forest Service is learning is a sustained safety record of zero fatalities. In order for that to happen, lessons learned from accident investigations need to result in some kind of change. It then follows that an understanding of how change occurs is warranted if the goal is to be met. The following section aims to determine whether the use of staff rides results in the kind of change that produces an improved safety record.

Change Theories

Scientific research has outlined the components necessary for human behavioral change. Lewin (as cited by Schein (1996b)) developed a model that describes the conditions necessary to influence change within and among humans. He contends that change occurs as a result of passing through three stages: Unfreezing, Changing, and Refreezing. Schein (1996b) describes and refines Lewin's change model. Schein (1996b, p. 59) "found Lewin's basic change model of unfreezing, changing, and refreezing to be a theoretical foundation upon which change theory could be built solidly." He refined this theory by breaking down the unfreezing component into three sub-components. Schein claims that for unfreezing to occur, one must have some sort of "dissatisfaction or frustration generated by data that disconfirm our expectations or hopes" (p. 60). In order to unfreeze, we must experience "survival anxiety". We also experience another kind of anxiety called "learning anxiety" that serves as a barrier to unfreezing. We must possess enough "psychological safety" to overcome the learning anxiety in order to be willing to allow ourselves to unfreeze (p. 60).

These three factors together (frustration, survival anxiety, and psychological safety) foster the motivation to change, and motivation rooted in these factors leads to unfreezing. It is conceivable to imagine a situation where one group or culture within an organization may unfreeze while the others remain frozen. It then follows that in order to invoke bottom to top changes in the organization, it is preferable to leverage events that have the power to yield synchronous unfreezing across all levels and groups within the organization. Tragedy situations may possess this power. Thus, staff rides based on tragedy events may prove especially effective in influencing organizational change.

The second step in Lewin's change theory is change. Schein argues that change happens most effectively when existing values are redefined in such a way as to appease the survival anxiety rather than trying to substitute new values to take the place of old values. He describes *redefinition* as being "fundamental to any change if one wants it to last" (p. 61). Redefinition can be a result of observing role models in a process called *identification*, or can be a result of trial-and-error learning through a process called *scanning* (Schein, 1996b; Schein, 2002). The unfreezing process makes us open to new information, and a willingness to

redefine existing values in a way that alleviates the threat. This willingness can lead to change, but one last process still remains in Lewin's model: refreezing.

> The main point about refreezing is that new behavior must be, to some degree, congruent with the rest of the behavior and personality of the learner or it will simply set off new rounds of disconfirmation that often lead to unlearning the very thing one has learned…The implication for change programs are clear. For personal refreezing to occur, it is best to *avoid identification and encourage scanning* so that the learner will pick solutions that fit him or her (Schein, 1996a, p. 63, emphasis added).

The preceding quotation makes it clear that Schein is advocating for people to be put in situations where they find answers for themselves, rather than having answers modelled for them. This allows people to choose solutions that fit within their value systems, and induces ownership and long lasting adoption of any selected solutions.

The staff ride learning product accommodates this view very well by trying to come as close as possible to placing people inside the event they are studying and then encouraging them to scan the environment to come up with solutions to problems both individually and collectively. The staff ride aims to uncover frustrations and survival anxieties encountered by those whom the staff ride is studying and seeks to draw parallels between the survival anxieties suffered by those in the case study and survival anxieties suffered by the current staff ride participants. The staff ride cadre also strives to create an environment of psychological safety within the staff ride participant group as they engage in dialogue throughout the staff ride. The dialogue sessions are intended to allow participants to redefine their own beliefs in ways that are congruent with their current internal belief structures. According to Schein, this practice will set the stage to allow for permanent refreezing to occur.

Heath and Heath (2010) have a similar outlook on how to motivate change within humans. They expound upon an idea put forward by Haidt (2006, as cited by Heath & Heath, 2010; Haidt, 2012). Haidt claims that the relationship between the rational thought process and the intuitive thought process can be thought of in terms of an elephant (intuitive) and a rider (rational). The elephant is the dominate partner in this relationship, and employs the rider to act as a sort of inner lawyer who rationalizes the elephant's actions or provides advice and counsel to the elephant whenever the elephant petitions the rider to do so. Heath and Heath (2010) postulate that the change process is made much easier when the rider is given clear direction, the elephant is sufficiently motivated, and both the elephant and the rider are given a clear path to follow that leads to the end state desired. When these three things occur, change can occur as rapidly as flipping a switch. This holds true whether an individual wants to change him or herself, or whether a leader wants to impact his or her followers.

This elephant and rider metaphor could also be seen as another way to achieve an unfrozen state according to Lewin's model (Lewin as cited in Schein, 1996b).

It is one thing to help employees understand new concepts and ideas, but getting them to actually implement them on a regular basis could be considered an entirely different issue. This is an issue that the staff ride has to confront as well if they are going to have an effect on accident rates. Works by Lewin, Schein, Heath & Heath, and to some extent Kolb give insight into how to bring changes in behavior about, and some clues as to increasing the probability that the new changes become lasting changes. Lewin's work has gained broad influence on how to facilitate change. He outlined three components: unfreezing, change, and refreezing. Schein and others later built upon that foundation. In order to effect lasting change, the similar or related concepts of refreezing (Lewin as cited by Schein, 1996b) scanning (Schein, 1996b; 2002), redefinition, (Schein, 1996b), and integration (Kolb, 1984) are needed. In their own way, each of these authors postulate that lasting change is much more probable if people redefine their world view in such a way as to integrate the desired change into how they already see the world. If, instead, people are asked to substitute a new world view to replace their old view, the likelihood of lasting change is diminished because of the propensity to revert to a prior world view at the first sign of resistance.

The staff ride product can lend itself well to this view providing the staff ride cadre understand this theory and account for the need to find clear direction for the rider, the need to provide motivation to the elephant, and the need to construct a clear path of travel for both. They do not need to come up with the direction, motivation, or path; rather they could use these concepts to aid in successful facilitation of discussion and dialogue. Assuming that learning from staff rides will induce change, how does that relate to accident prevention and improved safety statistics (e.g. zero fatalities)? The next section explores the science of accident prevention and how it relates to staff rides.

Accident Prevention Theory

One issue directly related to the staff ride is accident reduction. Dekker (2006) proposes that successful accident prevention begins with an understanding of the perspectives of the people involved in the accident. He calls this understanding the view from within the tunnel. Dekker invite us to "go inside the tunnel...It will help [us] understand an evolving situation from the point of view of the people inside of it"(Dekker, 2006, p. 25). He claims that an understanding of the view from inside the tunnel is critical in preventing future accidents.

After an event occurs, observers of an event have a difficult time not succumbing to outcome bias. Once we know the outcome, Dekker likens us to becoming an observer located outside the tunnel of understanding. From the outside (after the event has already happened), the outcome seems as if it should have been easy to predict. Inside the tunnel of understanding, the outcome hasn't happened yet. People inside the tunnel do not have access to the broader perspective. They have to act on what information they have as the situation is unfolding. People on the outside of the tunnel, with access to information after the fact and unhindered by in-the-moment time constraints, feel like they have an understanding of what happened. But in reality, only people who can place themselves inside the tunnel are able to truly understand the context of the outcome within the constraints of the emerging situation.

There is a tendency to assign the fault to humans in accident situations because "people would rather feel guilty than helpless" (Dekker & Nyce, 2011, p. 3). Dekker (2006) argues for what has been termed the new view, which supports the notion that accident investigators are much better served if they seek out weaknesses in the system if prevention is truly the goal. This approach often leads to a product that evokes more questions than people had before they read the report. These questions contribute to the helpless feeling alluded to by Dekker and Nyce.

A central focus of the staff ride is to place attendees in the shoes of the people involved in the incident (e.g. fire suppression event, battle, accident, etc.) The staff ride is a learning product that is specifically designed to get results akin to Dekker's notion of the view from inside the tunnel.

Possible Suggestions to Improve the Staff Ride Product

Wilson's (2002) notion of the adaptive unconscious requires an altogether different view of how some learning can occur. Most of the above referenced research focuses on the differences between individuals. Wilson (2002, p. 71) argues that social situations can sometimes overwhelm individual differences in people. Further, those social situations may influence us outside of our conscious awareness. He also argues that our conscious belief system and our unconscious belief system may interpret the same social situation in very different ways (p. 74). Each system (conscious and unconscious) may also learn things in different ways (i.e. implicitly and explicitly, p. 25). While Wilson admits the topic of implicit vs. explicit learning is still the subject of much debate and research, he states "it is clear that the adaptive unconscious is capable of learning complex information, and indeed, under some circumstances it learns information better and faster than our conscious minds" (p. 26). Wilson cites one experiment by Lewicki, Hill, & Bizot (1988 as cited by Wilson, 2002, p. 26):

In the experiment, subjects were asked to push one of four buttons when an "x" appeared on a computer screen. The screen was divided into four quadrants, and there was a button that corresponded to each quadrant. Unbeknownst to the subjects, the "x" followed a complex rule that governed where it would appear next. As time went on, the subjects became faster and faster at pushing the correct button. Then

the researchers changed the rule, and the subjects' performance deteriorated. They took longer to push the correct button and began to make more frequent errors (that is they began to push the wrong button). The subjects realized that their performance was suddenly negatively affected, but they could not explain why. They had no idea that they had unconsciously caught on to a complex pattern. They began to consciously search for explanations such as "they had suddenly lost the rhythm." (p. 27) Wilson concludes that this "study may be a case in which the adaptive unconscious does better than our conscious minds" at pattern recognition.

It could be argued that if enough staff rides were attended on similar topics offering enough repeated exposure to repeated patterns, a person's adaptive unconscious may be able to discern these patterns unconsciously. That being said, the staff ride learning product does not seem to aim to provide a learning experience geared toward this aspect of the adaptive unconscious. Wilson's ideas concerning the adaptive unconscious could provide a framework, which may give rise to new and innovative improvements to the staff ride learning product.

Klein et al (1986) describes a situation where a Fire Ground Commander (FGC) attributed a split second decision to disengage a fire that exhibited surprising behavior because of a "sixth sense" (p. 578). Klein et al ascribed a "less poetic" reason for disengaging, namely that there was a mismatch between expected fire behavior and observed fire behavior. Perhaps this is an incidence of the FGC's adaptive unconscious recognizing a pattern discrepancy that the FGC could not consciously articulate, and that is why he chose to describe it as a sixth sense instead of a conscious recognition.

In addition to science, the practitioner Salman Khan (Khan, 2011) has found success that may be worthy of emulation. He developed a method of "flipping the classroom" by using technology to present lectures to individual students that they can watch independently. This gives the students more control over the pace of the class as they can rewind and watch portions of the lecture over again without affecting the teacher or other students.

Then they come together in a group environment and do what used to be known as "homework" in the classroom with the teacher present to answer questions. This idea of viewing the lecture at home and doing homework in the classroom has come to be known as "flipping the classroom," and has spurred a movement that Bill Gates claims may showcase the future of learning (Kahn, 2011).

This innovative idea could be used to enhance the preliminary study of the staff ride. In addition to the written pre-work material, a well designed and implemented digital product could provide additional context, drive main points of the pre-reading home, and offer questions that attendees can focus on while preparing for the field study phase. An online assessment could be made available for attendees to complete before the field study phase begins. This would help cadre members gain insight to the perspective and level of understanding that attendees have before the field study phase commences. It would also help ensure that a thorough preliminary understanding of the context of the case study is firmly implanted in the participants before they arrive for the field study phase. This may result in much more engaging dialogue sessions among participants and cadre during the field study.

Literature Review Summary

There is a great deal of scientific literature available on the topic of learning styles. Much of it is contradictory. Meta-analyses of this literature acknowledge the contradictions and opacity of the field. One aspect of learning theory is rather certain, and that is that people do to a large degree self-identify as having a particular learning style. While there is empirical evidence to suggest that people prefer to be taught in different ways, there is a lack of empirical evidence that would suggest that people actually do learn better when matched to a particular learning style. Coffield (2004a; 2004b) states that even the most ardent opposers of the validity of the concept of learning styles concede that a discussion centered on learning styles may have a positive effect on students through arming them with a language or vocabulary with which to explore how learning occurs.

However, works by three authors, (one meta study (Arthurs, 2007) supporting two empirical studies (Nilson, 2003; Bowman, 1997 as cited by Arthurs)), claim that incorporating a teaching style that accommodates a variety of learning styles does seem to significantly improve overall retention of material among students.

Researchers involved in mapping out learning styles and learning style metrics seem to infer (and thus imply to their readers) that the primary goal of learning is knowledge transfer. This may be a reasonable assumption in simple and static systems, but it becomes much more suspect in complex and dynamic systems. In other words if the body of applicable knowledge is rather static, it seems prudent to invest energy into acquiring that knowledge. If, however, it is ever changing, it would seem more prudent to focus on acquiring skills needed to acquire knowledge (McDaniel, 2007). It would also seem prudent to invest in ways of determining which knowledge about knowledge is outdated and which is still current.

This literature review suggests that making use of Knowles's concept of andragogy by encouraging students to take more ownership of the learning process may relieve instructors of the burden of identifying which learning styles are most appropriate for a given set of students. If teachers are aware of the different learning styles available, they need only to listen to their students and draw on their knowledge of learning styles to accommodate their students' desires.

Knowles concept of andragogy also enables instructors to tap into the knowledge held by the students (the community of practice in the case of the Forest Service) rather than expending energy trying to acquire, update, organize and disseminate knowledge to a body of students that are likely just as (if not more) familiar with the dynamics of the system as the classroom instructor his or herself. In the event of operating within a Complex Adaptive System, it makes sense to focus more on teaching how to learn rather than engaging in knowledge transfer (McDaniel, 2007).

Lewin (as cited in Schein, 1996b), Schein (1996b; 2002), Heath & Heath (2010), Bandura (1971), and Kolb (1984), give practical tips on how to go about inducing permanent change, and understanding how to provide the motivation for change to occur, but further research needs to take place in the realm of how Lewin's (as cited in Schein, 1996b) notion of refreezing occurs.

The staff ride learning product lends itself very well to ideas put forward by Knowles, McDaniel, Schein, Heath & Heath, and Lewin. The research highlighted in this review seems to indicate the staff ride learning product is well positioned to promote learning, induce change, and prevent future accidents.

As a means of proposing possible improvements to the staff ride product, this literature review touches on Wilson's notion of the adaptive unconscious's ability to recognize patterns outside of human awareness. Wilson's ideas are potentially groundbreaking, bur are also fairly new and remain untested. As it stands right now, the staff ride learning product does not incorporate Wilson's findings. However, with some tweaking, the preliminary study and integration phases of the staff ride product might be improved through adopting new components aimed at utilizing Wilson's work.

This literature review highlights the difference between linear, cause and effect relationships and the concept of a non-linear network of influences model supported by Complex Adaptive Systems theory. This concept can perhaps be better flushed out through the use of a case study.

Case Study: Herald of Free Enterprise (HoFE)

The HoFE incident is a good example of how the recognition of networks of influence can provide options to aid in the prevention of future accidents. On first glance, it may seemingly be easy to determine the cause of the capsize of the HoFE was due to the ferry embarking on its way across the English Channel with its bow doors open. Upon closer inspection, it is reasonable to conclude that there were a number of factors that contributed to the accident.

The HoFE is a roll on/roll off (RORO) passenger and freight ferry that was designed to ferry passengers and freight back and forth from Dover, U.K. to Calais, France. Later a second run was instituted to carry

passengers from Dover, U.K, to Zeebrugge, Belgium. On March 6th, 1987, shortly after departing Zeebrugge the HoFE capsized killing "not less than 150 passengers and 38 members of the crew" and many others were injured (Sheen, 1987, p.1).

Upon first glance, it seemed obvious that the cause of the crash could be traced back to the Assistant Bosun who was sleeping in his cabin when the order to "Harbor Stations" was given. He slept through the order that should have cued him to go close the bow doors. The ferry embarked for Dover with the doors open, which allowed water to breach the ship. The design of the ship allowed for the water to freely move from one end of the ship to the other, allowing for water hammer to yield violent turbulence to the point that the ship capsized and sank.

It looks as though a simple cause and effect relationship existed between the open bow doors and the sinking of the ship. But a closer look reveals that on at least five other occasions ships from the same company had sailed with their bow doors open without incident (Sheen, 1987, p. 12), begging the question why was this trip different?

Sheen (1987) highlighted several factors that were involved. The water in the harbor at Zeebregge was very shallow (inducing a "squat" effect, p. 68). The berth at Zeebregge was not designed to allow for the simultaneous loading and unloading of passenger cars, and the ramp was too short to reach the upper deck of the HoFE (p. 5). The crew of the HoFE were forced to trim their ship forward by adding weight to the front of the ship in the ballast tanks so the front of the ship would ride low enough in the water to enable the ramp to reach the upper deck (p. 5). The ship was designed for rapid acceleration to maximum speed to minimize travel times for passengers (p 4). The run to Zeebrugge was 4.5 hours longer than the run to Calais, so the company cut the number of Officers due to excess down time the officers were afforded during the longer voyage (p. 5). The estimated weight of passenger cars was calibrated to generate lower weights for passenger cars than the passenger cars actually weighed (p. 5). The ship itself had been modified to the extent that it weighed 102 tons more than it did when it was manufactured (p. 6). As a result, the ship was overloaded and overweight. This ship was designed under merchant class regulations as opposed to passenger class regulations (p. 41). Passenger class regulations require a ship to be constructed in a manner that increases the likelihood that if it sinks, it will do so on an even keel by inhibiting the emergence of water hammer or free flowing water that can flow unrestricted from one end of the ship to the other.

The combination of a heavy merchant class ship with a forward trim in shallow water resulted in a much taller bow wave than the crew was used to. Under normal conditions (boat on even keel, within load limitation specifications, in deeper water) the bow wave usually stayed well below the top of the spade on the front of the ship. In a re-creation of this incident, the bow wave was observed to be 2 meters above the top of the spade and well up the bow doors (p. 7).

In addition, the Master of the ship could not see the bow doors from the bridge, the ship Officer tasked with the responsibility of ensuring the bow doors were closed was caught in a goal conflict that required him to be in two places at the same time.

If the accident investigators subscribed to the simple cause-and-effect linear model of investigation, there is a very real possibility that none of these other factors would have been discovered. But looking to populate a network of influence as opposed to a cause, investigators are able to piece together a broader picture of the event. This broader picture can lead to more options to employ when trying to prevent accidents in the future. Understanding the network of influences and the relationship between the identified nodes on the network allows for a more holistic approach to accident prevention. While the cause-and-effect model might lead one to offer a narrow set of suggestions focused on the Assistant Bosun (such as buying him a louder alarm clock), the network of influence model more easily allows for broader suggestions such as indicator lights on the bridge that communicate to the Master whether the bow doors are closed, faster ballast pumps, a longer ramp, slower acceleration speeds in that harbor, and removable barriers that can be placed on the lower car decks to prevent water hammer.

When looking to populate nodes on a network, diverse opinions become valuable. Finding people who look at the same set of facts but interpret them in different ways increases the likelihood of finding more nodes. Once a new node is found, the group can begin to try to understand the relationships that exist with the rest of the network. Instead of arguments over whose perspective is the "right" one, discussions form over possible ways to integrate the identified nodes.

METHOD

To address my research question – Do staff rides help move the Forest Service toward its goal of becoming a learning organization?– I researched concepts of modern learning theory and conducted before and after focus group sessions of participants of a Forest Service sponsored staff ride based on a case study of an event.

Since the staff ride itself limits the number of participants, it was not feasible to incorporate a sample size large enough to merit a statistically relevant quantitative study. There was only enough time and budget to attend one staff ride for this project. Bearing this in mind, I sought to capture depth as opposed to breadth in this study (Flyvbjerg, 2006). This project is a qualitative analysis due largely to the nature of the staff ride product.

A new staff ride was designed by the Forest Service and a contractor hired by the Forest Service that was centered on a case study of the Battle of the Big Hole. This battle occurred between the US Army and the Nez Perce Indian tribe in 1877. Participants were invited by the staff ride organizers to take part in the preliminary run of this staff ride. Each participant was contacted several weeks prior to the scheduled staff ride and was provided with preliminary study materials consisting of a written report and a briefing sheet that provided background information about the battle and about the staff ride itself. Participants travelled to the town nearest to the battle field and stayed either in motels or Park Service owned housing. The first morning of the staff ride included introductions, a film viewing, a logistical briefing, and area orientation. The first focus group session occurred after lunch. Immediately after the focus group session, participants participated in a presentation that aimed to re-enforce the preliminary study materials and set the stage for the site visit on the following day.

On the day of the site visit, participants were given a field journal with a set of specific questions to answer during the site visit and were split into two groups. One group studied the events of the battle from the perspective of the Army and spent half the day on the side of the river the Army was on when the attack was initiated. The other group studied the events of the day from the perspective of the Nez Perce (also known as the Nimi'ipuu) and spent half the day on the side of the river that the Indians were on when the battle commenced. After lunch the two groups switched locations and focused their study on the opposite party of the battle. Then dinner was served and participants were encouraged to talk about the events of the day with their peers. After dinner the staff ride concluded with the integration phase of the staff ride where each participant was asked to sum up in about a minute what they thought the take home message of the staff ride was. After the integration phase, participants were asked if they would volunteer to attend a second focus group session.

All 19 staff ride participants and all six members of the staff ride cadre participated in the before-focus-group session. The after-focus-group session included twelve staff ride participants and five cadre members.

I tried to discover how the staff ride attendees viewed this battle before, during and after being exposed to the different learning products. Both focus group participants were asked the following six questions:

- What ways do people learn?
- What do you expect to learn from this staff ride?
- What are your assumptions at this point
- What conditions influenced the Nimi'ipuu (Nez Perce)?

- What conditions influenced the Army?
- What effect does survival anxiety have on learning?

During the course of discussion in the second focus group session, an additional four questions were asked:

- What is it about the staff ride that makes it such a popular product?
- How does the staff ride learning product compare with the written report?
- How much does the physical site visit impact learning?
- How did the use of journals during the site visit impact your learning?

The focus group sessions were recorded and later transcribed. All participants signed and informed consent form that explained the nature of the research and were given opportunities to ask any questions they might have.

After the staff ride was over, the staff ride cadre contacted all participants via e-mail and were asked to participate in a course evaluation. Sixteen of the 19 participants responded to the anonymous evaluation.

To evaluate individual learning, answers to these questions were analyzed against current scientific literature as outlined in the literature review section of this paper. I looked for examples of learning situations that involved different learning styles and methods. I wanted to see if participants of this staff ride used learning styles as a means of communicating perceived learning preferences to instructors to aid in clarifying expectations. I also tried to create or outline learning opportunities and possibilities within the staff ride learning product that were consistent with the different learning styles identified within the literature. I looked for examples of these opportunities and possibilities in the data collected from focus groups. My initial thought going into this project was to determine which learning style metric was most applicable to wildland fire personnel. After conducting my literature review, it seemed more appropriate to try to ensure instruction methods allowed for accounting for a wide range of learning style metrics. My literature review led me to conclude that matching employees to learning styles was not the answer, rather creating learning environments that are capable of teaching people how to acquire knowledge for themselves was a much better use of time (McDaniel, 2007).

Comments and observations about the effectiveness of the training were contrasted with and analyzed according to the different learning styles highlighted in the literature review to determine which styles were important to the focus group participants, and, perhaps, glean more ideas about how to improve the design of the staff ride.

To evaluate learning, I compared the before and after survey questions and looked for differences between the answers (e.g. differences in vocabulary used, emphasis on cause vs. emphasis on conditions, etc.) I also used a difference in the use of common vocabulary between before and after focus groups. A specific example of a noticeable shift away from the term "cause" and a noticeable shift toward the phrase "conditions that influenced or supported decisions and actions" or the terms "influenced", "context", "complexity", or "conditions". I used this criteria as a means of implementing Dekker's (2006) notion of the view from within the tunnel and Schien's (1996a) notion that conflicting cultures within an organization representing barriers to learning. If it could be shown that the existing individual cultures within the Forest Service had migrated away from pointing fingers at other cultures and labeling them the 'cause' of an event, and migrated toward making an effort to understand how conditions, context, and complexity influence other cultures in decision making, that would indicate instances of learning, and according to the research result in a reduction in the number of accidents. Participants that are quoted in this paper were given an identifier to allow the reader the ability to decipher the level participation of each of the quoted informants while preserving their anonymity.

RESULTS

The transcriptions were analyzed and distilled down to 5 themes. The first theme was centered on the difficulty of replicating the effects of the site visit. The second theme concerned the use of multimedia to improve written reports. The third theme focused on factors that make staff rides successful. The fourth theme focused on how survival anxiety can translate to increased reflection, the impact of reflection on the learning process, and how effective a combination of reflection and focused dialogue can be in increasing insight and understanding. The fifth theme was formulated around the lack of follow-through with regard to lesson implementation.

Theme 1: The Affect of the Site Visit

The focus groups were in strong agreement that physically visiting the site added much value to the experience. Factors such as physical scale and distance; an emotional, reverent, respectful connection to the actual ground on which they were walking; passionate, emotional, intense face to face interaction with staff ride presenters and other staff ride participants; and the subconscious effects of being on-site were all thought to be very difficult to reproduce in any other setting. Participant A said:

> …every staff ride, including this one, that I've ever been on I've been surprised by scale and distance, and how small the actual incident took place in. You can't get that from photos, books, video … That sense of scale, they were right here and what they were dealing with was right there. Standing right there makes that discussion with everybody with that exact same perspective of what the scale was and where people were … I think that enables it to be as rich as it is when you walk the ground.

The site visit made a significant impact to this informant. When reading about the event, his interpretation of the written text changed dramatically when he visited the site. The mental image of the physical scale of the event was shattered when compared to the actual scale. This surprise and rectification was directly attributable to visiting the physical location of the event.

Participant B put it this way:

> [Staff rides are] about as close as you can to doing it without doing it. It's more than just seeing it, to be able to stand there and know that there is blood in it … Looking back you can envision the warrior heading off to the knoll over here where the monument is in the gun fire. You can never get that I don't care how good a video you have really. To be able to look as we're talking about something, to look … How high is that hill? How many horses could fit over there? How hard would it have been to come around it, completely encircle this place, then we could get away. Those things…your mind can race…you could never do [that] without actually being here.

The site visit seems to have made it easier for this informant to see the situation from inside the Dekkarian tunnel (Dekker, 2006). The physical topography and the capacity of the available horse pasture seems to have helped this informant connect with the event being studied in an emotional way (Richter & Levin, 2003). As stated previously research suggests emotion serves to tag certain events as important and stores emotional events differently in long term memory, resulting in greater capacity to recall emotionally tagged memories into the future.

Participants also mentioned the respect and reverence that comes with visiting a location where a tragedy happened. Participant K captured the sentiment this way:

> …here it definitely felt like there was a special place and there was a reverence and there was a respect that everybody gave the whole exercise, I think because of the place. It felt like everyone involved was taking it really seriously; I don't think you could get that from a video.

There was a common theme among the participants that the site visit added an emotional component to the learning product that would be tough to replicate any other way. There was some discussion among the staff ride cadre to schedule the staff ride so that it would coincide with an annual ritual the Nez Perce tribe conducts to memorialize their ancestors that died in that battle. The thought was that rescheduling to this timeframe may aid the participants in making an even stronger emotional connection with the event.

Theme 2: The Use of Multimedia

When the conversation shifted to identify ways to improve the written report, there was a strong consensus that quality digital media products could vastly improve both stand-alone written reports and the traditional preliminary study phase (written report, pre-reading section) of the staff ride learning product. Factors such as multimedia is more engaging, a richer experience, and easier to convey emotion were all highlighted. Participants stated that multimedia products would make stand-alone reports and the preliminary phase more memorable. They also discussed the idea that the younger generation of employees seem to identify better with that style of presenting information. Participants seemed to be in broad agreement that a multimedia approach to the preliminary phase would lead to deeper learning.

> I think there is a trade-off too. I think I agree with everybody in terms of the power of being at a place. You can't replicate that, but at the same time I think some of the ideas that come from discussions such as the ones we've had over the last day or so. I think you can reach a wider more diverse audience through a medium such as video. So I think there is a trade-off there, are they going get the full experience like we are? [Non-verbal cues indicated his answer to this question was no.] Are they going to take away stuff that's going to be meaningful for their learning process and developing leadership within in their own infrastructure? I think that's possible (Participant H).

> I think you can get at least a way there by … Let's say we have a high quality digital product…and you could get some of that magic by having dialogue around it. We learned together by interacting and having conversation and to I believe could a dialogue group have a … Instead of going to stands, they have a video segment that's the stand, not as good, but maybe good enough to get to the masses (Participant J).

Participant D stated:

> I think multi-media approach would help. It's going to be a more rich experience, and maybe more engaging and allow for somewhat deeper learning to take place than just a written report. Even the written stuff, more pictures, more maps. One thing that I suggest for this staff ride is more maps and pictures would help for that understanding of what's going on. Again a richer experience.

There was broad consensus that the multimedia products should strive to connect with its intended audience on an emotional level.

The concept of multimedia reports became a major topic when the participants focused on how best to design learning products for the next generation of Forest Service employees:

> Let me interject something here, I'm going to look at the obvious. How many 18 year olds do we have in here, how many 17 year olds do we have? We've got to

> build a staff ride for the future, how do they learn from multi-media? What do they need? How many 25 year olds do we have? We don't have that many in here (Participant E).
>
> Again it's how people learn and the generation coming behind us, my kids learned differently and my grandkids are learning differently. So how do we enrich their mind and meet them where they're at going into the future? I think that's your challenge (Participant E).

There seemed to be broad consensus among the group that multimedia products connected with the younger generation much better than written reports do, but more work was needed to determine the best way to structure the multimedia products in an effort to get better results and higher levels of information transfer. Throughout the second focus group session participants compared and contrasted being on site against a virtual presentation or a written report 25 different times.

Theme 3: Factors that Make Staff Rides Successful

Regardless of the delivery mechanism (written report vs. facilitated site visit), there was broad consensus (I interpreted a lack of verbalized conflicting views as consensus) that staff rides are the most successful when they focus on social interaction; diversity of attendees; peer engagement; emotional content; respectful, focused dialogue; differing perspectives; an in-depth look at conditions and context; making personal connections; challenging of assumptions (i.e. internal conflict); reflection; an effort to personalize the situation; and a focus on telling the story from different perspectives as opposed to trying to distill the event down to one cohesive narrative.

With regard to the importance of face-to-face interaction, Participant F put it this way:

> You think about why did the military start doing staff rides in the first place and what was a staff ride originally? It was a command general staff that was going to have to function together as a unit, and in order to improve their communication skills, their understanding of each other's styles, and all those other kinds of things, in addition to learning about history and how things have been done in that particular engagement.

There was a sense within the group that participants should be strategically chosen to attend a staff ride together.

Staff rides can influence people in a way that makes them more open-minded. Participant D stated it this way:

> …this is my fifth staff ride and I've had pretty good understandings of every staff ride I've gone to before going through with the preliminary study. The important quantum leap that happens for me on a staff ride is; I really understand the conditions, I can see me doing that given those conditions. That's the huge thing that happens to me during the field study… Being on the ground and talking together and really chewing on this together, on staff rides for me that's what happens is; Wow I can see myself doing that and that's not always good. Sometimes there's bad things that happen when you do something, Mann Gulch [a tragedy fire] for instance, if exactly seeing the logic and putting … I can see myself doing that in those conditions.

Here is an example of an informant explicitly stating that the site visit with peers really helps to understand the conditions from the historical participants' perspective. He is really able to identify with what the people he is studying went through in a way that was not available to him after the preliminary study phase.

Participant D also said,

> What's cool about that now, is when I read reports, when I read a Yarnell [a tragedy fire] report or something like that, I'm hesitant to rush the judgment because I've had enough of this experience now, a personalizing experience where … Well I can see myself doing that even. So I think that's the value of the staff ride, it opens you up to actually being able to personalize it. To be able to see yourself in that and learn from that and not rush the judgment and have it all figured out.

This statement seems to imply that written reports may become more valuable to a person once he or she has been exposed to the staff ride experience. Where before he used to rush to judgment while reading a report, now that he has been exposed to staff rides he is able to get more out of the report because staff rides have made him less judgmental.

Participant I, who has studied this event extensively in the past, noted how much more powerful the dialogue session can be compared to just reading about an event[1].

> I think in a place like this, you can read and read it but unless you actually come out here and especially the situation like this where you're talking intensely about what happened and getting that perspective…limited perspective from the people that were here and reflecting back on it. As well as what the Nez Perce and the Park Service say about this now, what it still means to them…My understanding of this is much better than it's been. I've read about this a dozen times and I didn't really understand exactly what happened. While I might not have a perfect understanding of why all of the decisions were made, I have a much clearer understanding of what happened now.

The dialogue he was exposed to during this event gave him a much greater understanding than what he had previously obtained through extensive self-study.

There was a lot of overlap between the theme centered on "Factors that make the Staff Ride Successful" and the theme centered on "The Impact of Reflection." There was broad consensus within the focus group that people who were worried about their survival tended to reflect more on incidents than those who were not worried about survival.

Theme 4: Impact of Reflection

The instructors of the staff ride stated that the real strength of the experience was the built-in opportunity to reflect. As people reflect on what other participants in the dialogue session are saying, they come up with ideas and concepts that had not occurred to them before. This staff ride took place on a National Park Service owned battlefield. Employees stationed at this particular battlefield commented that they saw things in a new light after the dialogue sessions, even though they spend the majority of their work time talking extensively about this particular battle[2]. This reflection may take place during the staff ride, or even after the staff ride has concluded and participants later reflect back on the experiences and discussion that occurred during the staff ride.

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[1] The staff ride is a unique environment where participants who are otherwise very familiar with the events of a story are placed in a group dialogue session, long held perspectives can change in ways that may not be available in isolated reflection without the aid of the differing perspectives of the group.

[2] See the above footnote.

Participant G, a Park Service employee stationed at this battlefield, stated.

> Some of the way people…some of the dialogue that it brought up and some of the ways that folks look at it differently. It was ways that I had never really thought about that before, it was very enlightening, so I appreciate that.

There is something about a focused dialogue session that brings about new ideas and viewpoints. On the flip side, there was at least one participant (Participant M) that found the real-time nature of the reflection process to be too fast paced. This individual felt that more time was needed to absorb the information and process it before it could be digested to a point where the dialogue would begin to flow well enough to engage in meaningful conversation.

The concept of survival anxiety brought about rich discussion in both focus group sessions. In both sessions the concept of reflection seemed to be closely tied to survival anxiety. The group discussed the idea that the greater survival anxiety you experience, the more you reflect on events after they pass. And reflection was viewed as being key to learning. They also discussed the idea that survival anxiety influences people to be less resistant to change.

Participant L put it his way:

> I think there is a lot of reflection when you're in those situations. There may be actually more learning that just takes a while. You spend a lot of time contemplating it and revisiting it. It's probably biased reflection. It is such an important aspect that I think there is a lot of consideration and maybe learning, but it may be erroneous.

Participant A stated:

> It's more reactive while it's happening. It's important to reflect on it afterwards if you want to learn from it. You got to learn something just by going through the experience. I think the more you reflect afterwards and think back what you did and try to focus your training and your learning to: if I'm in that situation again, how can I react in a better way?...Those lessons that are learned under that survival anxiety, those are the lessons that I think are deeply learned and easily recognized when you face those same conditions again

There was also some discussion about how easy or difficult it is to change a mental model that has been forged during an event that induced survival anxiety. While Participant A (above) reflected on uncertainty in the face of extinction, Participant D (below) reflects on using past performance to predict future outcomes:

> I'm just speculating that we may learn things from certain situations. The Civil War for instance, these army folks who had been veterans of the Civil War may be still continuing to carry certain models in their mind that they learned from hard, hard experiences that they're having a difficult time as individuals seeing this is a whole new situation. It's actually requiring of them a whole different way of looking at it, of making sense of it.

This line of thinking raising interesting questions concerning whether it takes a survival anxiety event to rattle you enough to change a mental model forged in a previous survival anxiety event. If these events induce more reflection and permanent change, what happens when someone is exposed to a whole new set of circumstances? How do you unlearn lessons forged from survival anxiety that no longer apply to the current situation? These are questions that must be answered in order to move the Forest Service to a more complete example of a learning organization.

Theme 5: Lack of Follow-through

With respect to whether staff rides help contribute to a learning organization, participants voiced some concerns. Participants offered up reasons why the Forest Service may fall short of the title of learning organization.

There were some comments concerning follow-through with respect to implementation. Comments such as "We are really good at admiring the lessons that we've learned. But not making the changes to prevent those lessons from happening again for those same incidents" (participant A) and "[I was] expecting to come away from this with exactly who was to blame and that obviously didn't happen. I have more questions going away than I did coming, which I think is a good thing" (participant K) are examples of people learning lessons, but not having concrete ideas of how to improve the safety of those who work for the Forest Service into the future.

The relative size of the organization was cited as a reason why lessons don't get implemented. Participant C felt that government organizations have a harder time than private sector organizations of the same size. "The organizations we deal with [government] struggle with [adapting]. There are other organizations that adapt very quickly." When asked what the difference between government and private sector organizations is, Participant C responded, "Part of it is the drive of how you survive." There was some overlap discussion between the theme that centered on "Lack of Follow-through" and the theme that centered on "Impact of Reflection."

DISCUSSION

Analysis of the focus group conversations showed that staff rides can be effective at helping participants gain a better understanding of the conditions that affected decisions and actions. The initial focus group conversation (the one that took place after the preliminary study phase of the staff ride) included a discussion of conditions highlighted by the reading. Group discussion proved to be valuable as different participants brought up different conditions of influence. This discussion served to help solidify the material covered in the pre-reading document, as discussion occurred about some conditions that were caught by some participants, but missed by others. In other words, group discussion was more successful in identifying nodes on the network of influence than individual study.

Discussions from the second focus group tended to highlight conditions that were not captured in the pre-reading, but that were captured during discussions during the actual site visit. People from various backgrounds interacted during the site visit, and the multiple perspectives of members of the group proved to be very thought provoking to the collective group during group sense making sessions.

One metric that was used to identify learning effectiveness was a change in vocabulary from the use of words aimed at determining blame to the use of words aimed at determining conditions. The most apparent example of this change was articulated by one staff ride participant who stated outright that she came into this staff ride with the intent of deciding who to blame for the outcome, but left with unanswered questions that she would continue to reflect on trying to identify conditions that may have influenced the outcome. She came to a realization that a similar attitude shift in her work life could prove to be very useful in her organization.

When the conversation in the second focus group session turned to the preliminary study (given in the form of a written report), there was a strong feeling that it could be improved. –there was broad consensus that a multimedia based product aimed at conveying emotional appeals was strongly supported. Reasons used to support this conclusion included: that is the medium the younger generation is used to, emotional messages stick with you longer, it is easier to bring conditions to light and focus on them with this format, etc. The participants were mailed a written report to read before they made the trip to the site of the battle. Once they arrived, they were shown a video that covered some of the same information that was included in the reading. The video was well received and was stated to significantly add to the

preliminary study material. While the showing of this video before the site visit may have biased the staff ride participants in favor of multi-media learning product, it also gave them an opportunity to compare and contrast first hand a written report product and a multi-media product covering similar information. This comparison would give them a basis for determining which format they preferred.

Several individuals in the group made the comment that there is a wide gap between the written report and the staff ride. There was strong agreement that there is space for a new learning product to be created to fill the gap between the two existing products (written report and staff ride).

Any attempt to understand how to structure a learning product for the wildland fire community will be more successful if its organizational forces are taken into account. An effort should be made to map the subcultures within the organization, and then try to ensure each subculture is represented during the learning sessions. If respectful dialogue occurs during the learning sessions, and the learners are comprised of a representative sample of the organization, opportunities for a richer and deeper understanding of different perspectives will be much more likely.

Knowles (2011) notion of andragogy may provide a necessary shift in a deeply held assumption concerning the most beneficial way to structure a learning environment by reducing the hierarchical nature of the learning environment. As stated in the literature review, if the instructor views her or his job is to teach people how to identify nodes on the network of influence, the specific nodes identified are not nearly as important as honing the ability to identify nodes in the first place. In a dynamic system, nodes on the network of influence come and go. Learning how to identify nodes should become the focus.

This can result in shared understanding of different perceptions which may lead to the breaking down of organizational barriers. Teachers who view their role as one of facilitation may be in a better position to allow new solutions to emerge from the collective input of all participants of the learning process. Students who have more autonomy and a louder voice in the way the learning environment is structured will be able to address many of the concerns that provided the drive to develop the notion of learning styles in the first place. While there was much discussion about the value of visiting the actual site where a studied event took place, the staff ride was also lauded because of its focus on student participation. This seems to be another factor that could help set the staff ride apart from other learning products and methods within the Forest Service.

This paper suggests the reason staff rides are so highly regarded is because they easily fit within the bounds of the advice research offers regarding designing learning products. Staff rides for example encourage varied perspectives and viewpoints, offer a high resolution "view from inside the tunnel" (Dekker, 2006), encourage group dialogue, and by respecting and promoting the use of student backgrounds and experience can lead to discovering more nodes on the network of influence.

Historically, staff rides have exclusively been conducted on tragedy incidents. Using tragedy events arguably encourages us to draw counter-factual conclusions. The Forest Service needs a new metric that spurs the initiation of the staff ride process, something to the tune of "acres burned in a single burn period."[3] If we gathered intensive data of all fires that burned in an explosive way, we would have a better picture of how intense fire behavior is dealt with. The Forest Service would less likely be limited to implementing counter-factual fixes, but would be cultivating a nursery to grow and implement proven solutions that are field tested. However, with that being said, tragedy fires may induce participants to achieve an unfrozen state as feelings of survival anxiety may more readily surface within the participants.

One critique of the staff ride is that it is very expensive to conduct (compared to the written report), laborious to organize, and is not scalable (that is, it is largely limited to a small number of participants). To reach a larger audience, and to incorporate ideas put forward by Wilson (2002)—(adaptive unconscious

[3] Burn periods are broken up by diurnal patterns, but do not necessarily adhere to night and day delineations, e.g. some fires burn all night long, but most of the time a burn period lasts less than 24 hours and can be as short as a couple of hours depending on the ambient conditions.

pattern recognition), Schein & Lewin, (Scanning and survival anxiety) and Kolb & Elkind (Integration); further research should be initiated to explore the concept of a virtual learning product that incorporates some kind of simulator or video game aspect to it as a way to implement Wilson's (2002) findings (unconscious pattern recognition).

Survival anxiety and scanning (a process by which individuals learn by trial and error) can be more easily emulated in a game environment. Research suggests that dialogue sessions should be conducted between game playing sessions so that learners have the ability to share success stories and strategies among themselves (this adds a social aspect to the learning environment which is also supported by the research as a strength). The game could be based on and continually updated with past fire scenarios based on real-world tragedy fires, or fires that burned very intensely. Having firefighters inductively create potentially hazardous conditions that are challenging to identify could lead to fine-tuning the skills necessary to predict and prevent unintended outcomes in the future.

Traditional aspects of firefighting such as LCES (Lookouts, Communications, Escape Routes, and Safety Zones), the downhill checklist, and others could be incorporated into the game strategy. If any of these items are neglected, the probability of beating the game is dramatically decreased. A facilitator should be given access to the game results so they can search for common themes of unsuccessful attempts. Once a theme is identified, it can be highlighted during the next dialogue session.

CONCLUSIONS

Staff rides are highly valued learning products, and could contribute to the Forest Service's mission to become a learning organization. Staff rides can easily be structured to conform to most of the suggested elements of a learning product. A glaring exception is Wilson's (2002) notion of the Adaptive Unconscious's ability to recognize repeated patterns.

A surprising conclusion is that it seems more important to incorporate teaching styles that account for a wide variety of learning styles than it is to figure out the learning style preferences of the students. Research shows that accounting and allowing for a wide variety of learning styles within a presentation is more effective than tailoring a presentation to the self-described learning preferences of the students in the class. In short, informants in socially complex contexts may not necessarily be the best judges of what works for them.

While staff rides are effective, they are expensive and are not scalable. There is also a perceived gap between the traditional written report and the staff ride. The Forest Service can make progress toward its goal of becoming a learning organization by closing this gap through designing learning products that aim to replicate the emotional and intellectual impact of the staff ride to a much wider audience.

During the focus group sessions a fair amount of dialogue centered on the idea of what Lewin calls refreezing. There was a consensus that while we do a good job of identifying lessons to learn, we don't do as good a job of actually following through with organizational change. More research could be done to better identify what it takes to successfully refreeze organizationally after learning a lesson on an individual level.

Human systems can be viewed through the lens of Complex Adaptive Systems (CAS). CAS theory suggests that knowledge transfer should not be the highest priority, but rather focusing on teaching people to learn how to learn will yield better results. Linear cause and effect models inhibit learning through ruling out a network of influencing factors in favor of the pursuit of a root cause.

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