Education in ecotourism: Instructional strategies that can promote pro-environmental learning outcomes

By

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Abstract

Ecotourism is a form of tourism that takes place in natural areas and should benefit both the local social and ecological environment. Additionally, some form of visitor learning is widely accepted as an integral aspect of a true ecotourism experience. During a time in which many environmentally detrimental industries exist, ecotourism is promoted as an environmentally sustainable industry. Though previous research regarding the actual environmental impacts of ecotourism have yielded both positive and negative results, the potential for ecotourism to positively impact our natural environment is undoubted. One way to positively impact the natural world through ecotourism is to use education to promote pro-environmental learning outcomes in participants. Because visitor learning is an essential element in ecotourism, education has been researched extensively within ecotourism contexts. However, specific instructional strategies that can facilitate pro-environmental learning outcomes during ecotourism experiences have not yet been analyzed. This study examines findings from previous literature that identify elements of ecotourism experiences that promote pro-environmental learning and analyzes specific instructional strategies that can facilitate such elements. The instructional strategies analyzed in this paper are metacognition, conceptual change, photo elicitation, and service learning. Several educational and behavioral theoretical frameworks are used in the analysis of these instructional strategies as they relate to ecotourism – Ajzen's Theory of Planned Behavior, Kolb's Experiential Learning Cycle, and the Contextual Model of Learning. Findings will allow ecotourism operators to benefit local environments by using these four instructional strategies to promote pro-environmental learning outcomes in ecotourism participants.

<div align="center">**Acknowledgements**</div>

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Chapter 1

Introduction

The environment is being degraded at an alarming rate across the world. If current trends

continue, 440 mammalian carnivores and ungulate species are predicted to decline in abundance

by 18-35% by the year 2050 (Visconti et al., 2016). Indicators of the state of biodiversity

continue to decline, while indicators of pressures on biodiversity continue to increase (Butchart

et al., 2010). As such, it is becoming increasingly important to identify and utilize industries that

have the potential to combat such degradation. Ecotourism is believed to be an environmentally

sustainable industry, and one that can assist in influencing its participants to have more

environmentally conscious beliefs, attitudes, knowledge, behavioral intentions and behaviors

(Ballantyne et al., 2009). Though the impact of ecotourism has not always been identified as

environmentally positive, the potential to have a positive impact is undoubted, and ecotourism

experiences can be designed such that they increase positive impacts and mitigate negative

impacts. There are a variety of different tools and aspects of an ecotourism experience that have

the potential to increase environmentally positive impacts. Specifically, one of the tools that can

be used to influence people during an ecotourism experience, and in turn increase positive

environmental impacts, is education.

Tourism and ecotourism background

Though the size of the tourism industry is difficult to accurately measure, the tourism

industry is considered to be the sixth largest industry in the world, and the largest service

industry in the world (Lew, 2011). With millions of annual travelers bringing in hundreds of

billions of dollars, the industry has a large role in the economy of many countries. Ecotourism is

a specific segment of the tourism industry, and one that has been growing rapidly over the last

few decades. Ecotourism's origins date back to the mid 1960s, when academic Nick Hetzer first referenced 'ecological tourism', or ecotourism (Weaver, 2001b). Hetzer identified four principles of ecotourism; (a) minimizing environmental impacts, (b) respecting host cultures, (c) maximizing benefits to local people, (d) maximizing tourist satisfaction (Weaver, 2001b). As the environmental movement grew in the 1970s and 80s, so did a dissatisfaction with mass tourism (Weaver, 2001b). Hector Ceballos-Lascurain is widely credited with first formally defining ecotourism in 1983 as traveling to remote and undeveloped areas with a focus on education about the ecology and culture of the area (Kiper, 2013). Today, a common (shared) definition of ecotourism is still debated, though most definitions of ecotourism include the idea that ecotourism is centered around experiences in nature, is sustainable to both the local environment and the local community, and involves some form of visitor learning (Coles et al., 2015; Hughes, 2013; Hvengaard, 2011; Tisdell & Wilson, 2005).

Ecotourism impacts

Ecotourism impacts have been researched in great detail. As a form of tourism centered around natural settings and environments, advocates of ecotourism promote it as an industry that has the means to engender pro-environmental outcomes in its ever-growing number of participants. However, many question the idea that ecotourism is indeed beneficial, both environmentally and economically, citing many examples of environmental harm caused by ecotourism (Banerjee, 2010; Russell, 1994; Stronza et al., 2019). Research on economic impacts on the local community, and environmental impacts on the local environment have shown a variety of results. Many negative impacts have been identified, both from an economic standpoint and from an environmental standpoint, including deforestation of habitat to build tourism infrastructure, increased trash, and negative impacts to wildlife (Banerjee, 2010;

Hvengaard, 2011; Russell, 1994; Stronza et al., 2019). One of the goals of ecotourism is to benefit local people and communities. The idea is to provide opportunity for employment and economic gain for local people, often in rural communities (Das & Chatterjee, 2015). Ecotourism also attempts to put a more tangible value on ecosystems (Isaacs, 2000). The belief is that seeing economic gain from intact ecosystems will incentivize people and communities to protect important habitat. However, the efficacy of this has proved uncertain, and many do not see economically incentivizing protecting habitat as a long-term solution. The actual economic gain of local people in the local communities has also been called into question (Das & Chaterjee, 2015; Hvengaard, 2011; Isaacs, 2000).

Environmentally speaking, ecotourism's actual impact again brings debate. Ecotourism does have potential conservation benefits; however, ecotourism can also have negative impacts such as habitat destruction, negative impacts on wildlife behavior and ability to reproduce, increased degradation of natural environments (i.e. littering and trash), spreading of human disease to wildlife, and more (Hvengaard, 2011; Russell, 1994). Because one of the goals of ecotourism is environmental sustainability, previous research has considered how these negative impacts could be avoided (Stronza et al., 2019).

Solutions to unintended consequences

Many people believe that properly managed ecotourism can bring more positive impacts to the environment and can minimize the negative impacts (Coles et al., 2015; Hvengaard, 2011; Kimmel, 1999). Research has identified a variety of aspects that can lead to increasing environmentally positive impacts. These include protection of habitat for ecotourism purposes, encouraging visitors to make monetary donations to conservation goals, influencing visitors beliefs, attitudes, and behaviors, and influencing local people's mindsets towards conservation

and protection of natural areas (Ballantyne et al., 2009; Kimmell, 1999; Powell & Ham, 2008; Stronza et al., 2019).

Influencing participants has a large potential to increase positive environmental impacts and minimize negative impacts. By conveying conservation-based messages, ecotourism experiences can ultimately lead to a change in the environmental beliefs, knowledge, attitudes, and behaviors of participants (Ballantyne et al., 2009; Hvengaard, 2011; Powell & Ham, 2008). It is widely accepted that visitor learning and education are an integral aspect of ecotourism, and ecotourism participants see education within the context of their ecotourism experience as enhancing the experience, rather than detracting (Ballantyne et al., 2009; Hughes, 2013; Tisdell et al., 2005). Education is often referenced as a tool that can be used to promote the adoption of pro-environmental qualities in ecotourism participants. As such, education has been researched extensively in an ecotourism setting, and different educational theories have been applied to ecotourism by researchers (Ballantyne & Packer, 2011; Ballantyne et al., 2011a; Ballantyne et al., 2011b.; Coles et al., 2015; Walter, 2013).

Ecotourism is a form of *free-choice* environmental learning, the goals of which have been stated as trying to promote conservation awareness and environmentally sustainable behaviors (Ballantyne & Packer, 2011). Visitors identify some form of learning and education as a primary reason for participating, making ecotourism a self-selected learning opportunity for participants (Ballantyne & Packer, 2011). Ecotourism is also considered a related field to environmental and experiential education (Barnes, 2013). It is largely considered within the field of environmental education that experiences in ones' natural environment are a necessary component to environmental learning, and to understanding the interconnected nature of the natural world (Barnes, 2013). Given that ecotourism provides unique, memorable, and fascinating experiences

with the natural environment, the potential to impact participants through education in an ecotourism setting is evident, and ecotourism is well placed to promote pro-environmental learning outcomes in participants (Ballantyne et al., 2011a).

Because of the opportunity to deliver environmental education within an ecotourism context, researchers have examined education as a potential tool to increase positive environmental impacts (Rattan et al., 2012). Different aspects of ecotourism experiences have been identified as predictors of environmental learning, such as guiding, interpretation, pre-visit participant motivations, marketing strategies, reflection and emotional connection, and post-visit action resources (Ballantyne & Packer, 2011). Empirical data has been gathered on participants' short-term learning in terms of pro-environmental beliefs, knowledge, attitudes, and behavioral intentions (Ardoin et al., 2015). The collection of empirical data has proven to be more difficult to collect on long-term outcomes and actual behaviors, as opposed to behavioral intentions. However, some research has collected data on this information (Ballantyne & Packer, 2011).

Statement of the problem

Although ecotourism has the potential to positively impact the environment, and positively influence participants' pro-environmental attitudes, knowledge, beliefs, behavioral intentions, and behaviors, previous research shows that this is not always the case. Research has also shown that ecotourism has the potentially to negatively impact the environment as well (Banerjee, 2010; Hvengaard, 2011; Russell, 1994). Because of this, there has been much research that attempts to identify how to mitigate negative impacts, and promote positive impacts (Ballantyne et al., 2011a; Coles et al., 2015; Hvengaard, 2011; Kimmel 1999; Powell & Ham, 2008). Several elements of an ecotourism experience have been identified as tools to potentially increase positive impacts. One important element to mitigate negative impacts and increase

positive impacts is education. Participants of ecotourism experiences expect and desire some form of visitor learning. With a growing number of participants across the globe, if pro-environmental learning outcomes can be attained by these participants, the positive impact environmentally has the potential to be quite large.

Education has been examined as a tool to increase positive impacts, with several educational elements identified as increasing positive environmental impacts. These include promoting emotional engagement and reflection, challenging participant conceptions, providing on site opportunities to engage in conservation practices, allowing visitors to control their own learning experience, and strategically designed interpretation and communication techniques (Ballantyne & Packer, 2005; Kimmel, 1999; Powell & Ham, 2008). However, specific instructional strategies that can be applied to ecotourism settings to promote identified aspects of an ecotourism experience that have positive environmental results have not been examined and analyzed.

Purpose and Theoretical Framework

Education within ecotourism has the potential to reach a large audience in a rapidly growing industry, and can be a powerful tool in promoting pro-environmental learning outcomes, which will be defined in Chapter 2. Education is considered to be a primary component of an ecotourism experience; however, specific instructional strategies to promote pro-environmental learning outcomes have not been examined in an ecotourism setting. Specific instructional strategies have the potential to effectively promote and facilitate elements of an ecotourism experience identified as creating pro-environmental outcomes. In Chapter 2, an extensive literature review will provide necessary background information on the tourism industry, ecotourism, education in an ecotourism context, and relevant instructional strategies. In Chapter

3, Ajzen's (1985) Theory of Planned Behavior, Kolb's (1984) Experiential Learning Cycle, and the Falk and Dierking's (2004) Contextual Model of Learning will provide the theoretical lens to analyze instructional strategies in ecotourism settings. Ajzen's Theory of Planned Behavior has been used often in research on education in ecotourism settings (Ballantyne & Packer, 2005; Powell & Ham, 2008; Walter, 2013). This theory views learning as a behavior change, explaining behavior change through three different kinds of beliefs; behavioral, normative, and control beliefs. Kolb's Experiential Learning Cycle has also provided the theoretical lens for previous research on education in ecotourism (Ballantyne et al., 2011b; Walter, 2013; Walter & Reimer, 2012). Kolb's Experiential Learning Cycle is a model that explains learning through four cyclical steps; concrete experience, reflective observation, abstract conceptualization, and active experimentation. The Contextual Model of Learning explains learning specifically within free-choice learning settings through three contexts; the personal, sociocultural, and physical contexts. Using these theoretical lenses, the purpose of this paper is to further inform how education can be used to promote pro-environmental outcomes through specific instructional strategies in ecotourism settings. As such, this research project is guided by the following research question: According to the literature, what instructional strategies can be effectively applied to promote pro-environmental learning outcomes in ecotourism settings?

Chapter 2

Ecotourism in Context

In this chapter, I will provide the methods that I used for obtaining articles for the extensive literature review related to education and instructional strategies in ecotourism. This chapter will also discuss the definition of ecotourism, and present a working definition for the context of this paper. An examination of the tourism industry as a whole, as well as the ecotourism sector specifically is presented. A review of the demographics and general background information about ecotourism participants is provided, as is a list of the different types of tourism activities that are considered ecotourism in the context of this paper. A review of previous research on the positive and negative impacts of ecotourism is evaluated. Elements and aspects that have been shown to promote pro-environmental participant outcomes (outcomes that result in participants having more environmentally conscious beliefs, attitudes, knowledge, behavioral intentions, and behaviors), both in ecotourism settings and beyond ecotourism settings are listed. Potential issues of data collection methods are considered within previous ecotourism research. A discussion of education in ecotourism, both as a tool to promote pro-environmental participant outcomes, and the application of educational theories to ecotourism settings, lays the groundwork for the theoretical framework. Background information on specific instructional strategies that can be applied to ecotourism settings is also provided.

Methods

For this paper, an extensive literature review was conducted. I began searching for and gathering peer reviewed articles related to education in ecotourism broadly. I used the educational database ERIC, and Google Scholar searches. I searched for key words such as *ecotourism*, *education*, and *conservation*. As I began to find articles that were relevant to my

topic, I used the literature cited section of those articles to find additional articles, and significantly added to the body of literature that was relevant to my research. For subsequent relevant articles, I looked to see what articles had cited that article. This initial search phase also widened my scope of search terms to include *pro-environmental learning,* and *free choice learning.* Articles focusing on how to promote conservation or pro-environmental outcomes in ecotourism settings, both through education and other aspects, provided a significant amount of material to be reviewed.

To provide further relevant background information, I also searched more broadly for articles regarding the background of tourism generally and ecotourism specifically, which provided information on the growth of the industry and demographics of the participants. I reviewed articles pertaining to the positive and negative impacts of ecotourism, both economically and environmentally, as well as articles pertaining to educational and behavioral theories relevant to ecotourism and free-choice learning settings. These educational theories included *environmental education, experiential learning cycle, experiential education, ecological literacy, theory of planned behavior,* and *contextual model of learning.*

After gathering and evaluating articles consisting of pertinent background information, I searched for literature specifically related to instructional strategies that could be used to promote pro-environmental learning outcomes in an ecotourism setting. I used a specific set of criteria that is discussed in Chapter 3 in order to identify such instructional strategies. To aid in my article searches, I also sought advice from experts in the field, further refining search terms, educational and behavioral theories, and instructional strategies. I sorted articles by their overarching topics, putting them into categories of general tourism and ecotourism industry background, ecotourism economic impacts, ecotourism environmental impacts, education in

ecotourism, educational theory, and instructional strategies. These categorized articles became the basis of my literature review.

Ecotourism definition

Authors and researchers still debate the definition of ecotourism, with a range of definitions existing. Part of the complexity of defining ecotourism is the fact that there are a variety of different tourist experiences that can be considered ecotourism. One of the issues with the debate about the definition, and the existence of a variety of definitions, is that this can facilitate mismanagement of ecotourism experiences (Coles et al., 2015). When considering ecotourism as a whole, though, certain elements are identified as being essential to any variety of ecotourism experiences. These include tourism experiences taking place in, and with a focus on natural areas; tourism that benefits the local community and local environment; and tourism that provides participant learning opportunities (Coles et al., 2015; Hughes, 2013 Hvengaard, 2011; Tisdell et al., 2005).

It is critical to most definitions of ecotourism that ecotourism experiences take place in natural areas, and the natural setting is an essential element. Tisdell et al. (2005) defined ecotourism as being responsible tourism to natural areas. Additionally, Eagles (1999) stated that ecotourism is designed to give people an opportunity to learn about and experience the natural world, in natural areas.

Another defining element of ecotourism is that it should benefit both the local community and the local environment. Ecotourism should promote conservation of the local ecosystem (Hvenegaard, 2011, Tisdell et al., 2005). Isaacs (2000) added that ecotourism promotes minimal human impacts on local natural environments, cultures, and communities. Ecotourism should emphasize creating environmentally and socio-economically sustainable tourism experiences

(Coles et al., 2015). In addition, ecotourism should focus on experiences in nature that centrally include elements of environmental education and sustainability, with management implementing practices that are sustainable to the environment and local community (Hvengaard & Kur, 2010).

Ecotourism definitions also often include an element of participant learning as an essential part of an ecotourism experience (Tisdell et al., 2005). Ecotourism is a form of free-choice learning, defined as learning that occurs when learning is under the choice and control of the learner themselves (Ballantyne et al., 2011b). The role of education in ecotourism was elaborated on by Hughes (2013), who said ecotourism generally includes some form of education and interpretation meant to raise participant awareness and knowledge of environmental issues.

These definitive elements are exemplified by Hvengaard (2011), who stated that ecotourism is defined by appreciating a natural area and learning in natural environments, while being managed to follow sustainable practices, both to the environment and the local community. In the context of this paper, ecotourism is defined by a tourist experience taking place in a natural setting while benefiting local communities and local environments, as well as emphasizing pro-environmental learning for visitors.

Tourism industry background

Exact tourism growth rates, numbers, and economic revenue are up for debate, given the difficulty of standardizing methods across countries. However, it is accepted that the tourism industry is a vast international industry that has been consistently growing, and is now one of the biggest industries in the world, with potential for even more growth (Isaacs, 2000). It is considered the largest service industry in the world, and by some accounts the sixth largest industry in the world (Lew, 2011). In 2006, there were 842 million international travelers, and they spent $645 billion dollars (Lew, 2011). In 2018 there were over 1.4 billion travelling

tourists, and the tourism industry generated over $1.7 trillion worldwide (UNWTO, 2020). Tourism as an industry also showed great resistance in the wake of recent financial crises, with annual growth consistently at 3-4% since 2000 (Coles et al., 2015). Additionally, in 2012 the tourism industry accounted for 1 in 11 jobs (Coles et al., 2015). Although measuring the size of the tourism industry globally has proven difficult, and issues have been raised, there is little doubt that is one of the largest industries in the world. The popularity of traditional tourism has not come without its downsides, however. Tourism puts pressure on natural resources and landscapes, and increases pollution. Tourists themselves can negatively impact the environment simply by trampling natural areas, resulting in loss of organic matter, increased runoff, and accelerated erosion (Sunlu, 2003).

Ecotourism sector background

Ecotourism – a specific form of tourism that takes place in a natural setting, benefits the local community and environment, and that includes visitor learning – has grown in popularity over the last two decades (Rattan et al., 2012). Ecotourism is one of the fastest growing segments of the tourism industry as a whole (Coles et al., 2015). Ecotourism has shown particularly large growth in certain developing countries, becoming a major source of economic income for these countries (Jacobsen and Robles, 1992; Mbaiwa & Stronza, 2009). Countries such as Kenya, Nepal, Ecuador, and New Zealand rely on ecotourism as their most important industry (Eagles, 1999). Despite this, ecotourism destinations are not limited to any countries specifically and exist in both developing and developed countries alike. For example, from 1992 to 2002, the number of wildlife festivals, a particular type of ecotourism experience, grew from 10 to 240 in North America (Hvengaard & Kur, 2010).

Given the size of the tourism industry, ecotourism has the potential to create large scale change, even if only a small percentage of tourists are inclined to adopt new attitudes, beliefs, or behaviors after their experience (Ardoin, 2009). Coupled with the size, growth, and primary goals of ecotourism specifically, ecotourism could have a potentially large influence on conservation ideals and the adoption of pro-environmental outcomes by the many participants around the world.

Varieties of ecotourism

Although ecotourism is a subset of the tourism industry at large, ecotourism on its own is also a large umbrella. Though all ecotourism experiences share the essential elements as listed in the definition, there are many different varieties and forms of ecotourism. Some researchers split ecotourism into two broad categories, hard ecotourism and soft ecotourism. An example of soft ecotourism is a visit to a natural area as part of a longer cruise ship itinerary (Coles et al., 2015). Hard ecotourism consists of a smaller number of visitors, with more intimate experiences in nature, where interacting with the natural world is the primary purpose of a visitors' whole travel experience (Weaver & Lawton, 2007).

Beyond soft and hard ecotourism, there are varieties of ecotourism defined by the specific type of activity being offered. Wildlife tourism is a form of ecotourism in which the primary purpose of the experience is to provide some kind of encounters with wildlife (Ballantyne et al., 2011b). Wildlife tourism experiences can take place in natural wildlife habitat or with captive wildlife, such as wildlife that live in reserves, rescues, or sanctuaries. It is also worth noting that much of the previous research on ecotourism and education has specifically looked at wildlife tourism (Walter, 2013).

Another variety of ecotourism is community-based tourism. Community-based tourism can be defined as visitors paying to visit a place, generally a developing country, and working and assisting in development and conservation goals (Scheyvens, 2002). Additionally, community-based tourism has a focus on both natural and human history, and emphasizes learning about the culture of local and indigenous communities (Walter, 2013).

Adventure ecotourism is another form of ecotourism in which experiences are based around outdoor recreational activities. Adventure ecotourism differs from non eco adventure tourism in that it also has a focus on visitor environmental learning (Walter, 2013).

Volunteer tourism is a form of ecotourism in which paying visitors participate in education and research-oriented activities and services (Coles et al., 2015). Coles et al. believe that volunteer tourism, a form of hard tourism, maximizes benefits to the local community, local natural environment, and to the visitors themselves. The increasing number of volunteer tourism organizations and opportunities worldwide indicate that this segment of the ecotourism industry is growing (Rattan et al., 2012). Regardless of the specific focus or type of activity in a certain type of ecotourism, all varieties should include the primary elements of ecotourism as a whole – sustainable tourism experiences in natural areas that provide benefits to both local environments and local communities, and include visitor learning.

Demographics and background of ecotourism participants

Because ecotourism is a relatively large umbrella, defining who makes up the market, as in, who is an ecotourist, is difficult. Trends differ from hard and soft ecotourism experiences, and wildlife tourism compared to adventure ecotourism, and other varieties of ecotourism. The belief that ecotourists generally have a higher income than other travelers has been refuted by Wight (2001), who states this inconsistency is most likely due to the many different definitions and

varieties of ecotourism that have been presented in the literature. However, there has been some agreement that education levels are high in ecotourists as compared to other travelers (Wight, 2001). Trends also exist within specific varieties of ecotourism. For example, participants of wildlife festival tourism typically have pro-environmental traits, and are generally older, more educated, and more affluent than the average tourist (Hvengaard, 2011).

The number of travelers interested in conservation and aware of environmental issues is growing (Ballantyne et al., 2009), and travelers are also increasingly desiring tourist experiences that provide opportunities for environmental learning, and foster conservation of the natural world (Ballantyne et al., 2011b). This is emphasized by the finding that tourists are more satisfied with their travel experience if learning is included (Orams, 1997). Overall, the number of environmentally and socially conscious travelers has risen (Rattan et al., 2012). Wildlife tourists in particular are becoming more informed, and are seeking new and unique experiences, including experiences that get them closer to wildlife (Hughes, 2013). Studies from Ballantyne et al. (2009) examined participants' support of conservation related elements of an ecotourism experience at Mon Repos Conservation Park in Queensland, Australia. Their research showed that participants place high importance on minimal impact to wildlife, and overwhelmingly support conservation elements of the experience. Similarly, Walter & Reimer (2012) state that not only are ecotourism participants eager to learn during their experience, but often times want to learn in ways that contribute to the sustainable development of local communities and environments.

Impacts of ecotourism

Although the definition of ecotourism states the impact of an ecotourism experience should be beneficial to local environments and communities, the actual impacts have been both

positive and negative. There has been plentiful research done on the actual impacts of ecotourism, both economically, in terms of impact on local communities and regions, and environmentally.

Negative economic impacts. Economically, studies have shown ecotourism experiences do not necessarily provide income and opportunity for local people and communities (Das & Chaterjee, 2015;Hvengaard, 2011; Isaacs, 2000). Ecotourism puts monetary value on intact ecosystems, hence incentivizing intact ecosystems, however some have doubted ecotourism's ability to do this long-term (Isaacs, 2000). Isaacs argues that with the increased incentive to preserve environments and habitat from ecotourism also comes an increase in negative externalities, such as deforestation of habitat to build tourism infrastructure.

The idea that intact ecosystems should be preserved for their economic value is considered unsustainable by multiple authors (Isaacs, 2000; Pegas & Stronza, 2008; Russell, 1994). It is thought to be unsustainable because if economic gain is the only consideration in the preservation of natural habitat, then other more environmentally degrading, yet economically gainful industries would be favored over preservation for ecotourism purposes (Pegas & Stronza, 2008; Russel, 1994). Other research shows many ecotourism operations currently neglect local peoples and communities, and use the idea that their practice benefits the local communities as a form of "false-advertising", to attract more visitors (Das & Chatterjee, 2015). Hvengaard (2011) has also noted that the negative economic impacts of ecotourism are often overlooked, for example tourism raising inflation rates, creating inequitable distribution, and causing instability due to the potential seasonality of ecotourism, political sensitivity, conditions of the ecotourism region, or competing attractions.

Negative environmental impacts. Just as economic impacts of ecotourism have drawn criticism from researchers, so have negative environmental impacts. The negative environmental impacts of ecotourism identified in research include increased trash, increased habitat destruction, frightened animals, decreased animal reproductive rates, and increased infection from human disease (Hvengaard, 2011; Russell, 1994). Individuals of a species may be negatively impacted by recreation from tourism in both the short-term and long-term, for example birds being flushed out of their nesting area as a short-term impact, resulting in a long-term impact of birds altering nesting sites entirely (Hvengaard, 2011). Negative impacts from tourism can even occur at a population level, altering abundance of a species in a particular area that may be heavily trafficked (Hvengaard, 2011). Developing visitor infrastructure in these natural areas can be damaging to the ecosystem and environment. Recent research on the impact of tourism on wildlife stress and physiology show negative impacts (Stronza et al., 2019).

Banerjee (2010) found that current ecotourism operations in India not only have a detrimental impact on wildlife habitat, but also creates hostility between local people and wildlife, as opposed to engendering mutually beneficial relationships. If the existence of ecotourism creates a negative relationship between local people and communities and wildlife and habitat, conservation of such wildlife and habitat is unlikely.

Positive economic impacts. On the other hand, advocates of ecotourism cite many examples of ecotourism providing economic opportunity, and as such promoting the conservation of natural areas. Common economic benefits of ecotourism include local employment, stimulation of industry, diversification, and infrastructure improvements (Hvengaard, 2011). These economic benefits may also result in environmental benefits. For example, elephant habitat in Thailand, primate habitat in the Democratic Republic of the Congo,

and harp seal habitat in Labrador are a few of the cases cited in which the economic benefits of ecotourism have aided in preservation efforts (Issacs, 2000). Hvengaard (2011) stated that although economic gain should not be the sole motivation of ecotourism, economics is an element that can promote preservation of natural areas. Similarly, Walter & Reimer (2012) state that ecotourism can provide income dependent upon a healthy environment and preservation of natural resources, which in turn functions as an incentive for the local community to support and participate in environmental conservation.

A case study in Tortuguera, Costa Rica additionally found that local residents were in support of ecotourism opportunities after participating in a guide training program, due to the economic opportunity it provided them (Jacobsen & Robles, 1992). Jacobsen and Robles found that as a result of this economic opportunity, local residents' motivation to preserve and protect natural ecosystems, rather than harvest the natural resources for other purposes, increased. Similarly, in a case study in the Peruvian Amazon, Gordillo et al. (2008) found that local people receiving economic benefits have more positive attitudes and support for conservation.

In a case study of Operation Wallacea, a volunteer tourism organization that operates programs all over the world, Coles et al. (2015) examine the benefits of such a program to the local community. Coles et al. state that Operation Wallacea initially directly managing the program, but then gradually allowing the top local guides to take over management of the program, creates large economic gain to local communities. In Honduran mountain communities, Operation Wallacea has generated over $250,000. Similar to Jacobsen and Robles' (1992) finding that economic gain and opportunity from ecotourism motivates locals to protect and preserve the environment, Coles et al. (2015) state that the benefits from Operation Wallacea are so evident to local communities that in many cases they actively lobby to protect ecosystems in

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order to ensure Operation Wallacea can continue. While the debate about economic benefits of ecotourism continues, there is little doubt that ecotourism represents a potential for economic gain resulting in benefits to local communities, and preservation of natural areas.

Economic impacts of ecotourism can be categorized as direct impacts, indirect impacts and induced impacts (Hvengaard, 2011). Direct impacts are a result of tourists spending money at local businesses within an ecotourism region. Indirect impacts result from those local businesses then spending that money locally for operations. Induced impacts are a result of employees of the businesses spending the income generated from tourists locally. Though much of the research on economics of ecotourism has focused on direct impacts, a case study of the Hummer/Bird Celebration wildlife festival in Rockport, Texas showed that through indirect and induced impacts, an additional $1.4 million was generated (Hvengaard, 2011). There have been few studies that have examined indirect and induced economic impacts of ecotourism (Hvengaard, 2011). As additional research continues to examine indirect and induced economic impacts, it is possible that the economic impact of ecotourism will increase.

Positive environmental impacts. Though negative environmental impacts are present, some authors (Coles et al., 2015; Hvengaard, 2011; Kimmel 1999) have stated that proper management of ecotourism experiences can promote positive environmental impacts, as well as mitigate environmental harm. Hvengaard (2011) states that in order to properly manage ecotourism experiences so as to maximize positive environmental impacts, the number of participants must not exceed the ecological or social carrying capacity of the region. However, not all ecotourism programs adhere to the ecological carrying capacity of the particular region of operation (Shi et al., 2015). Hvengaard (2011) also calls for properly managed ecotourism experiences to never sacrifice the sustainability of the wildlife and ecosystem for any other

objective, such as economic gain, as all of the benefits of an ecotourism experience depend on wildlife and habitat. Others assert that not all tourism experiences that take place in nature are true ecotourism experiences, designed within the goals of ecotourism. Consequently, many of the negative environmental impacts from tourism are a result of other 'nature based tourism' experiences apart from true ecotourism (Stronza et al., 2019).

Positive environmental impacts through properly managed ecotourism experiences include providing revenue for conservation efforts and drawing attention of visitors to environmental issues and concerns (Ballantyne et al., 2009). Hvengaard (2011) defines five ways that wildlife festivals can potentially benefit conservation, which can be applied to ecotourism in general. These five potential ways to benefit conservation are incentivizing establishment of protected areas, generating revenue for wildlife and habitat management, providing economic benefits to local communities, which in turn encourages local people to conserve wildlife and habitat, providing an alternative to other uses that are more environmentally degrading, and educating locals and visitors about conservation (Hvengaard, 2011). Although the positive and negative impacts both seem to be significant, Ballantyne et al. (2011a) make the argument that if ecotourism experiences had long-term positive impacts on participants' environmental attitudes and behaviors, the net impact would certainly be a positive one in relation to conservation and pro-environmental goals.

One case study of an ecotour operator in the Galapagos Islands that shows a positive impact on visitors' pro-environmental attitudes found that through the adoption of specifically designed interpretation and communication, the ecotour operator has generated over $400,000 annually in donations to a Galapagos conservation organization (Powell & Ham, 2008). In another example of a positive impact of ecotourism, Coles et al. (2015) examined the benefits of

a volunteer tourism organization called Operation Wallacea. The purpose of Operation Wallacea trips is to gather data that can be used to assess current conservation programs and the efficacy of such programs. Within eight years of the implementation and data collection of the Operation Wallacea program, deforestation was virtually eliminated on Buton Island, Indonesia.

Elements that lead to pro-environmental outcomes

Previous research has examined how ecotourism experiences can mitigate negative environmental impacts and increase pro-environmental outcomes. For the context of this paper, pro-environmental outcomes exist in two different categories: "on-site" and "off-site." On-site pro-environmental outcomes consist of knowledge, attitudes, beliefs, behavioral intentions, and actual on-site behaviors. Off-site pro-environmental outcomes consist of actual off-site behaviors. Authors have identified a variety of different elements and strategies increase pro-environmental outcomes (Ballantyne & Packer, 2011; Ballantyne et al., 2009; Hvengaard & Kur, 2010; Powell & Ham, 2008). Ballantyne et al. (2009) identified marketing strategies as having potential to increase positive impacts through influencing visitors' incoming motivations for participating in the ecotourism experience. Ballantyne et al. state that visitors with pro-conservation attitudes and environmental awareness are more likely to experience pro-environmental outcomes after participating in an ecotourism experience. As such, emphasizing conservation elements of an ecotourism experience in the marketing phase can influence incoming motivations and for that reason has been identified as an element of an ecotourism experience that can increase positive environmental impacts (2009). Ballantyne and Packer (2011) suggest that obtaining information about ecotourism visitors' interests, knowledge, beliefs, and motivations for participating can be used to design relative and effective educational messages according to that will improve pro-environmental learning outcomes.

Ballantyne and Packer (2011) identify the inclusion of post-visit action resources as another element that can increase positive environmental impacts. Much of the research on pro-environmental outcomes have only shown short-term and on-site influence on participants (Ardoin et al., 2015). Post-visit action resources provide participants with the opportunity to continue to engage in conservation, and change the outcomes of the ecotourism experience from short-term benefits to long-term, transformative learning on visitors' pro-environmental outcomes (Ballantyne & Packer, 2011).

Research shows sustainable management practices and clear communication of those practices to be an important element of an ecotourism experience to increase positive environmental impacts. Ballantyne et al. (2009) found in their studies that many participants engaging in a particular wildlife tourism experience were concerned with management practices that they perceived to have negative or result in adverse impacts on wildlife, in this case turtles, such as large group size. The large group size was determined in order to give turtles some protection from light on and around the beach; however, more clear communication of this management practice would have made it easier for participants to accept the large group size, increasing their overall satisfaction of the experience. The finding by Ballantyne et al. (2009) that participant desires and conservation goals align in ecotourism settings allows for ecotourism operators to design experiences in a conservation-oriented manner and not detract from visitor satisfaction.

Incentivizing habitat preservation through economic gain and employment opportunity were identified as having conservation and environmental benefits by several authors (Hvengaard & Kur, 2010; Jacobsen & Robles, 1992). Hvengaard and Kur (2010) list five ways in which wildlife and wildlife habitat can benefit from ecotourism. These include the economic

opportunity of ecotourism providing incentive to establish protected areas, revenues from festivals (and other ecotourism experiences) being used to enhance management and habitat, and economic benefits of ecotourism can promote conservation of wildlife and habitat among local residents. Similarly, Jacobsen and Robles (1992) found after a pilot study in Costa Rica, in which local residents were trained in an ecotourism tour guide program, that all of the local tour guides felt that they and their families would benefit from increased tourism and wildlife conservation.

Providing visitors with an active participation opportunity was also cited as an element of an ecotourism experience that increases the positive environmental impacts of an ecotourism experience (Weaver, 2001a). Weaver (2001a) argued that active participation, or volunteer tourism and volunteer tourists, gain a deeper understanding and appreciation of the environment. A case study by Rattan et al., (2012) also found that ecotourism participants attitudes and awareness of elephant conservation issues were positively impacted after visiting volunteer tourism sites, even if they did not volunteer, but just visited. In other words, the presence of volunteer tourists had a positive impact on non-volunteer tourists at the site studied. According to Powell and Ham (2008), providing immediate opportunity for conservation action can positively influence pro-environmental outcomes. Powell and Ham (2008) state that providing immediate opportunity for action has influence on participants' control beliefs, or beliefs about an individual's ability to perform a certain behavior. Providing the individual with an easy opportunity to perform an environmentally positive behavior increases the likelihood that individual will actually participate in that behavior. Providing on-site opportunity for action can also influence participants' intentions to engage in pro-environmental behaviors off-site. Powell and Ham's (2008) case study also resulted in significant increases in participants' intentions to write letters to government, join environmental organizations, donate money to environmental

organizations, avoid the use of environmentally harmful products, and attend environmental meetings.

Educational and behavioral theories in ecotourism

Ecotourism is centered around natural areas, benefits the local environment and community, and includes visitor learning. With visitor learning being a definitive part of an ecotourism experience, the role of education in ecotourism has been extensively researched. Research has shown education in ecotourism to have positive impacts on pro-environmental learning, attitudes, and beliefs (Ballantyne & Packer, 2005; Ballantyne et al., 2011a; Ballantyne et al., 2011b; Hvengaard, 2011; Kimmel, 1999). A swath of different educational theories and models have been developed and applied to education in an ecotourism setting.

Ecotourism is a form of free-choice learning, meaning participants are choosing to partake in this learning experience and are largely in control of their own learning. Falk and Dierking (2004) developed the Contextual Model of Learning, which provides a framework in which to organize learning in free-choice learning settings. They found eight factors that were particularly integral to learning in museum settings, a free-choice learning setting, which can be applied to ecotourism. These factors exist in three larger contexts, the personal context, sociocultural context, and physical context. The personal context includes motivation and expectations, prior knowledge, interests, and beliefs, and choice and control. The sociocultural context includes within-group sociocultural mediation, and facilitated mediation by others. The physical context includes advance organizers and orientation, design, and reinforcing events and experiences outside the museum. Since ecotourism is considered a form of free-choice learning, this widely accepted theoretical framework for understanding and investigating learning in such settings has been applied to ecotourism (Ballantyne & Packer, 2005). Within free-choice learning

settings, there are factors that contribute to pro-environmental learning outcomes. These include arousing emotions, challenging beliefs, and enhancing environmental conceptions (Ballantyne & Packer, 2005).

Walter (2013) examined educational models that are best applied to three different forms of ecotourism: wildlife tourism, adventure ecotourism, and community-based ecotourism. Walter asserts that cognitive dissonance models and Ajzen's Theory of Planned Behavior model best apply to wildlife tourism, and Kolb's Experiential Learning Cycle is best applied to adventure ecotourism. In addition to Ajzen's Theory of Planned Behavior and Kolb's Experiential Learning Cycle, Walter states that Mezirow's Transformative Learning Model is best applied to community-based ecotourism.

Ajzen's (1985) Theory of Planned Behavior is one of the most commonly referenced theories related to education in ecotourism settings. This theory examines learning in terms of behavioral change relative to three kinds of beliefs: behavioral beliefs, normative beliefs, and control beliefs. Behavioral beliefs are beliefs about the outcomes and consequences of a particular behavior. Normative beliefs are beliefs related to perceived social pressures to either perform or not perform the behavior. Control beliefs are beliefs about ones' ability to perform a behavior based on knowledge, skill, resources, and opportunity. In addition to Walter (2013), Ballantyne and Packer (2005) used this theory in terms of learning in wildlife tourism settings by using signage based on the Theory of Planned Behavior, designed to influence participants on-site pro-environmental behaviors. Results suggest that signage developed in this manner is can effectively influence participants on-site behavior. Powell and Ham (2008) examined a case study in the Galapagos, where an ecotourism operation used the Theory of Planned Behavior in their communication strategy while trying to influence participants beliefs about the positive

outcomes of donating to a conservation organization while on the trip. Results showed that this strategically designed communication method had a positive impact on participants knowledge of Galapagos National Park, the management of the park, general environmental behaviors, and attitudes and behavioral intentions related to donations for conservational purposes.

Kolb's (1984) Experiential Learning Cycle views learning as cyclical. Kolb suggests there are four stages of this learning cycle: concrete experience, reflective observation, abstract conceptualization, and active experimentation. The concrete experiences provide opportunity for reflective observation, which allows for learners to create a personal meaning of the experience. The abstract conceptualization stage may follow the reflective observation stage, which allows for learners to formulate new concepts. Active experimentation occurs when learners' new concepts become implications for their own actions, which can lead to new concrete experiences, and repetition of the whole cycle (Ballantyne et al., 2011b) Learners exist in one of those four stages at any particular time. Both Ballantyne et al. (2011b), and Walter (2013) used Kolb's Learning Cycle to assist in analyzing the effectiveness of education in wildlife ecotourism settings.

Mezirow's (2000) Transformative Learning Theory states that transformative learning occurs when learning from an experience can shift a learners' identity and future behaviors. Mezirow's lists 10 phases of the transformative learning process:

 (a) a disorienting dilemma

 (b) self-examination with feelings of discontent

 (c) a critical assessment of assumptions

 (d) recognition that the learner's discontent and the process of transformation are shared

 (e) exploration of new options

(f) planning a course of action

(g) acquiring necessary knowledge or skills to implement course of action

(h) provisional trying of new roles

(i) building self-confidence and competence in new roles

(j) reintegration into one's life on the basis of conditions dictated by one's new

perspective. (Mezirow, 2000, p. 22)

Walter (2013) uses Transformative Learning Theory to examine education within community-based ecotourism settings. Walter also posits that personal experiences in culture's apart from the learner's own culture, and experiences in wilderness can act as facilitators of the transformative learning process.

There are additional educational theories used to examine education in ecotourism beyond the Contextual Model of Learning, the Theory of Planned Behavior, the Experiential Learning Cycle, and the Transformative Learning Theory. Orams (1997) developed a cognitive dissonance model that aimed to improve program design, called Orams' Model for Program Design. This model focused on the emotional and affective responses in participants, promoting visitors to act. It also included a feedback loop for program evaluation and design. All of these educational models and frameworks have helped to frame the understanding of visitor learning and promotion of successful learning outcomes in ecotourism settings, specifically pro-environmental learning outcomes.

Educational elements that promote pro-environmental outcomes

Several researchers have examined specific elements of education that promote pro-environmental outcomes (Ballantyne & Packer, 2005; Ballantyne et al., 2011a; Ballantyne et al., 2011b; Hvengaard, 2011; Kimmel, 1999). Hvengaard (2011) stated that education about local

wildlife issues can increase support for conservation. Ballantyne et al. (2011b) found that certain

interpretation and educational aspects of an ecotourism experience can promote pro-

environmental learning. These include incorporating multiple senses, accessing participants'

prior knowledge, facilitating visitors experiencing empathy for wildlife, informing participants

about dangers faced by animals, providing practical things that participants can do to assist in

conservation, and facilitating reflection of their experience. Challenging people's conceptions,

allowing for participants to have agency in their own learning, and emotional and cognitive

reflection were also cited as leading to pro-environmental learning outcomes (Ballantyne &

Packer, 2005; Ballantyne et al., 2011a; Kimmel, 1999).

Ballantyne et al. (2011b) conducted a study that explored effective educational strategies

in four marine-based wildlife ecotourism experiences in Queensland, Australia. Ballantyne et al.

(2011b) identified these educational strategies by examining what elements of a wildlife tourism

experience were most memorable to visitors four months after the experience had concluded.

Results showed four different levels of visitor memories, collected through a self-reported

survey. These four levels were sensory impressions, emotional affinity, reflective response, and

behavioral response. Ballantyne et al. (2011b) note that these four levels are quite similar to the

stages of learning Kolb's experiential learning cycle; concrete experiences, reflective

observations, abstract conceptualizations, and active experimentation, which the leads to the next

concrete experience.

Further, Ballantyne et al. (2011b) state that incorporating multiple senses can have a

positive influence on pro-environmental outcomes. There were strong visitor memories of

specific sensory impressions, such as touching a sea turtle. Often times these sensory

impressions were closely related to emotional affinity, in which visitors recalled some type of

emotional connection with wildlife, which, according to Ballantyne et al. allowed them to develop empathy for wildlife and care about their health and well-being. Reflective responses showed more than just a recollection of factual information, but showed evidence of further cognitive processing. Sometimes these reflections were in response to interpretation or signage, though other times they were in response to sensory impressions, emotional connections, or social interactions with other visitors or staff. Ballantyne et al. state that it is important to not only allow time for reflection during the experience, but also to encourage participants to reflect beyond just the temporal scope of the experience (2011b).

The combination of reflection and emotional affinity had the most powerful impact on visitors. This combination caused visitors to consider more than just a particular individual of a species, but instead the species as a whole, and even beyond to other species (Ballantyne et al., 2011b). Often times it was the information visitors were given about the dangers wildlife face that caused this type of emotional and reflective response. In an analysis of 18 case studies about education and conservation in marine ecotourism, Zeppel (2008) found that participants attained the greatest pro-environmental outcomes when the experience allowed them to integrate both cognitive and emotional benefits, "tourism experiences that increase both environmental awareness and positive feelings are likely to generate environmental actions resulting in conservation benefits for marine wildlife and the natural environment" (Zeppel, 2008, pg. 12).

Ballantyne et al. (2011b) also found that reflection was at times facilitated through social interaction. The social interactions were both involving participants interacting with fellow travel companions as well as with the staff or guides. According to Ballantyne et al., social interaction facilitates participants forming, discussing, and reflecting on their own thoughts and feelings of the experience (2011a). Not only was this social interaction found to facilitate reflection, but

participants in the study also reported that it was a satisfying part of the experience. These social interactions were reported by 90% of the participants of the study to occur beyond the temporal scope of the experience (Ballantyne et al., 2011b).

Accessing and understanding participants' prior knowledge, experiences, and motivations can also lead to pro-environmental learning outcomes in ecotourism experiences (Ballantyne & Packer, 2005; Ballantyne & Packer, 2011; Ballantyne et al., 2007; Falk et al., 2012). Visitors to a free-choice learning experience come with a wide array of prior knowledge, and will learn from the experience in potentially highly different ways (Ballantyne & Packer, 2011; Ballantyne et al., 2007). Ballantyne et al. (2011a) found that visitors' prior knowledge, experience, and motivations influenced how an ecotourism experience impacted them. Due to the influence visitor's prior knowledge has on their ecotourism (or other free-choice learning) experience, it is an important challenge for ecotour operators to design their programs in a way that can connect with this prior knowledge and experience (Ballantyne et al., 2007). Ballantyne & Packer (2011a) assert that in order for environmentally focused educational messages to be effective, ecotourism operators need to collect information and understand visitors' prior knowledge, beliefs, and motivations.

Ballantyne et al. (2011b) also state that pro-environmental outcomes are more likely to be achieved if information about the dangers faced by animals is provided during the experience. The researchers also call for giving examples of how participants' everyday actions can positively and negatively impact wildlife as a way to positively influence pro-environmental outcomes. Along with providing this information, it is also important to ensure staff and guides are available to answer questions and initiate discussion about the impact of everyday actions, as well as the dangers faced by wildlife.

One of the goals of wildlife tourism is to promote the conservation of wildlife by raising awareness and promoting more responsible and sustainable behavior among visitors (Ballantyne et al., 2011b). The Ballantyne et al. (2011b) case study that analyzed visitors' memories of four different wildlife tourism experiences through self-reported surveys showed 7% of participants had reported the adoption of a new and more sustainable behavior in response to their experience. These included changing household practices, changing purchasing practices, taking more responsibility for the environment beyond their home, seeking further environmental information, discussing environmental issues, and volunteering for environmental causes (Ballantyne et al., 2011b).

Limitations of previous research

In terms of education within an ecotourism setting, studies to date have more often looked at short-term learning outcomes through the use of pre-and-post experience surveys than at long-term learning outcomes. There is a growing body of research aimed to address this by looking at long-term learning outcomes to promote pro-environmental behaviors. Ardoin et al. (2015) found while reviewing literature about ecotourism's impact on pro-environmental learning that 37% of the studies examined included a long-term follow up survey, though the length of time to administer the long-term follow up survey varied from three to 12 months after the experience.

Another concern about the research on education in ecotourism is that, mostly out of necessity, nearly all of the results come from self-reported surveys. Ardoin et al. (2015) found in reviewing the literature regarding ecotourism's impact on environmental learning that a 77% of the studies examined either used solely self-reported surveys or a combination of comparative pre/post results with self-reported surveys. In that same review, Ardoin et al. (2015) noted that

many studies looking at behavior actually measured behavioral intentions, due to convenience, as it can be measured immediately after an ecotourism experience. This is problematic because evidence shows that stated behavioral intentions rarely result in actual behavior change, and that participants' enthusiasm to engage in pro-environmental behaviors often decreases after their experience (Hughes, 2013). Zeppel (2008) also notes the need for more longer-term studies that look at actual conservation action as opposed to self-reported behavioral intentions. Some studies did look at actual behaviors, though all of these were collected through self-reported surveys (Ballantyne & Packer, 2011; Ballantyne et al., 2011b).

Rattan et al., (2012), in their case study regarding volunteer tourism and pro-environmental learning outcomes among visitors, discussed the idea of social-desirability bias. Social-desirability bias occurs when participants of a survey fill out answers and respond to questions in ways that they believe their peers and other people in the group approve of. All of these perceived issues and limitations must be considered when examining previous literature involving education in an ecotourism setting.

Gap in the literature

Though there has been a great deal of research on education in ecotourism as a way of promoting conservation and pro-environmental outcomes, and certain elements of ecotourism experiences can promote conservation, research has seldom referenced specific instructional strategies that can be used to promote these outcomes. Identifying instructional strategies that facilitate elements that promote pro-environmental learning outcomes (accessing prior knowledge, reflection, emotional engagement, and opportunity for active participation) would allow ecotourism operators and interpreters to design their experiences in a tangible manner, with the potential of ultimately leading to pro-environmental and conservational outcomes

through ecotourism. Through instructional strategy frameworks, educational elements of the ecotourism experience can be enhanced to promote pro-environmental learning outcomes in participants.

Though instructional strategies have not been broadly applied to ecotourism settings, there is an extensive body of research on instructional strategies in and of themselves. Much of this research is regarding instructional strategies in formal learning settings. However, the framework and theory of such instructional strategies can be applied to free-choice learning settings and used in the context of the various educational models and theoretical framework as discussed above. Specific instructional strategies that, according to previous research, successfully promote and facilitate elements of an ecotourism experience that positively impact pro-environmental learning will provide a tangible framework for designing educational experiences in an ecotourism setting.

Defining instructional strategies

In the context of this paper, instructional strategies are defined as methods of educational instruction. These can include facilitating certain activities, the use of specific materials and resources, and the specific methods of asking questions and facilitating discussions or reflection. The instructional strategies that will be highlighted and applied to an ecotourism setting are examined in the following section.

Instructional strategies to be applied

The conceptual change instructional strategy uses people's misconceptions as a tool to learn and make sense of the world. Misconceptions are defined as learner ideas that are not consistent with science, and sometimes hard to change, and sense-making is defined as working on and with ideas in ways that generate meaningful conceptions (Campbell et al., 2016). This

strategy can involve asking learners to talk about their thinking, compare ideas, test ideas, and see if they can be used to explain natural processes. In the past, misconceptions were considered problematic, and needing to be fixed. In this previous way of teaching, 'incorrect' student ideas were replaced with 'correct' ideas, provided by the teacher or the text. According to the conceptual change instructional strategy, this fails to engage learners with reasoning and idea revision, and learners replace their own ideas with ideas they do not fully understand. They may memorize 'correct' information for the specific setting, but in the real world they will often fall back on their original misconceptions, as they are not able to explain the 'correct' ideas that were provided (Campbell et al., 2016).

Metacognition is defined as 'thinking about one's own thinking', and there are two main aspects to this instructional strategy: reflection and self-regulation (Sims, 2018). Reflection is the awareness of what learners know and don't know, as well as thinking of the strategies learners are using, and self-regulation is planning one's own approach to learning, monitoring one's activities, checking outcomes, and generally managing how they go about learning. Metacognitive strategies are commonly used in formal education settings, but Sims (2018) looked at metacognition in a free-choice learning setting, specifically museums. The practices Sims identified for effective metacognitive teaching in a free-choice learning setting include assessing prior knowledge, purposeful use of thinking routines, modeling, analogy, chunking, asking for evidence and paraphrasing, using activity materials that provide visual cues, and a focused discussion of thinking skills (Sims, 2018).

Photo elicitation is a method of interview that has been used to conduct research in education as well as other fields, including psychology, sociology, anthropology, and community health (Loeffler, 2004). For the purposes of this paper, photo elicitation is considered an

instructional strategy when used in the context of an ecotourism experience. Photo elicitation uses photos as the center piece of an interview process, allowing more symmetrical power dynamics between the interviewee and interviewer, due to the focus on photos rather than the individuals (Loeffler, 2004). The researcher becomes the listener as the participant interprets and reflects on photographs, making the interview a more collaborative process. Harper (2002) states that photo elicitation facilitates deeper connection with the human experience than merely the use of words. Loffler's (2004) study used photo elicitation as an interview method to collect data from 14 participants of a college-based outdoor program. Photographs taken by the participants during their outdoor program were used. The researcher asked questions about the participants' memory of the photographs, the meaning of the photographs, and the value of the photographs. Many themes emerged from the interviews, though three that came up repeatedly were "1) spiritual connection with the outdoors, 2) connections with other through outdoor experience, 3) self-discovery and gaining perspectives through outdoor experience" (Loeffler, 2004, p. 543). Results from this study showed that experiences in the outdoors foster emotional connections to the individual self, to others, and to the environment. Using photographs from the experience helps participants articulate and reflect on the meaning of the outdoor experience.

Service learning combines community service with educational instruction, and includes intended outcomes such as critical thinking, civic responsibility, and global understanding and citizenship (Furco, 1996). The National Society for Experiential Education defines service learning as a monitored service experience in which participants have intentional learning outcomes and actively reflect through the experience (Furco, 1996). The Corporation for National and Community Service also includes in the definition of service learning that participants learn through active participation in organized service that meet community needs

(Furco, 1996). Furco (1996) makes the distinction between service learning and other experiential education approaches by asserting that the intention of service learning is to equally benefit both the provider of the service and the recipient, as well as having an equal focus on providing service and learning. In order to accomplish this, service learning must include both academic and service contexts (Furco, 1996). Prentice and Robinson (2010) found in a study of community college students that service learning participation and increased learning were positively connected. Prentice and Robinson also found that community college students reported the greatest learning outcomes in the areas of career and teamwork and academic development and educational success. They make the suggestion that this may indicate service learning provides participants with opportunities to develop skills beyond the curriculum. Previous research shows that photo elicitation, conceptual change, metacognition, and service learning instructional strategies can successfully facilitate identified elements of an ecotourism experience that promote pro-environmental learning.

Ecotourism in context summary

Clearly, the body of research on ecotourism is vast. The very definition itself has been debated at length, though specific elements required to be considered ecotourism are now generally accepted. There are many different varieties of ecotourism, all of which should align with the overarching goals of ecotourism, which is defined as tourism that takes place in a natural setting, benefits the local environment and community, and includes visitor learning. Due to the variety of ecotourism experiences, identifying common trends of ecotourists themselves is difficult, though it has been relatively well accepted that generally ecotourists are well educated travelers and ecotourists value learning as part of the ecotourism experience. The positive and negative impacts of ecotourism, both economically and environmentally, have been of concern to

researchers and a central aspect of much of the research done in the field. Education, being widely accepted as an integral part of an ecotourism experience, has also been studied at length in ecotourism settings, and it can be a tool to promote positive impacts of ecotourism. Educational theory has been applied to ecotourism settings and specific elements of an ecotourism experience that promote pro-environmental learning outcomes have been identified. There is also a large body of research on instructional strategies, some of which has been shown to facilitate the experiences and elements found to promote conservation and pro-environmental learning in ecotourism. In the final chapter of this paper, I will show how the application of these specific instructional strategies can improve the promotion of conservational and pro-environmental learning in an ecotourism setting.

Chapter 3

Analysis and discussion

The literature reviewed thus far lays the foundation for the analysis presented in this chapter.

This analysis will evaluate instructional strategies that, based on previous literature, can facilitate

the identified elements shown to promote pro-environmental learning outcomes. As discussed in

the Chapter 2, cognitive reflection, active participation, emotional engagement, and accessing

prior knowledge have all been identified as elements of an ecotourism experience that promote

pro-environmental learning. Ajzen's Theory of Planned Behavior, Kolb's Experiential Learning

Cycle, and the Contextual Model of Learning provide the basis for the analysis of the

instructional strategies. The instructional strategies to be analyzed are conceptual change, service

learning, metacognition, and photo elicitation.

Theoretical Framework

Ajzen's (1985) Theory of Planned Behavior evaluates learning in the context of

behavioral change. The ability of an individual to change their behavior is dependent on three

kinds of beliefs; behavioral beliefs, normative beliefs, and control beliefs. Behavioral beliefs

relate to an individuals' beliefs about the outcomes and consequences of a specific behavior.

Normative beliefs relate to an individuals' beliefs about perceived social pressures to either

perform or not perform a certain behavior. Control beliefs relate to an individuals' perception of

their actual ability to perform a behavior based on their knowledge, skill, resources, and

opportunity. Ajzen's Theory of Planned Behavior has provided a theoretical framework for

several articles regarding education in ecotourism (Ballantyne & Packer, 2005; Powell & Ham,

2008; Walter, 2013). In ecotourism settings, participants are learners. Since education is an

essential element of an ecotourism experience, guides or interpreters educate participants, often

times about environmental topics, with the hope that this new knowledge and awareness will lead to new action (Walter, 2013). Education and interpretation in ecotourism settings attempts to influence attitudes or behavior by challenging behavioral, normative, and control beliefs, and ultimately promoting new, more pro-environmental beliefs (Ballantyne & Packer, 2005).

Kolb's (1984) Experiential Learning Cycle asserts learning consists of four stages that exist in a learning cycle. Concrete experience is the first stage of the learning cycle and provides an opportunity for the second stage of the cycle, which is reflective observation. Reflective observation allows learners to create meaning for and from the experience, which leads into the abstract conceptualization, the third stage of the cycle. Abstract conceptualization enables learners to formulate new concepts. The fourth stage, active experimentation, occurs when these new concepts impact learners' actions. These new actions can result in new concrete experiences, and the cycle begins again. Ecotourism takes place in natural, generally remote areas or places that can be considered relative wilderness. Experiences in wilderness can come with powerful concrete experiences that can challenge participants physically, mentally, or emotionally (Walter, 2013). Using Kolb's Experiential Learning Cycle as the foundation, reflecting on these concrete experiences can lead to participants creating new meaning and concepts, which can ultimately influence participants' actions. In an ecotourism setting, these concrete experiences take place in natural settings, often times with a focus on the environment, and participants make new pro-environmental meaning and are exposed to concepts that can influence them to act in more pro-environmental ways.

Falk and Dierking's (2004) Contextual Model of Learning provides a learning framework applicable specifically to free-choice learning contexts. This model identifies factors that are particularly important to learning in free-choice learning settings, and that exist in three larger

contexts. The first larger context, the personal context, includes motivation and expectations, prior knowledge, interests, and beliefs, and choice and control. The second larger context, the sociocultural context, includes within-group sociocultural mediation, and facilitated mediation by others. The third larger context, the physical context, includes advance organizers and orientation, design, and reinforcing events outside the free-choice learning experience.

Ecotourism functions as free-choice learning as the visitors, or participants, are choosing to engage in the experience. Visitors have self-selected to participate in an ecotourism experience, in which some form of learning is emphasized. The Contextual Model of Learning is particularly relevant to framing free-choice learning experiences due to the emphasis it places on participants' prior knowledge, experiences, and motivation. The model recognizes that in free-choice learning settings, participants enter with a wide variety of prior knowledge, experiences, and motivation. The model also views learning as a process of meaning making that exists when individuals interact with their environment in a social context (Ballantyne & Packer, 2005). With ecotourism involving interactions with the environment in a social context, the Contextual Model of Learning provides a relevant foundational lens.

Criteria

In order to ensure the instructional strategies analyzed successfully facilitate pro-environmental learning outcomes in ecotourism settings, I developed a list of criteria. The criteria not only pertained to the instructional strategies themselves, but also to the previously identified elements that promote pro-environmental outcomes, as well as the theoretical frameworks that provide the foundation of the analysis. The purpose of developing the criteria was to systematically evaluate important characteristics relevant to the implementation of instructional strategies in ecotourism settings. The criteria are as follows:

1. Instructional strategies must facilitate elements that have been shown to promote pro-environmental learning outcomes

    (a) Elements that lead to pro-environmental outcomes have been identified in multiple articles

    (b) Articles that identify elements that lead to pro-environmental outcomes are studies deliberately designed to collect data

2. Instructional strategies must be transferrable to different ecotourism varieties/locations

3. Instructional strategies are able to be used in both 'hard' and 'soft' ecotourism experiences

Justification

In order for an instructional strategy to have qualified for the analysis, it most importantly had to be able to facilitate the identified elements that lead to pro-environmental outcomes. Findings from previous literature were used to provide the elements that promote pro-environmental learning outcomes. Only elements that had been identified in more than one article were used for this analysis. Instructional strategies, the identified elements they are paired with, and the cited articles are represented in Table 1. Accessing prior knowledge was identified as an element that can lead to pro-environmental learning in two studies that focused on free-choice learning in ecotourism settings, one that examined conservation learning in a wildlife ecotourism setting, and one on travel and learning in general (Ballantyne & Packer, 2005; Ballantyne & Packer, 2011; Ballantyne et al., 2007; Falk et al., 2011). Reflection was identified as an element that can lead to pro-environmental learning in an article examining participants' memories of a wildlife ecotourism experiences, participants' long and short-term environmental learning in a wildlife ecotourism experience, and an article examining the use of post-visit action resources to promote pro-environmental learning (Ballantyne & Packer, 2011; Ballantyne et al.,

2011a; Ballantyne et al., 2011b). Emotional engagement was identified as an element that can lead to pro-environmental learning in an article regarding education and conservation benefits of marine wildlife ecotourism, an article examining participants' memories of a wildlife ecotourism experience, an article using ideas about conservation and learning from zoos and aquariums in wildlife ecotourism, and an article about environmental learning in free-choice learning settings broadly (Ballantyne & Packer, 2005; Ballantyne et al., 2007; Ballantyne et al., 2011b; Zeppel, 2008). Active participation was identified in a case study in the Galapagos about participant learning and behavior, an article evaluating ecotourism as mass tourism, a study about volunteer tourism in Thailand, an article on participants' memories of a wildlife ecotourism experience, an article on free-choice learning in general, a case study evaluating the role of ecological field work in University students, and an article examining the role of post-visit action resources in ecotourism settings (Ballantyne & Packer, 2005; Ballantyne & Packer, 2011; Ballantyne et al., 2011b; Bowler et al., 1999; Powell & Ham, 2008; Rattan et al., 2012; Weaver, 2001). Previous literature on instructional strategies provided information about which instructional strategies facilitate which types of identified elements. How these instructional strategies facilitate the identified elements is analyzed in-depth in the next section.

Table 1

Instructional Strategies, Identified Elements, and Literature Cited

Instructional strategies to be applied	Identified elements	Literature cited
Conceptual change	Accessing prior knowledge	Ballantyne & Packer, 2005; Ballantyne & Packer, 2011; Ballantyne et al., 2007; Falk et al., 2011
Metacognition	Cognitive reflection	Ballantyne & Packer, 2011; Ballantyne et al., 2011a; Ballantyne et al., 2011b
Photo elicitation	Emotional engagement	Ballantyne & Packer, 2005; Ballantyne et al., 2007; Ballantyne et al., 2011b; Zeppel, 2008
Service learning	Active participation	Ballantyne & Packer, 2005; Ballantyne & Packer, 2011; Ballantyne et al., 2011b; Bowler et al., 1999; Powell & Ham, 2008; Rattan et al., 2012; Weaver, 2001

The instructional strategies must also be transferrable to different varieties of ecotourism occurring in different locations. As discussed in the Chapter 2 section 'Varieties of ecotourism', there are different types of ecotourism experiences; wildlife ecotourism, adventure ecotourism, community-based ecotourism, and volunteer tourism. While each variety looks different in the types of activities visitors participate in, all forms fit into the larger umbrella of ecotourism, and take place in natural settings, benefit the local community and environment, and include some form of visitor learning. Instructional strategies provided are able to be used in any of these varieties of ecotourism and are not specifically suited to just one variety. In addition to being transferrable to different varieties of ecotourism, the instructional strategies analyzed can also promote pro-environmental learning in both 'hard' and 'soft' ecotourism experiences. 'Hard'

ecotourism experiences generally have a smaller number of participants with the primary focus of their travel being the ecotourism experience itself, whereas 'soft' ecotourism generally consists of larger groups of participants, where visits to natural areas may be part of a larger itinerary and not necessarily the main focus of the experience. Metacognition and conceptual change are instructional strategies that do not require the use of any specific materials and can be used to assist in learning outcomes in any variety of content. Although not mandatory, using social and group interactions can assist in achieving desired learning outcomes and a vast majority of ecotourism experiences take place in group settings. Though more opportunity for the use of metacognition may be available in 'hard' ecotourism settings, with intention opportunities will also exist in 'soft' ecotourism settings, through the use of specific interactions and questions from the guide to the participants. In the context of a 'soft' ecotourism experience, metacognition could be used simply by having a short group discussion prior to the experience, in which participants' name what they know about a specific environmental subject that will be addressed during the duration of the program. Participants' could name what they know, and reflect on how they know that. Throughout the course of the 'soft' ecotourism experience, both during and at the end, the guide should facilitate further reflection, inquiring about what participants' have done, the thinking skills they have used, any new learning outcomes as a result of the experience, and how those new learning outcomes might have changed their perspectives.

Similarly, while the use of the conceptual change instructional strategy may be able to expose more beliefs and more detail about beliefs in a 'hard' ecotourism setting, it can also be used to expose broad and general beliefs in a 'soft' ecotourism setting. While using the conceptual change instructional strategy in the context of a 'hard' ecotourism experience may consist of a full day, or even multi-day lesson plan, it may also be used in a shorter timeframe. In

the context of a 'soft' ecotourism experience, the guide can use the conceptual change instructional strategy to access participant prior knowledge through facilitating group or individual discussions. By using specific questions about a particular environmental subject, the guide can uncover existing participant knowledge, beliefs, and attitudes, and use those to make new concepts based off of what the participants experience throughout the course of the 'soft' ecotourism experience.

Though photo elicitation does require the use of photos specific to an experience, participants of ecotourism experiences of any variety often times document their experience through photos. However, in the context of a 'soft' ecotourism experience, where participants many not necessarily take their own photos, the guides have the capability and responsibility of documenting the experience through photos if photo elicitation is the instructional strategy to be used. In this scenario, the guide should take photos throughout the course of the experience and can facilitate a closing activity where they emphasize one or two photos to elicit an emotional response. It can be expected that even a 'soft' ecotourism experience will have some kind of closing group interaction between participants and the guide before the participants leave. Presenting or passing around the photos and asking participants to consider how the experience documented in the photo made them feel, and how that might have changed their perspective would suffice in the context of a 'soft' ecotourism experience.

While service learning does require some additional resources in order to provide the opportunity for participants to actively engage in pro-environmental actions, ecotourism settings generally lend themselves to this opportunity. All varieties of ecotourism, by definition, take place in natural settings, and provide benefits to both the local environment and community. This being the case, in any variety of ecotourism, as well as in both 'hard' or 'soft' ecotourism

experiences, the opportunity to perform some environmentally or socially beneficial service to the local community is highly likely. In the context of a 'hard' wildlife ecotourism experience, participants could engage in a service learning experience that lasts multiple days. Rattan et al. (2012) serves as a good example of what service learning can look like in a 'hard' wildlife tourism setting, in which participants have ongoing duties during the experience to aid Asian elephant conservation efforts, including preparing fruits and vegetables for the elephants and engaging in habitat restoration. In the context of a 'soft' ecotourism experience, service learning could consist of something as simple as providing participants the opportunity to engage in less wasteful and environmentally harmful activities by providing them with a reusable water bottle and emphasizing that this is a tangible action they can participate in beyond the scope of the particular ecotourism experience to be more environmentally conscious. It can also be common for ecotourism operators to include a visit to a local market as part of the experience. Another example of a simple way to include service learning would be to specifically take participants to a local market that sells sustainably produced goods, and highlighting that being aware of sustainability with their purchases is an action they can take to be more environmentally conscious in their everyday lives.

There are instructional strategies and techniques that may be effective in promoting pro-environmental outcomes only in specific varieties of ecotourism. For example, critical pedagogy could be used to "decolonize" the way participants think about the world and their own ecological knowledge, by emphasizing local ecological knowledge or indigenous knowledge (Walter & Reimer, 2012). This allows participants to see their experience through a local lens as opposed to more typical tourist lens and can facilitate transformative learning. However, the reliance on local and indigenous knowledge is not necessarily transferrable to all varieties of

ecotourism. While this strategy could have a profound impact on participants of a community-based ecotourism experience, where local and indigenous knowledge are at the forefront, it does require the presence of individuals who have this local and indigenous knowledge, which is not necessarily present in all ecotourism varieties. For this reason, this particular strategy did not fit the criteria for inclusion in this analysis.

Finally, the instructional strategies for this analysis have been paired with elements that were identified in articles deliberately designed to collect data, as opposed to narratives in which findings were analyzed retroactively after a specific experience. For example, Kimmel's (1999) article discusses environmental learning as it relates to ecotourism. However, Kimmel uses a trip that he led as a guide to retroactively assess learning outcomes. While Kimmel does use intentional instructional strategies to achieve environmental learning, the trip was not designed to collect data regarding learning outcomes of the participants. However, Kimmel's findings do pertain to the use of instructional strategies to promote pro-environmental learning. In one instance, Kimmel calls for the use of discovery and inquiry on the part of the participants as a way to promote pro-environmental learning. While this idea could be analyzed through the lens of various inquiry-based instructional strategies, and perhaps calls for additional research, it does not fit the criteria for instructional strategies I chose to analyze.
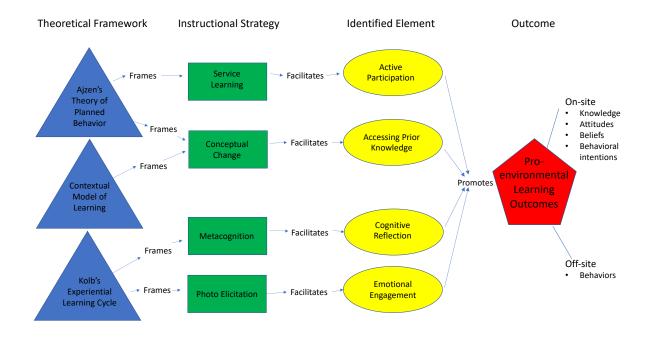
Analysis using theoretical frameworks

Through an extensive review of previous literature, I found four instructional strategies that can facilitate identified elements to promote pro-environmental learning outcomes in different varieties of ecotourism settings: a.) metacognition, b.) photo elicitation, c.) conceptual change, and d.) service learning. Metacognition is an instructional strategy that facilitates cognitive reflection and was analyzed using Kolb's Experiential Learning Cycle. Photo

elicitation is an instructional strategy that facilitates emotional engagement and was analyzed using Kolb's Experiential Learning Cycle. Conceptual change is an instructional strategy that facilitates accessing prior knowledge and was analyzed using both Ajzen's Theory of Planned Behavior and the Contextual Model of Learning. Service learning is an instructional strategy that facilitates active participation and was analyzed using Ajzen's Theory of Planned Behavior. Figure 1 illustrates the relationship between theoretical frameworks, instructional strategies, identified elements, and pro-environmental learning outcomes.

Figure 1

A Conceptual Model for Pro-environmental Outcomes

Metacognition

Metacognition is an instructional strategy that can facilitate the identified element of reflection. Metacognition as an instructional strategy was analyzed through Kolb's Experiential Learning Cycle. This particular instructional strategy can be generally described as thinking

about one's own thinking. One of the two primary aspects of this instructional strategy is reflection, which involves an awareness from the participant of what they know and what they do not know (Sims, 2018). The act of reflection through metacognition fits into Kolb's Experiential Learning Cycle as the second stage of the learning cycle, reflective observation. Reflective observation is the stage of the cycle that allows learners to make meaning of the experience, which in turn enables learners to formulate new concepts that impact learners' actions.

Within the metacognition instructional strategy, there are a number of specific actions educators can take to facilitate reflection, though the most important thing is that the participants are naming what they know and describing the thinking skills that allow them to know that information. Sims (2018) provides an example of how to use metacognition in a free-choice learning setting taking place in a museum. Sims describes how to facilitate a discussion of thinking skills by asking specific questions that uncover what the participants did in the museum gallery, the types of thinking skills they used, the new information learned, and how their perspective changed over the course of the experience. This accomplishes two things: a.) it assists in solidifying new content, and b.) it allows for the transference of thinking skills to different situations (Sims, 2018). Solidifying new content and allowing for transference are akin to stages three and four of Kolb's Experiential Learning Cycle, where learners formulate new concepts that can impact future actions. In the context of free-choice learning settings, it is also important, and more effective, for participants to repeat these acts of reflection throughout the process, as opposed to only at the end of an experience.

Ballantyne and Packer (2005) state that enhancing participants' environmental conceptions is a factor that contributes to pro-environmental learning, and that this enhancement is accomplished by helping learners become aware of their own understanding and conceptions.

Ballantyne and Packer (2005) also assert that informal education settings (such as ecotourism experiences) are in a strong position to address environmental conceptions of participants by designing their experiences in a way that encourages participants to question their own conceptions as well as the accuracy of those conceptions, and then search for alternative explanations. Participants' conceptions can be thought of as what they know, and metacognition as an instructional strategy emphasizes learners naming what information they know, as well as the thinking strategies they use in order to know that information. Specifically, using metacognition as an instructional strategy to present evidence of an environmental problem and the effects of that problem, and facilitate reflection of participants' previous conception of that problem, allows learners to consider the actions they need to take to alleviate the problem. This reflection that metacognition facilitates can effectively lead to pro-environmental outcomes.

Ballantyne et al. (2011b) also found in their study that visitors of a wildlife ecotourism experience reported developing new insights or conceptions as a result of cognitively reflecting on what they saw and heard during the experience, something they called *reflective response*. Ballantyne et al. assert that these reflective responses showed evidence of cognitive processing beyond simply the reproduction of factual information, and that some participants reported that reflecting on their experience led to a greater understanding of wildlife. They also noted that participants incorporated concepts from interpretive programming into their reflections (2011b).

Ballantyne et al. (2011b) also found that the combination of emotional and reflective responses was the most powerful and made environmental issues more personal and relevant to the participants. Specifically, interpretive information relative to the dangers that wildlife faced were more powerful to participants than factual information and resulted in feelings of protectiveness on the part of the participants toward wildlife. Reflective responses also allowed

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participants to become aware of their own impact on wildlife, which led to a desire to change their behavior (Ballantyne et al., 2011b). The study also found that social interactions assisted in facilitating a reflective response. Discussions with fellow participants, as well as with guides, provided an opportunity to formulate and communicate new concepts, and comments and questions from others elicits furthered curiosity. Social interactions also contributed to feelings of companionship.

In a study on short and long-term impacts of wildlife tourism, Ballantyne et al. (2011a) found that engaging in reflection significantly contributed to short-term learning, which was a predictor of long-term impact. This reflective engagement was more strongly associated with learning outcomes than simply the concrete experience of seeing wildlife, though the excitement of seeing wildlife was important in eliciting this reflective response. Ballantyne et al. (2011a) assert that through reflection and group discussion, ecotourism experiences can positively impact participants' pro-environmental learning outcomes. Using Kolb's Experiential Learning Cycle, ecotourism presents an opportunity for participants to have new concrete experiences, such as seeing wildlife up close or spending time in undisturbed and intact habitat. Metacognition facilitates reflective observation of these concrete experiences, through the use of intentional individual or group activities and discussions. Reflection then allows participants to become aware of what they know and don't know, and how that has changed over the course of the experience. This reflective process solidifies new content, allowing participants to make new meaning of their conceptions, which ultimately leads to pro-environmental learning outcomes.

Photo elicitation

Photo elicitation is an instructional strategy that facilitates the identified element of emotional engagement. Photo elicitation as an instructional strategy was analyzed using the

framework of Kolb's Experiential Learning Cycle. Photo elicitation uses photos as the center piece of an interview process. The interviewer listens as the interviewee (the learner) reflects on the photos, which facilitates a deeper connection and more emotional engagement than reflection that occurs just through the use of words. Reflecting on photos through the use of photo elicitation also facilitates a more affective and spiritual connection with the outdoors (Loeffler, 2004). Using Kolb's Experiential Learning Cycle as a framework, the process of photo elicitation takes a concrete experience (a photo of the participants' experience) and facilitates observational reflection in an affective or emotional realm (reflecting during the interview process on the photo). This allows the participants to make meaning of their experience and in turn create new concepts that can impact future actions.

Ballantyne et al. (2011b) found in their study that participants emotions were one of the primary factors that contributed to their memories of a wildlife ecotourism experience. Engaging participants' emotions through specific experiences allowed some participants to feel empathy for the animals and care about their well-being. The long lasting and vivid memories from an ecotourism experience are often related to the participants' feelings and emotions. Arousing emotions within participants also sparked deeper thought and lead to a concern for wildlife. Ballantyne and Packer (2005) also state that arousing emotions is a factor that contributes to pro-environmental learning in free-choice learning settings, such as ecotourism. Not only can engaging emotions promote pro-environmental learning, but there is also limited evidence that suggests these emotionally related impacts are longer lasting than when emotions are not engaged (Ballantyne & Packer, 2005).

Zeppel (2008) additionally found in a review of education and conservation benefits of marine wildlife ecotourism programs, that participants' emotional responses to marine wildlife

can result in off-site pro-environmental learning, such as more environmental awareness and support of conservation efforts. The integration of new knowledge with the emotional aspects of viewing marine wildlife harnessed the greatest pro-environmental learning outcomes in participants, including influencing participants' intentions to adopt more pro-environmental actions (Zeppel, 2008). Therefore, Zeppel states that educational programming in ecotourism should be designed to include both cognitive and affective aspects. Ballantyne et al. (2007) asserts that in addition to cognitive aspects of a free-choice learning experience, connecting with visitors' emotions can also influence pro-environmental learning. Connecting with visitors' emotions can be particularly powerful in wildlife ecotourism, as humans generally have a strong emotional response to viewing and interacting with animals (Ballantyne et al., 2007).

Using photo elicitation, participants are able to capture salient aspects of an experience such as a close encounter with an animal. In the context of Kolb's Experiential Learning Cycle, these photos are capturing a concrete experience that participants engaged in. The process of interviewing, which in an ecotourism experience could present itself in a more informal manner, such as a discussion with peers or with the guide, facilitates stage two of the Experiential Learning Cycle, reflective observation. This reflective observation of a salient experience can elicit an emotional response which has been shown to have a powerful impact on participants in terms of pro-environmental learning outcomes. Eliciting an emotional response through reflective observation of a photo can also prompt a desire in participants to adopt more pro-environmental behaviors, which when analyzed through Kolb's Experiential Learning Cycle, would relate to the fourth stage of the cycle, active experimentation, in which new concepts learners have formed impact their actions. Additionally, given Zeppel's (2008) findings that combining cognitive and affective responses in participants can further positively impact pro-

environmental learning, integrating informational interpretation in specific areas, and then encouraging participants to photograph those areas to later connect with emotionally via photo elicitation could result in even more powerful pro-environmental learning outcomes.

Conceptual change

Conceptual change is an instructional strategy that facilitates the identified element of accessing prior knowledge. Conceptual change was analyzed through the Contextual Model of Learning, and Ajzen's Theory of Planned Behavior. The conceptual change instructional strategy uses learners' misconceptions as a tool to learn and make sense of the world. Using misconceptions as a tool for learning involves accessing learners' prior knowledge or exposing their current beliefs. While using the conceptual change instructional strategy, educators need to listen to and understand learners' misconceptions in order to successfully promote desired learning outcomes (Gooding & Metz, 2011). Educators can accomplish this by asking for learners to clarify, provide evidence, and evaluate their conceptions or beliefs. Asking learners to play devil's advocate and allowing sufficient time for learners to evaluate their conceptions can also assist in reaching desired learning outcomes. Using group interactions, discussions, and thinking with other participants in the group can enhance individuals' abilities to expose misconceptions, and then use those misconceptions as a tool for learning and to make new meaning (Campbell et al., 2016). When framed by the Contextual Model of Learning, exposing beliefs exists in the personal context, and the social interactions of group discussions exist in the sociocultural context. Within the context of Ajzen's Theory of Planned Behavior, exposing individual beliefs relates to the impact misconceptions can have on behavioral beliefs, or the beliefs about the outcomes of a particular behavior. The social interactions facilitated through the conceptual change instructional strategy relates to the normative beliefs, or the beliefs about

perceived social pressures to perform or not perform a behavior. Participants making new meaning out of conceptions relates to control beliefs, or beliefs about ones' ability to perform a behavior based on knowledge, skill, resources, and opportunity.

Connecting with visitors' prior knowledge and experience is an aspect of free-choice learning that has an impact on participants' conservation learning (Ballantyne et al., 2007). Free-choice learning experiences generally include participants who come with a wide array of prior knowledge and experiences. As such, the challenge of free-choice learning educators is to design experiences that enable participants to connect new information with their prior knowledge (Ballantyne et al., 2007).

Falk et al. (2012) note that learning in the context of ecotourism is a cumulative process, meaning participants' learning will be influenced by both their previous and subsequent experiences. In addition, Falk et al. state that it is not uncommon for educational programming in ecotourism to not put enough consideration into the fact that learning is cumulative. Educational programming is often based on the idea that participants lack knowledge, and learning occurs when they are simply presented with knowledge. Falk et al. suggest that a better approach is to build on participants' prior knowledge, interests, and skills (2012). Learning experiences designed specifically to build on individual participants' prior knowledge, interests, and skills should not only result in promoting desired learning outcomes, but also should add satisfaction to the participants' experience.

Similarly, Ballantyne and Packer (2011) state that connecting to participants' prior knowledge and experiences not only assist in conservation learning, but also positively impact participant satisfaction. Ballantyne and Packer also assert that ecotourism needs to design learning experiences that understand participants' pre-visit characteristics, such as prior

knowledge and experiences, and how these predispositions influence participant learning. In order to better promote desired learning outcomes, ecotourism operators must collect information relative to participants' entering attributes. These entering attributes include existing knowledge and beliefs, and accessing that prior knowledge can promote pro-environmental learning.

Ballantyne and Packer (2005) also conclude that informal environmental education programs (such as ecotourism) should target specific participant beliefs and that understanding prior knowledge is critical to doing so. Uncovering, and then challenging participants beliefs about their ability to make an environmental impact is also an important aspect of promoting pro-environmental learning through the accessing of prior knowledge. Accessing prior knowledge, and exposing participant beliefs and conceptions, allows for educators to present new information in a manner that challenges inaccurate or inadequate conceptions. Ballantyne and Packer also state that a good way to challenge participants' conceptions is to focus on providing evidence of an environmental problem, the effects of that problem, and efforts participants can make to alleviate the problem.

The conceptual change instructional strategy can facilitate the accessing and connecting of prior knowledge to new information through the use of visitors providing evidence of and evaluating their preconceived notions. Free-choice learning settings, such as ecotourism, are also well positioned to facilitate group discussions to assist in this process, as group social interaction is a natural part of the experience. In the context of the Contextual Model of Learning, the process of accessing prior knowledge and using prior conceptions or misconceptions to make new meaning can promote pro-environmental learning by impacting participants' personal and sociocultural contexts. When framed by Ajzen's Theory of Planned Behavior, accessing prior knowledge enables experiences to be designed in such a way that addresses participants' specific

beliefs and targets information in which those beliefs are founded (Ballantyne & Packer, 2011). If approached first by assessing and understanding a participants' existing beliefs, addressing misconceptions and making new meaning within the context of existing beliefs can facilitate a change in participant beliefs that may lead to changes in behavior.

Service learning

Service learning is an instructional strategy that facilitates the identified element of providing an opportunity for active participation. Active participation, though not specifically considered an educational element of an ecotourism experience, is an aspect of ecotourism experiences that has been identified to promote pro-environmental learning outcomes. The service learning instructional strategy was analyzed through Ajzen's Theory of Planned Behavior. Service learning consists of learners or participants providing a service in combination with educational instruction. Service learning provides learners with knowledge and skills that go beyond the educational curriculum, and can positively increase learning outcomes generally (Prentice & Robinson, 2010). Within the context of Ajzen's Theory of Planned Behavior, allowing learners or participants' in a group setting to actively participate in a service (a behavior), specifically one previously perceived as difficult, can positively impact participants' behavioral, normative, and, particularly, control beliefs.

Bowler et al. (1999) conducted a study relative to how service learning can impact participant learning outcomes. The study specifically examined learning outcomes of University classes, in which one class participated in ecological restoration services in addition to course work, and was compared against the control groups where the class did not participate in ecological restoration. Results of that study found that ecological behavioral intention, as well as general ecological behaviors were positively impacted and were significantly higher in the class

that participated in ecological restoration than that of the control classes. While this study examined the impact of service learning in a more formal educational setting, ecotourism is a form of free-choice environmental learning, with similar desired pro-environmental learning outcomes as an environmentally oriented University course. As such, it is worthwhile to consider these results and how similar results could be obtained using service learning specifically designed for ecotourism experiences.

Providing opportunity for active participation has been identified as an element of ecotourism experiences that can lead to pro-environmental outcomes. Ballantyne et al. (2011b) state that in order to accomplish desired pro-environmental outcomes, participants need to be convinced that they can make a difference in positively impacting the environment. They also need to be provided with achievable actions that they can do to have that impact. Not only can this lead to pro-environmental outcomes, but Ballantyne et al. (2011b) also found in their study that visitors are actually particularly interested and specifically desire receiving this type of information.

Ballantyne and Packer (2005) additionally state that providing participants with positive experiences that show them that they can have an influence on the environment encourages more environmental action. Ballantyne and Packer highlight the importance of making new knowledge applicable and relative to the participants' own lives, thus influencing participants' control beliefs. Weaver (2001a) also discusses the idea of *enhancement sustainability* in ecotourism. Enhancement sustainability occurs when participants aim to enhance the condition of the environment they are visiting, through donations or active participation in volunteer opportunities. Using service learning as an instructional strategy facilitates the opportunity for active participation, which could in turn result in enhancement sustainability. Given the findings

from Ballantyne et al. (2011b) that participants actively desire information related to opportunities to engage in achievable and impactful action, using service learning as an instructional strategy can not only result in enhanced ecosystem sustainability, but also enhanced visitor satisfaction.

In a study of volunteer tourism taking place in Elephant National Park in Thailand, Rattan et al. (2012) found that even the mere presence of volunteer tourists had a positive impact on non-volunteer tourists' inclination to volunteer with wildlife conservation groups, or to donate money to wildlife conservation groups. Rattan et al. (2012) conclude that educating non-volunteer tourists about environmental issues in a setting where active participation opportunities are available can promote pro-environmental learning outcomes. When analyzed through Ajzen's Theory of Planned Behavior, non-volunteer tourists witnessing the actions of volunteer tourists could influence behavioral, normative, and control beliefs. Specifically, observing other tourists participating in conservation actions could have a profound impact on normative beliefs, or beliefs related to perceived social pressures to either perform or not perform a certain behavior.

Ballantyne and Packer (2011) took the concept of providing participants with opportunities to engage in conservation-based action a step further in their study about *post-visit action resources*. The authors call for ecotourism operators to continue correspondence with participants by sending them resources after the initial on-site experience has concluded. The intention of these post-visit action resources is to encourage pro-environmental decision making, and to motivate visitors to adopt pro-environmental behaviors by providing a range of examples and models of appropriate behavior. Though not explicitly stated in Ballantyne and Packer's study, it could be argued that including both on-site active participation opportunity, as well as

post-visit action resources would have a significant impact on participants' behavioral, normative, and control beliefs, both on-site and off-site.

Powell and Ham (2008) studied the impacts of specifically designed interpretation during ecotourism trips to the Galapagos. Ajzen's Theory of Planned Behavior provided the theoretical basis for the interpretation strategy. The strategy specifically attempted to embed key beliefs in participants' minds about their ability to donate money to conservation efforts in the Galapagos, and the positive outcomes of those actions. Key themes relative to the uniqueness of the Galapagos ecosystem were developed and reinforced. Additionally, messages that target participant beliefs important to donating money to conservation efforts were interwoven. Guides included information about the threats facing the Galapagos ecosystem, seeking to influence participants' beliefs about donating money to conservation efforts. Later in the tour, a presentation was made that reinforces previously developed ideas and also draws attention to both the need, and the positive impact of ecotourism participant donations. Following that, the guides invite participants to donate, and inform them that an opportunity to do so will be provided in each participant cabin. The intent behind this invitation, following previously presented and reinforced information, is to target the participants' control beliefs by allowing them a direct and immediate way to participate in donating – a conservation action.

This strategy focuses on research that claims the more convenient and immediate of an opportunity provided to act, the higher the expected participation rate. In this example, one could argue that service learning as an instructional strategy is being used. A combination of education (information about the Galapagos ecosystem, the dangers it faces, and the benefits of monetary donation), and opportunity for active participation (immediate opportunity to donate) are both present. The results of Powell and Ham's (2008) study showed that this interpretation strategy

significantly impacted participants' knowledge about the Galapagos ecosystem and their attitudes towards Galapagos National Park Management. Additionally, results indicated a significant impact on attitudes and intentions to donate to a conservation fund, with 78% of the participants actually making a monetary donation.

The use of service learning as an instructional strategy can facilitate opportunity to actively participate in pro-environmental outcomes. Using Ajzen's Theory of Planned Behavior, opportunities to participate in these actions can also positively influence behavioral, normative, and control beliefs, hence having the potential to positively impact participant's pro-environmental actions beyond the temporal scope of the ecotourism experience.

Examples of instructional strategies in ecotourism settings

Appendix A consists of four mock lesson plans, each one utilizing one of the four instructional strategies to promote pro-environmental learning. These examples specifically consider a multi-day ecotourism experience taking place in the Greater Yellowstone Ecosystem, however, as discussed in the justification section of this chapter, these instructional strategies are transferrable to different varieties of ecotourism that exist in different locations. The content of the lesson in various locations would differ; however, the structure would follow the same sequence and the general activities that the guide facilitates would be similar. For instance, if the example provided calls for a group discussion with specifically aimed questions about human impact on a regional species of wildlife, those same ideas should be transferred to a species of wildlife relative to the particular region in which the ecotourism experience is taking place.

Additionally, though these examples represent detailed and specific plans, it should be noted that with proficiency, guides can use these instructional strategies based off of appropriate teachable moments. Though it is recommended to have cases in which the use of these

instructional strategies is planned out (as in the examples), ecotourism experiences often present moments in which these instructional strategies can be used without a detailed plan. However, it is important that the proper intention and structure remains. For example, if a guide notices a participant taking a photograph of something that elicits a particularly strong emotional response, like a young calf feeding from its mother, photo elicitation could be used in that moment by asking the participant to describe how that experience made them feel. Additionally, a group discussion focusing on the emotional response of the other participants could be facilitated.

Though each of the examples presented emphasizes only one of the examined instructional strategies, it is possible for multiple instructional strategies to be used in conjunction to promote pro-environmental learning. For example, using metacognition to facilitate participants' reflection of a service learning activity could have positive outcomes, potentially further influencing participants' behavioral, normative, and control beliefs. It should be noted that in the context of ecotourism, the assessment evidence provided by participants would look different than that of a more traditional environmental education setting. It is generally not expected that ecotourism participants produce any type of product to show their learning. In an ecotourism setting, evidence of learning will often be assessed through verbal communication in group discussions. In this case, the guide can enhance the evidence by documenting participant comments and learning, when appropriate.

Conclusion

Extensive research of previous literature shows that metacognition, photo elicitation, conceptual change, and service learning instructional strategies can facilitate identified elements of an ecotourism experience that promote pro-environmental learning. Ecotourism has the potential to be an industry that positively impacts the environment in a time when many

industries are causing environmental harm and degradation. All true ecotourism experiences should include some form of visitor learning and promoting pro-environmental learning outcomes in ecotourism participants can have a large and positive impact on the conservation of the natural world. Given the findings of this study, it is recommended that future studies regarding environmental education in ecotourism specifically design interpretive programming to use these instructional strategies in the manner presented. Ultimately, ecotourism is an industry that is well positioned to influence environmental knowledge, attitudes, beliefs, behavioral intentions, and behaviors. The instructional strategies presented can positively influence these pro-environmental learning outcomes, thus positively impacting the environment as a whole.

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Appendix A: Example Lesson Plans

Metacognition Model Lesson Plan

Audience Information: *Group of 12 adult participants on a 3-day tour in the GYE, ages range from in their 30s to in their 70s, as is the case with many free-choice learning environments, participants come with a range of prior knowledge, experience, motivations, etc.*

Plan of the Field Day

Location: *Beaver pond in Yellowstone National Park*
Theme of the Day: *Wildlife conservation, habitat preservation, human impact on wildlife and habitat*
Topics Explored: *Wildlife conservation and habitat preservation, specific wildlife species (i.e. beavers), keystone species, interconnectedness, trophic levels and trophic cascades*

Learning Objectives for the Day:	*Assessment Evidence for the Day:*
Participants will:	*Participants will demonstrate learning through*
1. *Observe natural history of a particular species (in this case beaver), and their importance on the ecosystem*	1. *Engagement in reflection on what participants knew during an initial group discussion, and how their perspective changed over the course of the experience*
2. *Understand how humans have impacted beavers through habitat destruction and over harvesting*	2. *Verbal demonstration of how conservation ideals of one species can be transferred to wildlife conservation and habitat preservation more generally*
3. *Conceptualize trophic levels, and the interconnected nature of ecosystems*	3. *Engagement of pro-habitat preservation behaviors such as staying on appropriate trails*
4. *Familiarize themselves with humans' role, both historically and presently, on wildlife and habitat impact*	4. *Demonstration of intent to behave in pro-environmental manners as it pertains to habitat preservation beyond the scope of the ecotourism experience*
5. *Name tangible behaviors they can do to conserve wildlife and habitat*	

Sequence:

9:00am – Arrive at beaver pond in Yellowstone
- Upon arriving at a beaver pond, introduce the theme of the day
  - Wildlife, wildlife conservation, habitat preservation, human impact on wildlife and habitat
- Give participants a few minutes of free exploration of the beaver pond area while considering the following question:
  - What signs or evidence of wildlife do you observe in this area?
- Regroup participants and facilitate a group discussion
  - First, have participants share any signs or evidence of wildlife that they observed[1]
    - In this scenario, this could include participants pointing out the beaver damn, observing fish or other aquatic wildlife in the beaver pond, noticing avian species in surrounding aspens, seeing ungulates or signs of ungulate herbivory on surrounding willows, etc.
  - Second, have participants reflect and elaborate on why they believe what they observed was a sign of wildlife, and the types of thinking skills they used[2]

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[1] Having participants name out loud what they observed in a group discussion setting facilitates stage 2 of Kolb's Experiential Learning Cycle, reflective observation
[2] Naming specific thinking skills both solidifies new content, and allows for the transference of those thinking skills to different situations

- - - i.e. seeing signs of herbivory led them to believe ungulates have been in this area, and they used prior knowledge, deductive reasoning, used available resources such as guidebooks, etc.
  - o Third, focus conversation specifically to one species that is evidenced as being present in the area, in this case beavers
    - - If no one points out the beaver dam, or cites beavers as a species that is present in the area, specifically point out the dam and ask probing questions about what the beaver dam is, and what type of wildlife is responsible for it
  - o Then have participants share existing knowledge about beavers, reflecting on where they learned that information and why they believe what they believe[3]
  - o Following that, give a brief lecture about beavers
    - - Life history
    - - Keystone species
    - - Ecological importance/impact on ecosystem
  - o After lecture and presenting information, have participants do another exploration, considering the question:
    - - What new perspectives do you have while viewing this ecosystem and observing signs of wildlife?
  - o Regroup and have participants share out, with follow up questions to responses designed to have participants reflect on what made their perspective change
- Transition to human impact on beavers
  - o Inquire about participants beliefs and conceptions of how humans have impacted beaver populations, again asking them to reflect on what leads them to believe what they believe
- Brief lecture on human impact
  - o Over harvested
  - o Habitat destruction
  - o Degraded land due to decreasing populations
  - o Reintroduction and theories stating reintroduction of beavers in partially responsible for increased health of Yellowstone ecosystem
  - o Trophic levels and trophic cascades
- Reflection/group discussion about how new perspectives of human impact on wildlife and habitat can be transferred to different areas and different species
  - o How does can this new information and these new perspectives be applied to other situations, or your daily lives?
  - o What tangible actions can you take to assist wildlife conservation efforts?[4]
    - - During the rest of this ecotourism experience?
    - - Beyond the temporal scope of this experience?
  - o What leads you to believe these actions will make a difference?
- Introduce tangible actions not listed
  - o Volunteer/donate to organizations such as the Nature Conservancy
  - o Participate in citizen science projects
    - - iNaturalist
- Wrap-up
  - o Have participants reflect on what participants did today, the thinking skills they used, new information gained, and how their perspective changed[5]

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[3] Sharing existing knowledge allows participants to become aware of their own understanding and conceptions, something contributes to and enhances pro-environmental learning

[4] Listing tangible actions assists in facilitating stage 4 of Kolb's Experiential Learning Cycle, active experimentation

[5] This process is again designed to both solidify new content, and allow for the transference of thinking skills

Photo Elicitation Model Lesson Plan

Audience Information: *Group of 12 adult participants on a 3-day tour in the GYE, ages range from in their 30s to in their 70s, as is the case with many free-choice learning environments, participants come with a range of prior knowledge, experience, motivations, etc.*

Plan of the Field Day

Location: *photographing takes place throughout the experience, while photo elicitation takes place on the last night of the trip after dinner back at participant accommodations*
Theme of the Day: *connection to the outdoors, human impact on the environment*
Topics Explored: *the relationship between feeling connected to the outdoors and environmental conservation*

Learning Objectives for the Day:	*Assessment Evidence for the Day:*
Participants will:	*Participants will demonstrate learning through*
6. *Engage with their emotions while talking about photographs they took*	5. *Present 1-3 photos they took during the experience, and discuss with the group how their photos make them feel*
7. *Understand how human impact can negatively impact the health of wildlife populations*	6. *List actions they can take to promote conservation*
8. *Be aware of actions they can take to promote conservation and minimize their impact on the environment*	

Sequence:

*Prior to the photo elicitation process, guides should let participants know (at the beginning of the experience), that on the last night of the trip participants will choose 1-3 personally meaningful photos they took during the experience to present and discuss with the group. Over the course of the trip, guides should:

- Periodically remind participants of this event
- Encourage participants to photograph salient moments in which participants felt particularly connected to the outdoors, and that have high potential for emotional arousal (for example, close encounters with wildlife, pristine landscapes, evidence of habitat destruction via human impact, or evidence of negative impact to wildlife via human impact)
- During particularly salient moments, also include information about the subject at hand, intended to cognitively engage participants, later to be combined with emotional engagement[6]

7:30pm – Wrap up dinner, and gather the group in a common area where photos can be viewed and discussed
- Go over the sequence of events for the night, and emphasize the intended topic
  - First, reiterate what the process consists of
    - Each participant will share one to three photos from the trip that they found particularly meaningful
    - When presenting their photos, participants should describe
      - When and where this photo took place during the trip
      - What they learned during this particular experience[7]
      - Describe how the photo(s) make them feel
      - Describe how the experience in this photo changed their perspective

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[6] This part of the process facilitates capturing the first stage of Kolb's Experiential Learning Cycle, capturing the participants' 'concrete experience'
[7] Describing what they learned reinforces cognitive engagement, and combines cognitive engagement with emotional arousal, which can potentially further promote pro-environmental learning outcomes

- - - • Describe what it means to them to feel connected to the outdoors, and what, if any, impact this has on environmental conservation
      - ▪ As the guide, you should participate in this process as well, perhaps even going first to model the activity for the rest of the group
  - o As participants present their photos, capitalize on opportunities to ask questions intended to make participants elaborate and reflect on emotions associated with the photo
  - o As well, ask questions intended to have participants consider the role of human impact in the photos they are presenting, or the environment broadly
    - ▪ This could include asking participants about how humans have impacted wildlife that is present in the photos, or how humans have impacted habitat (if the picture is of pristine, undisturbed habitat, a follow up question related to human impact could be "how does seeing this pristine environment make you feel about the overall landscape of the country?"
- • After all participants have presented, transition to actions they can take to promote conservation[8]
  - o Briefly recap the emotional engagement participants showed during the presentations, and talk about relevant thoughts or quotes from participants about how connection to the outdoors can positively impact conservation
  - o Pose the question, "what actions can we take to promote a healthy environment?"
    - ▪ Facilitate a group discussion, emphasizing participant emotional and cognitive responses when appropriate
    - ▪ Document participant ideas
    - ▪ Then, present any actions that participants did not mention
      - • I.e. volunteering at wildlife conservation organizations, sustainable purchasing, reduction of carbon emissions, donation to conservation organization, citizen science projects, education of peers, etc.
  - o After documenting both participant and guide conservation actions, present the entire list to group
  - o Lastly, recap by walking participants through the process what they just did
    - ▪ "Tonight, we shared photos from our experience that were particularly meaningful to us, and talked about how these photos made us feel, specifically about our connection to the outdoors, and the impact of human on landscapes and wildlife. After reflecting on those photos and experiences, we conceptualized ways in which we can minimize our impact and promote conservation. The next step is to keep these ideas in mind as we part ways, and to have these ideas impact your actions moving forward"[9]
  - o Let participants know that the document they created pertaining to tangible actions to promote conservation can be shared
  - o Encourage participants to share photos with each other after the trip if they wish[10]

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[8] This is intended to facilitate stages 3 and 4 of Kolb's Experiential Learning Cycle. Considering potential actions relates to their abstract conceptualization (stage 3), by enabling them to formulate new concepts. These new concepts could then impact their actions while they engage in active experimentation (stage 4)

[9] This recap subtly reinforces the four stages of Kolb's Experiential Learning Cycle

[10] Both the list, and the participants sharing photos can act as 'post-visit actions resources', both further arousing emotions (through sharing of photos), and providing participants with a list of tangible actions they can adopt after the experience has concluded

Conceptual Change Model Lesson Plan

Audience Information: *Group of 12 adult participants on a 3-day tour in the GYE, ages range from in their 30s to in their 70s, as is the case with many free-choice learning environments, participants come with a range of prior knowledge, experience, motivations, etc.*

Plan of the Field Day

Location: *Lodgepole pine forest in Yellowstone in area effected by 1988 fire*
Theme of the Day: *Wildfire impact on ecosystem, human impact on wildfire*
Topics Explored: *Succession, adaptations, fire suppression, fuels (fine fuels vs ladder fuels), climate change, wildfire frequency and intensity, wildland urban interface (WUI)*

Learning Objectives for the Day:	*Assessment Evidence for the Day:*
Participants will:	*Participants will demonstrate learning through*
9. *Observe the function of wildfire on ecosystems*	7. *A group discussion designed to expose beliefs and conceptions*
10. *Know lodgepole pine (and other conifer) adaptations to wildlife, and how it plays into succession*	8. *Responses to questions that target participants change in perspective*
11. *Understand natural and human factors that impact fire frequency and intensity*	9. *Relating new knowledge to a different area relative to their lives outside this tour*

Sequence:

9:00am – Arrive at lodgepole pine forest in Yellowstone effected by 1988 burn
- Upon arrival, give participants a few minutes to freely explore the area, while considering the following question:
  - Do you notice any evidence of a disturbance?[11]
- Regroup participants after free exploration, asking them to name any evidence of disturbance
  - If no participants point out wildfire as a disturbance that occurred in this area, draw attention to evidence of wildfire such as remaining burnt stumps, and the even age of lodgepoles in this stand
  - If participants do name wildfire as a disturbance, ask them to provide evidence of how they came to that conclusion
- Then, ask participants to have a group discussion about both whether wildfires are harmful or beneficial to an ecosystem, and explain why they think what they think, and what previous knowledge or experiences have allowed them to believe that
  - At this stage, let participants lead the discussion, do not yet interject with relative content information about wildfires. Give participants ample time to expose their current beliefs, and think about/name why they believe that[12]
- Following group discussion, build on participants prior knowledge and beliefs, giving a brief lecture on the importance of wildfire for the ecosystem
  - Discuss adaptations of plants, using lodgepole pine serotinous cone as evidence

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[11] Specific questions like this are designed to expose individual beliefs, or beliefs that exist in the 'personal context', as it relates to the Contextual Model of Learning. Within the context of Ajzen's Theory of Planned Behavior, exposing individual beliefs relates to the impact misconceptions can have on behavioral beliefs (the beliefs about the outcomes of a particular behavior)

[12] Exposing beliefs in a group setting exists within the sociocultural context of the Contextual Model of Learning, and when framed by Ajzen's Theory of Planned Behavior, relates to the normative beliefs (beliefs about perceived social pressures to perform or not perform a behavior)

- o Discuss succession, and how species such as lodgepole and aspen thrive after disturbance such as fire
    - ▪ Relate this to the benefit to wildlife that rely on species like lodgepole and aspen
    - ▪ Relate this to wildfire promoting diversity in the ecosystem, and how the lack of wildfire would create homogenous ecosystem, less supportive of a diversity of life
- • Transition to exposing beliefs about human impact on wildfire
    - o Question to the group: what role have humans played in wildfire?
        - ▪ Allow a group discussion to occur, encouraging participants to share their beliefs about human impact on wildfire[13]
        - ▪ Ask probing questions to participant responses, intended to make them think about why they believe what they believe
            - • For example, it is not unlikely a participant will mention climate change as a human impact to wildfire. Follow up with a question pertaining to how they know climate change is impacting wildfire, and ask them to provide examples
                - o This step is intended to get them thinking about 'how they know what they know', and could additionally uncover misconceptions participants may have
    - o After group discussion and follow up questions, build on participants prior knowledge and beliefs, and giving a brief lecture on human impact to wildfire
        - ▪ Natural fire regime frequency and intensity
            - • Discuss the idea of fire frequency and intensity making up a 'fire regime'
            - • Relate back to previous lecture, i.e. plants and animals are adapted to, and reliant on the natural fire regimes occurring
            - • Discuss fuels, and the role fuels play
                - o Fine fuels vs ladder fuels
        - ▪ Climate change
            - • Climate change can impact duration of fire season, potentially increasing frequency, and altering historical fire regime
        - ▪ Fire suppression
            - • For most of the 20th century Euro-Americans did not understand the important role wildfires play in ecosystem functionality
            - • Fire suppression was the strategy
            - • Suppressing fires causes a build-up of fuels, both fine fuels and ladder fuels
            - • Fire suppression can decrease frequency, however due to build-up of fuels, can increase intensity
                - o I.e. an area that historically was a high-frequency, low-intensity fire regime could become a low-frequency, high-intensity fire regime
            - • Introduce Wildland-Urban-Interface (WUI)
                - o More and more infrastructure built in WUI, without proper protocol and regulations pertaining to wildfire
- • Transition to relating personally to, and transferring new knowledge and meaning
    - o Ask participants if they have any thoughts pertaining to human impact on wildfire, and personal connections (if they are comfortable sharing)
    - o Group discussion question: what are actions you can take to decrease human impact on wildfire?
        - ▪ Allow participants to discuss as a group, sharing ideas and beliefs
    - o Build on participants' responses, discussing actions that they can take

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[13] This group discussion again exists within sociocultural context of the Contextual Model of Learning, and targets normative beliefs in the context of Ajzen's Theory of Planned Behavior

- Climate change actions – achievable reduction of emissions (it is likely participants will have mentioned this, and specific actions they may be taking, highlight those for others)[14]
- Fire suppression actions – if you do live in the WUI, there is something called a Community Wildfire Protection Plan
  - Healthy Forests Restoration Act and Community Wildfire Protection Plans allow communities to influence how federal agencies implement fuel reduction projects on federal lands, as well as how federal funds may be distributed on nonfederal lands

- Wrap-up
  - Ask participants, as a group, to share new information they learned during this experience, and how and why it changed their previous conceptions
  - Throughout the course of the rest of the tour, reinforce ideas as 'teachable moments' present themselves
  - Let participants know where to find additional info about action steps (i.e. info on Community Wildfire Protection Plans)

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[14] Discussing actions can influence both participants' normative and control beliefs in the context of Ajzen's Theory of Planned Behavior

Service Learning Model Lesson Plan

Audience Information: *Group of 12 adult participants on a 3-day tour in the GYE, ages range from in their 30s to in their 70s, as is the case with many free-choice learning environments, participants come with a range of prior knowledge, experience, motivations, etc.*

Plan of the Field Day

Location: *Bridger-Teton National Forest area heavily impacted by invasive plants*
Theme of the Day: *personal action and impact on environment*
Topics Explored: *invasive plants, botany, ecosystem functionality, habitat restoration*

Learning Objectives for the Day:	*Assessment Evidence for the Day:*
Participants will:	*Participants will demonstrate learning through*
12. *Understand how invasive plants damage ecosystems*	10. *Active engagement in invasive plant removal*
13. *Examine botanical factors that allow for invasive plants to damage ecosystems*	11. *A group discussion about invasive species impact on ecosystems*
14. *Become aware of opportunities to engage in actions that assist in habitat restoration beyond this trip*	12. *List and consider additional opportunities to engage in habitat restoration*

Sequence:

10:00am – Arrive at Bridger-Teton National Forest invasive plant removal site
- Begin with a pleasant hike through the National Forest to the invasive plant site
    - During the hike, focus on native vegetation, and its function in a healthy ecosystem, emphasizing species reliance on healthy native vegetation for survival
    - Introduce what an invasive species is, how they impact the ecosystem, and how human activity is often times responsible for the existence of invasive species
    - Specifically, point out vegetation that is heavily impacted by invasive species, and how those species in particular interact with other species in the ecosystem
- Once arriving at the invasive site:
    - Present relative information about the invasive species
        - Point out the invasive species
        - Discuss how to properly identify it
        - Discuss how to properly remove it
            - Include relevant botanical information about why it is important to properly remove it, and how improperly removing it can actually further promote the reproduction of the invasive species
    - Facilitate a group discussion designed to reinforce ideas presented during the hike
        - What are invasive species?
        - How do they impact the ecosystem?
        - What, in many cases, caused the prevalence of invasive species?[15]
- Begin invasive plant removal, providing a range of different specific activities for different participants[16]
    - I.e. identification, removal, collection
- After invasive species removal activity is complete, wrap up with another group discussion

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[15] Up until this point, the content acts as educational instruction to be combined with service
[16] When framed by Azjen's Theory of Planned Behavior, the social nature of such group activity can positively influence participants' normative beliefs

- o Reinforce ideas related to ecosystem functionality, how invasive species harm the ecosystem (specific to the invasive species at hand), and humans' role in invasive species
- o Emphasize the positive impact invasive plant removal, like they just did, can have for habitat restoration
- o Inquire if any participants know of any invasive species in their area
  - If yes, encourage participants that they have the ability to participate in similarly impactful activities where they live
  - If no, present participants with the means to find out such information
    - Local forest service districts generally have info about invasive plants in their region, some even have volunteer programs in which people can participate in invasive plant removal like we just did[17]

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[17] This wrap-up and group discussion is designed to highlight the participants' ability to engage in such behaviors (or control beliefs as it relates to Ajzen's Theory of Planned Behavior), as well as highlight the positive impact engaging in such behaviors has on the ecosystem (of behavioral beliefs as it relates to Ajzen's Theory of Planned Behavior)