

NATURE VERSUS TECHNOLOGY: WHICH IS MORE APPEALING TO YOUTH

AGES 11-14?

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Title

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State University's regulations and meets the accepted standards for the degree of

**MASTER OF SCIENCE**

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## **ABSTRACT**

Recent studies show playtime for youth has shifted from playing outdoors to being connected to a screen-based device. This study examines the amount of time youth ages 11-14 are spending in nature versus the amount of time they are spending connected to a screen-based device. The Drift Prairie group (N=16) spent a day in the great outdoors interacting with their peers and nature. The Comparison group (N=19) was randomly selected from a local 4-H organization. Both the Drift Prairie group and the Comparison group were surveyed using a questionnaire. The Drift Prairie group response was 62.6% active in nature whereas the Comparison group was 68.4%. The Drift Prairie group response to using a screen-based device was 6.3% whereas the Comparison group was 15.8%. The results of this study were not conclusive with the growing trend of youth spending more time with a screen-based device versus spending time with nature.

## ACKNOWLEDGEMENTS

What a roller coaster ride! I can honestly say I don't think I have ever worked so hard for something in my entire life. I never realized one could have so many emotions happening simultaneously: frustration, stress, overwhelming, excitement and joy top the list.

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## **LIST OF ABBREVIATIONS**

ART.....	Attention Restoration Theory
DPD.....	Drift Prairie Day
GPS .....	Global Positioning System
NOLS .....	National Outdoor Leadership School



## INTRODUCTION

*If a child is to keep alive his inborn sense of wonder,  
he or she needs the companionship of at least one adult who can share it,  
rediscovering with him the joy, excitement, and mystery of the world we live in.*

- Rachel Carson

Generations Y, 1977-1994, and Z, 1995-2012, (Schroer, n.d.) are growing up in a world filled with social media and technology. Recent studies show playtime for youth has shifted from playing outdoors and interacting with natural capital to being connected to a screen-based device (Marshall, Gorely, & Biddle, 2006; Pergams & Zaradic, 2006). The community capitals framework is a model which reveals the interactions between different parts of a community. There are seven community capitals which work together to form a healthy ecosystem and vibrant economy. This study focuses on three of the seven community capitals: natural, social, and human.

What we know is youth growing up in today's society are growing up with computers, the Internet, Twitter, Instagram, and the plethora of other social media "apps" and games. It is not uncommon to see youth engaging in their cell phone and video games instead of playing with each other.

As a youth growing up as part of Generation X (1964-1980), the following are my memories of summer vacation. *Many of my childhood memories are of my brother and me figuring out how to sneak into our house to go play Nintendo. The advancements in gaming systems and the internet were not contenders of our time. Because of this, unlike today's world, the majority of my childhood memories were not consumed with technology, TV time, or social media (which surfaced a good decade or two later). The majority of my memories are of my siblings and me riding our bikes down the long gravel road to go visit a nearby friend, building*

*forts in our forest of trees surrounding our farm, jumping from hay bale to hay bale, playing with our farm animals, riding horseback, and hunting the prairie lands, sometimes covered in feet of snow. Reminiscences of those out-of-door experiences only bring peaceful, joyful, dreamful, youthful, and beautiful memories.*

Compare my free time as a youth to the following story from a girl who is currently thirteen. *My sisters and I do not feel safe going outside to play. Our mom tells us to lock the door when she leaves for work. We are not supposed to answer the phone unless we recognize the name on the caller I.D. We definitely do not answer the door. I spend a lot of time on my cell phone talking to my friends. When I am not talking to them, I grab my iPad and play games. I do like to go for walks with my mom when she comes home from work, but our walks have become less and less because of our neighborhood crime rate.*

Both stories display technology as a part of their free time. However, the thirteen year old girl has little to say about being out-of-doors. The purpose of this study looks at two youth groups: Drift Prairie Day environmental education group (N=16) and a Comparison group (N=19). All the youth are ages 11-14 and were asked a series of questions regarding their time in nature versus their time with a screen based technological device. The sample for the Drift Prairie Group were those youth who registered for Drift Prairie Day (DPD), an outdoor skills day. The sampling frame for the Comparison group was selected from those youth who were enrolled in the county 4-H program during the year of 2014-2015. The two objectives of this study

1. Examine the amount of free time youth in early adolescent ages 11-14 are spending with nature versus spending time with a screen based device.

2. Examine the connection youth have with natural capital as early adolescent youth, ages 11-14.

Cofounder and chairman of the Children Nature Network, Richard Louv, wrote the book *Last Child in the Woods*. He coined the term “nature deficit disorder” to describe the human costs of alienation from nature, including diminished use of the senses, attention difficulties, and higher rates of physical and emotional illnesses (Louv, 2008). His book shares a plethora of nature-related stories from college professors, researchers, adults, youth, naturalists, and famous individuals, such as John Muir, Meriwether Lewis, William Clark, Ansel Adams, Theodore Roosevelt, and Benjamin Franklin. Louv’s work is the inspiration behind this new phenomena of youth spending less time being socially active in natural capital. Louv describes the benefits of interacting with nature as intimate, cognitive, fascinating, masterful, and social. Louv states that nature provides greater physical, mental, and spiritual health. Nature can be a stress reducer, nature develops more creativity, and nature provides a sense of play. Additional research on the mounting evidence and benefits of nature include psychological, physical health, and cognitive performance. Simply put, exposure to nature provides positive benefits.

In 2014, a North Dakota county 4-H office implemented an outdoor skills day for area youth ages 11-14. 4-H is America’s largest youth development and youth mentoring organization whose purpose is to provide opportunities in program areas such as organized clubs, camps, afterschool programming, and school enrichment. The local 4-H club initiated an outdoor skills day which aligned with the statewide teachers’ convention held in October. Similarly, hands-on experiential approach to education learning can be found with organizations such as National Outdoor Leadership School (NOLS) and Outward Bound.

Youth today are considered the most inactive generation (Sylvia & Baldwin, 2003). Society has created a culture where Generations Y and Z youth have a lifestyle of being connected to an electronic device. According to Louv (2008), a 97.5 percent drop in visitation at National Parks is due to increased time spent plugged into electronics. A University of Illinois of Chicago research professor, Oliver Pergam, echoes Louv as well as other researchers (Biocca, 2000; Marshall et al., 2005; Montgomery, 2000; Pergams & Zaradic, 2006; Rusby et al., 2014; Salmon et al., 2011) that more leisure time is being spent with some form of screen-based technological device. Youth who are experiencing early adolescence fall into several categories which include (1) physical development, (2) activities involving boys and girls, (3) interest in sports and active games, (4) interest in having in-depth, longer learning experiences, (5) ability to take responsibility in planning and evaluating their own work, (6) wanting to get outside of their community to explore, and (7) feeling in control about technology (Query & Stokesbary, 2010). Understanding these youth characteristics will help to prevent screen-based technology as a rite of passage for adolescence. Notable past environmentalists (John Muir, 1838-1914; Aldo Leopold 1887-1948; and Rachel Carson, 1907-1964) concluded that natural capital is a fundamental component for youth (human) survival.

## LITERATURE REVIEW

Engaging youth in local community development can empower them to become civic community members. Community members, program developers, and policy planners need to better understand the role which youth can play in the community development process (Brennan, Barnett, & Lesmeister, 2007). Youth who are fully engaged and involved in community efforts can become effective members of society (Nitzberg, 2005). Youth involvement in the community development process could lead to natural capital improvements as well as interaction with nature. Community building and involvement for youth leads to lifelong skills that can bring confidence and ownership (Brennan, et al., 2007).

Research demonstrates the health and well-being of America's youth are increasingly in jeopardy due to a screen-based culture that decreases exposure to the natural world (Biocca, 2000; Marshall et al., 2005; Montgomery, 2000; Pergams & Zaradic, 2006; Rusby et al, 2014; Salmon et al, 2011; Warber et al., 2012). In recent decades, the changing technological and social landscapes have rapidly moved youth indoors (Outdoor Foundation, 2010). Outdoor recreational opportunities are all around urban and rural communities. In a local, urban community, nature can be experienced by going to a city park, local zoo, community garden, golf course, swimming pool, trails/paths, or sports field. Other options may include the local YMCA and summer camps. In a rural community, nature is at one's backdoor. Access to activities in the home, such as television, iPads, smart phones, and the Internet, compete with youth choosing to be active outside.

Interacting with nature is thought to be important not only for survival but also for a quality of life. The mounting evidence on the benefits of nature is realized in terms of physical and health benefits, psychological well-being, cognitive ability, or social cohesion. Since society

is establishing a culture connected to technology, youth growing up in Generations Y or Z are less likely to participate in the natural environment than previous generations.

A regular dose of time in nature may offer considerable benefits. The benefits of outdoor recreation and the outdoors have been extensively researched. Following Cornelia and Jan Flora's (2008) community capitals framework, this research focused on three of the seven capitals – natural, social, and human capital. First, natural capital includes those assets that abide in a location including resources, amenities, and natural beauty (Flora, Flora, & Gasteyer, 2015). Literature specific to natural capital consists of environmental education. Natural capital has a long standing relationship transforming natural capital into social capital (Flora & Flora, & Gasteyer, 2015). Second, social capital reflects connections among people and organizations (Flora, Flora, & Gasteyer, 2015). Literature specific to social capital consists of the social benefits and relationships between natural and social capital. The third capital is human capital, which includes the skills and abilities of people to develop and enhance their resources (Flora, Flora, & Gasteyer, 2015). Literature specific to human capital consist of health benefits and psychological benefits. Literature related to each of these three community capitals will be discussed below.

### **Natural Capital and Environmental Education**

Location, time, money, and exposure are all elements which can play a role in why a youth may participate in natural capital. Wells and Evans (2003) found youth to include natural elements as their preferred environment. Youth describe outdoor places as lawns, playgrounds, schoolyards, their own yard, local parks, and trees as some of their preferred natural landscapes. In a study conducted by Moore (1986), urban youth who made a map of their favorite place illustrated outdoor places. Both rural and urban greenspaces provide a multitude of

environmental services that can include wildlife biodiversity, landscape and aesthetic features, recreation and amenity opportunities, water services, climate change mitigation, and health services (Barton, Hine, & Pretty, 2009).

Adventure programming has been one way researchers have looked at increasing the amount of time youth spend outdoors. Adventure and environmental education programming has shown strong pro-environmental attitudes among individuals who participate in outdoor recreation (Marchland, 2014). The practice of Leave No Trace, a non-profit organization started in 1994, is a member-driven center for outdoor ethics and teaches people of all ages how to enjoy the outdoors responsibly (Leave No Trace, n.d.). Today, many adventure programs teach some level of Leave No Trace.

National Outdoor Leadership School (NOLS) defines their values as a commitment to wilderness, education, leadership, safety, community, and excellence (NOLS, 2015). NOLS is a leading outdoor adventure program following Maslow's hierarchy of needs. Few healthy, alert people walk off cliffs, but many dehydrated, hot, cold, or tired people do (NOLS, 2015). This information tells us that Maslow's hierarchy of needs correlates with understanding basic human needs while applying these principles to learning. With this logic, Drift Prairie Day is designed to get youth outdoors and allow them to use their natural instincts by providing an opportunity to try a new activity as well as understand some basic principles of environmental stewardship. With respect to content, Drift Prairie Day models NOLS six learning objectives: (1) communication skills; (2) leadership skills; (3) small-group behavior; (4) judgement in the outdoors; (5) outdoor skills; and (6) environmental awareness.

Outward Bound, another adventure education organization, provides programs that are (1) wilderness or backcountry, (2) a small group, (3) a variety of mentally and/or physically

challenging objectives, (4) frequent and intense interactions which involve group problem solving and/or decision making, (5) with a trained leader, and (6) a duration of 2-4 weeks (Hattie, Marsh, Neill, & Richards, 1997). Both NOLS and Outward Bound programs teach adventure activities for educational and behavioral development.

In addition to adventure programming organizations such as NOLS and Outward Bound, schools that link nature in their programming show a significant impact on student self-confidence, inspiration towards learning, and a greater connection between students and teachers (Mirrahimi, Tawil, Abdullah, Surat, & Usman, 2011). Research on outdoor learning in natural environments provides opportunities to improve academic achievement and social and emotional intelligence under the umbrella of natural landscapes. Natural landscapes influence awareness in natural environment and enhance the senses of smelling, feeling, hearing, seeing, touching, and even tasting.

### **Human Capital and Healthy Living**

Today's lifestyles are characterized by sedentary behaviors with a growing disconnection from nature. Studies have found the impact of a sedentary lifestyle links health concerns such as obesity and diabetes. Increasing evidence shows that regular contact with nature and greenspace positively affects physical health and mental well-being (Barton et al., 2009). Reports will indicate youth who are inactive have a tendency to be inactive as adults. There are several reasons why youth today are inactive. According to a report done by the Outdoor Foundation, *The Future of the Outdoors*, two barriers are the cause of inactivity: lack of interest and lack of time. Modern society has created a culture of "too much to do with too little time."

Youth are not finding the outdoors as an appealing alternative for use of their free time. For some youth, the lack of greenspace is the larger barrier preventing them an opportunity to be



active outdoors. Lachowycz & Jones (2011), identified 50 studies that examined the relationship between greenspace and physical activity. These studies were conducted in USA, England, Australia, the Netherlands, Canada, New Zealand, Portugal, Sweden, and Europe-wide. The results of this study showed 40% positive association between greenspace and physical activity. If there is greenspace, there is a positive association with physical activity (Lachowycz & Jones, 2011).

The beneficial effect of decreasing obesity among youth is supported by results of several controlled exercise intervention programs (Goran, Reynolds, & Lindquist, 1999). Researchers argue that environmental planning, educational efforts, and increased opportunities, along with encouragement for physical activity, will serve to increase activity levels among youth populations (Goran, et al., 1999).

Not only is physical activity a health benefit, but so, too, is the level at which greenspace acts as a buffer of stress. In his book, *Last Child in the Woods*, Richard Louv tells the story of one girl in suburban California who goes to the woods to find a place of peace. For any person experiencing stress, the sight of trees, water, and other natural features may rapidly initiate positive affective responses which block the negative feelings and thoughts, which opens the door for stress recovery (Johansson, Hertig, & Staats, 2011).

Being active outdoors can have many classifications. Recreational land can be a national park or any land designated as the primary use for the public to recreate. Recreational land can be a national forest where recreation, as well as timber production, can provide a quality of life. Recreational land can be a national refuge or natural preserve that is dedicated to wildlife habitat, scientific exploration, or open space.

The power of outdoor health benefits can be of high or low impact. Fishing and walking are two outdoor activities which are low impact yet provide enjoyment and a feeling of accomplishment and/or a high self-esteem level.

### **Human Capital and Psychological Benefits**

Recreational activities in the leisure field state enjoyment, perceived freedom, and social interaction are among the psychological benefits of nature participation. Cognitive benefits of interacting with nature have been suggested by Attention Restoration Theory (ART). According to ART, after interaction with natural environments, one is able to perform better tasks (Berman, Jonides, & Kaplan, 2008). Direct attention abilities are linked to being surrounded by peaceful, natural environments. Berman, et al. (2008) explain how nature can promote improved cognitive functioning. Attention restoration theory depicts involuntary attention and voluntary or directed attention to identifying and restoring a cognitive mechanism. According to ART, interacting with natural environments (e.g., sunset) inherently produces fascination stimuli to invoke involuntary attention, allowing directed-attention mechanisms a chance to replenish (Berman, Jonides, Kaplan, 2008). The Berman, et al. (2008) study on Cognitive Benefits of Interacting with Nature, conclude peacefulness was driven by natural environments. Continued research provides support for the hypothesis that interactions with nature improve attention and memory (Berto, 2005; Faber, Taylor, Kuo, & Sullivan, 2002; Hartig et al., 2003; Ottosson & Grahn, 2002; Tennessen & Cimprich, 1995).

Evidence shows that regular contact with nature and greenspace positively affects mental well-being (Pretty, 2004; Van den Berg et al., 2007). Greenspace improves psychological health by reducing stress, enhancing mood and offering a restorative environment which enable people to escape from the stresses of urban life (Barton, Hine, & Pretty, 2009).

Among the research on psychological benefits are the connections between wildlife, learning, and emotion. This is where famous nature environmentalists and poets, such as John Muir, Rachel Carson, Henry David Thoreau, Ralph Waldo Emerson, and Aldo Leopold, cited experiences with nature as significant, transformational, and therapeutic.

### **Social Capital**

The age of 11-14 is the prime time when youth really start to pay attention to their social status. Social connections are important. Facebook has created a culture where youth post their “friend status.” Who has more “friends” can be self-describing. Social ties are an important contributing factor to an early adolescent “status.” Social benefits of nature go beyond the social benefits youth are receiving from technology. Social benefits influence health outcomes (Mass, Dillen, Verheij, & Groenewegen, 2009). Social relationships including social networks, are a part of youth wellbeing. Natural settings are attractive because they provide privacy, yet a place to get-a-way from modern society.

A large part of youth’s social benefits with nature have been studied through attitudes of students who participate in adventure programming (Marchand, 2014). Drift Prairie Day is one local example where youth get to share in the social benefit of participating in nature while learning about nature and all the possibilities.

In some studies, the term greenspace refers to summer, whitespace to winter, and blue space to water. Whether the variable correlates to green, white, or blue, finding an emotional connection between nature-based outdoor recreational and emotional well-being decreases mortality and increases the connection of natural importance (Korpela, Borodulin, Neuvonen, Paronen, & Tyrvaainen, 2013).

## **Electronic Renaissance**

Youth who are exposed to natural areas tend to be more interested as adults. With this information, finding a way to remove the hustle and bustle of the fast-paced modern world would mean disconnecting from electronics. Since the mid-1980s, electronic entertainment has risen, consequently, increasing sedentary lifestyles (Pergams & Zaradic, 2006). Exposure to nature has shown many benefits including physical activity, health, and social cohesion.

The Outdoor Foundation (2010) sites 20-22% of youth ages 11-14 would rather spend free time watching TV or movies, surfing the internet or playing video games. What is more astounding in the Outdoor Foundation Report (2010) is that youth who do not participate in outdoor activities say they are not interested (22%-36%) and parents do not take them (20%).

Does a screen-based technology device replace the free time youth are spending in natural capital? This study will examine the amount of free time youth in early adolescent ages 11-14 are spending with nature versus spending time with a screen based device. Part Two of this study will examine the connection youth have with natural capital as early adolescent youth, ages 11-14.

## **THEORY**

The Association for Experiential Education defines experiential learning as the philosophy and methodology in which educators purposefully engage with students in direct experience and focused reflection in order to increase knowledge, develop skills, and clarify values. Drift Prairie Day group of this study fits under experiential education learning. The concept of experiential education groundwork was provided by John Dewey (1859-1952), Carl Rogers (1902-1987), and David Kolb (b. 1939). The focus of experiential learning theory is on learning through experience or learning by doing. The 4-H slogan is also “learn by doing.” In this study, 56.3% of the Drift Prairie Day group were also local 4-H members. Figure 1 shows the experiential learning model as it applies to the youth who participated in Drift Prairie Day.

Following the experiential learning model, the Drift Prairie Day activities will keep the youth engaged and give them an opportunity to complete the four essential elements of 4-H: mastery, belonging, independence, and generosity. The curriculum for each activity will increase the youth’s physical activity, encouraging a better quality of life.

The 4-H experience youth receive from Drift Prairie Day fits under the community capitals framework as the various capitals interact with one another. In this study, the capitals being used are the human capital, natural capital, and social capital. The interaction among the capitals can generate an upward spiral of positive community change.

The community capitals framework (Figure 2) uses asset mapping to begin conversations in community planning. Asset mapping provides positive aspects of the community and this research is to focus on the positives of youth interaction with nature versus technology. The two constants, youth and technology, are considered assets because by definition (Canadian Rural

Partnership) assets are what we want to keep, build upon, and sustain for the future. An asset becomes capital when it is invested (Flora, Flora, & Gasteyer, 2015).

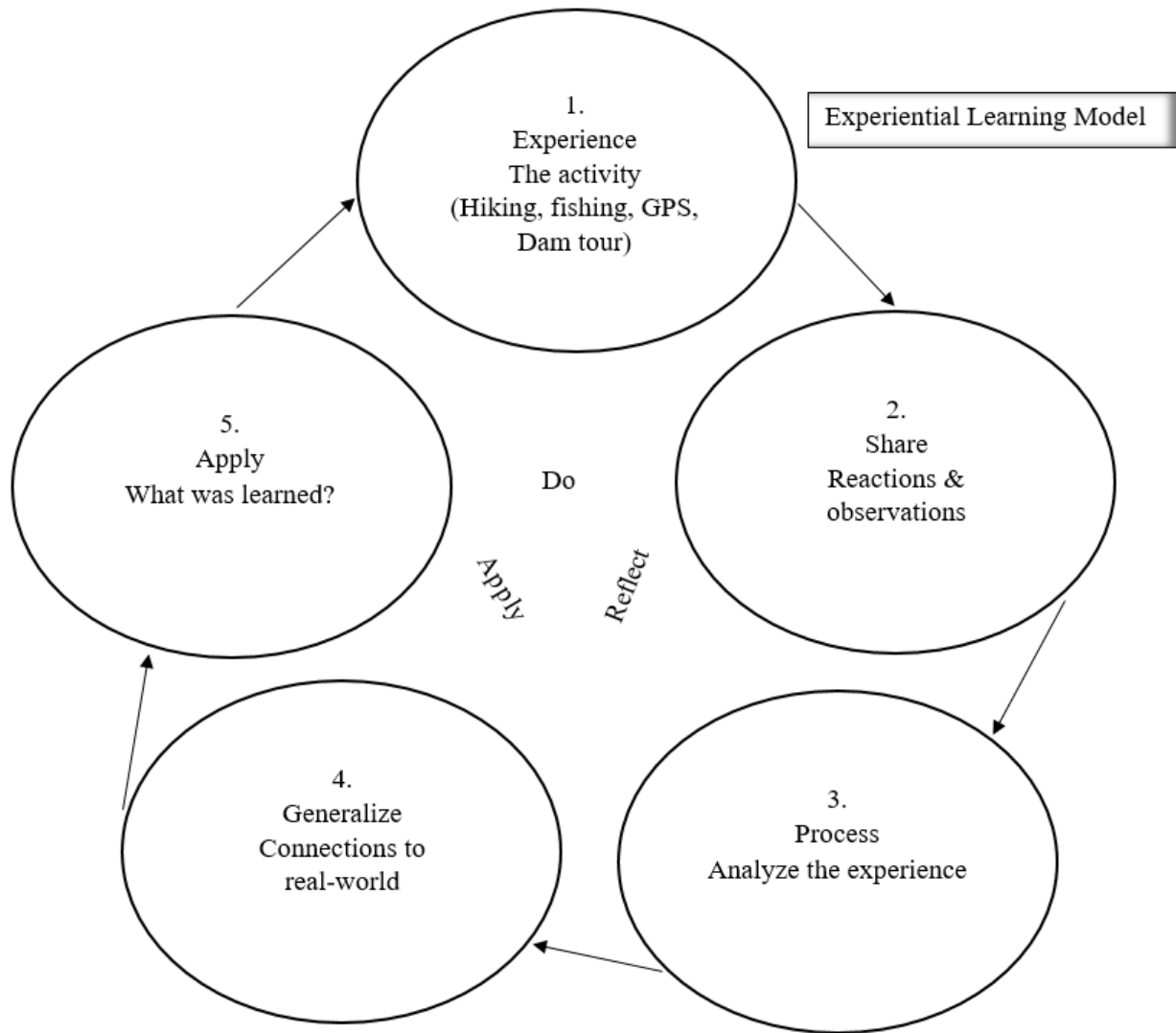


Figure 1. Experiential Learning Model

The community capitals framework approach to analyzing communities works best when all seven types of capital are paid attention to (Flora, Flora, & Gasteyer, 2015). Human capital (youth) defined by Flora & Flora (2013) is the characteristic and potential of individuals determined by the intersection of nature (genetics) and nurture (social interactions and the environment). Natural capital (Upper Souris National Wildlife Refuge) consists of air, water,

soil, biodiversity, and weather and is influenced by human activities (Flora, Flora, & Gasteyer, 2015). Social capital (peers and adults) involves the bonding and bridging of interactions. Social capital involves trust, working together, collective identity, and a sense of shared future (Flora, Flora, & Gasteyer, 2015). Drift Prairie Day closely follows the bonding of social capital as interactions with the group are specific to the day's activities.



*Figure 2. Community Capitals Framework*

Although the premise of this study focuses on social, human, and natural capital, the other four capitals continue to assist in the social well-being, vital economy, and healthy ecosystem of our society. Cultural capital is defined by Flora, Flora, & Gasteyer, (2015) determines how one sees the world and what one values. Each youth who participates in Drift Prairie Day already has some cultural value and perspective. Whatever the youth cultural value is may change after the Drift Prairie Day adventure thus creating a cultural experience.

The last three capitals -- political, financial, and built capital -- are less evident in the study yet are fundamental. Built capital is all the human constructed infrastructure (Flora & Flora, 2013). The road to travel to Drift Prairie Day, the bridge crossing the Lake Darling Dam, the outhouses, and the main office are all built capital the youth will be utilizing during Drift Prairie Day. Financial capital includes the fee for attending Drift Prairie Day. Finally, political capital translates into the rules and regulations the youth and adults follow as part of the Upper Souris National Wildlife Refuge principles and practices. For example, when the youth are hiking and geocaching for hidden treasures, the Leave No Trace practice will be experienced.

The results of the community capitals framework will be on display during this research study. Youth participating in the experiment will develop assets by exposure to natural capital and interaction with social, built, and human capitals.



## METHODS

### Study Sample and Design

This study took place in Minot, North Dakota, during October 2015. According to the 2010 U.S. Census, the City of Minot population was 40,888. Minot is part of Ward County. In 2015, Ward County had a population of 3,790 youth between the ages of 10-14 (N.D. Compass, 2015). Youth participants were in early adolescence, ages 11-14. An advertised outdoor skills day was offered to area youth through the local 4-H Extension office during the statewide teacher's convention, October 22-23, 2015. Advertising was distributed through the Ward County 4-H Facebook page (342 likes), the Minot Public Schools *Backpack* system, the Ward County 4-H newsletter, the *Clover Spirit*, and the local newspaper, the *Minot Daily News*. The event was open to the first 18 participants also known as the Drift Prairie group in this study. Thus, the sample size is N=18. This outdoor skills day is called Drift Prairie Day.

Once the Drift Prairie Day event met youth capacity, using the North Dakota 4-H online system, comparison group was selected. During the 2014-2015 Ward County 4-H year, the sample size was 97 youth enrolled in 4-H between the ages of 11-14. The total sample size was made up of 65.7% male and 34.3% female. Of the 35 youth, 5.7% were in fifth grade, 28.6% in sixth grade, 25.7% in seventh grade, 20% in eighth grade, and 20% in ninth grade. Those youth studied lived mostly on farms or ranches (80%) versus living in a town or city (20%).

The Drift Prairie Day location is found 30 miles north of Minot, at the Upper Souris National Wildlife Refuge (USNWR). The Refuge is a 32,902-acre refuge which provides the perfect recreation and education setting. The Refuge specializes in environmental education, fishing, hunting, photography, and wildlife observations.

## **Participation Rates**

After taking out those who signed up for Drift Prairie Day, 22% of the 4-H members population contacted filled out and returned the questionnaire (Appendix A). Combining both groups and all possible participants, there was a 33% overall consent to participate in this study.

## **Measures and Activities**

Drift Prairie Day participants met at the Ward County courthouse the morning of October 22, 2015. Once all 18 participants arrived and proper risk and release forms were completed by parents and youth, the group headed to the Upper Souris National Wildlife Refuge. Additionally, all youth who signed up for Drift Prairie Day were mailed a pre-questionnaire form (Appendix B). Of the 18 youth who participated in Drift Prairie Day, 89% of the youth turned in their survey.

Participants were asked why they registered for Drift Prairie Day and which activity was most exciting to them. The activity choices youth picked from included fishing, Global Positioning System (GPS) and hiking, cooking and nutrition, or Lake Darling Dam tour, and history of the Refuge system. Fishing was the number one choice with 43.8%. GPS/Hike fell into second place with 31.3% followed by cooking & nutrition and the Lake Darling Dam tour and history of the Refuge system.

North Dakota law states residents and nonresidents age 15 and under do not need a fishing license. Pike, perch, trout, and walleye are the four common fish found in Lake Darling. Youth fished from the dock or along the shore just south of the Lake Darling Dam. Upper Souris Wildlife Refuge staff volunteered their knowledge and expertise.

A fundamental component of outdoor recreation is outdoor skills. Through a scavenger hunt, similar to geocaching, youth participated in a nature trail hike while navigating a GPS unit

and finding treasures. Proper hiking attire, along with a backpack consisting of nutritious foods were observed and evaluated. Participants were paired up in teams of two building on their social capital.

How to pack the right foods, how to keep hydrated, and how to cook in the great outdoors were all activities the youth learned through the cooking and nutrition portion of the outdoor skills day. Youth also made their own Hobo lunch with carrots, onions, potatoes and beef.

The Refuge staff showed a 20-minute presentation on the history of the National Wildlife System. North Dakota ranks number one in the country with the most refuges. Additionally, the Refuge staff gave a tour of the Lake Darling Dam.

When answering the question of why youth signed up for Drift Prairie Day, 31.3% of the youth registered answered to be with friends (social capital). The activities (natural capital) had 25% of the responses. Discovery and exploration which could fall under social, natural, and human capital came in with 18.8%.

### **Data Analysis**

The method of analysis used was the chi-square test using SPSS Statistics 22. Chi-square test ( $X^2$ ) is a test statistic that allows one to decide whether observed frequencies essentially are equal to or significantly different from frequencies predicted by a theoretical model (Frankfort-Nachmias, Nachmias, & DeWaard, 2015). Chi-square is a goodness of fit test. Chi-square compares two sets of data using a specific hypothesis where the comparison is the observed value minus the expected value squared divided by the expected value. The two sets of information in this study are the Drift Prairie group and the Comparison group. Both groups took a similar questionnaire and then their results were computed using chi-square.

Fisher's exact test was also calculated. Fisher's exact test was used when there were two nominal variables. This test is typically shown in an R x C table format. The R means rows and the C means columns. Fisher's exact test is more accurate than chi-square when the numbers are small. For this study, N=35 for both the Drift Prairie group and the Comparison group.

### **Ethical Issues**

The IRB approval (Appendix E) process was fairly simple. Human subjects were used in this study. Subjects who were part of the Drift Prairie group were self-selected. However, each youth had the option to opt out of the study once they signed up for the Drift Prairie Day event. All but two (N=16) of the 18 youth who participated in Drift Prairie Day were more than happy to fill out the assent forms required. For the Comparison group, the youth who were contacted (N=19) all filled out the questionnaire.

Some of the issues which were considered include the safety of the youth in the Drift Prairie group. As an Extension educator, the process is already considered in the event registration. Parents and youth sign a risk and release form required by NDSU and 4-H.

Potential risk and discomforts for the Drift Prairie group included social implications. Excitement of catching a fish or disappointment in not catching a fish may be an emotional factor for the youth. Youth were asked to hike, fish and use a knife to cut potatoes for their hobo lunches. The youth's physical ability during the hike may cause some discomfort. The hike is classified as easy.

## RESULTS

This study used a questionnaire to study both samples. The results were then figured using chi-square, Fisher's Exact Test, df, and p. The null hypothesis was that youth ages 11-14 are spending more time with a screen-based device than they are spending with nature. This study population was N=35. The statistics of this study reject the null hypothesis.

The objectives of this study were to (1) examine the amount of free time youth in early adolescent ages 11-14 are spending with nature versus spending time with a screen based device and (2) examine the connection youth have with natural capital as early adolescent youth, ages 11-14. Each youth answered a series of questions in order to provide evidence of the hypothesis that youth are spending more time with screen-based devices than in nature.

### **Group Correlations**

The Drift Prairie group and Comparison group showed a strong correlation between who they spend time with in nature. Table 1 defines the youth characteristics of gender, grade in school, and residence. The results of the youth characteristics show that the percentage of males and females in the two groups is somewhat similar. Although the percentage of males and females in the Drift Prairie group was 75.0% and 25.0%, respectively, and the percentages of males and females in the Comparison group was 57.9% and 42.1%, respectively, the difference was not statistically significant (Chi-square =1.145; Fisher's Exact Test =.476; df =1; p =0.285).

The grade and residence population sample showed a significant difference. The grade in school was spread out through five different grades. Percentages of grades 5, 6, and 7 in the Drift Prairie group had a combined total of 87.5% and grades 8 and 9 12.5%. The percentages in the Comparison group grades 5, 6, and 7 was 36.9% and grades 8 and 9 63.1% showing a larger statistical significance (Chi-square =12.197; df =4; p =0.016). Youth had the option to select

from two types of residency: farm/ranch or city/town. The percentage of farm/ranch and city/town in the two groups is different. The Drift Prairie group was 62.5% and 37.5%, respectively, and the percentages of farm/ranch and city/town in the Comparison group was 94.7% and 5.3%, respectively (Chi-square = 6.023; Fisher’s Exact Test = .032; df =1; p =0.014).

Table 1

*Youth Characteristics*

	<u>Drift Prairie Group</u>		<u>Comparison Group</u>		Chi-Square	df	p
	Number	Percent	Number	Percent			
Male	12	75.0%	11	57.9%	1.145	1	0.285
Female	4	25.0%	8	42.1%			
Total	16	100.0%	19	100.0%			
Grade 5	2	12.5%	0	0.0%	12.197	4	0.016
Grade 6	7	43.8%	3	15.8%			
Grade 7	5	31.3%	4	21.1%			
Grade 8	1	6.3%	6	31.6%			
Grade 9	1	6.3%	6	31.6%			
Total	16	100.0%	19	100.0%			
Farm/Ranch	10	62.5%	18	94.7%			
Town/City	6	37.5%	1	5.3%			
Total	16	100%	19	100%			

A response of 62.9% of the youth surveyed said they spend their time with family while 20% and 17.1% said they spend their time alone or with friends, respectively. The youth ranged in age from 11-14, with a mean age of 12.4 years.

The first series of tables examine the amount of free time youth in early adolescent ages 11-14 are spending with nature versus spending time with a screen based device. Table 2 shows the variation between where the youth considered their special place location. The location of their special place consisted of: recreation activities (i.e. hunting/fishing, river, woods), quiet places (i.e. bedroom), social interactions (i.e. campfire, watching/playing sports) and screen-based devices (using social media, playing video games). The percentage of recreation activities

is somewhat similar between the Drift Prairie group and the Comparison group, 62.6% and 68.4%, respectively. The percentage of quiet time is 0.0% for the Drift Prairie group and 10.5% for the Comparison group. The percentage of social interactions between the Drift Prairie group and the Comparison group was 31.3% and 5.3%, respectively. The percentage of screen-based devices was 6.3% for the Drift Prairie group and 15.8 % for the Comparison group. The overall results of the location where youth find their special place was significantly different among the eight categories (Chi-square =13.005; df =7; p =0.072).

Table 2

*Youth Special Place*

	<u>Drift Prairie Group</u>		<u>Comparison Group</u>		Chi Square	df	p
	Number	Percent	Number	Percent			
Bedroom	12	75.0%	11	57.9%	1.145	1	0.285
The woods	4	25.0%	8	42.1%			
Playing video games	16	100.0%	19	100.0%			
Campfire	2	12.5%	0	0.0%			
Sports	7	43.8%	3	15.8%			
The river	5	31.3%	4	21.1%			
Hunting/Fishing	1	6.3%	6	31.6%			
Social Media	1	6.3%	6	31.6%			
Total	16	100.0%	19	100.0%	12.197	4	0.016

Youth were directly asked in the survey where they spend their free time. Psychologically perceived free time is offered as a context in which most people tend to engage in recreational activities (Howe & Rancourt, 2009). Youth were limited to choosing from five different activities. Table 3 shows the five choices youth selected from: doing school work, going to sports practices/playing sports, hanging out with friends, connected to a screen-based device, or somewhere in nature. The percentages between doing school work, going to sports practices/playing sports, hanging out with friends, connected to a screen-based device, or somewhere in nature in the Drift Prairie group was 25%, 31.3%, 12.5%, 12.5%, and 18.8%,

respectively, and the percentages between doing school work, going to sports practices/playing sports, hanging out with friends, connected to a screen-based device, or somewhere in nature in the Comparison group was 10.5%, 21.1%, 15.8%, 26.3% and 26.3%, respectively. The difference between where youth spend their free time was not statistically significant (Chi-square =2.568; df =4; p =0.64).

Table 3

*Youth Free Time*

	<u>Drift Prairie Group</u>		<u>Comparison Group</u>		Chi Square	df	p
	Number	Percent	Number	Percent			
School work	4	25.0%	2	10.59%			
Sports	5	31.3%	4	21.1%			
Friends	2	12.5%	3	15.8%			
Connected	2	12.5%	5	26.3%			
Nature	3	18.8%	5	26.3%			
Total	16	100.0%	19	100.0%	2.568	4	0.64

**When youth get involved with nature and/or technology**

To examine the connection youth have with natural capital as early adolescent youth, ages 11-14, the youth were asked to check a pre-selected amount of time they spend in nature and technology during the different seasons. Both the Drift Prairie group and the Comparison group (N=35) results were combined and highlighted in Figure 3. A breakdown of the Drift Prairie group and the Comparison group can be found in Appendix D.

The group breakdown was 40+ hours, 39-20 hours, 19-5 hours and 4-0 hours. The percentages the youth spent in the summer hours with nature were 61.8%, 18.3%, 14.1% and 5.8% respectively (chi-square = 4.512; df =3; p =0.0211). The percentages the youth spent in the summer hours with technology were 0%, 2.5%, 42.5% and 55% respectively (chi-square =1.786; df =3; p =0.41)



Following the same hours breakdown of 40+, 39-20, 19-5, and 4-0 the percentages the youth spent in the fall hours with nature were 29.9%, 24.2%, 34.4% and 11.% respectively (chi-square =7.03; df =3; p =0.071). The percentages the youth spent in the fall hours with technology were 2.6%, 0%, 59.2%, and 38.2% respectively (chi-square =3.029; df =3; p =0.22). The percentages the youth spent in the winter hours with nature were 6.3%, 29.9% 31.4% and 32.4% (chi-squared =8.253; df =3; p =0.041) The percentages the youth spent in the winter hours with technology were 5.2%, 11%, 72.3%, and 11.5% (chi-square = 3.602; df =3; p =0.308) The percentages the youth spent in the spring hours with nature were 32.5%, 26.2%, 32.9% and 8.4 (chi-square = 8.374; df =3; p =0.039). The percentages the youth spent in the spring hours with technology were 2.6%, 3.4%, 56.9% and 37.1% (chi-square =3.064; df =3; p =0.216). The overall results state that 62% of the youth spend 40+ hours of their summer free time active in nature, while 58% said they spend 4-0 hours of their summer free time with technology.

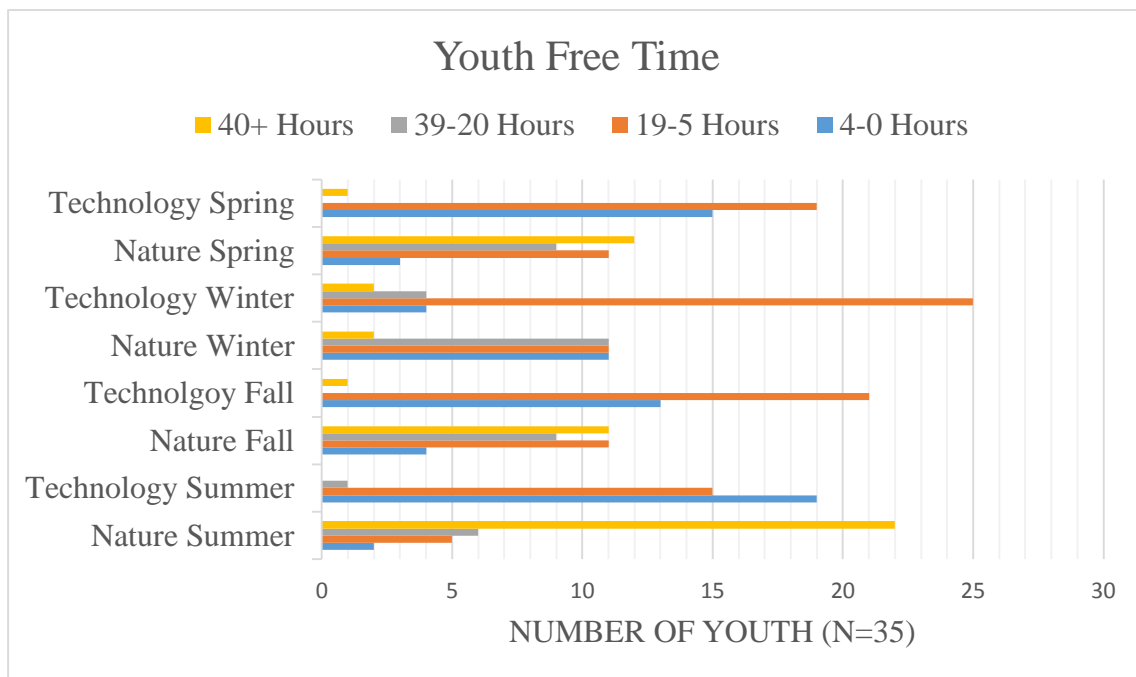


Figure 3. Seasonal Free Time by Hour

## Drift Prairie Day Results

The Drift Prairie Day participants were asked to evaluate (Appendix C) their experience in natural capital after spending the day participating in the DPD event. The youth were asked a set of nine questions which they had to score using a Likert Scale: none, a little, some, and a lot (Table 4). Of the nine questions, five were directly related to natural capital and two discussed technology. Combining the percentages relating to nature activities, a 46.18% of the youth surveyed replied that participating in Drift Prairie Day made them feel “a lot” connected to nature...some, a little and none results showed 30.02%, 16.26%, and 7.54%, respectively. Combining the percentages relating to screen-based devices a lot, some, a little and none showed 50%, 12.5%, 18.75% and 18.75%, respectively.

Table 4

*Drift Prairie Day Likert Scale Results (N=16)*

<u>Participating in Drift Prairie Day helped me to...</u>	None	A Little	Some	A Lot	Total
Understand the nature opportunities at USNWR	6.3	12.5	37.5	43.8	100%
Be interested in GPS technology	0.0	37.5	12.5	50.0	100%
Be interested in hiking	6.3	18.8	25.0	50.0	100%
Understand the importance of proper nutrition	6.3	18.8	31.3	43.8	100%
Be interested in fishing	12.5	31.3	31.3	25.0	100%
Be interested in nature activities	6.3	12.5	31.3	43.8	100%
Enhance my social skills	12.5	31.3	37.5	18.8	100%
Connect to nature	6.3	6.3	18.8	68.8	100%
Disconnect from my screen-based device	37.5	0.0	12.5	50.0	100%

To gain a better understanding of youth’s reaction to Drift Prairie Day, the immediate evaluation is an important tool to understanding the program logistics. However, providing a post evaluation where the youth recall their experience may provide a better understanding of the more memorable experiences. Reviewing the results, it appeared that some youth did not respond genuinely. This margin of error could be eliminated with an interview by the researcher. Trained

teachers and professors who work with students on a regular basis may know if a child struggles with reading. This example is provided because unless previously informed, I would not have realized that there might be youth who could not read the evaluation.

After reviewing the evaluation, an important question to add would have to do specifically about screen-based devices. The question could be something like, did the GPS navigation satisfy your disconnect from a cell phone? Because GPS are technology, it would be worth asking whether youth consider GPS unites as a screen-based technological device. The results of the evaluation showed that half of the youth wanted to learn more about GPS technology.

## **DISCUSSION**

The subjects of this study were found to be more active in nature than with a screen-based device. The Drift Prairie group response was 62.6% active in nature while the Comparison group was 68.4%. The Drift Prairie group response to using a screen-based device was 6.3% while the Comparison group was 15.8%. The following section will discuss the opportunities to improve this study and how as a Cooperative Extension employee, I can better use this experience for future programming.

### **Application**

From the community capitals framework, this study used three of the seven capitals extensively: natural, human, and social. Natural capital was the playground for the youth who participated in the Drift Prairie Day event and included the air, water (Lake Darling), land (Refuge), flora, and fauna. Green & Haines (2012) describe the air, water, land, flora (native grasses), and fauna (birds) as amenities. Amenity classifications include the wildlife ecosystem, a recreational area, a historical site, or even the social and cultural traditions (Green & Haines, 2012). The Upper Souris National Wildlife Refuge is a recreation area in this community. Human capital in this study focused on the education, artistic development and appreciation, health, and skills and experiences (Green & Haines, 2012).

Just as natural and human capital played a role in this study, so, too, did social capital. Building relationships amongst Drift Prairie Day participants potentially affected the youth's well-being, specifically as they relate to health (hiking) and education (outdoor skills learned). A combination of bridging and bonding was associated with this study. Several of the youth knew each other from their 4-H experience and thus strengthened their bonding capital. Additionally,

the bridging process, bringing together a group of people who did not previously know each other, occurred.

The results of this study showed the Drift Prairie group and the Comparison group had similar responses in their time with nature 63% versus 68%, respectively. Youth time with a screen-based device was much less than with nature. The sampling process for this study consisted of a convenience sample. The Drift Prairie group was determined from the youth who registered for the Drift Prairie Day event. The Comparison group was a sample of the enrolled 4-H youth. The results precluded the population of youth ages 11-14 in the county from participating unless they were enrolled 4-H member.

Drift Prairie Day youth all said they would participate again. During the evaluation, youth had an opportunity to provide feedback on what they would change regarding DPD. Youth provided suggestions such as provide better/more fishing equipment, birding, wildlife viewing, kayak, more hiking and GPS. Drift Prairie Day participants said DPD helped connect them to nature (62.6%). From the previous two statements, it is evident that the youth have a connection to nature and want to be outdoors.

These youth showed a strong interest in environmental education. This study showed youth want to be outdoors. Fishing, hiking, and GPS are all part of what these youth enjoy about nature and spending their free time. It is important to provide opportunities for youth to experience the outdoors.

### **Extension Educator**

Moving forward, as a Cooperative Extension Educator, changes to the design of the study could include providing a larger sample size for youth to register for Drift Prairie Day. Additionally, to further understand youth's level of participation in nature, an outdoor skills day

could be conducted each season. This would provide different educational experiences and also test youth's time spent in nature versus technology. The sample size for the Comparison group could also be expanded to include a larger sample from the population. One thought could be to locate rural and urban schools to provide a larger sample instead of using just the 4-H youth. It could be perceived that many 4-H youth already have tendencies to be active in nature.

This study was a quantitative study. The measurement used was through questionnaires. Within this study, the questionnaire could be refined for both the Drift Prairie group and the Comparison group. For example, asking youth where their special place is could be ranked from one to 11. This could better determine the relationship between nature and technology. The question which asked where youth spend their free time could also be asked differently. Understandably, school work and going to sports practices/playing sports defines the life of most 11-14 years old. Though this is a choice the youth make, this question does not represent the term free time or leisure time.

Other changes to the program to better prove the objectives of this study, would be to set up a design where youth have the option to fish from the shore or fish using a social media app. This is just one example of many which could be used to determine whether or not natural capital is preferred over a screen-based device. Observations by the research could determine a level of time the youth are spending in nature or with a screen-based device.

There were also minor differences in the questionnaires between the two groups. The first question of this study could be which season is your favorite followed by does the time of year change your amount of time spent in nature. This could help the researcher develop an understanding of the hours youth are spending in nature and with technology. The location of this study needs to consider that winter can be 6-8 months of the year, potentially changing the

amount of time youth have to spend outdoors. The time of year and favorite season were not asked of the Drift Prairie group, an error in the researcher's questionnaire. To provide an improved in-depth analysis, this study could expand on the quantitative process and provide a qualitative approach. This would provide a deeper richness to the overall results of the program.

The results of this study were surprising to the researcher. Observations and conversations from area teachers and parents showed youth to be more engaged in screen-based devices than with nature. One conclusion of this could be that teachers and parents are not providing opportunities for youth to be in nature. A second conclusion could be that the majority of the youth surveyed reside on a farm/ranch (80%) versus a town/city (20%).

### **Limitations**

Though this study sampling for the Comparison group was small (N=19), the internal validity is crucial to social science research because these findings can be generalized to larger population and applied to different social settings. The population of this study was a convenience sample using 4-H members.

The Drift Prairie outdoor skills day has validity with outdoor education and natural capital. The opportunities 4-H brings to the community has created a culture where youth are active in nature. 4-H members, although often considered rural, farm kids, does not limit urban youth and is an all-inclusive program.

The study proved several strengths. The demographics of the youth, the culture region, and the 4-H principles all followed previous 4-H work which focuses on learn by doing and the skills of mastery, belonging, independence, and generosity.

A future hypothesis, which could be built from this study, might be who is more active in nature versus technology: 4-H youth or non-4-H youth?

## **Future of the Program**

This was the second year of Drift Prairie Day. Very few changes took place from the 2014 year versus the 2015 year. The largest change was the weather. When reviewing the 2014 evaluations and comparing them to the 2015 evaluations, the only change in the comments was to pick a day where the weather was better. This is one of the natural wonders an educator risks when planning a program set in the great outdoors. It was from the comments of 2014 that the idea of having the program once each season came to fruition. It is also worth noting that 33% of the youth who participated in 2014, came back for 2015.



## **CONCLUSION**

This study showed that youth living in Ward County, North Dakota, who are 4-H members, are more likely to spend more time in nature than with a technological device. The largest take-a-way from this study was that youth in this region are not falling into the growing trend of free time being consumed by screen-based devices. Rather, youth showed a significant connection to natural capital with nature being a part of their quality of life.

## REFERENCES

- Association for Experiential Education. (n.d.). Retrieved on February 13, 2016 from <http://www.aee.org/what-is-ee>.
- Barton, J., Hine, R., & Pretty, J. (2009). The health benefits of walking in greenspaces of high natural and heritage value. *Journal of Integrative Environmental Sciences*, 6(4), 261-278.
- Berman, M., Jonides, J., & Kaplan, S. (2008). The cognitive benefits of interacting with nature. *Psychological Science*, 19(12), 1207-1212.
- Berto, R. (2005). Exposure to restorative environments helps restore attentional capacity. *Journal of Environmental Psychology*, 25, 249-259.
- Biocca, F. (2000). New media technology and youth: Trends in the evolution of new media. *Journal of Adolescent Health*, 27, 22-29.
- Brennan, M., Barnett, R., & Lesmeister, M. (2007). Enhancing local capacity and youth involvement in the community development process. *Community Development*, 38(4), 13-27.
- Faber Taylor, A., Kuo, F., & Sullivan, W. (2002). Views of nature and self-discipline: Evidence inner city children. *Journal of Environmental Psychology*, 22(1-2), 49-63.
- Flora, C. & Flora, J. (2013). *Rural Communities* (4<sup>th</sup> ed.). Boulder, Co: Westview Press.
- Flora, C., Flora, J., & Gasteyer, S. (2015). *Rural Communities* (5th ed.). Boulder, Co: Westview Press.
- Frankfort-Nachmias, C., Nachmias, D., & DeWaard, J. (2015). *Research Methods in the Social Sciences* (8th ed.). New York, NY: Worth.
- Green, G. & Haines, A. (2012). *Asset Building & Community Development* (3rd ed.). Thousand Oaks, CA: SAGE Publications.
- Goran, M., Reynolds, K., & Lindquist, C. (1999). Role of physical activity in the prevention of obesity in children. *International Journal of Obesity*, 23(3), 18-33.
- Hattie, J., Marsh, H., Neill, J., & Richards, G. (1997). Adventure education and outward bound: Out-of-class experiences that make a lasting difference. *American Educational Research Association*, 67(1), 43-87.
- Hartig, T., Evans, G.W., Jamner, L.D., Davis, D.S., & Garling, T. (2003). Tracking restoration in natural and urban field settings. *Journal of Environmental Psychology*, 23, 109-123.
- Howe, C. & Rancourt, A. (2009). The importance of definitions of selected concepts for leisure inquiry. *Leisure Sciences*, 12(4), 395-406.

- Johansson, M., Hartig, T., & Staats, H. (2011). Psychological benefits of walking: Moderation by company and outdoor environment. *Applied Psychology: Health and Well-Being*, 3(3), 261-280.
- Korpela, K., Borodulin, K., Neuvonen, M., Paronen, O., & Tyrvaïnen, L. (2014). Analyzing the mediators between nature-based outdoor recreation and emotional well-being. *Journal of Environmental Psychology*, 37, 1-7.
- Lachowycz, K., & Jones, A.P. (2011). Greenspace and obesity: A systematic review of the evidence. *International Association for the Study of Obesity*, 12 e183-e189.
- Leave No Trace. (n.d.). Retrieved on September 1, 2015 from <https://lnt.org/about>.
- Louv, R. (2008). *Last Child in the Woods*. Chapel Hill, NC: Algonquin Books of Chapel Hill.
- Marchand, G. (2014). Environmental attitudes of students enrolled in adventure programming classes. *Journal of Outdoor Recreation, Education, and Leadership*, 6(2), 180-182.
- Marshall, S., Gorely, T., & Biddle, S. (2006). A descriptive epidemiology of screen-based media use in youth: A review and critique. *Journal of Adolescence*, 29, 333-349.
- Mass, J., Dillen, S., Verheij, R., & Groenewegen, P. (2009). Social contacts as a possible mechanism behind the relation between green space and health. *Health & Place*, 15, 586-595.
- Mirrahimi, S., Tawil, N.M., Abdullah, N.A.G, Surat, M., & Usman, I.M.S. (2011). Developing conducive sustainable outdoor learning: The impact of natural environment on learning, social and emotional intelligence. *Procedia Engineering*, 20, 389-396.
- Montgomery, K. (2000). Youth and digital media: a policy research agenda. *Journal of Adolescent Health*, 27, 61-68.
- Moore, R.C. (1986). *Childhood's Domain*. London: Croom Helm.
- ND Compass. (2015). Retrieved September 12, 2015 from <http://www.ndcompass.org/>.
- Nitzberg, J. (2005). The meshing of youth development and community building. Putting youth at the center of community building. *New Directions for Youth Development*, No. 106: Summer 2005.
- NOLS. (2015). *NOLS Wilderness Educator Notebook* (11th ed.). Lander, WY: National Outdoor Leadership School.

- Ottosson, J., & Grahn, P. (2005). A Comparison of leisure time spent in a garden with leisure time spent indoors: On measures of restoration in residents in geriatric care. *Landscape Research, 30*, 23-55.
- Outdoor Foundation (2010). Special report on youth: The next generation of outdoor champions. Retrieved September 1, 2015 from <http://www.outdoorfoundation.org/research.youth.html>.
- Pergams, O., & Zaradic, P. (2006). Is love of nature in the US becoming love of electronic media? 16-year downtrend in national park visits explained by watching movies, playing video games, internet use, and oil prices. *Journal of Environmental Management, 80*, 387-393.
- Pretty, J. (2004). How nature contributes to mental and physical health. *Spiritual Health Int. 5*, 68-78.
- Query, S. & Stokesbary, C. (2010). Understanding and working with youth. Fargo, ND: North Dakota State University Extension Service.
- Rusby, J., Westling, E., Crowley, R., & Light, J. (2014). Psychosocial correlates of physical and sedentary activities of early adolescent youth. *Health Education & Behavior, 43*(1), 42-51.
- Salmon, J., Tremblay, M., Marshall, S., & Hume, C. (2011). Health Risks, correlates, and interventions to reduce sedentary behavior in young people. *American Journal of Preventive Medicine, 41*(2): 197-206.
- Schroer, W. (n.d.). Generations X, Y, Z and the others – cont'd. Retrieved February 26, 2016, from <http://www.socialmarketing.org/newsletter/features/generation3.html>.
- Sylvia S. N., & Baldwin, C.K. (2003). Enhancing the physical activity levels of youth a review with implications for leisure programming and evaluation, *World Leisure Journal, 45*(3), 43-52.
- Tennessen, C.M., & Cimprich, B. (1995). Views to nature: Effects on attention. *Journal of Environmental Psychology, 15*, 77-85.
- U.S. Census Bureau. (2014). *Minot (city) Quickfacts, North Dakota*. Washington, DC: Government Printing Office. Retrieved from <http://quickfacts.census.gov/qfd/states/38/3853380.html>.
- Van Den Berg, A.E., Hartig, T., Staats, H. (2007). Preference for nature in urbanized societies: Stress, restoration and the pursuit of sustainability. *Journal of Social Issues, 63*, 79-96.

Warber et al. (2012). Addressing nature deficit disorder: a mixed methods study of social well-being among young adults attending a wilderness science camp. *BMC Complementary and Alternative Medicine*, 12, 377.

Wells, N., & Evans, G. (2003). Nearby nature a buffer of life stress among rural children. *Environment and Behavior*, 35(3), 311-330.

## APPENDIX A. COMPARISON GROUP

NDSU

NORTH DAKOTA STATE UNIVERSITY



### Nature versus Technology: where is your free time spent?

*Your participation in this questionnaire will be compiled and used in a study to determine your level of interaction with nature versus technology.*

Age:	Grade in school:
<input type="checkbox"/> 11	<input type="checkbox"/> 6
<input type="checkbox"/> 12	<input type="checkbox"/> 7
<input type="checkbox"/> 13	<input type="checkbox"/> 8
<input type="checkbox"/> 14	<input type="checkbox"/> 9
Gender:	Residence:
<input type="checkbox"/> Male	<input type="checkbox"/> Farm/Ranch
<input type="checkbox"/> Female	<input type="checkbox"/> Town/City

1. Does the time of year change your amount of time spent in nature?  
 Yes  
 No
2. Which is your favorite season?  
 Summer  
 Fall  
 Winter  
 Spring
3. If active in nature, who are you with?  
 Alone  
 Family  
 Friends
4. Describe your relationship with nature?  
 I love it! I spend the majority of my free time outside playing.  
 I like certain elements. I enjoy watching a sporting event, going for a walk, playing in the park, or riding my bicycle.  
 I would rather be inside. I do not like bugs and would rather be playing my Wii or Xbox.
5. Based on the above answer, please describe/give examples: \_\_\_\_\_  
\_\_\_\_\_

6. Where is your special place?

- Bedroom
- Sports field/playing sports
- The river
- The woods
- Garden
- Playing video games
- Campfire
- Watching TV/movie
- Hunting/fishing
- Using social media apps
- Surfing the Internet

7. Where is your *free time* spent?

- School work
- Going to sports practices/playing games
- Hanging out with friends
- Connected to a screen-based technological device
- Somewhere with nature

8. If you could bring one of the following items with you on a nature trip, which would you bring?

- Fishing pole
- Running/hiking shoes
- Cell phone
- Canoe/kayak
- Bicycle
- iPad/Nook/Tablet
- Binoculars
- Bow

9. How much free time (a week) is spent in nature during the four seasons?

- Summer
  - 40 plus hours
  - 20-39 hours
  - 5-19 hours
  - 0-4 hours
- Winter
  - 40 plus hours
  - 20-39 hours
  - 5-19 hours
  - 0-4 hours
- Fall
  - 40 plus hours
  - 20-39 hours
  - 5-19 hours
  - 0-4 hours
- Spring
  - 40 plus hours
  - 20-39 hours
  - 5-19 hours
  - 0-4 hours

10. How much free time (a week) is spent using a screen-based technology device?

- Summer
  - 40 plus hours
  - 20-39 hours
  - 5-19 hours
  - 0-4 hours
- Winter
  - 40 plus hours
  - 20-39 hours
  - 5-19 hours
  - 0-4 hours
- Fall
  - 40 plus hours
  - 20-39 hours
  - 5-19 hours
  - 0-4 hours
- Spring
  - 40 plus hours
  - 20-39 hours
  - 5-19 hours
  - 0-4 hour

## APPENDIX B. DRIFT PRAIRIE DAY GROUP



### Drift Prairie Day Pre-Questionnaire

Please take the time to fill out the following questions. Your responses will be complied with the other participants and used in a study to determine your level of interaction with nature versus technology.

Age: <input type="checkbox"/> 11 <input type="checkbox"/> 12 <input type="checkbox"/> 13 <input type="checkbox"/> 14	Grade in school: <input type="checkbox"/> 6 <input type="checkbox"/> 7 <input type="checkbox"/> 8 <input type="checkbox"/> 9
Gender: <input type="checkbox"/> Male <input type="checkbox"/> Female	Residence: <input type="checkbox"/> Farm/Ranch <input type="checkbox"/> Town/City

1. Why did you register for Drift Prairie Day?
  - To be with friends
  - Activities look fun
  - Mom/Dad or parental guardian signed me up
  - I enjoy discovery and exploration
  - To be physically active
2. What activity are you most looking forward to?
  - Fishing
  - GPS/Navigation & Hike
  - Cooking/Nutrition
  - National Wildlife Refuge history/dam tour
3. If active in nature, who are you with?
  - Alone
  - Family
  - Friends
4. Describe your relationship with nature?
  - I love it! I spend the majority of my free time outside playing.
  - I like certain elements. I enjoy watching a sporting event, going for a walk, playing in the park, or riding my bicycle.
  - I would rather be inside. I do not like bugs and would rather be playing my Wii or Xbox.
5. Based on the above answer, please describe/give examples: \_\_\_\_\_  
\_\_\_\_\_



6. Where is your special place?
- Bedroom
  - The woods
  - Garden
  - Playing video games
  - Campfire
  - Sports field/playing sports
  - The river
  - Watching TV/movie
  - Hunting/fishing
  - Using social media apps
  - Surfing the Internet
7. Where is your *free time* spent?
- School work
  - Going to sports practices/playing games
  - Hanging out with friends
  - Connected to a screen-based technological device
  - Somewhere with nature
8. If you could bring one of the following items with you on a nature trip, which would you bring?
- Fishing pole
  - Running/hiking shoes
  - Cell phone
  - Canoe/kayak
  - Bicycle
  - iPad/Nook/Tablet
  - Binoculars
  - Bow
9. How much free time (a week) is spent in nature during the four seasons?
- Summer
    - 40 plus hours
    - 20-39 hours
    - 5-19 hours
    - 0-4 hours
  - Winter
    - 40 plus hours
    - 20-39 hours
    - 5-19 hours
    - 0-4 hours
  - Fall
    - 40 plus hours
    - 20-39 hours
    - 5-19 hours
    - 0-4 hours
  - Spring
    - 40 plus hours
    - 20-39 hours
    - 5-19 hours
    - 0-4 hours
10. How much free time (a week) is spent using a screen-based technology device?
- Summer
    - 40 plus hours
    - 20-39 hours
    - 5-19 hours
    - 0-4 hours
  - Winter
    - 40 plus hours
    - 20-39 hours
    - 5-19 hours
    - 0-4 hours
  - Fall
    - 40 plus hours
    - 20-39 hours
    - 5-19 hours
    - 0-4 hours
  - Spring
    - 40 plus hours
    - 20-39 hours
    - 5-19 hours
    - 0-4 hours

## APPENDIX C. DRIFT PRAIRIE DAY EVALUATION

**NDSU**

NORTH DAKOTA STATE UNIVERSITY



### Drift Prairie Day Youth Evaluation

*Please take the time to fill out the following questions regarding your experience today. In the table below, check the box (none, a little, some, or a lot) that best reflects how you feel. The questions on this page are your opinions and have no right or wrong answers.*

<p><b>Age:</b></p> <p><input type="checkbox"/> 11</p> <p><input type="checkbox"/> 12</p> <p><input type="checkbox"/> 13</p> <p><input type="checkbox"/> 14</p> <p><b>Gender:</b></p> <p><input type="checkbox"/> Male</p> <p><input type="checkbox"/> Female</p>	<p><b>Grade in school:</b></p> <p><input type="checkbox"/> 6</p> <p><input type="checkbox"/> 7</p> <p><input type="checkbox"/> 8</p> <p><input type="checkbox"/> 9</p> <p><b>Residence:</b></p> <p><input type="checkbox"/> Farm/Ranch</p> <p><input type="checkbox"/> Town/City</p>
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Participating in Drift Prairie Day....	None	A Little	Some	A Lot
Helped me develop a basic understanding of the nature opportunities available at the Upper Souris National Wildlife Refuge				
Made me more interested in learning about GPS/Navigation technology				
Made me more interested in hiking				
Taught me the importance of proper nutrition				
Made me more interested in fishing				
Made me want to learn about nature activities				
Helped to express my social skills				
Helped create a connection to nature				
Made me feel disconnected from my screen-based devices				

1. What was your favorite part of Drift Prairie Day
 

<input type="checkbox"/> Fishing <input type="checkbox"/> Hiking – GPS/Navigation <input type="checkbox"/> Dam tour	<input type="checkbox"/> Nutrition less and making hobo lunch <input type="checkbox"/> Social connections
---	--
  
2. What was missing from Drift Prairie Day?
  
3. Would you participate in Drift Prairie Day in the future?
 

Yes

No

## APPENDIX D. SEASONAL HOURS

### Nature

Hours	Drift Prairie Group				Comparison Group				Chi-Square	df	p
	40+	39-20	19-5	4-0	40+	39-20	19-5	4-0			
Summer	8	5	2	1	14	1	3	1	4.512	3	0.0211
Percent	50.0%	31.3%	12.5%	6.3%	73.7%	5.3%	15.8%	5.3%			
Fall	2	4	8	2	9	5	3	2	7.03	3	0.071
Percent	12.5%	25.0%	50.0%	12.5%	47.4%	23.6%	18.8%	10.5%			
Winter	2	2	5	7	0	9	6	4	8.253	3	0.041
Percent	12.5%	12.5%	31.3%	43.8%	0.0%	47.4%	31.6%	21.1%			
Spring	2	5	8	1	10	4	3	2	8.374	3	0.039
Percent	12.5%	31.3%	50.0%	6.3%	52.6%	21.1%	15.8%	10.5%			

### Technology

Hours	Drift Prairie Group				Comparison Group				Chi-square	df	p
	40+	39-20	19-5	4-0	40+	39-20	19-5	4-0			
Summer	0	0	6	10	0	1	9	9	1.786	3	0.41
Percent	0.0%	0.0%	37.5%	62.5%	0.0%	5.3%	47.4%	47.4%			
Fall	0	0	8	8	1	0	13	5	3.029	3	0.22
Percent	0.0%	0.0%	50.0%	50.0%	5.3%	0.0%	68.4%	26.3%			
Winter	0	1	13	2	2	3	12	2	3.602	3	0.308
Percent	0.0%	6.3%	81.3%	12.5%	10.5%	15.8%	63.2%	10.5%			
Spring	0	0	7	9	1	0	12	6	3.064	3	0.216
Percent	0.0%	0.0%	43.8%	56.3%	5.3%	0.0%	63.2%	31.6%			

## APPENDIX E. IRB APPROVAL



October 6, 2015

Gary Goreham  
Dept. of Sociology and Anthropology

IRB Approval of Protocol #HS16072, "Nature vs. Technology: Which is more appealing to youth ages 11-14"  
Co-investigator(s) and research team: Micky Zurcher

Approval period: 10/6/2015 to 10/5/2016  
Continuing Review Report Due: 9/1/2016

Research site(s): varied Funding Agency: n/a  
Review Type: Expedited category # 7  
IRB approval is based on the revised protocol submission (received 10/6/2015).

Additional approval is required:

- o prior to implementation of any changes to the protocol (Protocol Amendment Request Form).
- o for continuation of the project beyond the approval period (Continuing Review/Completion Report Form). A reminder is typically sent 4-6 weeks prior to the expiration date; timely submission of the report is your responsibility. To avoid a lapse in approval, suspension of recruitment, and/or data collection, a report must be received, and the protocol reviewed and approved prior to the expiration date.

A report is required for:

- o any research-related injuries, adverse events, or other unanticipated problems involving risks to participants or others within 72 hours of known occurrence (Report of Unanticipated Problem or Serious Adverse Event Form).
- o any significant new findings that may affect risks to participants.
- o closure of the project (Continuing Review/Completion Report Form).

Research records are subject to random or directed audits at any time to verify compliance with IRB regulations and NDSU policies.

Thank you for cooperating with NDSU IRB procedures, and best wishes for a successful study.

Sincerely,

A handwritten signature in black ink that reads "Kristy Shirley".

Digitally signed by Kristy Shirley  
DN: cn=Kristy Shirley, o=NDSU,  
ou=Institutional Review Board,  
email=Kristy.shirley@ndsu.edu,  
c=US  
Date: 2016.02.16 13:32:16 -0600

Kristy Shirley, CIP, Research Compliance Administrator

For more information regarding IRB Office submissions and guidelines, please consult [www.ndsu.edu/irb](http://www.ndsu.edu/irb). This Institution has an approved FederalWide Assurance with the Department of Health and Human Services: FWA00002439.

### INSTITUTIONAL REVIEW BOARD

NDSU Dept 4000 | PO Box 6050 | Fargo ND 58108-6050 | 701.231.8995 | Fax 701.231.8098 | [ndsu.edu/irb](http://ndsu.edu/irb)

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