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Date

Effect of Song on Fifth Grade Students' Environmental Education Knowledge  
and Retention

A Thesis  
SUBMITTED TO THE FACULTY OF EDUCATION AND HUMAN SERVICE  
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BY

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**Dedication**

To my dad, Nsangong Manasses Nganji, of blessed memory

## Abstract

This study reports the effect of song on fifth grade students' environmental education knowledge and retention. Participants in this study were twenty-nine fifth grade students at a school in north Minnesota. Participants were randomly assigned to two groups, fifteen students in the control group and fourteen students in the experimental group.

Both groups were taught a one-hour lesson on endangered primates of Cameroon, after which students took a posttest, one month after, twelve students in the control group and thirteen students in the experimental group took a delayed posttest. During the lesson, students in the experimental group were taught a song that contained the objectives of the lesson.

In the closed-ended questions of the quiz, posttest results, measuring knowledge, revealed a significant difference between the control and experimental group, with the treatment group scoring higher. There was no significant difference between both groups during the delayed posttest results, measuring knowledge retention. In the open-ended questions of the quiz for both the posttest and delayed posttest, when asked what participants learned or recalled from the lesson, both groups listed causes, consequences and solutions to the problems of endangered primates; names of endangered primates and lesson activities (song and game). Participants of the control group listed more causes, consequences and solutions the government of Cameroon and other conservation organizations are applying to the problem of endangered primates of Cameroon. Participants in the experimental group listed more names of endangered primates as what they learned or recalled from the lesson.

In the delayed posttest, participants in the experimental group listed more lesson activities as what they learned or recalled from the lesson.



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## Chapter 1

### Introduction

#### Background

*“It is the supreme art of the teacher to awaken joy in creative expression and knowledge.”*  
Albert Einstein (1987-1955)

Environmental predicaments, especially since the beginning of the Industrial Revolution, have continually grown with increasing human populations and human needs. In the preface of a report produced by the United Nations Millennium Project task Force on Environmental Sustainability (2005), the magnitude of such devastating human effects on earth systems is described:

The 1972 meeting was followed by a second in 1992, in Rio de Janeiro, and a third in 2002, in Johannesburg. Over these three decades, forests disappeared, greenhouse gasses accumulated, air and water pollution rose, and zoonotic and vector-borne diseases exploded. Land degradation worldwide led to grinding poverty, hunger, and abandonment of the village for the city. All of this continues today. (p. iii)

In their article captioned “Human Domination of Earth’s Ecosystems,” Lubchenco, Melillo, Mooney, and Vitousek (1997) state that:

Human alteration of Earth is substantial and growing. Between one-third and half of the land surface has been transformed by human actions; carbon dioxide concentration in the atmosphere has increased by nearly 30 percent since the beginning of the Industrial Revolution; more atmospheric nitrogen is fixed by

humanity than by all natural terrestrial sources combined; more than half of all accessible surface fresh water is put to use by humanity; about one-quarter of the bird species on Earth have been driven to extinction. By these and other standards, it is clear that we live on a human dominated planet. (p. 494)

Environmental experts have consistently proposed timely intervention as a sustainable means of mitigating such quandary (UNESCO-UNEP, 1978). Economically, it is sound to deal with these problems at the preventive stage, rather than trying to reverse the consequences. UNESCO-UNEP (1978) report affirms in the following statement:

While there have always been certain expressions of concerns for issues relating to the environment, only in the last few decades, as a result of extraordinary rapid scientific progress, as well as technological and social changes, have new problems emerged and others, which existed before, taken on entirely new dimensions. It is now recognized that many human activities, collectively, have detrimental and possibly irreversible consequences. (p. 11)

Environmental education providers both within the formal and informal sectors seek to accomplish the overarching goal of environmental education which according to Environmental Protection Agency (2009), "...is not only to increase awareness, but also to improve people's knowledge of environmental concerns." The Tbilisi Declaration (1978) suggested objectives that will help accomplish such goal. These objectives are: knowledge, awareness, skills, participation, and attitude. Knowledge and recall of environmental issues and their solutions are important in decision making and application

in other problem solving situations, not only in the field of environmental education but in other subject areas as well. Bransford (2000, p. 5) quotes Nobel laureate Herbert Simon as stating “the meaning of “knowing” has shifted from being able to remember and repeat information to being able to find and use it.”

In both the traditional and modern teaching styles, song has been one of the tools used for teaching. For example, songs are used in teaching phonics and language in early childhood education. Research has shown that songs have not only helped people learn, remember and repeat, it has also helped people find information at a later time and to use it (Brewer, 1995; Smith, 2000). The importance of songs in teaching has been emphasized especially after theories confirmed that to reach different learners, effective teaching and learning occurs when multiple teaching styles are incorporated. Songs have been part of environmental education programs for a very long time. Jack Pearse reports that, at the 1987 International Camping Congress in Washington, D.C, Pete Seeger, the keynote speaker said, perhaps, camp songs began in the Camp Gospel Revival Meetings and was seconded somehow by Rev. Larry Eisenberg, an influential song leader in the history of camps. According to American Camp Association, Pearse states that songs that were sung were “...fun, upbeat, harmonious, or inspiring. Most of all, the songs are easy to sing and remember.” (Pearse, 2009, para.3). Other Outdoor camping enthusiasts identify the place of songs within their activities. On *Love the Outdoors Camping and Campground* website, the publishers write:

Camp just wouldn't be camp without an evening campfire. And a campfire just wouldn't be a campfire without singing. Some of my most enjoyable memories

are from camping and the songs and friendships shared around a campfire. Here are just a few of my favorites (sic) camp songs. ([www.acacamps.org](http://www.acacamps.org), 2012)

Bernardy (2000) in *A Case for the Place of Music in the Outdoor Program* challenges Outdoor education to go beyond traditional campfire and sing-along-activities, and make use of the qualities music possesses in enhancing education. Music has been used in other subject areas to facilitate learning due to its qualities of promoting memory and recall (Salcedo, 2000; Yoho, 2001; Sousa, 2006, Wallace, 1994). Bernardy (2001) suggests that:

The inclusion of music in outdoor educational programs exposes students to a form of communication outside verbal language, develops intrapersonal and interpersonal skills, and improves academic performance in other areas. Through music, one can connect with nature, appreciate other cultures, and improve listening skills. (p. 3)

Gardner (1999) in his book, *Frames of Mind*, suggests the theory of Multiple Intelligences first published in 1983. Among the eight intelligences suggested by Gardner, he posits that “Of all the gifts with which individuals may be endowed, none emerges earlier than musical talent.” Pearse (2009) also notes that music is universal, hence is part of every culture. Brain-based learning and constructivist theories have also promoted student centered activities and the use of music to promote learning (Duman, 2006).

In accordance with Bernardy’s (2000) challenge for music to be used more for educational intentions in outdoor education than just sing-along-activities; this study

investigates the effect of songs when incorporated in an environmental education lesson for fifth grade students on their knowledge and knowledge retention.

### **Statement of Purpose**

The purpose of this study was to investigate the effects of songs on fifth grade students' environmental knowledge and retention.

### **Research Question**

The following research question was developed to investigate the research problem:

- Does incorporating a song to a lesson increase knowledge and knowledge retention in an environmental education context?

### **Assumptions of the Study**

In this study, I assumed that since knowledge is a desired outcome of environmental education, based on The Tbilisi Declaration, retention of the knowledge is of paramount importance as without retention, knowledge as an objective has little value.

### **Limitations of the Study**

The lesson, song, and research instruments were not pilot tested prior to use. However, a panel of experts previewed them. As the principal investigator and teacher of the lesson in this study, there could have been some bias in the implementing the lesson and administering the instrument. Effort was made to avoid bias. This study cannot be generalized to other fifth grade students as students came from only one school; further research is needed to confirm the external validity of these findings.



**Definition of Terms.***Environmental Education:*

Environmental education is learning that produces an environmentally responsible citizenry (Hine, Hungerford & Tomera, 1987).

*Environmental Knowledge*

Environmental knowledge is to help social groups and individuals gain a variety of experience in, and acquire basic understanding of, the environment and its associated problems (UNESCO- UNEP, 1978).

*Knowledge Retention*

Knowledge retention refers to the process whereby long-term memory preserves learning such a way that it can locate, identify, and retrieve it accurately in the future (Sousa, 2006 p. 86).

*Song*

Song is “a) a melody for a lyric poem or ballad; b) a poem easily set to music (Merriam-webster.com).

**Significance of the Study**

Since the conception of camps and the creation of environmental learning centers as well as outdoor extra-curricular activities in the formal school setting, songs have been used within levels of environmental lessons and campfire sing-along-activities, but no study has been conducted to investigate its effects on students’ knowledge and retention. Knowledge is one of the desired outcomes for most formal and informal environmental

education programs. The ability to retain information and use in future situations to solve problems in favor of the environment is critical. The outcome of this study will provide providers of environmental education with some basic tool as they make decisions on what value to give to the use of songs in their programs. It is likely that engaging students in learning about the environment through songs could reveal other outcomes beneficial to the process of striving towards providing an environmental education program that is purposeful and meets guidelines for acceptable and age appropriate activities.

Music has been an integral part of several cultures and with the most schools enrolling students from different cultures, incorporating songs in teaching different topics, environmental education in the case of this study may enhance learning among some students.

## Chapter 2

### Review of the Literature

The purpose of this review of literature is to review research articles that have examined theories promoting the use of song for learning as well as those that have studied the incorporation of song in teaching. My intention is to focus on the use of songs in outdoor, adventure and environmental education with the aim of achieving knowledge and retention in particular or environmental education goal in general. This review of literature shall be grouped as follows: 1. Environmental Education's Goal, and Objectives, 2. Knowledge Retention, 3. Music and Outdoor, Adventure, and or Environmental Education, 4. Learning Theories, 5. Other Subject Areas that Incorporate the Use of Songs, and 6. Conclusion of review of literature.

#### **Environmental Education's Goal and Objectives.**

The goal of environmental education is to instill in learners knowledge about the environment, positive attitudes toward the environment, competency in citizen action skills, and a sense of empowerment (Athman & Monroe, 2001). Environmental Protection Agency (2009) states that; the overarching goal of environmental education is not only to increase awareness, but to improve people's knowledge of environmental concerns.

The following are five objectives of environmental education as stated at the Tbilisi Declaration in Georgia (1978, pp.26-27):

Awareness: to help social groups and individuals acquire an awareness of and sensitivity to the total environment and its allied problems.

Knowledge: to help social groups and individuals gain a variety of experience in, and acquire a basic understanding of, the environment and its associated problems.

Attitudes: to help social groups and individuals acquire a set of values and feelings of concern for the environment, and the motivation for actively participating in environmental improvement and protection.

Skills: to help social groups and individuals acquire skills for identifying and solving environmental problems.

Participation: to provide social groups and individuals with an opportunity to be actively involved at all levels in working toward resolution of environmental problems.

North American Association for Environmental Education (NAAEE, 2012) defines environmental education as one that teaches children and adults how to learn about and investigate their environment, and make intelligent, informed decisions about how they can take care of it. NAAEE in line with the Intergovernmental Conference in Tbilisi identify that environmental education is taught in both formal and non-formal settings "... like traditional classrooms, in communities, and in settings like nature centers, museums, parks and zoos." (NAAEE, 2012). NAAEE states that environmental education is interdisciplinary, works best when taught in an organized sequence, and is known to increase students' academic achievement.

The No Child Left Inside Act (NCLI), a coalition of several businesses, health, youth, faith, recreational, environmental, and educational groups representing over 50 Americans was introduced in 2007 to enhance the No Child Left Behind (NCLB) law. In

alignment with NAAEE (2012) and the proceedings from the Tbilisi Declaration (1978),

recognizes environmental education as one that includes:

- learning in the field, as well as classroom,
- incorporates the teaching methods of outdoor education,
- experiential education, and placed-based education,
- is inherently interdisciplinary,
- promotes school/community partnerships,
- is hands-on,
- student centered,
- inquiry driven,
- engages higher level thinking skills,
- and relevant to students' everyday lives, develops awareness, increases knowledge, builds skills, and creates the capacity for stewardship and good citizenship regarding the environment upon which we depend for life support, helps address the causes of "nature deficit disorder", boosts student achievement in math, science, reading, writing and social studies (UNESCO-UNEP, 1978 p. 12).

Knowledge of environmental issues and their application in different situations is important.

**Knowledge Retention.**

As defined earlier in the definition of terms section, knowledge retention refers to the process whereby long-term memory preserves learning such a way that it can locate, identify, and retrieve it accurately in the future (Sousa, 2006, p. 86).

Knowledge retention is important because it saves time for both the student and the teacher as concepts already learned is safeguarded for future use. Retention is critical to optimizing the reinforcement of knowledge (Douglas et al., 2008). Bell and his fellow researchers in their study, Knowledge retention after an online tutorial: a randomized educational experiment among resident physicians, conclude that “education that appears successful from immediate posttests and learners evaluations can result in knowledge that is mostly lost to recall over the ensuing days and weeks. To achieve long-term retention, physicians should review or otherwise, reinforce new learning after as little as 1 week.” Learning that takes place in nature enhances environmental knowledge and its retention (Uzun, 2009; Nuyen, 2008).

**Music and Outdoor, Adventure and Environmental Education.**

Environmental Education overlaps with Music in areas of improving students’ academic achievements, reduces behavioral issues, improves social interactions among other benefits, as supported by these learning theories; multiple intelligences, brain-based learning; and constructivism. Environmental education takes place both outdoors and in the physical and psychological environment of the classroom. It is also interdisciplinary but seems to be attributed more to the sciences than the arts (Wade, 1996). In the past, science was the only means by which inquiry is conducted. However, paintings from the

Yellow Stone convinced lawmakers to ascribe it as a National Park. Further, the lyrics of songs can be a powerful tool in communicating environmental messages as have been used by many singers (Filipowitsch, 2011; Ashley, 2010; Shirley, 2010). “When listening to music, audiences can listen for key words, follow along with lyrics sheet, or accompany the music with physical actions and sound effects.” (Jacobson, McDuff, & Monroe, 2006).

Ramsey (2002) writes on the role of music in educating young people about ecosystem fragility and the cultural importance of rural resources. In his paper titled “The Role of Music in Environmental Education: Lessons From the Cod Fishery Crisis and the Dust Bowl Days,” Ramsey describes how lyrics and music styles drawn from the 1930s to the 1990s was used to describe the ecological and cultural issues facing Great Plains farmers. He concludes in his paper that music does not only provide a rich data source from which to draw, but that it is a powerful tool for making connections to real life situations in the classroom. The process of making music in the outdoors can connect us to the wonders of nature (Bernardy, 2001). Turner and Freedman (2004) in their article titled *Music and Environmental Studies*; state that using music in environmental education can enhance students’ learning when ideas are incorporated in musical lyrics. They further suggest that “Music can also enhance perceptions of the natural world, especially when nature itself is recognized as being musical” (Turner & Freedman, 2004, pg. 45).

The United Nations Environmental Program (UNEP) attaches importance to the significant contribution songs play in conveying environmental messages through their

lyrics. One of its world-widely observed activity is World Environment Day (WED), celebrated on June 5, annually now has among other songs composed by Jes Ebrahim, an anthem in an album baptized “Heal Our World.” UNEP has dedicated a full webpage for music and they affirm the power of song lyrics in conveying environmental messages. On their webpage, they state: “The ‘WED Anthem’ is a lyrical appeal, an emotional urge to refresh and breathe life into our world that’s losing its green cover. It’s a song that celebrates nature through its vibrant color, capturing and remembering those refreshing moments that touch our senses.” (UNEP, 2012). Jacobson, McDuff and Monroe (2006) suggest “Music should play a role in conservation education because of its ability to attract attention and invoke emotional responses” (p. 202).

Traditionally, campfire evenings are thrilled with solo, large and small group singing with very little educational insights (Bernardy, 2001). “Outdoor education is challenged to reach beyond the traditional campfire and sing-a-long activities by integrating musical concepts and experiences in an educational process. Outdoor education is in a unique position to make learning a vehicle by which to educate students about the world in which they live.” (Bernardy, 2000, p. 4). Songs, like other arts, have been a great tool in communicating environmental messages with people responding positively to them. For example, Jacobson (2006, p. 203) reports that:

In Tripoli, Lebanon, a campaign to improve the disposal of solid waste made use of a catchy jingle. A planning assessment revealed that people throw their waste on the streets and out their windows. The municipality wanted residents to bag their waste and place it in cans for collection. A song addressed the housewives,



who often listen to the radio, was broadcast on many stations. The song repeated simple slogans to prompt compliance.

Quoting Mehers (2000), Jacobson states that a catchy melody made the message hard to forget and helped increase compliance.

### **Learning Theories That Support Use of Music in Environmental Education.**

#### ***Multiple Intelligences***

Educational theorists have long sought to answer the question, what teaching styles would best achieve optimum learning by students. Researchers and Neurologists have suggested theories on how people learn and the use of music in aiding knowledge and retention of messages. Multiple Intelligences by Howard Gardner (1999) reveals that people have different intelligences, hence different learning styles and if educators are able to understand what styles contribute the most to learner's gain in knowledge, there would be a stronger literacy achievement (Campbell & Campbell, 1999). Gardner's Multiple Intelligence teaching methods identifies eight forms in intelligence: linguistic, logical-mathematical, musical, bodily kinesthetic, visual-spatial, interpersonal, intrapersonal, and most recently naturalist. There could be more but as at the moment these are the ones Gardner has identified. *In Learning Styles: Concepts and Evidence* by Pashler, McDaniel, Rohrer and Bjork (2008), these cognitive psychologists with an interest in both basic science of learning and memory and in ways that science can be developed to enhance teaching and learning seek to find out if the popular believe that different people have different learning styles, is grounded on scientific evidence. As of their publication in 2008, these authors explain that those who think different learners

learn best when the best learning style that appeals to them is used, have not used any experimental methodology capable of testing the validity of learning styles applied to education and they report that those who have used an appropriate method have found results that contradict the popular meshing hypothesis, according to which instruction is best provided in a format that matches the preference of the learner. Their review concludes that there is no adequate evidence base to justify incorporating learning styles assessments into general educational practice. They however conclude that it would be erroneous to conclude that all possible versions of learning styles have been tested and found wanting, as many have not been tested at all. This suggests exploiting the strengths of different learning styles and different learners. Gardner's initial findings reveal seven areas of intelligences among which are musical, interpersonal, and intrapersonal. Outdoor education provides participants with the opportunity to go solo (intrapersonal) considered time to exploit one's self, feelings, fears and motivations, and time to work as a team (interpersonal) considered time to study and understand other peers intentions, motivations and desires requiring communication which is sometimes accomplished through songs (Bernardy, 2001). Some modern learning technologies employ the use of songs to assist in learning. One of several studies on learning theories that gained inspirations from studies on multiple intelligences is brain-based learning.

However, Gardner's multiple intelligences theory has been criticized by other schools of thoughts. In a study titled "Deciphering the theory of multiple intelligences: An Islamic perspective," Akpunar and Dogan (2011) criticize multiple intelligences which was introduced into the Turkish educational system in 2004 from an Islamic

religious perspective. Gardner's multiple intelligences had taken roots into many Muslim countries and both authors challenged the theory's emphasis on materialism and Darwin referenced as the sources of Gardner's theory. "For, materialism and Darwinism are completely dissimilar to the core values of Islam. Moreover, Gardner's theory conflicts in that it cannot present a consistent goal in education and cannot keep a balance between the material and the spiritual, and it can bear such risks as nihilism and hedonism." (Akpunar & Dogan, 2011). In Chapter 15 of his book titled Multiple Intelligences in the Classroom 3<sup>rd</sup> edition, Armstrong, Thomas (2009) criticizes the theory of multiple intelligences under the pretext that there has not been enough acknowledgement of the critical literature on the part of the theory's advocates. Brody's book published on Intelligence originally published in 1976 states thus about Howard Gardner's Multiple Intelligences Theory "list of intelligences is arbitrary, and that his attempt to restructure the theory of intelligence to omit a general factor is no more successful than the attempts of psychometric theorists to dispense with g" (Brody, 1992, p. 36)

Despite criticism, multiple intelligence theory is generally accepted. Routier (2003) states that "Music is an important part of multiple intelligence theory which encourages using several ways of teaching the same material in order to reach students with different ways of learning."

### ***Brain-based Learning***

Brain based learning is a teaching method that emphasizes that the student is allowed to use their best learning style to build their own knowledge. Neuroscience has promoted studies on how the brain receives information, processes, interprets and stores

it (Sousa, 1998, 2006; Nuthall, 2000). Research has shown that students' academic achievement is improved when brain-based learning is used when compared to the traditional teaching method (Duman, 2006). Duman's findings are congruent with other studies achieving the similar results. Such stance as would allow for learners to exploit their own abilities and finding themselves stepping up the ladder with the guidance of teachers whose experience and mentorship cannot be overemphasized.

I want my children to understand the world, but not just because the world is fascinating and the human mind is curious. I want them to understand it so that they will be positioned to make it a better place. Knowledge is not the same as mortality, but we need to understand if we are to avoid past mistakes and move in productive directions. An important part of that understanding is knowing who we are and what we can do... Ultimately, we must synthesize our understandings for ourselves. The performance of understanding that try matters are the ones we carry out as human beings in an imperfect world which we can affect for good or for ill. (Gardner, 1999 pp. 180-181)

“It is important to understand not just how we attend to, remember or reason, but also why we attend to, remember or reason about some things rather than others” (LeDoux, 2002). Rogers (1983) describes learning that allows students the freedom to build knowledge through discovery, experience and fun instead of overstuffing the student with materials and expecting them to cram rather than logically understand through systematic processes on their own inquiry why and how things came to being. “Experts hold that the best learning comes true with making use of the variety of experience which is

intensively stimulating, music, role-playing, drama, art, colors, graphics, figures and metaphors” (Duman, 2006; Sousa, 2000). The use of a broad range of teaching styles can accommodate different learners and enable them reach attain heights greater than they have when teaching styles are streamlined to exclude how their brains learn best (Bransford, 2000).

### **Other Subject Areas that Incorporate the Use of Songs.**

#### ***Early Childhood Learning***

Research has shown that in early childhood learning, the very first words are facilitated through the use of songs. There are children who easily interact with others while there are others who tend to be very reserved. Using songs to teach students does not only provide a conducive environment to learn, it also increases attention levels, improve retention and memory, extends focused learning time and expands thinking skills (Brewer, 1995). Smith (2000) states that English speakers in their early childhood learn the ABCs through tunes of songs like “twinkle, twinkle little stars” and have moved on to be able to identify the printed alphabet letters using an alphabet song chart with two colors distinguishing vowels from consonants. Several people who have learned these basic concepts on the academic ladder are still able to sing them several years after. Most of them still use these skills acquired long time ago to teach their children these basics.

#### ***Use of Songs to Facilitate Learning Foreign Language***

Researchers have also shown that music facilitates learning of a foreign language (Keskin, 2011; Salcedo, 2002). Salcedo has shown in her study that there is significant

increase in text recall when that text is learned through the use of songs. Her research has also shown that students who hear texts as music report a higher occurrence of involuntary mental rehearsal than the students who only hear spoken text. She also tested to find out if there is a significant difference in the recall results when one group of students from a song group hears the melody of the song during the recall test. Her research has shown that there is no observed advantage for the group that heard the melody of the song during testing. “The power of music in foreign language classroom is invaluable. Chants and songs are used to serve as chunks of comprehensible input so that students can understand, create relevancy and retain the second language.” (Merrel, 2004). Keskin states that:

For foreign language teaching, if songs are carefully chosen by taking the audience, objectives, language level of students and song content into consideration and if deliberate activities are carried out, it is possible to make use of songs effectively. Utilizing songs this way provides an enjoyable experience not only for students but also for the teacher. Using songs along with such activities will have many advantages such as saving the lesson from being boring and monotonous and improving student motivation.

### ***Songs and Academic Achievements***

In what was termed “The Mozart Effect” by the Los Angeles Times, thirty-six college students were treated to a Mozart sonata (K 448) for ten minutes and a Stanford-Binet IQ test showed that students who listened to the music scored higher on spatial-temporal reasoning task suggesting that the Mozart’s music has positive effects on brain and its

mode of functioning. Richard and Patricia (2003) in *Making it Happen: From Interactive to Participatory Language Teaching* supports this in his statement that “Music’s physical vibrations, organized patterns, engaging rhythms, and subtle vibrations interact with the mind and body in many ways, naturally altering the brain in a manner that one dimensional rote learning cannot.” Discussing the “Mozart Effect for Children”, Routier (2003) states that” the Mozart Effect for children refers to such phenomena as:

- The ability of Mozart’s music to temporarily heighten spatial awareness and intelligence
- Its power to improve listeners’ concentration and speech abilities
- Its tendency to advance the jump in reading and language skills among children who receive regular music instruction
- The startling increase in SAT scores among students who sing or play an instrument.”

Routier (2003) further highlights the benefits of the Mozart Effect for children, stating, “The Mozart effect is more than just raising test scores. If consciously implemented can effect a child’s life, introduce the child a wider world of emotional expression, creativity, and aesthetic beauty, enhance the social abilities of a child, improve reading, writing, mathematical, and other academic skills, as well as the ability to remember and to memorize, introduce the child to the joys of community, and help the child create a strong sense of his own identity. The Mozart Effect has also proven that music is an effective tool in providing required patterns for brain development, music can calm or stimulate the movement and heart rate of a baby in the womb, premature infants

who listen to classical music in the Intensive Care Unit (ICU) gain more weight, leave the hospital earlier, and have better chance of survival. Young children who receive regular music training demonstrate better motor skills, math ability, and reading performance than those who do not. Adult musicians' brains differ anatomically in cases where the musicians began their training before age seven (Routier, 2003).” Music can facilitate verbal recall (Wallace, 1994). The composition of songs (rhythm, melody, rhymes) is not only soothing to students; it also facilitates language learning and also improves students' speaking and listening skills, reading and writing (Keskin, 2011).

### ***Music and Recall/Retention***

Powhida (2008) has shown that song as an instructional aid can facilitate students' retention and recall of factual information that would have otherwise been taught in lecture form. The researcher studied 24 fourth grade students whose socioeconomic status was classified as a moderate to low income level. Though most subjects were primarily white, Hispanic, a small number included black non-Hispanic. The subjects' knowledge on two different topics: Pilgrims and Civil war, which had not been covered in their fourth grade curriculum, were tested before and after lectures using PowerPoint presentations. The students were also tested after music was used to teach the lessons. His results showed that songs aided in an increase in students' retention and recall as shown by a dramatic improvement of their grade scores.

Research has shown that repeated exposure to phonics music increases students' retention and ability to produce letter sounds (Tabor, 2006). Yoho (2011) in her Action Research project titled “Using Music to Increase Math Skill Retention” studied 18 fourth



grade students. Among these subjects were 7 students with specific learning disabilities and 2 students with a primary language of Spanish. Out of the fourth grade classes, the lowest students were placed in the classroom that she was investigating. Yoho, alongside the regular class teacher of the class where she selected for her study taught the lessons. She introduced new concepts, definitions and or formulas into a short, melodic song that was taught to the students. Songs were taught to the students immediately after the concepts were introduced. The students were expected to practice the song(s) regularly, during the course of the unit and before taking the assessment for the unit, the songs were sung. Her students sang the songs 2-3 times a week and several of the students regularly requested that they sing the songs. Results after taking the unit test showed significant gains in knowledge and retention in Yoho's class when compared to the other fourth grade classes.

Memorizing scriptural passages for Christians is considered paramount to a Christian's growth and relationship with God. "My son, keep my words and store up my commandments within you. Keep my commandments and you will live; guard my teachings as the apple of your eye. Bind them on your fingers; write them on the tablets of your heart (Proverbs 7: 1-3). Research has shown that using songs to achieve bible verse memorization is possible. Noll (2003) in her research titled "A Comparison of Bible Verse Memorization Using Traditional Techniques versus Using Songs" studied 16 students in a private Christian kindergarten classroom over a 12-week period demonstrated that song had significant effect on long-term retention of Bible verses.

Songs have been a tool for communication for ages. Human beings in different cultures have used and continue to use songs for communication. This tool could be stronger in some cultures but it is described as the universal language by Stephen Luscomb in chapter 12 of the book titled “Welcoming Linguistic Diversity in Early Childhood Classrooms: Learning from International Schools” by Edna Murphy (2011). Research has shown that songs and storytelling are considered culturally appropriate tools in enhancing communicating health messages (Silver, 2001). His study shows how songs and storytelling is such power tools in influencing health behaviors in the remote Ugandan district of Pallisa, villages without doctors and health units to care for their daily health issues. Those who have advocated for the integration of arts in education have linked music, art, drama and dance activities to social, personal and academic gains (Dean & Gross, 1992; Hanna, 1992).

Several researches affirm that music has positive effects on learning. Campbell, Campbell and Dickinson state that:

Music can become an important part of any educational setting. It provides a welcoming atmosphere as students enter; it offers a calming effect after periods of physical activity; it smoothes classroom transitions; it reawakens energy on gray days; and it reduces stress that commonly accompanies examinations or other academic pressures. (p. 136)

O'Donnell writing on “Music and the Brain” reports that researchers in the University of North Texas (1982) completed a study to confirm the effectiveness of incorporating music in the classroom. The researchers carried out this study on post-

graduate students to test if music aids memorizing vocabulary words. Their results showed that simply listening to music during testing does not absolutely assure recall but can improve it. (O'Donnell,n.d. para. 3)

### ***Music and Classroom Management***

Music has been found very effective in classroom management. Classroom management is of high value to teachers considering that it creates a suitable environment in which the teacher and student coexist (VanGilder et al (2007), Bauer, 2001).

According to Jackson and Joyce (2003), music is underutilized even though studies have shown that it reduces stress, improves behavior, enhances learning and provides an appreciation for various cultures. "The calming effects of music have positive effects on the students when it is introduced into the classroom. Creating a classroom that has low anxiety and stress levels is important to classroom management. Music can help to keep the levels of tension and stress to a minimum." In 2011, Martha Rivera Alanis, a Mexican teacher was praised for protecting her kindergarten students during a drug war fight outside her school. A gun battle occurred outside her class that scared her students but Alanis was said to have asked her students to duck and cover. She immediately initiated her students to singing a song popularized by a children's show "Barney & friends." The songs talks about the sky raining down candy. The students engaged in singing and Alanis was successful in getting the students' minds away from the fright of the gunshots outside her classroom. It is reported that none of the students were harmed. (Huff Post, 2011)

Music increases attention and listening, as well as it helps improve classroom behavior as Paquette and Rieg (2008, p. 228) state: “Music improves listening and oral language development, improves attention and memory, and enhances abstract thinking.

### **Popular Song genre preferred among fifth grade students.**

Different genres of songs have different effect on different age groups. Research carried out has shown that fifth-graders’ most preferred generic music was pop music (LeBlanc, 1979). Another study examined self-reported reasons by students at various grade levels for their pop music preferences. In addition, it compared responses of students in grades five, seven, nine, eleven, and college, as well as responses of students with different experience and background characteristics. Results revealed that characteristics such as the melody, mood, rhythm, and lyrics of a selection were the most important reasons for preference. Sociocultural variables generally were viewed as less important. Specific differences were noted in the importance of several variables for different grade levels. Similarly, there were some differences in response according to some student background characteristics (Boyle, Hosterman & Ramsey, 1981).

### **Conclusion to review of literature.**

Songs have been widely used and for different purposes other than just entertainment. Its results are terrific as explained in this review of literature section. Song has been found to improve memory and recall of information. It has been used in outdoor, adventure and environmental education settings (formal & non-formal) mostly for the purpose of entertainment. Bernardy (2000) suggests that the educational component should be given more attention than it currently earns. Emphases on some

literature is placed on the need for educators to understand that there are different learners with different learning styles and the need to explore the use of different tools that can enhance their learning. Merrel (2004) concludes in her article titled *The Benefits of Incorporating Music in the Classroom* thus “Music can be used and introduced into any classroom because it serves as a resource for the teacher to gain a sense of effective classroom management, it is a tool to raise scores and it can be used to learn a second language. The capabilities of music are important in the realm of education and learning, it is important not to overlook the benefits of regularly using music in the classroom.” Outdoor, Adventure and Environmental Education occurs both inside a classroom and outside the walls of a classroom. During several camps and environmental day and or residential programs, songs are used for both education and entertainment. The effects of these songs on learners’ environmental knowledge and retention still has to be known and hereby lays the raison d’être for this study. The success stories reported by different studies of the positive impacts of songs across different disciplines could possibly enhance students’ environmental knowledge and retention.

## Chapter 3

### Methods

#### Introduction

The purpose of this study was to investigate if incorporation of a song in fifth grade students' environmental education lesson enhances knowledge and retention. This researcher developed a sixty minutes lesson (See appendix A) on endangered primates of Cameroon and also wrote a song that carried the objectives of the lesson. Participants in this study were randomly assigned to both experimental and control groups, thus, this study was a quantitative, true experimental research (Creswell, 2009).

#### Participants

The participants for this study were fifth grade students at an elementary school in northern Minnesota. The fifth grade class comprised of forty-nine students and were all contacted to participate in the study. Out of the 49 students who received parental consent letters, only 29 parents (n=49, 59.2%) granted consent for their children to participate in the study. Participants were randomly assigned to the experimental and control groups, thus true experimental research (Creswell, 2009). After knowing that 29 students were going to participate in the study, this researcher printed fifteen ones and fifteen twos on sheets of papers and cut into small pieces. Participants took turn in picking without looking at what number they were picking from a hat in which the cut pieces of paper were placed. All students who picked one were grouped together as the control group while those who picked two were grouped as the treatment group. 15 students picked ones and 14 students picked twos.

The fifth grade science class teacher with whom this researcher was collaborating in this study confirmed that all participants who were all incoming students from fourth grade did not have any prior knowledge of the content of the lesson.

### **Variables**

The independent variable in this study was a song. The dependent variables were knowledge and knowledge retention.

### **Research Design**

This study was a posttest-delayed posttest true experimental design. Participants were randomly assigned to control and experimental groups.

### **Threats to Validity.**

#### **Internal Validity**

Diffusion of treatment could have been a concern. However, this did not appear to be a threat as over 90% of students in the control group showed no signs that they heard the song or were taught by anyone in the experimental group. However, one student in the control group mentioned she was taught a song but could not remember any of the content wise from the song.

A second threat to internal validity was mortality. Some students who took part in the posttest did not show up for the delayed posttest. Some had come to school and were called back home by parents and some were out sick.

## **Treatment**

The treatment in this study was a song (See Appendix F), written by this researcher, capturing the lesson objectives on endangered primates of Cameroon. The first verse of the song addresses the question asking students to list the three endangered primates. It ends up slightly answering the question on one of the causes of the problem of endangered primates that continues in verse 2. Verse 3 addresses some of the consequences as well as some of the solutions the Cameroon government in partnership with other primates' protection non-profit organizations are applying to the problem of endangered primates. Note should be taken that the song (treatment) was part of the sixty minutes lesson. Both groups received a lesson (See Appendix A) with the experimental group receiving the song as part of the lesson. The lesson was designed for sixty-minutes. This researcher taught the lesson, beginning with self-introduction, then a PowerPoint presentation comprising of where Cameroon is located on the world map, pictures of three endangered primates and some basic descriptions of what these primates are. An outdoor game was part of this lesson and students through this game learned the causes of, and the consequences of primates' endangerment. Through this game and after game discussions, they also learned ways that the government of Cameroon and other conservation organizations are addressing the problem of endangered primates of Cameroon. After the game and discussion aimed at discussing lessons learned from the game, the participants took the quiz. In the case of the experimental group, after the lesson and discussion on what they learned from the game, participants were taught the song on endangered primates of Cameroon. At the end of the delayed posttest, the



students in the control groups were taught the song so that they could also benefit from that portion of the lesson that was cut off from them due to standard experimental procedures.

### **Instruments**

Two instruments (See Appendixes D and E), used to measure participants' knowledge and knowledge retention, were developed specifically for this study. The first instrument (Appendix D) was used to collect information measuring knowledge (posttest) and the second instrument (Appendix E) was used to collect information measuring knowledge retention (delayed posttest). The instruments were aligned with the content of the lesson ensuring that the objectives of the lesson were fully covered. This lesson was developed in alignment with both National and State standards for fifth grade students. The first instrument, a questionnaire, consisted of two parts; Part A comprised of two open-ended questions. Question 1 asked what the students remembered from the lesson activities they participated in, while question 2 asked what the students learned from the lesson they participated in. Part B comprised of four questions. The second instrument, a questionnaire, consisted of two parts; Part A comprised of three open-ended questions. Question 1 asked what the students remembered from the lesson they participated in. Question 2 asked what the students learned from the lesson while question 3 asked if the students were taught a song, who taught them, and what they recalled from the song. This question was intended to control for diffusion of treatment and also to identify what participants learned from the song. Part B of the instrument was the same for both control and experimental groups. In both the posttest and delayed posttest, participants were

required in the quantitative section (Part B of instrument) to respond to questions by writing down their responses in the spaces provided. The open-ended questions were included to allow for students illicit additional knowledge or intended affective outcomes from lesson participation. The reliability and validity of the instrument was validated by a panel of experts that included my committee and a certified classroom teacher with some experience in curriculum development. To distinguish the control group from the experimental group, the questionnaire was printed on two different colored papers, green for the experimental group and blue for the control group. Since students were not required to write their names on the questionnaire for privacy purposes, students' record from posttest to delayed posttest was tracked by asking students to draw and name in a box provided, their favorite animal or plant. A follow-up question required them to write their favorite color and their favorite food. Each questionnaire for the posttest was given a number after the students took the quiz. This was only required for the posttest as during the delayed posttest, students self-identified their question papers based on their drawings and this researcher used their numbers and gave them similar numbers on their delayed posttest quiz sheets.

### **Data Collection Procedure**

This researcher contacted the Director of an elementary school in northern Minnesota with a written letter (Appendix B) and a phone follow-up requesting permission to carry out this study with its fifth grade class. The request was granted and this researcher was requested to submit background records. In the letter, this researcher requested permission to randomly assign participants to both control and treatment group.

A sixty-minute time slot was requested to teach the lesson after which the quiz will follow. A posttest (knowledge test) was administered immediately after the lesson and one month after, the delayed posttest (knowledge retention test) was administered to both groups without teaching the lesson or singing the song prior to the quiz. After the posttest, the quantitative section of the quiz (Part B) was corrected and points awarded for each correct answers accordingly. Frequencies of responses in the open-ended questions were tallied according to categories that best described them.

### **Data Analysis**

A descriptive statistics calculation for the observations and measures at post-test and delayed post-test stages was carried out using Statistical Package for Social Sciences (SPSS). Inferential tests were conducted to see if there is a significant difference in posttest scores and delayed posttest scores between the experimental and control groups. The above mentioned data analysis covered the quantitative section of the quiz. The open-ended questions on part A of the quiz was described after calculating the frequencies which were a reflection of what themes came up as students responded to the questions of what they learned and what they recalled from the lesson activities.

## Chapter 4

### Results

#### Quantitative Results

Independent-sample t tests were conducted to determine if incorporating a song in an environmental education lesson enhances fifth grade students' knowledge (posttest) and knowledge retention (delayed posttest). Data for this test came from Part B comprising of 4 questions on the quiz. Each question was scored 1 point for a correct response and 0 for an incorrect response. There were a total of 10 possible points on this portion of the quiz.

Table 1

*Mean (M) and Standard Deviation (SD) results for both groups in both posttest and delayed posttest*

<b>Group</b>	<b>Posttest (Knowledge) M (SD)</b>	<b>Delayed Posttest (Knowledge retention) M (SD)</b>
Control	5.73 (2.34) <sup>a</sup>	6.42 (1.24) <sup>c</sup>
Treatment	7.71 (1.54) <sup>b</sup>	6.62 (1.80) <sup>d</sup>

Note: <sup>a</sup>n = 15, <sup>b</sup>n = 14, <sup>c</sup>n = 12, <sup>d</sup>n = 13

The experimental group had a higher mean score than the control group in the posttest and in the delayed posttest; both groups' mean scores were very similar. The control group also, slightly improved in its mean scores from posttest to delayed posttest while the treatment group experienced a slight drop.

Two independent-samples t tests were conducted to investigate if incorporation of a song in an environmental education lesson enhances fifth grade students' knowledge and knowledge retention. The test was significant for the posttest,  $t(27) = 2.67, p = .013$ . Students in the experimental group scored higher.

There was no significant difference on knowledge retention, as measured by the delayed posttest,  $t(23) = .32, p = .75$ . Students in the control group ( $M = 6.42, SD = 1.24$ ) scored similarly to students in the experimental group ( $M = 6.62, SD = 1.80$ ) on the delayed posttest.

### **Opened-ended results**

In addition to the closed-ended questions, students were asked to respond to two open-ended questions in the posttest and three open-ended questions in the delayed posttest. First they were asked what they recalled from the lesson. Then they were asked what they learned from the lesson. The responses to the two questions were merged as their responses seemed to indicate respondents had difficulties distinguishing between what they recalled from what they learned (Students for example, wrote the same responses for both, or responded to one but not the other).

During the delayed posttest, a third question asked if participants of both the control and treatment groups had been taught a song on endangered primates of Cameroon and what they recalled about the song (Part A question 3). This question was aimed at both assessing the level of diffusion of treatment as well as evaluating the knowledge retention. Participants' responses were categorized and clustered under five themes that emerged from lesson. The themes that emerged were; Lesson Activities,

Endangered Primates Lesson, Cameroon, Endangered Primates list, and Causes, Consequences and Solutions to the problem of endangered primates. Responses for the third question regarding what participants learned from the song, were categorized under three themes: Endangered primates list; Causes, consequences and solutions to the problem of endangered primates of Cameroon, and Lesson activities.

Table 2

*Summarized description of categories in Part A - Open-ended questions 1 & 2 combined.*

<b>Category</b>	<b>Description</b>
Lesson Activities	<i>When students wrote that what they learned or recalled about the lesson activities e.g. song, game, quiz etc.</i>
Endangered Primates – Theme	<i>When students wrote they learned/recalled the lesson was on Endangered Primates</i>
Cameroon	<i>When students wrote they learned/ recalled information about Cameroon</i>
Endangered Primates Listing e.g.	<i>When students wrote they learned or recalled one or more endangered primates, listing: gorilla, chimpanzee, drill</i>
Causes, consequences, solutions	<i>When students wrote either reasons why some primates are endangered, consequences of primate species endangerment and or what solutions Cameroon is applying to solve this problem.</i>

Here are a few examples in each category of what students wrote:

**Lesson Activities:** *“We did a fun game; we sang a song and did a quiz.”* – Participant in the experimental group.

**Endangered Primates** – Theme: *“I learned that there are endangered species in Cameroon.”* Participant in the control group.

**Cameroon** – *“about Cameroon. I didn’t know anything about Cameroon”* - Participant in the control group.

**Endangered Primates Listings** – *“about Gorillas, drills and apes (?) are endangered primates of Cameroon.”* Participant in the experimental group

**Causes, consequences, solutions** – *“That Cameroon is helping by preserving land as national parks and other things.”* - Participant in the control group.

Table 3

*Frequencies of responses from participants, for both posttest and delayed posttest, Part A of the quiz.*

<b>Category</b>		<b>Posttest Learned/recalled</b>	<b>Delayed Posttest Learned/recalled</b>
Lesson activities	Experimental	1	6
	Control	1	1
Endangered Primates Lesson	Experimental	4	4
	Control	5	7
Cameroon	Experimental	3	2
	Control	1	1
Endangered Primates (List)	Experimental	8	9
	Control	6	7
Causes, consequences and solutions to problems of endangered primates	Experimental	12	6
	Control	14	6

*Note:* In table 3 above, 29 students participated in the posttest (15 in the control group and 14 in the experimental group) while 25 students participated in the in the delayed posttest (12 in the control group and 13 in the experimental group).

The results from the open-ended responses revealed that more students in the control group listed more of the causes, consequences and solutions to the problem of endangered primates in Cameroon than those of the experimental group immediately following the lesson. More students in the experimental group listed more names of endangered primates and information about the country, Cameroon, than students of the control group immediately following the lesson. Students' responses across the experimental and control group were similar for indicating lesson activities or the lesson



theme of endangered species, as what they learned or recalled immediately following the lesson. It should be noted that in Part A, question 3 was not asked during the posttest.

Regarding the delayed posttest responses, more students in the experimental group listed the names of endangered primates of Cameroon; lesson activities and about Cameroon than those in the control group. On the other hand, more students from the control group listed the lesson theme (endangered primates) than those of the experimental group. Both groups were similar in the number of times they listed causes, consequences and solutions to the problem of endangered primates in Cameroon. It is worth noting that both groups recalled less knowledge of the lesson during the delayed posttest than they did during the posttest and the difference between both groups at the delayed posttest was not significant.

Responses from students in the experimental group with regards to what they retained from the song were categorized in three sub-themes. Four students in the treatment group mentioned that what they retained from the song was about the causes, consequences and solutions to the problem of endangered primates in Cameroon. Eight students in the same group listed names of endangered primates or said, they recalled having learned about three endangered primates of Cameroon, while one student wrote the entire first verse of the song as what he recalled from the song.

## **Chapter 5**

### **Discussion and Conclusions**

#### **Introduction**

The purpose of this study was to investigate the effect of song, when incorporated in an environmental education lesson, on fifth grade students' knowledge and retention.

To answer the question if incorporation of a song in an environmental education lesson enhances fifth grade students' knowledge and retention, posttest result for Part B, four questions quiz revealed a significant difference between experimental and control group with the experimental group scoring higher in knowledge than the control group.

The result of the delayed posttest, approximately one month after the posttest, did not reveal any significant difference between both experimental and control groups for knowledge retention.

The open-ended questions for Part 1 revealed differences and similarities what they learned/recalled in comparison to the other group.

#### **Discussion**

Part B posttest results confirmed earlier research that music enhances learning (Brewer, 1997; Sousa, 2006). In this study, that is evident from the results of the posttest that reflected a significant difference between the control and experimental group with the latter performing better. This suggests the song in this lesson was effective in increasing students' knowledge. Research in learning foreign language, mathematics and even phonics during early childhood education align with the results of this portion of the study.

However, the delayed posttest results reflecting knowledge retention, for Part B showed no significant difference between both groups. Sousa (2006, p. 99) suggests several rehearsals are needed in order to achieve retention and recall. The time allocated for the lesson likely did not allow for sufficient rehearsal of the song during the lesson.. The initial allocated time for teaching the lesson on endangered primates of Cameroon, incorporating the song was sixty minutes. This was to be followed by a twenty-minute quiz. Unfortunately, this researcher was informed on the day of the experiment that both the lesson and quiz had to be given within the sixty minutes time frame, hence losing twenty minutes out of expected average time for proper execution of the experimental lesson.

The delayed posttest measuring knowledge retention for Part A of the data collection instrument, comprising open-ended questions, found both experimental and control groups had strengths across a range of themes related to the lesson. Prominent in the results was that more students in the control group listed; causes, consequences and solutions Cameroon is applying to the problem of endangered primates while more students in the experimental group did better at listing the names of the three endangered primates. The experimental group may have been more successful in listing names due to the fact that the first verse of the song contains names of three endangered primates of Cameroon. It was rehearsed and sung four times and the other verses were each sung only twice. As Sousa (2006) suggests, retention is achieved with prolonged rehearsal and that appears to be consistent with this study. In the posttest quiz section, Part B, all students of the treatment group listed all three endangered primates and only a handful in the control

group listed all three. As mentioned earlier, a student in the treatment group, during the delayed posttest, wrote the entire first verse of the song and even noted that answers to the first question in Part B of the Quiz, were found in verse one of the song. Such observation resonates with Gardner's (1993) multiple intelligences suggesting that people learn differently. Such a student may have a strong presence of musical intelligence which enables him learn about the environment and other subjects better.

Most students did not seem to tell the difference between what they learned (concrete examples for example; listing the names of endangered primates and or causes, consequences and solutions to the problems of endangered primates of Cameroon) from they recalled (general things like played a game and learned a song) from the lesson. It might be a limitation with the data collection instrument, which did not go through pilot testing before the actual study. It should also be noted that the treatment did not diffuse, as was initially a concern to this researcher. It may be due to the fact that the students in the treatment group did not spend enough time mastering the song. However, some students reported that they sang the song at home even though not in its entirety due to poor mastery. The song stuck- in- my- head phenomenon was reported by some students.

### **Implications**

The research results align with similar research carried out in areas of the use of songs in mathematics, the use of songs in learning a foreign language (Keskin, 2001; Salcedo, 2002), and the use of songs in helping kids grasp their first understanding of the world and speech. This result can be used by providers of environmental education to make decisions on the use of songs in their programs not just for entertainment purposes

but also for educative reasons, both in the classroom and in the outdoors. If used, however, it seems important that sufficient time is allowed for rehearsal and repetition if the song is intended to be used for increasing knowledge and knowledge retention. Also, important is the content in the song, as students may remember what is in the song more so than what is in the other lesson activities. This study could be an indicator for researchers, educators, parents, and the communities where environmental education is provided both in the formal and non-formal sectors to examine the benefits that songs bring in the learning process among younger students and promote its use. Unfortunately, this tool, song, which cuts across cultures, is among the first to be slashed or completely deleted from the budget during challenging financial crises.

### **Recommendations for Future Research**

Research investigations in the area of songs and their effect on fifth grade students' environmental knowledge and retention should consider the following recommendations:

1. Modify the data collection instrument by asking questions that would guide students differentiate between what they learned and what they recalled from the lesson.
2. Try different song types after researching what song type may appeal to different groups of people. LeBlanc (suggests that the popular song genre among fifth grade students is pop music).
3. Compare effectiveness of number of times a song is properly rehearsed before the quiz.

4. The lesson was written to be taught for one hour and the quiz for about twenty minutes. This should be respected; otherwise, certain parts of the lessons will be crunched down to shorter time than would allow for effectiveness in its delivery.

## **Conclusions**

The intent of this study was to answer the question if incorporation of a song in environmental lessons enhances students' knowledge and knowledge retention, and it appears, based on this study, that song can enhance knowledge and not knowledge retention. The results of this study are congruent with other similar research where songs have been used to enhance knowledge. This suggests that songs could be used alongside other teaching tools to compliment different intelligences across the diverse range of students participating in environmental education lessons as also suggested and supported by different learning theories.

The theories of Multiple Intelligences, constructivism and Brain-based learning suggest that different people learn differently. The teaching focus has shifted from the traditional teaching method to student centered teaching where the student is not considered a blank board but brings with him some prior knowledge on which others should be developed, the teaching assisting the student where there is need.

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## APPENDIX A

### Lesson

#### Endangered Primates in Cameroon

By: Edwin Njeba Nganji

University of Minnesota Duluth

Master of Environmental Education Candidate

November 2012

#### Reviewed by:

-Dr. Bruce Munson, Dr. Julie Ernst, Mr. Rudy Perrault, Kaitlin Erpestad

#### Class Outline

1. Introduction – 5 minutes
2. PowerPoint (Selected endangered primates) - 5 mins.
3. Game (Causes, Consequences of primates' endangerment in Cameroon) – 20 Minutes
4. A) Lyrics as Song (Experimental group) 10 mins.  
No song Control group
5. Brainstorming – 5 Minutes
6. Reflection- 5 Minutes
7. Conclusion-5 Minutes
8. Quiz -
9. Wrap Up/Clean Up. – 5 Minutes

#### Duration: 60 minutes

#### Concepts:

- There are endangered primates in Cameroon
- Human activities such as bush fires for farming, hunting, trapping, deforestation, cause the endangerment of primates in Cameroon, such as Gorilla, Chimpanzee and Drill
- The population of endangered wild and as captive primates is gradually going below sustainable levels and needs more protection.
- Education, training of forest guards, rehabilitation and treatment of injured captive primates are among things that different conservation organizations in Cameroon are doing to protect endangered primates.
- 

#### Objectives: Students will be able to:

1. Identify two causes of primates' endangerment in Cameroon tropical rainforest
2. List three consequences of further poaching of endangered primates in Cameroon
3. Name two ways that endangered primates in Cameroon are being protected
4. List three endangered primates in Cameroon



### **Materials**

One computer with internet access, one projector, a projector screen, 3'x3' brown papers as money, song sheets for number of students in experimental group, Legos (20 of each color), pens/pencils for all students, papers, 3 clip boards, 4 cones, 3 empty boxes, 1 stop watch.

### **Correlation to Minnesota Academic Standards/Benchmarks**

Language Arts 5.8.1.1.b: Follow agreed-upon rules for discussions and assigned roles.

Language Arts 5.8.1.1.c: Pose and respond to specific questions by making comments that contribute to the discussion and elaborate on the remarks of others.

Science 5.4.2.1.2: Explain what would happen to a system such as a wetland, prairie or garden if one of its parts were changed.

Science 5.4.4.1.1: Give examples of beneficial and harmful interaction with natural systems. For example: Recreation, pollution, or wildlife management.

**Background Information:** Cameroon is one of the fifty-four Countries that make up the continent of Africa. Cameroon, located in central Africa has as neighboring countries; Nigeria to its west, Chad to the north, Central African Republic to its east, Equatorial Guinea, Gabon and Congo to its south. The southern part of Cameroon is endowed with the tropical rainforest that serves as a home to numerous animal and plant species. Some primates live in this forest and are classified as endangered by the International Union for Conservation of Nature (IUCN) following the numbers that live in the wild and as captives in zoos and other sanctuaries.

### **Procedure**

#### **- Preparation**

The teacher will set up a PowerPoint presentation with pictures of some endangered primates in Cameroon. The Song entitled "Endangered Primates of Cameroon" that will be used by the experimental group will be pulled up on a different slide and projected on the projector screen. The song will be sung after the game. The control group will get the lyrics of the song which will be read as many times as the song will be rehearsed. They students would be allowed to walk around from time to time to avoid boredom. A game activity stimulating concepts leading to primates' endangerment and consequences will be set outside the classroom. If for any reason students cannot be taken outside the classroom, the classroom space will be adapted for the same purpose. If the game has to take place inside a classroom, cut 3'x3' colored papers to replace the Legos. Hide the papers in places that cannot be easily seen or reduce the search time.

#### **- Introduction**

Begin by telling the students that they will be learning about some endangered primates in Cameroon. Ask how many of the students have heard or know about Cameroon. If they have any prior knowledge, allow some of them to share those with the rest of the class. Give them some little background about Cameroon; location, number of regions, languages and tribes and where the rainforest is located. Tell the students that you will in a little while pull up PowerPoint slides with pictures of some endangered primates in Cameroon and after

that, they will be part of a game that you will expect them to brainstorm on possible causes and consequences of primates' endangerment in the case of Cameroon and what can be done to stop it.

Ask students if they can explain or define what they understand by species endangerment. A species is considered endangered when their numbers both in the wild and as captives become so few that they are in danger of becoming extinct. Further deaths could render them extinct (disappear forever. An example of an extinct animal is the dinosaur).

- **Experience**

1. PowerPoint Presentation on endangered primates of Cameroon

1.1: Picture slides showing Gorillas, Chimpanzees, Drills, as some endangered primates in Cameroon.

1.2: **Poaching Game: (Outside the classroom except with adverse weather conditions)**

**Endangered primate game**

**Materials:**

- 3 empty boxes
- 3 clip boards with data recording sheets on each
- 1 pen/pencil per group of about 5 students
- Legos (20 of each color: green, red, yellow and blue)
- 4 cones or sticks with a colored tape at their tips to demarcate boundaries
- A whistle or sound at which they must respond to as required.
- 3'x3' brown papers (for money)
- 3'x3' green, red, yellow and blue colored papers (20 of each) in case the game takes place indoors. Replaces Legos.

**Instructions:**

1. Teacher/Instructor should place four cones at the four corners of a 25 by 12 yard safe piece of land outdoors. In the absence of cones, stick colored tape around four 2 feet long sticks and pin them at the four corners of the play area. Before the students arrive, hide 12 green Legos, 4 yellow Legos and 6 blue Legos at different locations inside the marked off space.
2. Take students to the game site. Divide students in three groups (preferably 5 students in each group) and request that they decide one student who will record their data, which two will be hunters, one student as finance officer and one who will be the logger.
3. Give each group an empty box in which they can put their 'animals' after they hunt them. They can also put in it remains of dead animals which they find on their way as they hunt.
4. Explain that the students who are playing the hunters will be hunting within the marked area.

- Green Legos – primates
  - Red Legos – diseased killed primates
  - Yellow Legos – predator killed primates
  - Blue Legos - baby primates which could be sold as pets
- a) **Round 1:** Tell them that they are free to bring back to their post where the data recorder, any of the primates they find. In this first round, give them two minutes to go hunting after which their results must be recorded on their data sheets.
  - b) **Round 2:** Time has gone, the human population has increased and many more people have come to the area. In this round, let loggers walk by as hunters hunt. Loggers can only point out an animal to a hunter once. Reduce forestland size to  $\frac{3}{4}$  its initial size. Ask students to face the opposite direction from the game area. Hide 6 more green Legos, 4 yellow Legos, 6 red Legos, and 4 blue Legos. Give them two minutes to hunt and at the sound of the whistle, they must all run back to their posts and record their data.
  - c) **Round 3:** Human populations continue to increase. While students face the opposite direction, hide 4 green Legos, 2 yellow Legos, 3 red Legos and 4 Legos. Give them two minutes to hunt and at the sound of the whistle, they must all run back to their posts and record their data.

If there is enough time, the game can be repeated and students can decide to maintain or switch roles. Switching roles is encouraged so as to expose students to different experiences.

5. Ask students to gather all the materials and return them to the right places. Take students back to class and get them into their groups to record their observations on the last part of their data-recording sheets. Have students make a plan in their groups to share their thoughts with the rest of their classmates. From their discussions, relate happenings of habitat loss through unsustainable logging, hunting and trapping.

**Note that:** As students share their observations, guide them with the following information:

- Reducing land size in the game represents growing populations and forest encroachment hence reduced habitat for the animals.
- Primates are preyed upon by crocodiles, leopards and lions and are easily exposed to the predators, man being the number one predator.
- As loggers continue to fell trees without planting new ones, the forest gradually disappears. Farmers also use bush fires to clear their farmlands for planting. This affects primates because their natural habitat is destroyed. Most of their primary sources of food including leaves, fruits and insects are destroyed.
- Habitat loss for the animals exposes them to hunters easily and other adverse conditions (bad weather, need to adapt to new conditions, disease etc.)

- Cameroon is not just rainforest; there are savannah, prairie and desert ecosystems as well. There are rural and urban cities with full life as well.
- The government and other conservation organizations like the Limbe Wildlife Center does education outreach and rehabilitates and treats injured primates. In collaboration with the local government, primates kept as pets are seized and released or if injured, treated in captivity until well and then released back into the wild.
- There are government training programs where forest guards are trained and posted to different forest posts to guard the forest against poachers.
- Several non-profit organizations train hunters and pepper soup sellers with other skills such as domestication of goats and cane rats in place of endangered primates.
- Further poaching can lead to species extinction and will affect research since most medicine trials are done on chimpanzees (closely related to man), tourism, which brings money to the country declines. Animals that prey on these primates are deprived of their food.

**1.5: What is been done to save the situation/Application:** Ask students discuss what Cameroon could do to solve the problem of primates' endangerment. Write down their suggestions and tell what Cameroon is already doing. Revisit points above.

**Discussions/Reflection:**

- Ask students to share with their classmates what they learned about primates, causes and consequences of their endangerment as a review.

**Conclusion:**

Tell students that they have learned about endangered primates in Cameroon and that they will be taking a quiz on what they have learned. Reiterate that this quiz will not affect their school grades in any way but that you'll appreciate if they can put in the best of their understanding/knowledge in the questions.

**Assessment:** Quiz

Extensions/Resources

1. Limbe WildLife Center: [www.limbewildlifecenter.org](http://www.limbewildlifecenter.org)
2. Save the Primates: [www.save-the-primates.org.au](http://www.save-the-primates.org.au)
3. [www.globio.org](http://www.globio.org) (Direct link to primates is: [http://www.globio.org/glossopedia/article.aspx?art\\_id=21](http://www.globio.org/glossopedia/article.aspx?art_id=21))
4. [www.learningtogive.org/lesson/unit350/lesson1.html](http://www.learningtogive.org/lesson/unit350/lesson1.html)

## APPENDIX B

### Letter to the Director of an elementary school in northern Minnesota

October 12, 2012

The Director

#### Thesis Proposal

Dear Madam,

My name is Edwin Nganji. I am an International Student from Cameroon studying at the University of Minnesota Duluth. I am in the Master of Environmental Education program. In partial fulfillment of my graduate studies, I am writing a thesis. I am interested in investigating the effects songs have when incorporated into an environmental education lesson for fifth grade students.

In summary, my study will entail teaching a one-hour environmental education lesson to fifth grade students. If authorized, I will like to randomly assign students to two groups; a control group and an experimental group. The difference between both groups is that, the experimental group will have songs incorporated in their environmental education lesson and the control group will have the lesson without any songs incorporated.

I have chosen to teach a lesson on endangered primates in Cameroon – Africa and I am working to correlate the lesson with State Standards and North American Association of Environmental Education guidelines.

One month after this lesson is taught and a knowledge test taken at the end of the one-hour lesson, I will like to take a delayed posttest to evaluate how both groups with retention of the lessons learned. For this reason, it will be great if I am able to carry out the first part of the study before the students go for thanksgiving and the delayed posttest in January 2013.

The choice of your school comes as a result of most colleagues and staff commenting on the great work your school is already doing in favor of the environment. I am certain that your school will be a perfect fit for such a study and hopefully; the outcomes will contribute to advancing the course of environmental education objectives worldwide.

I am very willing to further discuss any questions you may have with regards to this study.

Thank you,

***Edwin N. Nganji***

1421 E, 2<sup>nd</sup> Street Apt #3

Duluth, MN 55805

Tel (Mobile): (713) 818 0634

(Office) : (218) 726-8677

Email: [nganj002@d.umn.edu](mailto:nganj002@d.umn.edu) or [eddynjebs@yahoo.com](mailto:eddynjebs@yahoo.com)

## APPENDIX C

### **Assent form script for teacher to read to students:**

“Edwin Nganji is a graduate student from the University of Minnesota in Duluth and he would like our help with his research. He wants to learn how songs affect your environmental education knowledge and retention of that knowledge.”

He wants to use our class for this study. He will be coming into our classroom and he will teach you a 60 minutes lesson on endangered primates in Cameroon after which he will give you a test to measure your knowledge. The test has two Parts, A and B. Part A is comprised of two questions in the posttest and will have three questions in the delayed posttest. Part B has four questions and will be the same for both posttest and delayed posttest.

Your answers will NOT be graded on this study for class purposes. Your answers will only be used to help determine your environmental knowledge level and retention. Participation in this study is voluntary. It is your choice if you want to participate. If you choose to take part in this study or not, your grade will not be affected either way.

If you understand what is being asked of you and you agree to participate please take a permission letter home for your parents/guardian to sign. If you decide not to participate you do not need to take a permission letter. If you have questions please ask your teacher. “

**APPENDIX D**

QUIZ – Posttest

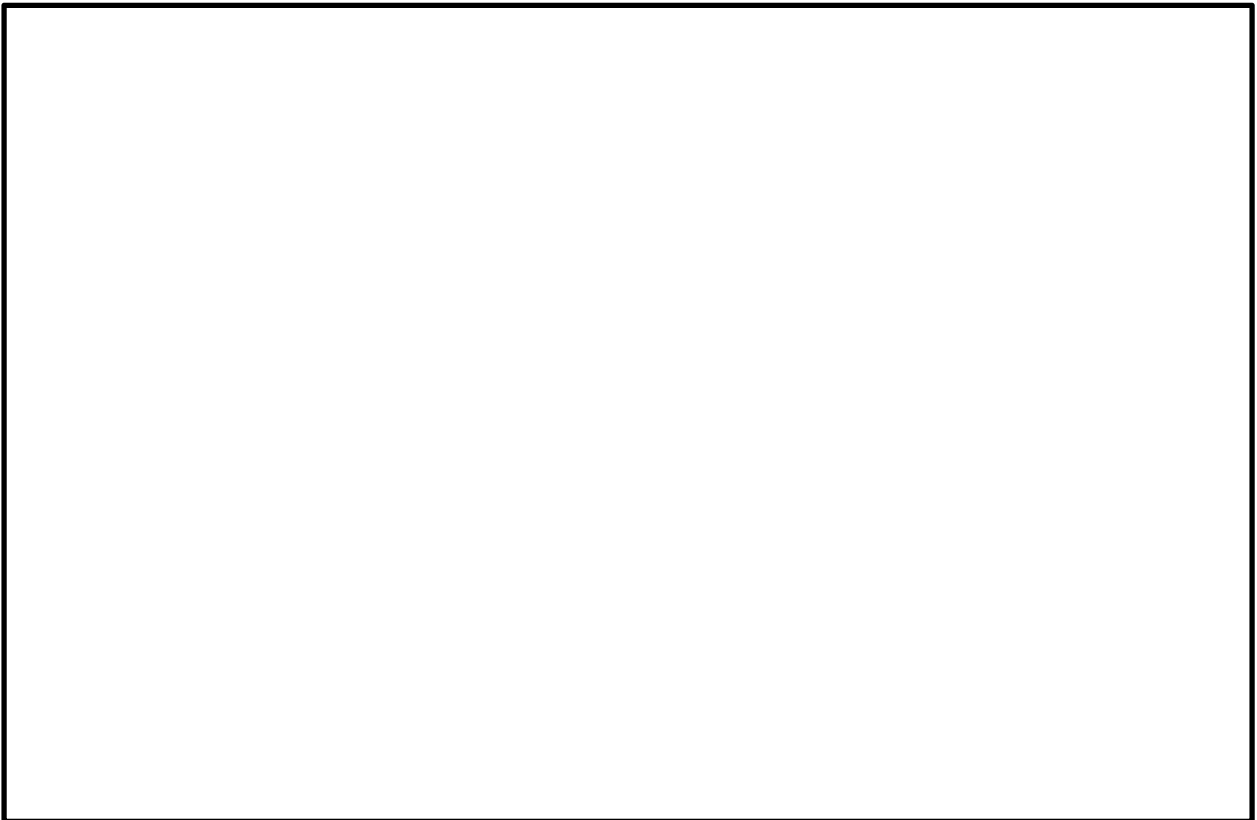
Date: \_\_\_\_\_/\_\_\_\_\_/2012

Dear Participant,

Thank you for accepting to be part of this study for my Master’s degree. Please take note that this quiz will not affect your school grades in anyway and any information you provide here will be only for the purpose of this study.

PS: I will not mind about spellings

Please in this box, draw, name and describe your favorite animal or plant.



What is your favorite color?

\_\_\_\_\_

What is your favorite Food?

\_\_\_\_\_



**Quiz – Posttest**

**Part A**

From all the activities you participated in today:

1) What do you remember?

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2) What did you learn?

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**Part B**

A) Fill in the blanks

1. Name three endangered primates in Cameroon.

A) 

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B) 

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C) 

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2. Give two reasons why primates of Cameroon are endangered.

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3. List three reasons why endangered primates should be protected.

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You have come to the end of the quiz, thank you for taking time to answer these questions. Please, kindly return this question sheet to Eddy.

Again, thank you!

**APPENDIX E**

Quiz – Delayed Posttest

Part A

From all the activities you participated in last time you were taught the lesson on endangered primates of Cameroon?

1) What do you remember?

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2) What did you learn?

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3) Were you taught a song on endangered primates of Cameroon? If your answer is yes, who taught you the song and what do you remember about the song?

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3. List three reasons why endangered primates should be protected.

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4. Name two things that the government of Cameroon and other non-profit organizations are doing to protect endangered primates?

A) \_\_\_\_\_  
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C) \_\_\_\_\_  
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You have come to the end of the quiz, thank you for taking time to answer these questions. Please, kindly return this question sheet to Eddy.

Again, thank you!

## APPENDIX F

## Endangered primates of Cameroon

Score

(Master of environmental education thesis research)

Edwin Nganji  
compiled and edited  
by Jean R Perrault

Voice

The musical score is written in treble clef with a key signature of two sharps (F# and C#) and a 2/4 time signature. It consists of four staves of music with lyrics underneath. The lyrics are: 'Go - ril - la\_\_\_ go - ril - la\_\_\_ chim pan zee\_\_\_ chim pan zee\_\_\_ and drills\_\_\_ and drills\_\_\_ Ca me roon's rain for rest\_\_\_ Come a long and sing with me . Pri - mates are cry - ing\_\_\_ O hun ter man stop shoo\_\_\_ ting\_\_\_ and trap ping them'.

Go - ril - la\_\_\_ go - ril - la\_\_\_ chim pan zee\_\_\_ chim pan zee\_\_\_ and  
drills\_\_\_ and drills\_\_\_ Ca me roon's rain for rest\_\_\_  
Come a long and sing with me . Pri - mates are cry - ing\_\_\_ O hun ter man  
stop shoo\_\_\_ ting\_\_\_ and trap ping them

*Verse 2*

The forest habitat  
Cutting trees, burning them  
For money, and that's greed  
Cameroon's rainforest  
Come along and sing with me  
Primates are crying  
O logging man, cut one tree while planting two.

*Verse 3*

These primates bring tourists  
Bring money, help research  
Educate forests guards  
To protect these primates  
Come along and sing with me  
Primates are crying  
Join in our song, raise your voice and protect them.