Eliciting and Activating Funds of Knowledge

in an Environmental Science Community College Classroom:

An Action Research Study

By

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ABSTRACT

Many non-traditional students are currently underperforming in college and yet may have untapped knowledge and skills that could support their academic success if appropriately utilized. Previous practices that students experience as a part of their lives are what Gonzales and other researchers call “funds of knowledge” (FOK). There is ample evidence to show that utilization of students’ FOK in K-12 instructional contexts can be beneficial. In contrast, little formal FOK research has been done with higher education students. To address this gap, this study explores how environmental college courses could be designed so as to better elicit and capitalize on students’ FOK, with the ultimate goal of increasing student engagement and learning.

More specifically, using an action research paradigm, I designed, implemented and studied an intervention in two sections of the required environmental science course I taught in Fall 2009 at the community college where I am employed. The intervention consisted of two phases: (1) eliciting FOK from the students enrolled in one section of the course through a draft survey, and (2) refining that survey tool in order to better elicit FOK, development of other methods of elicitation of FOK and activating (or incorporating) the FOK thus identified as relevant to enhance the learning experience of the students in both sections of the course.

The designs of the intervention as well as data collection and analysis were informed by the following research questions:
Q1. What are effective strategies for eliciting FOK that may be generalized to the practices of other college instructors?

Q2. What relevant FOK do students bring to this class?

Q3. What were instances where FOK were activated in the course?

Q4. What are effective strategies for activating FOK that may be generalized to the practices of other college instructors?

Q5. What evidence was there that students took up new practices due to the intervention?

Data were collected from a variety of sources including an audio recorded small-group session where FOK were elicited, surveys compiled by all students to point to potentially relevant life experiences and practices, audio recorded classroom lessons where FOK were utilized, audio recorded final class reflections on the experience, and my own teacher log. Data were qualitatively analyzed first to identify the range and frequency of students’ relevant FOK, then to identify and characterize effective activation of these funds in a classroom setting.

Findings highlight the breadth of relevant FOK present in a given class as well as strategies shown to be effective for both elicitation and activation of these funds. Implications are drawn for future research into FOK as well as for other instructors wishing to explicitly draw on students’ FOK to enrich their learning experiences.
CHAPTER 1
INTRODUCTION

1.1. Overview

Many non-traditional students are currently underperforming in college and yet may have untapped knowledge and skills that could support their academic success if appropriately utilized. This study was motivated by the desire to explore how environmental college courses could be designed so as to better elicit and capitalize on these students’ funds of knowledge (referred to as “FOK” in this document) thereby increasing their engagement and learning. Using an action research paradigm, I designed, implemented and studied an intervention where I elicited and used students’ relevant FOK in a required environmental science course I have been teaching for several years at a local community college.

The materials in this dissertation proposal have been organized as follows. In this chapter I will provide an overview of the proposed study, the goals of the study, a brief examination of the theoretical framework and a preview of the study’s findings. Chapter Two will provide a more detailed overview of the relevant literature, explicating in more depth the theoretical framework that informs my study and what we know about the challenges and effective strategies for both eliciting FOK and incorporating relevant FOK into instruction. Chapter Three will provide a detailed description of my research design, including the research questions informing the study, the context of the intervention, participant recruitment, a detailed description of the intervention, and data collection and analysis methods. Chapter Four is a discussion of the findings of the study, organized by the five research questions as well as a section for other important findings. In Chapter
Five I articulate how those findings impacted my own practice and identify future action research cycles. In Chapter Six I examine and summarize the findings of the study and their contributions to the field. Finally, the Appendices consist of additional documents related to this proposal, which will be referred to as needed throughout the text.

1.2. Statement of the Problem and Goals of the Study

Many college students, especially those that can be labeled first-generation, non-traditional and/or those who under-performed in high school, do not succeed academically, exhibited by low grades and even a failure to graduate. Yet a number of research studies (e.g., Barton & Tan, 2009; Ginsberg, 2007; Gonzalez & Moll, 2002; Moje et al., 2004; Moll, Amanti, Neff, & Gonzalez, 1992) have shown that populations of students with similar “deficits” often have a wealth of untapped “funds of knowledge” – defined as “historically accumulated and culturally developed bodies of knowledge and skills essential for household or individual functioning and well-being” (Moll et al., 1992, p. 133) -- which could assist in their academic success if instructors specifically drew on them. Moll and his colleagues state the following in regards to FOK utilization in the working-class Mexican communities of Tucson, Arizona where their study took place: “Our claim is that by capitalizing on household and other community resources, we can organize classroom instruction that far exceeds in quality the rote-like instruction these children commonly encounter in schools…” (p. 132). Referring to the FOK the Puerto Rican families in her study possessed, Mercado (2005) lamented “… failure to strategically harness these resources represents missed opportunities to increase the life chances of students at a time when high school graduation requirements have increased,
when a college diploma is an essential credential for economic survival, and when the economic value of Spanish is growing in the United States” (p. 250).

Despite the research showing the benefits of a FOK approach to K-12 teaching, there is little evidence in the literature that such practice is taking place in higher education. This lack of application may be explained by some of the challenges associated with utilizing students’ FOK. The literature suggests that these challenges include a lack of time, lack of comfort on the teachers’ part to give up the role of sage on the stage, standardized testing pressures, and a lack of recognition of the value of other ways of knowing (see for example Barton & Yang, 2000).

Failing to capitalize on any strategy (such as FOK utilization) that would increase non-traditional students’ success in college is indeed important, as this may negatively affect these students’ chances to complete a college degree, which in turn is connected with access to jobs, increased salaries and promotions within organizations (U.S. Census Bureau, 2009). In addition to these tangible benefits, success in higher education can lead to increased self-esteem, social contacts and greater involvement in a community. Furthermore, there are issues of equity at stake. Researchers have claimed that education favors a specific way of knowing, and does little to recognize differences among individuals or their distinctive cultural practices and instead promotes educational reproduction of the dominant culture (Gonzalez & Moll, 2002; Barton & Yang, 2000). Therefore, for college education to be more equitable, college instructors should become more aware of the types of knowledge and life experiences that non-traditional students bring with them, recognize the values of these other ways of knowing, and learn to utilize them in their teaching.
Indeed, many of the students that come to the required environmental science course I teach at a local community college have experiences and knowledge that may be relevant to the course but are not reflected in the curriculum, to their ultimate detriment. The following vignette reflects my typical experiences in a course I have been teaching for 16 years:

Students file into the first day of class for a required first-year course for environmental studies majors at a mid-sized community college. On their desks, they find specimens of animal skulls representing some of the local mammals they will be studying throughout the semester. It is obvious that some of the students are at home with the bones, picking them up with ease and pointing out features to their neighbors, while others treat the specimens as one would any foreign, unfamiliar object. As the instructor, I ask for a list of what the specimens could be and it is also clear that many of the students have different levels of knowledge about what wild animals are found in New York State. I am no longer surprised but rather anticipate that some of the students who have performed poorly in their first semester classes will be the same ones that will shine in this class, due largely to their previous experiences. Darryl, sitting in the back row and wearing his ever-present camouflage baseball hat, seems to know the identities of all of the skulls. I ask him in front of the class: “Where did you learn about skulls?” He replies that he has been a trapper since he was 12. Stacy, sitting in the front row (and who eventually goes on to earn an A in the class) wrinkles her nose at that admission. “Fur is murder,” she says under her breath.

As the weeks progress I find that there is a real wealth of experiences in this class. I have students from large population centers that relate stories about raccoons in
their chimneys and deer in suburban parks, while rural students tell matter of fact stories about weasels killing chickens and farmers killing weasels. I have adult learners with young children that tell stories of their kids’ first encounters with feeding squirrels and chipmunks alongside traditional age students, one of whom brings in venison jerky for everyone after harvesting his first deer. I wonder, though, how many of these students realize the value their previous experiences bring to the classroom and whether they ever thought of using these funds of knowledge to their benefit in other courses as well.

It is the personal experience of situations like the one captured in the above vignette that provided motivation for this study. Over the years, I have become increasingly dissatisfied with how this course (CON 102: Introduction to Wildlife and Fish) in particular fails to take advantage of the knowledge students bring to the class with them. I was finding out new information about my students and their relevant practices seemingly every day, and more frustrating to me as an educator, even after the course was over. I was increasingly left with the feeling that there was more that I could do to activate the skills and bodies of knowledge that my students possessed - many of which were the very things that drew them to become environmental majors in the first place. Many of these FOK are what Barton and Yang (2000) called non-formal science and argued should have a place in science instruction. I had no intention of sacrificing rigor or altering the goals of the course. Instead, I shared the position of Moje and her colleagues (2004): “Holding science to the standard of living in the everyday world is one way of challenging some of the privilege of science without necessarily dismissing its value in certain spaces, relationships, times, or activities.” (p. 54)
As I began investigating the literature, I found a glaring lack of work done regarding the utilization of college students’ FOK. To date, I have been unable to find a published article using a higher education population. Yet the findings from researchers in the K-12 arena are nothing but encouraging. There was no reason to think that the benefits that were being seen with younger students would not translate to this older audience. In fact one study (Davis, Akers, Green, & Zartman, 2006) specifically called for a further examination of college students’ participation in clubs and other activities prior to entering college to serve as a predictor of their success in an introductory environmental science course. Without using the term “funds of knowledge,” Davis and his colleagues were suggesting that there was a link between students’ prior skills and bodies of knowledge and their current academic success. My work proposes to take that one step further and suggests that college learning experiences can be tailored to specifically take advantage of those FOK to the benefit of the students in the class.

1.3. Theoretical Framework of the Study

In my review of the literature, the “Funds of Knowledge” theory emerged as the most valuable theoretical framework for this study. This theory is based on the premise that people are competent and have valuable knowledge acquired from life experiences. This recognition is particularly important for students who are often viewed as being at a deficit because of their socio-economic status, cultural differences or other perceived flaws (Gonzalez, Moll & Amanti, 2005). For example, the community college where my study took place is located in a rural county where agriculture plays an important role, and students from rural communities are often perceived of as at a deficit when compared to suburban students from more affluent communities.
As mentioned earlier, the term ‘funds of knowledge’ refers to “historically accumulated and culturally developed bodies of knowledge and skills essential for household or individual functioning and well-being” (Moll et al., 1992, p. 133). For the purposes of this study, however, I chose to use a slightly modified definition of funds of knowledge as explained below.

In the original FOK research (Velez-Ibanez & Greenberg, 1992), the population being studied was U.S.-Mexican children. One purpose of the research was to “provide a broad anthropological context for possible educational reforms of the public schools” in the southwestern United States (Velez-Ibanez & Greenberg, p. 313). They felt a key to understanding the culture being studied was at the household level; an understanding of how individual households controlled their labor and resources. It was important for the researchers to establish that the skills and bodies of knowledge (“funds of knowledge”) they were uncovering were an essential part of the daily lives of the study participants because they wished to show that every household had to negotiate a wide range of tasks vital to their existence, including providing income, cooking meals, repairing items in and around the home, etc, and in the process of completing these tasks, skills and bodies of knowledge were activated that could also be drawn on in the classroom. In other words, they created a theoretical framework whereby all households have FOK (and therefore value), not just certain types of households. These people were not privileged, but ordinary. The researchers argued that the study participants should not be seen in the light of a deficit model but rather as households full of individuals that have much to offer and effectively navigate their daily lives by providing for the success and well being of themselves and their family members (Velez-Ibanez & Greenberg, 1992). I believe it
was this particular research goal of presenting these “ordinary” individuals as successes (rather than holding up exceptional individuals as just that – “exceptions”) that led the researchers to view funds of knowledge as skills or bodies of knowledge that were “essential for” household and individual functioning.

In contrast, many of the skills and bodies of knowledge I will look for may not fit into what one would strictly call “essential.” In fact, I can make that argument about several of the studies I have read where researchers seem to have operationalized the term FOK differently than it was used in the original (and closer to what I am proposing here). For example, Moje et al. (2004) refer to popular cultural FOK and cite examples such as knowledge of music, movies and television shows. The study clearly states how this knowledge can be drawn on for the benefit of the students in their academic pursuits, but makes no attempt to show that this knowledge is “essential”.

Whitmore and Norton-Meier (2008) provide two case studies showing the FOK that two mothers bring to their families. One, Pearl Bright, shares experiences that are particularly relevant to my study:

Pearl described herself as an avid naturalist. She referred to the Mississippi River as her childhood backyard playground and continued the *family tradition* (emphasis added) of wisdom about nature with her boys. She served as the local Cub Scout leader so she could encourage her boys to become knowledgeable outdoorsmen. Frequent camping trips allowed the family to hunt, fish, canoe and explore local wildlife. They kept track of birds that visited the feeders outside their home, and when they spotted a bird they couldn’t identify Pearl looked it up
with the boys in a reference guide. Nature and hunting magazines were always found in their living room. (p. 453)

The authors contend that these FOK fit the definition of “essential” by stating “Nature for Pearl’s family and cooking for Ronda’s demonstrate the highly intellectual funds of knowledge that are an integral part of who these families are (emphasis added)” (Whitmore & Norton-Meier, 2008, p. 459).

I intend to replace the term “essential for” with “beneficial for” in order to access a wider range of skills and bodies of knowledge relevant to this study. One could argue that planting an ornamental garden is “essential for” the soul, but one would meet resistance. By broadening the definition, I also avoid arguments over whether an activity or body of knowledge a student brings to class is “essential” or not and can instead focus on whether it is relevant or not to a specific course. I believe the findings and implications of this study will, in turn, have a broader value by making FOK more accessible to the classroom teacher.

Equally important, I need to make clear how I intend to define “historically accumulated and culturally developed.” Although I have no intention of changing that wording in the broadly-cited definition of FOK, I will be looking at a vastly different population than previous researchers have. Again looking back to the original usage of FOK as a theoretical framework (Velez-Ibanez & Greenberg, 1992), the authors were examining the success of a somewhat discretely defined culture, one that was removed from and at times looked down upon by the dominant culture. The authors wished to show that over time, these individuals created their own ways of knowing and worked together to succeed (“culturally developed”) and that this success did not happen
overnight but rather has been going on for decades (“historically accumulated”) regardless of the lack of recognition from the dominant culture.

My study was situated in the context of a newly formed classroom, comprised of students from a wide geographical area. Students in this course are likely to have rural, urban and suburban backgrounds. And although the vast majority of the students each year are Caucasian, there is diversity in experiences, ages, socio-economic status and academic preparation. Some of the “cultures” I expect to encounter include first-generation college, agricultural, and low SES. I am also prepared to define the FOK that these students have accumulated within their lifetimes as “historical.”

This study will focus on skills or bodies of knowledge that are beneficial for the individual’s functioning and well being as it relates to class performance. Figure 1 provides my own graphical representation of this revised definition.

Figure 1: The revised definition of “funds of knowledge” (FOK)

```
Bodies of knowledge

Beneficial for

Household

Skills

Functioning

Well-being

Individual

Individual
```
1.4. The Choice of Action Research as the Methodology

The literature reports ample evidence that utilization of students’ FOK in instructional contexts is possible and beneficial – as documented in Chapter Two. Yet despite these positives, little formal FOK research has been done with higher education students. To address this need, this study will examine how environmental college courses could be designed to better elicit and capitalize on students’ FOK, with the ultimate goals of increasing student engagement and learning.

I believe that these research goals can be best achieved by an action research study. Action researchers differ from other researchers in that they “study social reality by acting within it and studying the effects of their actions” (Anderson, Herr & Nihlen, 2007, p. 1). This aim is exactly what my study attempted to accomplish, as I designed, implemented and studied the effects of an intervention in the environmental science college course I teach, where I purposefully and systematically both elicited and used my students’ FOK.

Definitions of action research provided in the literature (Anderson et al, 2007; Mills, 2007) share a similar four step spiral of intentional and systematic action:

1. To develop a plan of action to improve what is currently happening
2. To act to implement that plan
3. To observe the effects of actions in the context in which they occur
4. To reflect on these effects as a basis for further planning and future action through a succession of cycles

The study I have designed follows this model, as briefly described in what follows and articulated in more detail in Chapter Three.
1.5. Overview of the Research Design

The intervention at the core of this study took place in the two sections of CON 102: Introduction to Wildlife and Fish offered in the Fall 2009 semester, involving a total of 42 students. The design, implementation and study of this intervention have been informed by the following research questions:

1) What are effective strategies for eliciting FOK that may be generalized to the practices of other college instructors?
2) What relevant FOK do students bring to this class?
3) What are instances where FOK were activated in the course?
4) What are effective strategies for activating FOK that may be generalized to the practices of other college instructors?
5) What evidence was there that students took up new practices due to the intervention?

Although I teach only the eight-week wildlife section of the course, which takes place in the second half of the semester, I had some access to the students during the first eight weeks of the course. This allowed me to begin eliciting FOK and planning how I could utilize them in the classroom once my section of the course began.

More specifically, I solicited volunteers from one of the course sections (CON 102-01) and asked them to complete a pilot survey designed to elicit relevant FOK. All 22 chose to complete the pilot FOK survey during the first class of the semester. Students from that same section were asked to participate in follow-up discussion groups to further elaborate on those funds and six students chose to participate. The results of the pilot survey and the analysis of the information gathered during the discussion group led me to
create a more refined FOK survey that was given to all 42 students in the study just before the wildlife section of the course began. It was my intention that this survey instrument be an efficient way, both in terms of time spent and information received, to collect relevant FOK in future iterations of this course. The second phase of the study involved the actual incorporation of the uncovered relevant FOK into the teaching of the course, along with the documentation of these experiences so as to closely examine the context of the FOK utilization events and to begin to understand the impact of these decisions.

Data collected during the intervention included the audio-recorded small-group session where funds of knowledge were elicited, surveys compiled by all students to point to potentially relevant life experiences and practices, audio taped classroom lessons where funds of knowledge are utilized, audio taped and written feedback during a final class reflection on the experience, written responses to prompts regarding any new practices students’ took up as a result of the intervention, and my own Teacher Log. A qualitative analysis of these data uncovered emerging themes that offered insight into each of the research questions as described in detail in Chapter Three.

1.6. Preview of Findings

Chapter Four details the findings for each research question of this study. Those findings are further discussed in Chapter Six, where their significance and implications are presented.

I found several methods to be effective for eliciting relevant FOK including a written survey, direct in-class questioning of students and a field assignment. The survey was useful for obtaining a large amount of information in a short amount of time.
The implementation of the set of previously described methods revealed a wealth of relevant FOK among the students in the study. Elicited FOK were organized and thus will be presented under two large categories: “direct and indirect wildlife FOK” and “other relevant FOK.” (such as classification, communication and popular culture).

Although FOK were activated in literally every class, there were several instances that provide particularly rich and meaningful examples of how student FOK became useful in the course. These examples seemed to resonate with the class as evidenced by the student reactions during the class session they were presented or during the discussion at the end of the year. In addition, some were chosen based on my positive reaction to the instance as recorded in my Teacher Log.

Five strategies emerged as being particularly successful at activating relevant FOK. I found it effective to elicit and activate FOK at the same time through in-class questioning; this was particularly helpful when students were expected to share briefly on their FOK. When the FOK were more technical and the practice being described was not common, I employed a pre-planned student presentation. Small group activities and large group discussions were employed when it was assumed that virtually every student would be able to contribute to the goal of the lesson through their FOK. Finally, an open-ended and flexible field assignment allowed students the freedom to activate FOK from their out of school practices. Each of the five techniques are framed by the key insight that a collegial atmosphere of sharing was an essential element in their success.

Finally, ample evidence was found to support the contention that students had already taken up new practices or were planning to engage in some new practices based
on the intervention. Several of the new practices could be directly tied to the information shared by fellow students.
Chapter 2: Literature Review

2.1. Introduction and Overview

This literature review is comprised of two main sections and a concluding paragraph summarizing the gaps in the literature I hope to address. In the first section, I summarize the research on the potential benefits of incorporating students’ FOK in class lessons and discuss how Funds of Knowledge as a theory compares with Bourdieu’s Cultural Capital. These results lead one to conclude that students in higher education, especially in the context of a rural community college, would also benefit from such an approach to their education and document my motivation to include this approach in my own practice.

In the second section of this chapter, I explore the research findings that inform the research design of my intervention. Specifically, existing FOK literature highlights two important constraints to capitalizing on students’ FOK to support their learning: one is the challenge of eliciting the FOK and the other is the difficulties inherent in incorporating FOK into the lessons.

I conclude by identifying the gaps in the literature this study will address, with further explanation provided throughout Chapter 3.

2.2. Theoretical Framework

I was drawn to the theoretical framework Funds of Knowledge for this study, but only after exploring Cultural Capital as a potential framework as well. Although both address the broader concept of accumulated experiences, there are several important differences between the two theories, as shown below. I present a brief overview of
Cultural Capital in order to provide a proper contrast to FOK when explaining my choice of theoretical framework.

2.2.1 Bourdieu and Cultural Capital

Simply put, Bourdieu called capital “accumulated labor” (Bourdieu, 1986, p. 241), and he initially identified three distinct types: economic, social and cultural. Something would count as cultural capital if it could be converted into economic capital or is institutionally recognized as valuable, as in the case of a degree or certification. Further, Bourdieu contended that one form of capital could be exchanged or transformed into other forms of capital such as within cultural capital or from cultural to economic or social capital. An important point in Bourdieu’s discussion of capital is the fact that the accumulation of said capital is non-random. He saw the disparity in academic performance across class lines and how that inequality was replicated over time, with those with access to various forms of capital converting that capital to living wages and other tangible benefits.

However, this previous knowledge only counts as “cultural capital” if it provides an advantage over those that do not possess that knowledge (Bourdieu, 1986). Therefore, not all previous knowledge or experiences count as “cultural capital.” Cultural capital is deemed such when it is privileged by the dominant class or culture.

Given that the goals of this study were to elicit and incorporate students’ skills and bodies of knowledge in a classroom setting, cultural capital seems the most relevant form of capital to discuss here. Bourdieu (1986) conceived of cultural capital in three forms: the institutionalized state (in which status is conferred through an institutionally recognized position or manifestation such as a degree, title or appointment), the
objectified state (where culture is found in tangible items such as works of art or books) and the type of capital I am most interested in, the embodied state (where culture resides in an individual due to his/her life experiences, familial upbringing and personal habitus).

In the vignette reported in Chapter One, embodied cultural capital came from attitudes and interactions with wildlife throughout the students’ lives before entering the course. Many people form rich opinions about wildlife in general and individual species specifically and further have ideas about what interactions and utilizations may be appropriate given their personal world views. Complementing these opinions are experiences acquired and experienced over a lifetime.

One of the most important aspects (in regards to this study) of the definition of capital is the utilitarian nature of the term; the fact that it has a “potential capacity to produce profits” (Bourdieu, 1986, p. 241). In other words, the lived experiences of an individual are only considered “capital” if they are recognizable by society as valuable. “Habitus” is a term Bourdieu used to describe the perceptions, thoughts and actions of individuals in response to situations (Walpole, 2007). Further, Bourdieu claimed that the different classes each have a distinct habitus. If one’s personal habitus varies from what is expected from or valued by the dominant culture, one does not possess capital in their eyes. The theoretical framework of “Funds of Knowledge” takes a different approach to addressing the accumulated experience of individuals.

2.2.2 Funds of Knowledge

The term ‘funds of knowledge’ (FOK) refers to “historically accumulated and culturally developed bodies of knowledge and skills essential for household or individual functioning and well-being” (Moll et al., 1992, p. 133). The FOK framework is based on
the premise that people are competent, have valuable knowledge and their life experiences contributed to that knowledge (Gonzalez et al., 2005). The starting point with a FOK framework is that each individual has accumulated knowledge of value, regardless of whether others, such as those with authority, currently recognize that value or not. This distinction is a significant change in perspective from Bourdieu’s “cultural capital” which are skills or bodies of knowledge that are recognized as having value and therefore can be converted to economic capital (Bourdieu, 1986). The goal shifts from a deficit model where one might try to make someone else’s life experiences more reflect a norm, to one where the lived experiences are deemed valuable as they are, with the effort going towards recognizing why they are valuable.

This world view is particularly important for students who are often viewed as being at a deficit because of their socio-economic status, cultural differences or other perceived flaws (Gonzalez, et al. 2005) and was a driving force behind the development of the concept of FOK in the first place. Velez-Ibanez and Greenberg (1992) were the first to use the term “funds of knowledge” and created the term to describe the wealth of skill and knowledge they saw in Mexican-American households in the Southeastern United States. Important to their research was the sharing of information and labor among households. These communities of practice were termed “household clusters,” and the researchers were as interested in how the funds of knowledge were utilized as they were on documenting their existence in the first place. Since those early days, much of the work done with FOK has been with student populations that are largely non-White, K-12, and/or lower socio-economic status (Aviles-Reyes, 2007; Dworin, 2006; Gonzalez et al.; Kiyama, 2008; Moje et al., 2004; Moll et al., 1992; Street, 2005).
Moll and colleagues (1992) claim that when teachers capitalize on the FOK their students possess they can “organize classroom instruction that far exceeds in quality the rote-like instruction the children commonly encounter in schools” (p. 132). For example, during a visit to the home of an elementary student, two of the authors discover that the student has his own business selling candy from Mexico to neighborhood children. This FOK became the basis for classroom explorations on candy, the differences between candy found in Mexico and the United States and candy making with the assistance of the parent of another student. In this particular instance, the use of a simple FOK led to a week-long unit that covered many areas of the curriculum including math, science, health, consumer education and cross-cultural practices. Throughout the process, students were allowed to guide the direction of the inquiry based on the questions and hypotheses they generated. It is this rich and relevant instruction that can be a typical outcome of teaching using FOK. This example would be more powerful if there was empirical evidence cited to support the claims that students benefited from this experience. Although that is not the case, the authors (including the regular classroom teacher of these students) believe that this instance of FOK activation led to a substantially different and higher quality experience for the students (Moll et al., 1992).

It is important to note that the use of FOK from a student’s home is not intended necessarily to replicate that skill or body of knowledge (Gonzalez, 2005). Rather, the fund becomes the vehicle for instruction. For example, a student with a family history of masonry may find it easier and more meaningful to understand mathematical principles in a lesson that uses bricklaying problems over one that does not. The ultimate goal is not to teach students how to lay patio block, but rather how to perform mathematical skills like
measuring, estimating or calculating area. Further, that particular math lesson may allow for the student to directly participate in classroom discussion in a way he or she otherwise would not, provide opportunities for family members to visit the class and participate in the instruction and even facilitate conversation about math at the dinner table at home (Gonzalez, et al., 2005). Imagine those same benefits multiplied across many households when a fund can be found and utilized that is common within a community.

Another argument for connecting to student FOK is that the funds themselves often developed in thick, multi-stranded settings of friends and kin, perhaps spread over several settings rather than the single-dimensioned (and single-directional) learning typical of teacher-student interactions. Such rich learning is more likely to have meaning and therefore, is more likely to “stick” (Gonzalez, et al., 2005). Each member of the household is contributing to the total contribution of that household to the cluster. In addition, the FOK that develop in the “household clusters” noted above do so in a way that provides reciprocity among the members so that no single household needs to have all of the knowledge or skills necessary for household functions. One household may be relied on for automotive repair and trade on that skill for other needs like fresh produce from a garden or child care. These reciprocal practices provide for the development of “confianza” or a mutual trust among the participants that strengthens with the exchange of FOK (Gonzalez, et al.). Such benefits may be possible to some extent in a classroom if students feel that they are part of a reciprocal relationship with the other members of their “classroom cluster”.
2.3. Research Findings Informing the Study Design

Gonzalez and colleagues (2005) warn there is no one recipe for a successful FOK project, but they did propose a list of four minimal conditions:

1. Theoretical preparation of the teacher/researcher.
2. Home visits as participant observers.
3. Study groups to discuss, reflect and analyze the home visits.
4. Voluntary participation by teachers.

Two of the conditions mentioned by Gonzalez et al. remain in effect for my intervention, while two have been modified. My participation in this study is voluntary (condition 4) and I have grounded myself well in the theoretical underpinnings of the FOK framework (condition 1). Neither of these conditions should be taken lightly, for many authors repeated the difficulties involved in learning to recognize value in different ways of knowing (Gonzalez, et al.; Velez-Ibanez & Greenberg, 1992). Therefore, a rich understanding of FOK and the fact that I am a willing practitioner may alleviate the difficulties mentioned by previous researchers. However, there are several important differences between my study and studies to which Gonzalez and peers were referring, causing me to modify conditions 2 and 3. First, my study involves adult students rather than elementary students. My college students literally come from all over the state. The homes where their FOK were developed may be hundreds of miles away and therefore impractical to visit, and their local residences will be newly formed and perhaps not reflective of their homes of origin due to a variety of reasons. I believe that the age of the students will allow them to speak for themselves regarding their FOK, making home visits less critical. In addition, because I am looking for very specific FOK rather than
looking for literally any FOK available in a household, a home visit would be less valuable. Second, I was a lone researcher working on this project rather than one of several teachers collaborating within a district. I will not have the benefit of discussion sessions with others conducting the same intervention as the teachers in Gonzalez’s study had. What I do have is a cohort of three other peers who, along with my dissertation committee, provided the opportunity to discuss and reflect on all aspects of this study.

I have also drawn on the published work of others to address the potential problems of eliciting and incorporating FOK in the classroom, as outlined below.

2.3.1 Challenges to and effective strategies for eliciting funds of knowledge

The biggest hurdle to eliciting student FOK is learning to see it in the first place, especially when dealing with students of vastly different backgrounds than one is used to experiencing. Mercado (2005) states in relation to his FOK study involving Puerto Rican families in New York City and Long Island: “It is instructive that even bilingual teachers need to look closely to find the funds of knowledge.” How do researchers avoid stereotypes and assumptions about what goes on in households (Gonzalez & Moll, 2002)?

Since relying on a deficit model to define what is happening inside a home is ineffective and negatively biased, one common way for researchers to discover the FOK a student has access to is through interviews with family members, often conducted in the home (Gonzalez et al., 2005; Kiyama, 2008; Moll et al., 1992). Gonzalez and her colleagues warn that young students may not even recognize the FOK they possess and would therefore be unable to articulate it. As discussed below, home visits allow researchers to see some of the ways in which a household functions and view the
workings through the lens of a researcher. By talking to parents and other household members teacher researchers have the ability to hear first hand about their interests and abilities. Immersing themselves in the homes of their students, even for short periods of time, allows them to follow up on what they find.

However, home visits themselves present at least two other problems for those hoping to elicit FOK. The first is the amount of time it takes to conduct the visits (Ginsberg, 2007; Gonzalez et al., 2005), and the second is a certain amount of reluctance many teachers express over the prospect of visiting the homes of students (Moll, et al., 2005; Tenery, 2005).

It is natural to assume that teachers may be reluctant to visit the homes of their students. Most teachers are not formally trained as ethnographic researchers and therefore feel ill-prepared to visit a home and assess what is occurring during the visit. Also, some worry that they will not be welcome in the homes. Still, the literature is filled with success stories from teachers who overcame their initial fears of the home visits and reported positive experiences (Ginsberg, 2007; Gonzalez, et al., 2005; Moll, et al., 1992; Tenery, 2005;). The key seems to be the tone of the visit:

Although the concept of making home visits is not new, entering the households of working-class, Mexican-origin, African American or Native American students with an eye toward learning from households is a radical departure from traditional school-home visits. (Gonzalez & Moll, 2002, p.626)

Time, however, is a real concern that is harder to ameliorate. Gonzalez et al. (2005) state the following regarding their FOK project:

Teachers overwhelmingly remarked on the time-consuming nature of this process.
After a hectic school day, taking the time to conduct interviews that often stretched two or three hours and to later invest several hours in writing field notes was an exacting price to pay for a connection to the households. They cited this one factor as precluding wholesale teacher participation in this project. (p. 97) Certainly, there are benefits to investing all of those hours into understanding the family lives of students. However, the large time investment may preclude many teachers from incorporating FOK in their classes. Perhaps FOK can be elicited without home visits, as other research studies have shown.

While most of the published literature using FOK as a theoretical framework involves elementary students (Dworin, 2006; Gonzalez et al., 2005; Moll et al., 1992), some studies were found that involved students from middle school through high school (Aviles-Reyes, 2007; Kiyama, 2008; Moje et al, 2004; Street, 2005). No studies were found using college students. As the age of the students in the studies changed from elementary grades to older students, the strategies for assessing their FOK changed as well. For example, Street (2005) worked with secondary students to utilize their FOK by creating “The Funds of Knowledge Writing Project.” He relied on the students themselves to provide the entry points into their home lives by writing about topics of their choosing. He made no home visits and conducted no interviews with family members to uncover the funds. Street acknowledges this deviation from previous work:

It is an admirable goal for teachers to get to know their students on a personal basis, encouraging them to tap into family, community and/or cultural resources. But especially for secondary teachers, who may have responsibility for over 150 students, this is difficult to do. As a practical reality, it is not likely that secondary
teachers will have the opportunity to conduct home visits for more than a handful of their students. However, by asking students to write about their household funds of knowledge “teachers [can] academically validate the background knowledge with which students come equipped” (Gonzalez, 1995, p.5). (p. 23)

The approach seemed to be effective for Street and his students. He relates several incidents where students and their families became engaged in both the class and extra-curricular activities based on their Funds of Knowledge Writing Project. Street (2005) reports how these experiences affected him: “I am still taken aback at how significant an impact they had on my life as a teacher.” (p. 24).

Moje et al. (2004) worked with students aged 12-15. Like Street, they also relied on students to provide information about their FOK, without any home visits or parental contact. At first this may seem problematic given their finding that students rarely volunteer information about their skills and experiences in classes: “The question then remains why these youth were unwilling to bring everyday knowledges and Discourses to bear on academic texts in explicit or public ways when they were asked to read and write in school” (Moje et al., p.66). Other researchers have found similar behaviors in their subjects (Aviles-Reyes, 2007; Street, 2005). However, Moje and her colleagues worked hard to establish a rapport with the students to counter this reluctance. And it seems to have worked. The students seemed to accept the researchers as other than teachers and the study is rife with examples of the students sharing their experiences in ways they do not with their teachers. It would stand to reason that a study involving older students can be successful even without home visits if researchers are able to create an environment where the students are comfortable sharing details that they otherwise would not.
Gonzalez and Moll (2002) also call for high school students to become researchers of their own skills and bodies of knowledge by researching their own communities, and I believe college students could do the same.

Hensley (2005) recommends home visits as a primary means of eliciting FOK, but also lists several other ways she found effective including:

- actively listening to students for “clues” about their interests and the talents of their parents and grandparents
- having students interview parents
- incorporate parents’ occupations into the thematic planning of lessons
- build rapport with parents at every opportunity (open house, brief or happenstance encounters, etc)
- pairing parents at open house to interview each other.

**2.3.2 Challenges to and effective strategies for incorporating funds of knowledge**

Successfully incorporating FOK into classroom lessons often means a departure from the traditional delivery system most teachers are used to. In fact, one of the very reasons FOK loom so large in students’ lives is because of how they were accumulated. Certainly different cultures and communities teach their children in different ways, but several researchers report on the importance of children being active participants in their learning (Gonzales & Moll, 2002; Velez-Ibanez & Greenberg, 1992). Often these FOK are accumulated over periods of time in “safe” environments where there is time to practice and hone them without fear of reprisals. Certainly then, to incorporate these funds successfully into a classroom, one must take into account the very different atmospheres found in classrooms. In other words, incorporating FOK may be best done
when the classroom rules of engagement match those of the first space where the funds were obtained (e.g. Brown, Collins & Duguid, 1989).

Another challenge to the incorporation of student FOK, as reported in the literature, was the time it took to develop lesson plans. I have already described teachers’ concerns related to the large amount of time needed to elicit the funds in the first place. Now we see additional time needs to be devoted to creating lessons around the funds found. Along with time, teachers asked for support, in the form of training and sharing time, to develop the lessons (Gonzalez, Moll & Amanti, 2005). One creative solution to this time constraint was for students to design their own lessons (Basu, 2007). In this study, Basu provided the opportunity for five immigrant Caribbean youths to create their own physics lessons to encourage their expression of voice in the classroom. Each student created an end product that ultimately capitalized on their own FOK. Although this was practical for some of the high school students in Basu’s study, this would not be a wholesale solution to the problem of time. Regardless, the literature is full of stories that indicate the time invested was determined to be worth it to the students and teachers (Barton & Tan, 2009; Gonzalez, et al., 2005; Street, 2005). In addition, some lessons can be utilized year after year (and therefore creating a better return on one’s time investment) when they utilize skills or bodies of knowledge pervasive within a community.

Teachers also report unease over their changing role in the education process (Barton & Tan, 2009). By loosening more of their control over what is taught, some teachers had to step out of their comfort zones. In a “world of high stakes testing,” one teacher reports that she felt she “was in a state of uncertainty, yet I still had to cover
certain areas of the curriculum” (Gonzalez, et al., 2005, p. 162). Eventually, this teacher felt she had taught the students well using her unit informed by student funds of knowledge and pre- and post-tests bore that feeling out (Gonzalez, et al.).

Another challenge to incorporating FOK into the classroom is that sometimes the funds do not readily align themselves with curriculum units. A possible solution to this challenge is increased time and support for teachers to think of creative ways of using students’ funds. Again, high stakes testing plays a role in this challenge: “Because teachers are pressured to generate good results in high-stakes testing, urban school teachers often concentrate their efforts on classroom management, with little regard for hands-on critical thinking activities and students’ sociocultural contexts” (Upadhyay, 2005, p. 34).

Part of the challenge to incorporating FOK into the classroom is learning to value the funds themselves. Gonzalez and colleagues (2005) warn that it takes time to make shifts in thinking that allow us to re-conceptualize what we were told was of little value into something that has value.

The challenges to FOK utilization are real enough, but hardly seem unique to this situation. Lack of time to develop lessons or to explore new content areas is most certainly a common lament of teachers everywhere. Likewise, asking teachers to depart from their traditional role as sole arbiters of classroom information is what many reformed teaching methods require. It is important, therefore, to recognize these challenges and any work with FOK utilization should strive to address them.
2.4. Summary of Gaps in the Literature Addressed by this Study

In summary, this study will extend the existing literature on FOK in four important ways. First, this study will be one of the first studies undertaken with a college population. Second, this study will be one of the first working with a largely white population. Finally, this study seeks to address two of the main challenges to using FOK in a classroom setting: the time it takes to elicit FOK and how to incorporate funds appropriately.
CHAPTER 3: Research Design

3.1. Introduction and Overview

In this chapter, I detail the research design of my intervention. First, I will provide the rationale behind choosing action research as the most appropriate methodology for the intervention. Next, I will state my research questions and provide an overview of the study. I will then describe the context of the intervention, including the location and specifics of the course in which it took place. I then provide the manner in which I recruited participants, followed by the detailed plan for the intervention. Finally, I give details as to my data collection and analysis techniques.

3.2. Action Research as the Chosen Methodology

This study was conducted using action research as a methodology. As mentioned in Chapter One, there is no single definition for action research (Anderson et al. 2007; Mills, 2007) but all seem to share a similar four step spiral of action:

1. To develop a plan of action to improve what is already happening
2. To act to implement the plan
3. To observe the effects of action in the context in which it occurs
4. To reflect on these effects as a basis for further planning and subsequent action through a succession of cycles (Kemmis, 1982, p.7) (Anderson et al. 2007).

In short, this sequence of steps can be referred to as a series of plan-act-observe-reflect cycles that are intentional and systematic in nature (Anderson et al. 2007). Mills (2007) further defines action research to be research done “by teachers for themselves; it is not imposed on them by someone else” (p. 5).
Action research was most appropriate for this study as it allowed me the flexibility to quickly react to changing conditions in order to capitalize on opportunities as they arose. Further, action research is an effective technique for those, like me, who wish for their research to directly inform their practice rather than be of a more theoretical nature (Mills, 2007). One main goal of my research, as stated above, was to discover ways for teachers to capitalize on students’ FOK in the classroom to improve students’ learning.

This study consisted of two phases: elicitation (Phase 1) and utilization (Phase 2) of FOK. In Phase 1, CON 102-01 participants completed a draft FOK survey and then were invited to participate in a discussion group session to further discuss the relevant FOK they possess. From that discussion group session and analysis of the responses to the survey, I modified the survey into a revised version for the participants in both sections of CON 102. This comprises an action research cycle.

Phase 2 called for the utilization of student FOK in the classroom. Since I conducted this intervention in both sections of CON 102, each section could be considered its’ own action research cycle. In addition, although each instance of activation will be unique, there were enough similarities from one instance of activation to the next to allow for action research cycles. For example, since students in each section had similar skills and bodies of knowledge to draw from (such as hunting, farming and camping experiences) and in many cases those FOK were drawn on multiple times, I was able to modify my attempts to activate student FOK both within and between sections.
3.3. Research Questions and Overview of the Study

Every year, I have students in my classes that struggled to achieve academic success in high school and continue to struggle in college, as evidenced by their low GPAs. Many of them are part of the first generation of their families to go to college. In a large part, they have come to college to pursue a degree in an environmental field because of the positive experiences they have already experienced in outdoor endeavors such as hunting, hiking, camping, and farming. Yet these FOK that drew them to this field in the first place remain mostly untapped by college instructors and are therefore not capitalized on for academic success. Using action research, I designed, implemented, studied/evaluated and refined a process for eliciting and incorporating FOK in an environmental science course, in the hope of increasing student engagement and learning – especially for students from non-traditional populations or at risk for a variety of reasons.

Previously, ‘funds of knowledge’ has been defined as the “historically accumulated and culturally developed bodies of knowledge and skills essential for household or individual functioning and well-being” (Moll, Amanti, Neff, & Gonzalez, 1992, p. 133). For the purposes of this study, I modified that definition to read “historically accumulated and culturally developed bodies of knowledge and skills beneficial for household or individual functioning and well-being.” Further, I operationalized “historically accumulated” to include within the span of a single person’s lifetime and “culturally accumulated” to mean any community of practice where meaningful participation occurs.
This intervention took place in the two sections of CON 102: Introduction to Wildlife and Fish offered in the Fall 2009 semester. The design of this intervention, as well as of the data collection and analysis, has been informed by the following research questions:

1) What are effective strategies for eliciting FOK that may be generalized to the practices of other college instructors?
2) What relevant FOK do students bring to this class?
3) What are instances where FOK were activated in the course?
4) What are effective strategies for activating FOK that may be generalized to the practices of other college instructors?
5) What evidence was there that students took up new practices due to the intervention?

Literature (e.g. Moje et. al., 2004) indicates that students may not readily volunteer their FOK in a typical classroom, so I needed to explore ways in which FOK can be elicited. The first step in my intervention was to administer a pilot FOK survey in one section of CON 102 (n = 20 students). Next, I met with the volunteers from that same section who agreed to meet outside of class time to further investigate the FOK they possessed (n = six students). This was done in a small group discussion to complement and build upon the written survey results in order to create a more comprehensive final product. These initial efforts to elicit FOK were accomplished early in the semester, before I began teaching my half of the course.

The analyses of the initial survey results, the discussion results and my Teacher Log led to the refinement of the survey tool I administered the last day of the first portion
of both sections of CON 102 (n = 42 students) and can be used each year to uncover relevant FOK with future students. The modification of the tool was an action research spiral.

Once I elicited students’ FOK, I modified my lesson plans for individual units to intentionally and explicitly incorporate those FOK that furthered existing learning objectives. For example, two students with a trapping background agreed to share their experiences with muskrat and mink trapping. They spoke during class regarding not only the specific actions trapping these species entails but also included some knowledge they gained as a result of their trapping experience of the feeding habits and habitat preference of these species, both of which I normally cover as part of the life histories of those species.

A detailed description of the specific data collection and analysis can be found at the end of this chapter.

3.4. Description of the Context

The study took place in the community college where I have been employed for 16 years as an instructor in the Environmental Conservation and Horticulture Department. Part of my teaching assignment is CON 102: Introduction to Wildlife and Fish, a required course for all environmental majors (AS Environmental Studies, AAS Natural Resources Conservation, AAS Natural Resource Conservation: Law Enforcement, and AAS Fisheries Technology), those students pursuing a Certificate in Taxidermy, and is sometimes taken as a general elective by students from other majors throughout the college. Specifically, I teach the “wildlife” half of the course. I teach all sections of this course (ranging between five and eight sections/year) and have done so
for my entire 16-year tenure at the college. During the semester the intervention occurred, I offered two sections of CON 102 with 42 students enrolled between both sections. With the exception of the FOK survey development and administration, the intervention took place within the eight-week wildlife portion of the course and was open to all students enrolled in the two sections. The majority of students involved in the intervention were freshmen in their first semester of college.

The community college in which the intervention was conducted is situated in a small city in Upstate New York and is comprised of about 125 full-time faculty members and a total enrollment of full- and part-time students of nearly 6,000. The ethnicity of the college closely matches the local population with 95% of the students identifying themselves as white. Within the Environmental Conservation Department, the percentage of white students is slightly higher at 98% (Office of the Registrar, 2009). The gender distribution is 60% male and 40% female for students within the Department (Office of the Registrar, 2009). Despite the low diversity in race/ethnicity, the students in the Department range widely in age, SES and geographic point of origin. For example, last year the incoming freshmen in the Environmental majors came from a total of 85 different school districts and ranged in age from 18 to 57 years old. Additionally, many of the students we serve are first-generation college.

The official course description for CON 102: Introduction to Wildlife and Fish reads:

The study of fish and wildlife as a valuable aesthetic, recreational, and economic resource. Ecological considerations, life histories, identification, populations, habits, habitat characteristics, and relationship between humans and regional
wildlife and fish. Special attention is paid to fish and mammals of New York State.

This broad description allows for interpretation by the instructors as to what should be covered each semester. The amount of class time devoted to wildlife and fish is evenly divided, with the fish portion of the course being offered first. The instructor of that material stresses identification of fish while in the hand (captured), rather than in the field. Students are also expected to learn some of the basic natural history facts about each species, similar to the list given in the course description. The main method of instruction is lecture using both projected images and text and specimen examination through images and mounted and preserved fish. The wildlife section is similar in that the main teaching strategy is lecture accompanied by projected images and text supplemented by specimens (full mounts, study skins and skulls) of about three dozen species of mammals. Identification, however, is expanded from what is expected in the fish portion of the class to include identification of species seen “in the field” (rather than “in the hand”), tracks and other sign (e.g. any physical evidence left behind by the animals to indicate their presence). This is an important distinction between the two portions of the class because students are expected to develop a set of field skills in order to successfully meet the requirements of my half of the course. To this end, students are given a field assignment where they are asked to demonstrate this knowledge by actually identifying, describing and researching sightings of mammals or their sign from a checklist provided. This project within the course is an ideal platform from which to explore FOK development and utilization because students are expected to personally identify eight animals and/or their sign in order to complete the assignment. Students are
not allowed to use previous encounters to satisfy the requirement but may draw from these experiences while completing the written portion of the assignment. Therefore, in order to find and accurately identify the mammals and their sign, students must draw from existing FOK or begin to develop new ones.

Given the importance that field skills have in this course, I have devoted much time and energy to boosting my own skills at identification of the mammals covered in this course as well as adding to my knowledge of their life histories and behavior. In short, I have systematically developed wide-ranging FOK regarding the animals covered in this course. I document the encounters with these animals and their sign with photographs that supplement my retelling of the experiences during lecture. I have traveled extensively in pursuit of opportunities to personally observe the mammals covered in this class in their natural habitats at close range for extended periods of time. For example, my presentations for this class contain photos I took in 17 states, four Canadian provinces, four other foreign countries and throughout the major ecological regions of New York State. In addition, I make a point of experiencing wildlife locally as that will be what is most accessible to my students. This first-hand knowledge proves to be an effective way to teach as well as inspire students to expand their own repertoire of skills and knowledge regarding the wildlife they encounter.

There are many advantages to using this particular course for a FOK study. After 16 years of teaching the course to more than 1,700 students, I have developed a good understanding of the types of FOK students may possess that would be useful in this particular course. This positioning as an insider allows me to have access to the course and the students in ways that an outside researcher cannot. I was able to draw on my
years of experience to navigate institutional and cultural practices at the college as well as specifically within the Department. In addition, I am able to beneficially interact with the students in a variety of ways such as an instructor of other courses, as their advisor and through informal conversations.

It is very common for students to have gained relevant experience with at least some of the species of wildlife covered in this course as we cover all of the common mammals encountered in New York. Rural, suburban and urban students alike will most likely have some skills or bodies of knowledge that can be capitalized on as a FOK relevant to the goals of CON 102 (e.g. having a pet, hunting, or camping). Therefore, the study promised to be rich with opportunities to explore the advantages of a targeted approach to using FOK with college students. Since I plan to teach this course for many years to come, I was focused on research goals that will also have long-term applications to this course. To me, this intervention was not a one-time endeavor but rather the start of an action research cycle that will continue to grow and improve my practice each semester this course is taught. I am the only instructor for all sections of CON 102 “wildlife” sections. Therefore, I will be able to operationalize my results across all sections of the course in the future.

In addition, I believe this dissertation makes an important contribution to the literature in regards to capitalizing on FOK as a pedagogical tool. Most studies of incorporating FOK are with younger students of largely non-white ethnicity. The population I serve extends this work to an older population that is largely white.
3.5. Participant Recruitment

Two sections of CON 102: Introduction to Wildlife and Fish were offered in the Fall semester of 2009. Potential subjects were identified as all students enrolled in either of those two sections. These offerings are part of the regular schedule of courses available for students and are listed on the college website. CON 102 is a required course for all environmental majors (AS Environmental Studies, AAS Natural Resources Conservation, AAS Natural Resource Conservation: Law Enforcement, AAS Fisheries Technology) and those pursuing a Certificate in Taxidermy. Students were not advised into these sections for any particular reason relating to this study. Forty-two students comprised the pool of eligible candidates for this intervention.

College administration granted approval to use these two course sections as a setting for this research study. I was also granted permission by the instructor of the fish section of CON 102 to recruit study participants during the first meeting of the class. It is normal for me to visit the class on the first day to introduce myself and briefly explain the wildlife section of the class. At this time I also explained the purpose of the study, defined FOK and provided an information letter to all perspective participants. I read the letter aloud and ask if there were any questions. The letter explicitly stated that participation in the research was voluntary and that each person was free to cease participation at any time or not participate at all without fear of reprisals. No students chose to withdraw from the study.

Several precautions were taken to protect the identity of all participants. I personally transcribed audio recorded sessions that were selected to be data for this study. Each participant was assigned a pseudonym, and I will not publish any identifying
3.6. Detailed Plan for the Intervention

As stated previously, there were two phases to the intervention. Phase 1 involved eliciting FOK from my students while Phase 2 involved utilizing FOK in the selected course. The intervention took place in two sections of CON 102: Introduction to Wildlife and Fish. The course is evenly divided between those two topics, with the fish section being taught in the first eight weeks by another full-time instructor. Although I was not in the classroom with the students during that time, I did have access to them and scheduled the first phase of the intervention to take place in that time frame. Each of the two sections of the course played a different role in the intervention, with volunteers from Section 01 being solicited immediately during Phase 1.

3.6.1. Phase 1

The first phase of the study focused on soliciting participants to the study, eliciting FOK and devising lesson plans to incorporate relevant FOK in the upcoming wildlife unit of the course. During the initial class meeting I solicited participants from both sections, however only the volunteers among the participants from Section 01 were asked to complete the pilot FOK survey (see Appendix B.1 for the pilot survey) and participate in the discussion group, both designed to elicit FOK. (See Appendix B.2 for a list of guiding questions for the discussion group.) This set-up allowed me to conduct an action research spiral with the volunteers in the second section regarding my desire to find a more expedient way to elicit relevant FOK from future students without
conducting focus groups. Therefore, volunteers from CON 102-02 were not asked to participate in any data collection activities until Phase 2.

Ideally, I wanted about ten students to volunteer from CON 102-01 to provide an optimal amount of participants in the out-of-class discussion groups (Stewart, Shamdasani, & Rook, 2007), but only six did.

*Pilot FOK Survey*

All 20 students in Section 01 were given a FOK survey (see Appendix B.1 for the complete pilot survey) to complete during the first class meeting of the fish portion of the course. The purpose of this survey was two-fold. First, the results of the survey served as the basis for further discourse during the out-of-class discussion session. Second, it served as a pilot instrument to elicit FOK from future students, most notably volunteers for this study in Section 02 of CON 102. Both of these steps were important components in the refinement of the survey instrument to be as effective as possible. Table 3.1 shows the relevant FOK categories I believed would be most commonly encountered in this study and therefore were included in the pilot survey. I created this list based on my experiences teaching this course and the work of Gonzalez, et al.(2005) who classified several FOK that would be relevant to this study (“Hunting, tracking, and dressing of game” and “animal management”) under the category “Ranching and farming”.

Table 3.1. Potential categories of relevant funds of knowledge (FOK)

1. Hunting, fishing and trapping (including pre- and post- activities like scouting and processing)
2. Farming and ranching
3. Attracting wildlife (feeders, landscaping)
4. Pest control (home, garden, etc.)
5. Pet ownership
6. Family lore, traditions, beliefs regarding wildlife
7. Other animal-focused recreation (camping, hiking, zoo visits, etc.)
8. Knowledge gained through media (TV, internet sites, etc.)
9. Classification experiences (collecting stamps, baseball cards, etc.)

The same participants that filled out the written pilot FOK survey (n=20) were invited to participate in a discussion group session to further explore FOK. Six agreed to join the group.

The design of the survey was based on recommendations from Fink (2006). For example, I grouped questions into categories with short descriptive headings to make the survey easier for the respondents to follow. The survey took less than ten minutes to complete, which was within the time I had available as well as within the attention span of my college students. Finally, questions were worded clearly and simply.

**Out-of-class Discussion Group**

The out-of-class discussion group session was held on the third Thursday of the semester from 12:30-2:00. This particular date and time was chosen to correspond with
“college hour,” a block of time on Tuesdays and Thursdays when no classes are scheduled so clubs, governance, intramural and other activities may be scheduled with a reasonable expectation that students will be able to attend any activity if they wish. This was the most optimal time for my discussion group to meet so as not to interfere with course schedules.

As previously stated, six students volunteered their time to participate in this discussion. Four of the students were female (out of five in the class) and two were male (out of 15 in the class). Both male students were non-traditional, as they were not high school graduates. All six students readily participated in the discussion.

During this meeting, students were given the chance to introduce themselves and say a little bit about where they are from and why they are enrolled in CON 102. I asked students to spend a few minutes exploring the items that I had previously laid out around the classroom. These artifacts commonly used with wildlife-related practices were displayed to facilitate the discussion of relevant FOK. Artifacts included binoculars, camping equipment, traps, and scouting manuals, as well as others. For a more complete list of these props, as well as the questions I asked, see Appendix B.2. The artifacts were intended to stimulate conversation among the students, jog memories and provide richer data. In discussing focus groups, Stewart, Shamdasani, and Rook (2007) advise “… the physical environment (for the focus group session) should serve to focus the attention of the group on the topic of discussion. When props are used to facilitate discussion, they should be kept hidden until it is time to discuss them.” (p. 32) Since we began the session with the students examining the props, they were not masked in any way.
The purpose of the discussion was to further elicit or elaborate on relevant FOK that each student possessed. Since the participants in this discussion group had previously completed the draft FOK survey, I was able to triangulate the data from that source with what was said in the discussion group, as well as be able to identify the FOK that were not apparent from the survey results, but came to light during the discussion group. This allowed me to construct a survey for the second phase of the study that better elicited FOK through some modifications to the wording of some questions and the addition of open ended questions. The literature (e.g. Moje, et al. 2004) indicates that students may be reluctant to volunteer such information during class, so I took great care to provide a safe and friendly atmosphere (mostly by being a careful and non-judgmental listener) for students to do so in our discussion group. A discussion group was particularly appropriate to gather this data as it allowed for in-depth answers as opposed to the more superficial answers that are expected from the written survey, provided opportunities to evaluate the humanistic characteristics of the FOK being reported, and provided an opportunity for participants in the discussion to interact with each other verbally regarding the information being shared (Stewart, Shamdasani, & Rook, 2007).

I developed a series of prompts to ask the students during our discussion group session. The questions are found in Appendix B.2. Each of the questions required follow up questions to fully understand the FOK each student possesses. This discussion group was audio-recorded for analysis using an open-coding method.

The transcript of this discussion group session served as data for the study in two ways. First, it provided me with the information that I needed to directly include the FOK into the classroom for this section of the course and secondly, the student responses to
questioning helped me redesign the survey instrument to be more efficient at eliciting FOK in lieu of using discussion groups with future classes. I created a spreadsheet of the FOK that I elicited, making sure to note how each was discovered to assist in the redesign of the survey and a table that matches student FOK to the specific course objectives in order to facilitate incorporation into the lessons. Both the spreadsheet and chart were supplemented by a Teacher Log, an ongoing data collection instrument designed to house a variety of information.

In Phase 1, the Teacher Log served as a place to record information gained outside of the pilot survey and the first discussion group. For example, in the log I answer questions such as “What new FOK were elicited today?” and “What was the process by which I elicited each FOK today?” Appendix B.6 gives a complete list of the prompts I answered daily in my Teacher Log.

3.6.2. Phase 2

On October 28th, I began teaching the wildlife section of the course, thus marking the start of Phase 2 which included administering the revised survey, incorporation of FOK into the class lessons and examining any new practices taken up as a result of this intervention. As in Phase 1, the intervention looked different in each section of the course, as shown below.

*FOK Incorporation*

Based on the results of Phase 1, I began to incorporate some of the elicited FOK into the lesson plans for the remainder of the course for CON 102-01 (the section that was active during Phase 1). Additionally, I continued to be watchful during lessons for opportunities for impromptu utilization of previously elicited as well as additional
opportunities to elicit new FOK, documenting each of these instances in my teacher log as a data source. Each class meeting was audio recorded in its entirety, but I only transcribed sections when instances of FOK utilization took place. I utilized student FOK as appropriate through the last date the class was in session (December 21). By “utilize” I mean incorporate the student’s FOK directly into the course content either through use of the student to present information to the class from their direct experiences or by modifying my lecture to draw on the circumstances surrounding student FOK. Examples of the former include students sharing information from their seats during a class lecture regarding their skills or knowledge of a certain species of animal. An example of the latter is the instructor learning that several students are proficient in the use of trail cameras and modifying a lesson to include photographs from trail cameras supplied by the students themselves.

Incorporating FOK in Section-02 looked slightly different in that I did not have the benefit of exploring student FOK in a discussion group as I did with a subset of students from Section 01. The process of eliciting and incorporating FOK in Section-02 more closely resembled real-world conditions regarding time and energy a teacher would have to devote to the process. By incorporating the best techniques for FOK elicitation in Phase 1 to this new population, I hope to describe a more stream-lined process for FOK discovery that would be broadly applicable in the future.

Revised FOK survey

The information gathered from the pilot survey and the out-of-class discussion group led me to create a revised FOK survey, which I administered to both sections of the
course on the last day of the Fish portion of the course, just before I began the Wildlife portion. Appendix B.7 contains this revised survey.

The information gathered from the revised survey provided me a first glimpse at the FOK possessed by the students in Section 02, as well as a revised list for Section 01. Armed with this new information, I modified my pre-existing lesson plans from past years to incorporate relevant student-FOK throughout the remainder of the semester. To some extent, this meant different lesson plans for each section. For example, only one section had a pre-planned lesson on trapping beaver and muskrat because only one section had students with those FOK. But the majority of the planned activities were conducted in both sections. I remained prepared to take advantage of additional FOK that may become known at later dates or to incorporate new ideas for incorporation of student-FOK based on the results of the results of the intervention as it progressed.

Mid-course Checkpoint

Originally, I had planned to conduct this check as a discussion group with volunteers, however due largely to time constraints, I sought feedback from all students in writing through three questions that asked 1) Can you remember any examples of students sharing their skills or knowledge in class so far?; 2) Do you have any suggestions as to how to utilize the previous experiences you and my other students bring to this course?; and 3) (after listing the species still to be covered in the class) Do you personally have any experiences or knowledge with any of these species that you would like to share with me and perhaps the class? (See Appendix B.3 for a copy of this form). The purpose of this checkpoint was to receive student opinions regarding the way FOK was being utilized in the classes and what impact the intervention was having on the
students for the purpose of paring down the elicitation of FOK to a reasonable task that could be replicated by teachers with busy schedules. Additionally, the students themselves were able to provide suggestions on how I could incorporate FOK as well as provide more detail on their own FOK. Due largely to time constraints, I did little with this data during the intervention.

Written Questionnaire Regarding New Practices

As part of the pre-existing Portfolio Assignment Evaluation (the culminating authentic field assignment that requires students to report about live mammal or mammal signs such as tracks or scat), I added, for this intervention, a section asking students to describe any new practices they have taken up relative to the course objectives and asked them to explain what their motivation was for making the change. See Appendix B.5 for a copy of the table and instructions.

End-of-Semester In-Class Discussion

At the end of the semester, during class time, I facilitate a discussion with the full group of students in each section to determine if they have begun any new practices due to the FOK demonstrated by their peers, along with other questions regarding the FOK utilized throughout the semester. For example, I asked students to identify particularly memorable instances of FOK use in each section of the course. I asked students to reflect on those moments and discuss the impact that the sharing of FOK had on them. See Appendix B.4 for the entire protocol guidelines.

3.7. Data Collection

I addressed the research questions through the collection and analysis of seven data sources:
1. Results from pilot FOK survey (all 20 students in Section 01 during the first session of the fish section of the course).

2. Transcripts of one out-of-class discussion group session (focus group of six student volunteers from Section 01).

3. Results from revised FOK survey (all 42 students enrolled in the course).

4. Written summary of the mid-course checkpoint (only those 17 students from the two sections who returned the summary).

5. Transcriptions of selected segments of audio-recorded lessons from both sections (n=28).

6. Written questionnaire regarding new practices administered to all 42 participating students.

7. Transcript of end-of-year discussion session (all 42 students enrolled in course).

8. Teacher Log.

Each of these data sources specifically addressed one or more of the research goals of this intervention and is appropriate given the chosen theoretical framework of funds of knowledge and research methodology of action research. All participants in this study were assigned pseudonyms to protect their anonymity.

3.7.1 Pilot FOK survey

The first source of data was collected during class on the first day of the semester when students in CON 102-01 (n = 20) completed a pilot survey asking about their FOK relevant to the wildlife portion of the course. This survey addressed the second research question (What relevant FOK do students bring to this class?) and was one of the methods for eliciting FOK sought per the first research question (What are effective
strategies for eliciting FOK that may be generalized to the practices of other college instructors?). A written survey was an appropriate tool to gather this type of information from large numbers of subjects. In addition, several sources reported specifically surveying older students for their funds of knowledge (Moje, et al, 2005; Gonzalez & Moll, 2002). See Appendix B.1 to see the entire pilot survey.

3.7.2. Transcript of out-of-class discussion group session.

The purpose of the discussion group, comprised of six volunteers from Section 01 only, was to use artifacts and a discussion group setting to elicit FOK that did not come out during the pilot survey or to explore in-depth the FOK that were identified in the pilot survey. Since no new FOK were elicited, this discussion group served to give me a more complete understanding of the depth and character of student FOK. See Appendix B.2 to examine a guiding protocol for this session.

3.7.3. Revised FOK survey.

The purpose of the revised FOK survey was to elicit FOK from students in a quick and concise manner. This survey was administered to all students in both sections of the course (n = 42 students) on the last day of the fish section of the class. It is not reasonable to assume that postsecondary instructors would have the time to visit students’ homes or conduct discussion groups on a large scale in order to discover the FOK their students bring to class. Therefore, a survey was postulated as a reasonable way to gain insight into the skills and bodies of knowledge students possess. The survey served as a starting point to further query students about specifics from their experiences. For example, after a student noted on the survey that he had experience trapping foxes, I followed up quickly with the student before the lesson on foxes to determine the scope of
his knowledge and how it may be utilized in the class lecture. A survey has the advantages of being quick and malleable to the individual needs of an instructor for a particular course. Surveys also provide data in written form so the data can be reviewed easily at any time. An obvious disadvantage of surveys is the fact that they provide an incomplete record of the FOK possessed by the students. Even with open-ended questions, participants may leave out relevant FOK they possess for a variety of reasons. A well constructed survey can alleviate some of those concerns by providing comprehensive categories of likely FOK along with some open-ended questions for students to include things that are missing from the survey. I documented instances of FOK that were brought to my attention during the semester that were not noted on the survey and explored possible reasons for these omissions with the students. The fewer there were, the more likely I had constructed a reliable tool to elicit FOK through the survey. There were few instances of direct or indirect wildlife FOK that emerged throughout the semester that had not been elicited in the survey. Those findings are discussed in Chapter Four.

3.7.4. Mid-course Check.

Questions in this written assignment focused on the instances where FOK were incorporated into the class, suggestions from the students as to how I, the teacher, could improve in the future and what relevant FOK the students possessed regarding the course objectives still to be covered. I conceived of this data collection tool because I believed it was important to collect this data from the students rather than just rely on my perception of how FOK were being used in the class as well as provide for another way to elicit FOK. I administered these questions to both sections, but had a low (n = 14) return rate
because it was not a required assignment. These responses were intended to help me understand if and how the intervention was influencing the learning experience of the students. See Appendix B.3 to examine the directions and questions given to students. The data collected only minimally influenced the intervention, however new FOK were recorded and some student suggestions for future FOK activation influenced my recommendations in Chapter Six.

3.7.5. Transcriptions of audio-recorded lessons.

The wildlife portion of CON 102 consists of 22 50-minute lessons for each section. I audio recorded each lesson but only transcribed the instances of FOK elicitation and utilization. The data from the classroom transcripts was used to answer both research question 3 (instances where FOK was activated) and question 4 (effective strategies for activating FOK). To answer question 3, data was analyzed to provide rich instances when student FOK were utilized in the class. To answer question 4, I analyzed the data with an eye towards disclosing the methods by which I utilized FOK in the classroom that would be transferable to others wishing to do the same, regardless of the subject matter. This meta-analysis did not require any different data collection but rather it required its own set of codes. See Appendix C.1 for a list of the codes.

3.7.6. Written questionnaire regarding new practices.

The goal of this assignment was to provide data to help answer Research Question 5: What evidence was there that students took up new practices due to the intervention? See Appendix B.5 for a copy of this questionnaire.

3.7.7. End-of-year in-class discussion session transcript.
The goal of this class discussion session was to gather feedback from a large number of students regarding the effectiveness of the FOK utilization during the penultimate class period, when all instruction for the course is complete. The discussion revolved around several key instances of FOK utilization (identified by me or the students). I used this discussion to aid in my answer of research questions 3 (What were instances where FOK were activated in the course?), 4 (What are effective strategies for activating FOK that may be generalized to the practices of other college instructors?), and 5 (What evidence was there that students took up new practices due to the intervention?). See Appendix B.4 to examine the guiding protocol for this session. Students were asked specifically to name instances when their FOK were used in class and what they think regarding the effectiveness of that use. Besides the more open-ended discussion described above, I prompted students to comment on several particularly memorable instances of FOK activation of their choosing.

**3.7.8. Teacher Log.**

A Teacher Log was kept to document a variety of data sources. I answered daily prompts in both Phase 1 and Phase 2 of the intervention that served as data for all 5 research questions. See Appendix B.6 for a complete list of these daily prompts.

**3.7.9. Field Assignment.**

The field assignment was a source of data for FOK that students possessed. See Appendix A.2 for a copy of this assignment.

Taken together, these data sources provided an effective measure for the 5 research questions outlined for this study. They come from multiple sources (students and teacher), involve a variety of modalities (written, oral, small group, large group, etc) and
sufficiently overlap to provide ample opportunities to triangulate findings. I am confident this data collection plan provided a wealth of relevant and reliable information for this intervention.

3.8 Data Analysis

Data analysis proceeded throughout the intervention as data were collected. I used grounded theory as the research methodology for analysis, despite starting the study with a draft code book (see Appendix C.1). I believe these codes were only broad categories to address the various research questions but no real codes themselves. For example, I knew I was going to use a survey to attempt to elicit FOK, so “Survey” was a draft code or, more precisely, a category for further codes to emerge. Further, the survey itself provided ready-made codes for the types of FOK the students were revealing. I do not see this as a conflict with the intentions and application of grounded theory. The analysis quickly progressed beyond these rudimentary codes to more meaningful codes as I completed each level of analysis. Charmaz (2006) points out that “coding is more than a beginning; it shapes an analytic frame from which you build the analysis.” Throughout the analysis I remained open to all possibilities that were presented. What follows here is a narrative account of the specific actions I took to analyze the data throughout this project. I have organized the information around the research questions as I believe that will be most helpful to the reader. Additional details may be found in the chart included in Appendix C.2.

3.8.1. Research Question One: What are the effective strategies for eliciting FOK that may be generalized to the practices of other college instructors?
My first analysis for this project was with the data collected as part of the pilot survey on the first day of the semester. For the purposes of this research question, the pilot survey was analyzed for its effectiveness as a tool for eliciting FOK. I created a table of all answers from the survey and looked for any anomalies that may indicate that the survey was not measuring what I intended it to. Next, I looked at all of the answers in the various categories under the “Other” option to look for categories or items within categories that I had missed but were frequent enough that I should have included them. Finally, I wrote about the distribution of the survey, the amount of time it took to create, administer and compile the survey results in my Teacher Log, as a metadiscourse on the practicality of surveys as a FOK elicitation tool.

I revised the survey based on this analysis as well as the results from the discussion group. Specifically, I looked for ways to make the survey more comprehensive. The pilot survey and discussion group transcripts did not reveal any new categories but analysis did show the value of providing options for open ended responses for each category. I completed the same data analysis for the revised survey results after it was administered to both sections of the course. In addition, I used my Teacher Log throughout the semester to record instances where FOK were elicited outside of the survey. This was a way of measuring the completeness of the survey as an elicitation strategy.

Before the intervention, the survey was the only formal strategy I had decided to include in the intervention. The other strategies emerged as the intervention progressed. To that end, I kept a Teacher Log and recorded all instances when FOK were elicited in or out of the class. These Log entries were enhanced by the transcripts of classroom audio
for nearly every class session for both sections of the course. I was able to cross reference my impression as written immediately after class in the Log with the transcripts to see if my impressions and memory of what happened were borne out in the audio recordings. Both the Teacher Log and transcripts were analyzed using an open coding method to describe the nuances of FOK elicitation. As themes emerged in the coding, I was able to see the patterns in the way I was eliciting FOK. Final codes were similar to the titles of the effective elicitation strategies described in Chapter Four. I deemed a strategy “effective” if it elicited useful FOK, was generalizable to other situations and was not too time consuming.

The field assignment also became a means for eliciting FOK. I read each portfolio entry as a potential source of newly elicited FOK and copied and later coded the individual entries that were the most compelling, mostly because they provided examples of the types of FOK that would largely go unnoticed in a typical classroom. The codes were simple, descriptive categories of the types of FOK that were being elicited and the activities that served as the context for these FOK (e.g. employment). For example, many of the funds fit under the broad code of employment, as students wrote about mammal encounters they had while working. Other codes included home life, hunting and recreation.

3.8.2. Research Question Two: What relevant FOK do students bring to this class?

There were several sources of data for this research question, with the largest being the revised FOK survey. The survey results were tabulated in a spread sheet for each category of questions. These results were analyzed to determine which FOK were the most common and which were rare. Results are presented in table form in Chapter
Four. Other FOK were uncovered through the analysis of classroom audio and the field assignment. Codes for this analysis were simply the names and frequencies of the types of the direct and indirect wildlife FOK from the survey.

As analysis continued, new FOK emerged that were useful to the course goals but did not fall into the broad category of direct or indirect FOK. Data sources for these FOK were my Teacher Log, audio transcripts of classroom lessons and the field assignment. These new FOK were coded first in very specific terms (like “The Simpson’s” or “video camera”) and then re-coded after the initial analysis to find larger headings to better describe and organize these findings (like “popular culture” and “digital literacies”). The results were several categories of FOK unrelated to wildlife that will be presented in Chapter Four.

3.8.3. Research Question Three: What were some instances when FOK were activated?

Classroom transcripts and my Teacher Log served as the main sources of data for this question, along with the field assignment and analysis of these consisted of coding instances of FOK activation. There were many. I coded these activation episodes by the FOK they activated. At one level, these instances were coded by the species or family of animal being referenced. So in each class, for example, there were several instances when FOK were activated regarding porcupines and they were labeled as such. At the next level of coding, I refined the categories to more specifically describe the FOK being activated. Here, I had codes such as feeding behavior of dogs and dog grooming rather than just “dog”.

In addition, students themselves identified instances of FOK activation during the mid-course checkpoint and again in the in-class discussion at the end of the semester. As
stated earlier, this checkpoint was a time when students were asked to name some instances when they or classmates had used FOK in the course to that point. I was particularly interested in analyzing these data as these answers came directly from the students. I tabulated the results on a spread sheet looking for any instances that were mentioned at a high rate, perhaps indicating their value.

Finally, my Teacher Log was mined to retrieve my impressions of the elicitation events immediately after they occurred. Often, these initial reactions and recollections of the events proved to be valuable sources of data when calculating which of the many FOK activation episodes to include in this dissertation while also helping me to articulate their significance to the course and its goals. Most of the examples I chose to include in this document are those that made an initial impression on me as a teacher (as reflected in my Teacher Log with comments that indicated I thought a particular sharing episode was effective in delivering material and meeting course objectives based on the reactions of the class and myself) and on the students as well (as reflected in other data sources such as the end of year discussion group where students were asked to recall specific instances of FOK sharing).

3.8.4 Research Question Four: What are effective strategies for activating FOK that may be generalized to the practices of other college instructors?

The analysis of the data with an eye towards answering this question was a particularly long process for me. I went through several iterations of coding classroom transcripts, the in-class discussion group at the end of the year and the portions of the Teacher Log where I reflected on each day’s activities before I was finally satisfied that I had uncovered an accurate picture of what had occurred during the intervention that made
activation effective (understood, in this study, as an instance of sharing FOK that furthered course goals, was shared in such a way as to be understood by the class and was an efficient use of time). In addition, the Teacher Log entries provided additional insights as to my first impressions and memories of the lessons. They assisted in the analysis by helping me to narrow the focus of what I was looking for in the rest of the data.

I coded relevant phrases in each of these data sources three times, each time becoming more specific about the characteristics that described each of the methods. In the first round of coding, the codes I used were simple and described the event literally. In the second round, I combined events that had similar methods of elicitation. The third round of coding was a refinement of the terms I used to describe the elicitation methods. These final codes are essentially the titles of the elicitation methods presented in Chapter Four.

3.8.5 What evidence was there that students took up new practices due to the intervention?

The main sources of data for this question came from the written responses from students when I asked them directly about this in two questions added to their field assignment evaluation. Students were allowed to report their answers in their own words. Therefore, I had to create codes that served as broad categories to help organize the comments. For example, one student reported that his new practice was “Looking for tracks and things” while another student wrote that now she “… wanted to follow animal tracks to see what they did.” The main theme of each of these seemed to be the identification of animal tracks so I coded these types of responses as “Tracking.” Another example is the variety of ways students expressed the idea that they wanted to take
pictures of animals so “Wildlife Photography” became another code. Answers were then
organized in a spreadsheet according to frequency of appearance.

In the next chapter, I will present the findings from these analyses that are most
relevant to the research questions informing this study.
CHAPTER FOUR: FINDINGS

4.1 Introduction and Overview

“I always found the stories, like fascinating. I never left a class not interested in everything people had to say…Hearing what other people had to say was really cool and I learned something new every day.” (Transcript, Final Group Discussion, Section 01)

Below is a vignette complied from my Teacher Log entry and transcript of the first day of class to show the reader how this intervention was lived:

On the first day of the wildlife section of CON 102: Introduction to Fish and Wildlife, students entered the classroom to find a stack of index cards at each table, each card having the name of a mammal we were to learn about in the coming weeks. The instructions were simple: Create two piles, one for mammals that are currently found in the wild in New York and one for those that are not. The four students at each table eagerly began their task. Since we had not begun instruction on mammals yet, they had to rely on their relevant FOK to make their decisions as to which card goes where. As I pretended to busy myself in the front of the room, I listened intently to the groups as they worked to complete the tasks. Snippets of conversations reached my ear: “There are too many mountain lions in New York. I will argue that all day long.” “My dad shot a bear up in the Adirondacks last year.” “We had an opossum in our garage once.” “I’m gonna guess Norway rats are NOT found in New York.” I gave the groups a one minute warning and when that was up, I walked around the room and glanced over the piles they had laid out. I told them that no two groups sorted them in exactly the same way and that no group had all the cards sorted perfectly. Some were closer than others, but there was at least one mistake in each group. I then projected the answers on the screen at the front of the room and started facilitating the discussion. Someone in the back group knew there were
Norway rats in New York because that is what his dad called the ones in their barn. The groups all knew that we had black bears in New York but many were surprised to hear just how many. And the student who thought there was a wild population of mountain lions shared a few stories, and I promised to revisit that volatile topic later in the semester. Two days later, I asked students how they enjoyed that first activity. Many said they liked being engaged immediately and commented that it helped keep an early morning class interesting. One student summed it up nicely: “You have to rely on what you already know, not what you taught. It’s nice to see what is already up there.” I can think of no better way to summarize the spirit of this study and introduce the findings.

The story above provides the reader with a glimpse of one way in which FOK were elicited and activated in the course of the intervention. Before this intervention started, I did not know how much relevant FOK I would uncover among my students or even how I would be able to activate those FOK to further the course objectives. I found a large amount of FOK, with every student having at least some relevant skills or bodies of knowledge and was able to draw on those FOK in literally every single class session. What follows is a more detailed look at the findings produced by this study. I will address each of the five research questions in turn and then present a section on other findings of the study.

4.2 Research Question One: What are effective strategies for eliciting FOK that may be generalized to the practices of other college instructors?

Most of the published FOK studies involved a younger student population and relied heavily on household visits to identify the FOK present. My intervention did not include that technique but capitalized on the fact that my students were older and
therefore could articulate their skills and bodies of knowledge better than a younger population could. I found several ways to elicit FOK from the students in this study.

4.2.1. Written survey

The first way I elicited FOK from my students was through a written survey. Since I was not going to be visiting the student’s homes or interviewing them individually, a survey seemed ideal to gather large amounts of data quickly and efficiently. As expected, I found no adequate survey existing in the literature and therefore created my own. I drew on my previous experiences with the course and the goals of the class to create the questions for a pilot survey. There were few changes between the pilot and final survey because this prior experience enables me to anticipate the types of FOK I was looking to find.

I drew on my own practices and the 16 years of teaching this course to create the categories for the survey. I created the survey by listing all the ways I could think of for someone to have developed FOK directly related to the mammal species we covered in class. I rejected the idea of merely listing the species as being less useful than knowing something about the practices of my students.

After analyzing the written responses from the pilot survey and reviewing the transcript of the first discussion group session, I revised the survey (Appendix B.7 contains this revised survey) in several significant ways. First, I changed the order of the questions. The pilot survey revealed a high incidence of pet ownership among the participants. Therefore, I moved the category of questions about pet ownership to the beginning of the survey to maximize the chances that a student taking the survey would be immediately engaged by having contributions right from the start. I felt it would have
been a less inviting tool had students been faced with many questions they could not relate to from the start.

Second, I added three open-ended questions at the end of the survey. I realized after conducting the discussion group session that I would benefit from having information regarding the depth of the FOK the students were reporting. I felt it was impractical to measure the depth of all of the FOK I was inquiring about so I chose to ask very specific questions regarding areas I thought would be of the most value.

The first of the three questions I added asked students to list places they had encountered wildlife outside of the Finger Lakes Region of New York (where the study took place). Since some of the animals we were to study were rare or nonexistent in our area, knowing who had traveled where would give me an idea of what wildlife they may have encountered and thus how I could incorporate that into the course. Students that lived or traveled to the Adirondacks, for example, may have encountered these species or at least be able to describe or recall how the environment was different, giving us a clue as to why certain species were found there and not here. The results of the discussion group showed that some students had wide travel experiences and that their peers seemed interested to hear about them.

The second open-ended question I added asked students to list the mammals they had the most experience with. Students were able to list as many species as they wished. Note that this question is worded in such a way as to allow almost every student to answer. I did not ask them to list only species they knew a lot about, rather which they knew the most about. Two students listing the same animal, therefore, could still have vastly
different types and amounts of knowledge regarding that species, but this relative measure of their FOK was useful.

Finally, I added a third question that asked students to identify the activities from the survey questions above which they had the most experience with. As with the proceeding question, this was a relative measure, but a valuable one. I was able to quickly assess the FOK that might prove to be the most extensive for each student.

I had expected that the pilot survey and discussion group session were going to reveal some missing categories for the survey. They did not. I believe this is partly due to the fact that my years of teaching this subject allowed me to create a comprehensive list of categories in the first place. The survey was limited to asking about specific types of FOK and was not a comprehensive census of all the FOK a student possessed. Nor do I believe it was a complete measure of even the relevant FOK they possessed. Rather, it seemed to serve as a good indicator of the types of FOK that are most likely to be relevant to the goals of the course while remaining short enough to be useful in the typical constraints of a classroom.

The written survey was a successful way to elicit FOK. A survey of this kind proved to be a good technique to elicit broad information about practices as well as some specifics that allowed me to make some assumptions about what FOK a student may have (in some cases more so than others). For example, while no two hunters would go about their practice exactly the same way, there are some commonalities that can be assumed. All deer hunting in New York State takes place in a relatively narrow window of time (fall months); hunters should be able to tell male deer from female deer; recognition of deer sign; etc.
I believe my survey instrument was particularly complete as very few new direct or indirect wildlife FOK were elicited throughout the semester. None of these emergent FOK produced any new categories that were missing from the original FOK survey but rather seemed to be mere omissions on the students’ part. For example, one student listed a wide range of previous pets she had owned on the survey but did not recall that she had once briefly owned a pet wolf until that species was covered in class.

There were several limitations to the survey. As mentioned, the survey was not designed to measure the depth of FOK in most cases. Simply putting a check mark next to “camping” could mean the student had camped once in their life or that they participated in that activity often and in a variety of ways. To counter this, I could have asked fewer questions while probing for more detail, thus keeping the length of the survey reasonable. Instead, I favored getting information over a wide variety of FOK rather than more detailed information from a narrower list. I also thought about, but ultimately rejected the idea of having students rank their levels of experience among the various activities rather than merely check them off. For example, students could have been given a Likert-type scale to rate their FOK in each area. I felt that addition would have made the survey too complicated. However, during the initial focus group I was convinced that I needed some way to begin finding out which FOK had depth. To that end, I added several open ended questions to the survey that allowed students to provide me with more detail than a mere checkmark. I chose three areas that allowed students to provide greater detail regarding their FOK based on their potential importance.

Another limitation of the survey was the types of FOK it measured. By design, I created a survey that had the potential to elicit the FOK that directly related to the goals
of the class (largely direct and indirect wild animal experience) and made little or no effort to elicit other potentially valuable FOK. This choice was made consciously to keep the survey to a manageable length but also to create a manageable “type” of data.

Finally, the survey was not good at measuring the accuracy of the knowledge students possessed due to their experiences. Students may have harbored misconceptions as part of their FOK that were not in alignment with the goals of the course. I am referring specifically to factual knowledge like misidentification of species or inaccurate natural history concepts rather than opinions or values such as whether the black bear population in New York should be allowed to grow or not. This misinformation would not be revealed until the FOK were activated.

In summary, the survey proved to be an effective tool to elicit FOK over broad areas. It provided useful information from the students and was not time intensive. As with any new endeavor, creating the first version took the most time. However, the administration of the instrument and analysis of the data were not long processes. I felt the value of the information obtained from the survey far outweighed the commitment of time and made this an efficient tool for gathering FOK. The survey revealed what FOK where common among my students and which were rare. Since the survey was not done anonymously, I was able to identify which students had which experiences and that proved a valuable asset when it came to eliciting the FOK. However, I chose the topics to survey deeper carefully, opting to only include the few that were likely to give me the most value rather than lengthening the entire survey and gaining more information but perhaps at a diminished rate of return. As constructed, the survey was not good at measuring the depth of FOK or the accuracy of what they learned. However, a survey
instrument could be developed to address these limitations, but would require the survey to be longer and therefore take up more time or contain fewer categories thereby trading breadth for depth. Exploring these trade-offs could serve as the focus for future study.

4.2.2. Targeted questions

Often, I had opportunities to ask students on the spot about FOK they possessed that would be helpful for the class goals. Most of these situations involved students sharing brief stories or information rather than a presentation. In general, there were two reasons to ask these targeted questions. First, I often asked students to identify their FOK at the moment in a lesson when I wanted a student or two to activate their FOK through incorporating their experience, in their own voices, during a lesson. For example, as demonstrated in the following excerpt, some students had experience with animals that are rare or non-existent in our area:

I: My first question about snowshoe hares is who here has ever seen one in New York State? Shane? Where were you?

Shane: Pulaski.

I: Pulaski, good. That makes sense. Does everyone know where Pulaski is? Shane, were you out hunting or what?

Shane: I was actually just visiting my uncle’s cabin and we went out on those snow, what do you call them, snowshoes and we were going around and he showed me some kind of pine tree, I don’t know what it was, and under it there was a depression and a whole lot of the tracks right along on top of the snow and the tracks were huge. I didn’t know what it was and he told me what it was and
we walked around some more and we saw one go running (Transcript 11/23 Section 01).

In this case, I made no effort to elicit this information before the class. If multiple students had experience with snowshoe hares, I was prepared to let each of them speak briefly. Likewise, if no student volunteered first hand information about snowshoe hares, I was prepared to relate my own stories. The advantage of this approach is the fluidity it allows in any given lesson. As the instructor, I was free to elicit FOK when appropriate or when time allowed. I did not ask for student input specifically for each species or topic covered. I chose this particular species as a place to elicit (and activate) FOK because my previous experience indicates that most of my students would not be familiar with this species and might therefore benefit most from their classmates’ voices.

The following except illustrates another example of FOK elicitation through direct questioning – this time capitalizing on student travel experiences:

I: Who else has ever climbed Mt Marcy? (seeing several hands up) A couple of us. Jeff, you were up there? Jeff, when you were at the top, you were literally standing on tundra. (Transcript 11/23 Section 01)

A class on wildlife sometimes has to deal with subjects that are less than pleasant. They were dealt with in a matter of fact manner and even negative experiences can be a learning experience. Here, I try to give students a way to remember that Eastern cottontails nest above ground:

I: Has anyone ever had a dog tear into a rabbit’s nest?

Jackson: Yeah.

I: And how did that happen?
Jackson: Well, they happened to make it underneath a deck and uh, my sister’s
dog jumped over there and chased them all around.

I: But he didn’t have to dig to get at them.

Jackson: No, they were right there.

I: It is very common for dogs to get into rabbits nests because they are above
ground. (Transcript 11/20 Section 01)

Over the years I have found that it is a common misconception that all rabbits live
in holes. It is difficult to get students to unlearn that so I felt this was a particularly strong
chance to elicit FOK for the strength it could add to the discussion. Given the large
number of students who had indicated they owned dogs and how common it is for dogs to
find rabbit nests, I was counting on at least one of them having had the experience of a
dog interfering with a rabbit’s nest. In Section 4.5.1, I provide greater detail on the
activation portion of this technique.

In the above examples, the goal of targeted questioning was to allow a few
students to present information to the class regarding their FOK. I also asked targeted
questions to elicit FOK when it was instructive to show that an activity or experience
might be widely shared and therefore have a common thread among us. It could serve to
demonstrate something about an animal’s natural history is pedestrian, like gray squirrels
burying nuts. It could serve as something of a bond among the students; a shared
experience that brings them all together or serves as a form of verification of what I am
presenting, without necessarily allowing any of the students to speak about their FOK.

One important aspect the technique of using targeted questions to elicit FOK that
I had not thought about until it was brought up during our final group discussion was that
students were sharing from their seats rather than in front of the room. Here, Katelyn, a frequent contributor with a wealth of FOK, responds to what she liked least about sharing:

Katelyn: It was nice how we didn’t have to in front of the classroom to talk; we just stayed where we were.

I: Why was that nice?

Katelyn: It took a lot of pressure off.

Note that her answer was what she liked about sharing even though the question was “what did you like least about sharing.” Her final statement reveals that it was “pressure” that she liked least about sharing. I interpret this to mean that Katelyn did not like speaking in front of groups, but that I had made the experience more palatable by allowing her to stay right in her seat instead of being in front of the class. Katelyn was a frequent contributor, so despite the pressure she felt the FOK sharing was done in a way that allowed her to overcome it.

This initial insight regarding the importance of the ways in which I asked students to share led me to look at the data with an eye towards uncovering additional techniques. I concluded that my creation of a “collegial atmosphere” in which students felt safe sharing their ideas and experiences was a critical component of my study. This topic is discussed in some detail below, as I felt it would be most beneficial to discuss the details of how I accomplished this setting in relation to both eliciting and activating FOK.

In summary, targeted questions worked well to elicit FOK when they were relevant to the discussion at hand. This instantaneous response to the question being asked was often followed up with one or more questions to allow the student to detail,
and therefore activate, the FOK in service to the goals of the course. This technique is probably familiar to many teachers, however I was encouraged at the frequency I was able to use this technique. I believe due largely to the wealth of FOK among my students, it was rare for me to have asked a question regarding an experience or knowledge and not have at least one student able to participate in a meaningful way due to their FOK.

4.2.3. Field assignment

The field assignment was unique within this study in that it was done completely outside of class time and allowed students to access FOK that they otherwise may not have. In brief, the assignment required students to document eight encounters with living mammals or their sign from a predetermined list of possibilities (with one “wild card” allowed) with the first four entries due half way through the wildlife section of the course and the remaining four entries due at the end of the wildlife section. There was structure in what needed to be included in each entry but flexibility in how it could be presented. For example, several students drew on their artistic FOK and created quality sketches to accompany their entries and document their sightings. Other students took photographs. One even created a video. These communication FOK were not related to wildlife per se, but definitely useful and supportive of learning within the course. Since the majority of FOK that were elicited due to this technique were also activated, this technique is discussed in the context of an activation technique later in this chapter.

In addition, students were free to accumulate their experiences for the portfolio however they chose. They could even draw on past experiences to enhance an entry. I explained it to them this way:
I: My goal is to get you out in the field to get some firsthand experiences with these animals. For some of you, you are thinking of how easy this is going to be. ‘My god, I am going to be sitting in my tree stand anyway’ or ‘I hike every other day’ or ‘I see this stuff right from my window.’ That’s fine. The seeing it part is hopefully going to be the enjoyable part and not necessarily a challenge. It’s the writing it up that takes a little bit of doing. I want you to think of it this way: I want to give you college credit for this, so you need to do college level work. If you go home and say, “What did you do in school today?” “Yeah, I’ve got a teacher that told me to go look for a squirrel. I’m getting college credit for looking at squirrels.” (laughter) It’s not that easy. That’s a good starting place, but you do have to write it up. I’ve asked a couple of students if I could show you their portfolio assignments from last year…

This assignment was particularly good at eliciting FOK that students were still practicing rather than FOK they acquired strictly in the past. In addition, I found FOK that would have been particularly hard to survey due to their unusual nature and/or the fact that they were not obviously linked to wildlife experiences (like Civil War re-enactment). Since many of the students wrote about activities at or near their homes and with other family members, this technique provided some of the information that would have been gathered in a home visit. In this case, the students were able to report directly on their own practices rather than a teacher interpreting them from a visit.

On the other hand, this method alone would not have provided the breadth of FOK the students possessed like the survey or the questioning did. Each student was only required to complete eight entries and some were able to view multiple mammals and
mammal sign in a single outing, therefore revealing less breadth (but perhaps more depth) of their practices. In addition, many of the sightings revealed little about the student’s FOK other than the most banal. For example, one student spotted a red fox in a field while driving to school. While technically this gave me the information that the student had FOK related to driving a car, I chose not to include those types of results in this study.

With these combined techniques, I was able to uncover a vast wealth of FOK in my students as reported next.

4.3 Research Question Two: What relevant FOK do students bring to this class?

Students exhibited both knowledge and skills that were either directly or indirectly related to wildlife that were relevant to the course goals, as well as an array of other FOK that were also valuable in this class. In this section, I will provide first a general overview of the types of FOK that students possessed before giving a more comprehensive overview of their FOK in section 4.3.1.

The knowledge students had about the mammals to be covered in the class included: knowing common names, identifying characteristics, habitat and range, and other natural history facts. For example, based on their ability to participate in activities as early as the first day of class, I knew all students were familiar with the names of the most common mammals we were to cover in the class. Names such as deer, squirrel and rabbit fall into the category of common knowledge. However, some students exhibited a much more sophisticated knowledge of mammal names by referring to species by their more accurate names such as “gray squirrel” or “white tailed deer.” Mammals with restricted ranges (e.g. fisher, marten), small populations (e.g. fox squirrel) or those that
are not commonly referred to by their “formal” name were the ones students were less likely to know. For example, students knew we had rats and skunks in New York but were usually unaware that they are Norway rats and striped skunks specifically.

I (referring to image on screen): OK, this is what?

Several: Chipmunk.

I: Chipmunk, good. But which one? (pause) Nobody? See in New York, we can get lazy because we only have a single chipmunk species east of the Mississippi. That’s a hint by the way. Out West, there are almost a dozen different chipmunks. What is ours called?

Jeff: Eastern.

I: Are you guessing?

Jeff: Yes.

I: Good guess. (Transcript, December 2, Section 01)

In this case, many students knew that they were looking at a chipmunk, but none volunteered, after prodding, the more formal name “Eastern chipmunk”.

Often, students demonstrated that they knew the name and the characteristics of a mammal species at the same time. In the example above, many students in the class not only knew the name “chipmunk” but correctly identified an image of one when shown. This finding was an expected result for the common mammals that many people encounter regardless of their lifestyles or prior experiences. In addition, some students were quite proficient at identifying wildlife or their sign. It was typical of me to introduce a new species by showing an image on the screen and asking the students if they knew what it was. In most cases, at least one student in the class was able to state the correct
answer. These FOK were evident even on the first day of the wildlife section during a group activity I used to assess their knowledge of mammal ranges and described in the vignette at the beginning of this chapter. Students in each row were given identical sets of index cards with the name of a different mammal species on each card. They were instructed to work together to separate the cards into two piles: those mammals that are found in New York and those that were not. Students draw on their experiences to decide which animal goes in which pile:

    Devon (to another group member): No, moose are found in New York. One showed up at the Saratoga Springs Race Track this year. It was in our paper (Transcript October 30 Section 02).

Here Devon was able to use an unusual and recent news story from his hometown to demonstrate accurate knowledge about the range of a mammal we were to cover in class. It is important to note that every group sorted some of the animals correctly, most groups made few errors and that no group in either section performed this task without error. This activity required students to possess FOK of both the common name and the range of the animals presented.

As the semester progressed, it was obvious that some students had deep FOK and were willing to share them with the class. As I pointed out above, all students had at least a little to draw from, but several students emerged throughout the course who consistently provided interesting information that was both relevant to the course and accurate. For the most part, this knowledge came from first-hand experiences while participating in practices that put them in direct contact with wildlife. For example, these five students each contributed deep and unique FOK to the discussions.
Ray had FOK from his employment at a Boy Scout camp for several years. His work there brought him in contact with nature and wildlife such as bats, raccoons, and deer. He was an avid outdoorsman and owned dogs. Ray was able to articulate his experiences well during class.

Shane, like Ray, is a few years older than a typical college freshman and had been in the military where he traveled extensively. He had a rural background to draw on as well. He shared stories of his pet, his hunting and knew facts from a variety of sources.

Jeff worked with his uncle for a year and a half in his animal control business. Jeff had a wealth of information to share on a variety of topics. For example, he taught the class (and me) how to tell the difference between bat and flying squirrel droppings.

Laura is the oldest student among the 42 involved in the study. Her husband often accompanied her to class as they had a single vehicle, and he is between jobs. She drew on her vast experiences raising animals, including dogs, cats, farm animals, macaws, and even a pet wolf. She is returning to school after many years and exhibited difficulties in taking notes and a general uncertainty in being back in the classroom. However, her FOK allowed her a way to build knowledge and she completed the course successfully.

Katelyn and her family were frequent campers and their camping involved activities that involved learning about nature actively. Katelyn described her mother, a high school science teacher, as providing both inspiration and knowledge about the environment. In addition, Katelyn spent last summer working as an intern for the United States Fish and Wildlife service collecting macroinvertebrate samples from streams.

These relevant FOK can be divided into two large categories: “direct and indirect wildlife FOK” and “other relevant FOK” as reported below. The main method of eliciting
FOK was the written survey. I did not record a single instance where a direct or indirect FOK was elicited exclusively outside of the survey (except in one case of omission by the student). Rather, the other methods of elicitation served to deepen my understanding of the specific FOK students reported in the survey or provided information regarding “other relevant FOK”.

Targeted questions in the classroom, as shown above, were used to further clarify specific FOK a student may have. For example, the survey revealed whether a student had experience hunting rabbits, but further questioning revealed which species the students targeted.

Likewise the field assignment served to elicit FOK. The range of knowledge, skills and practices exhibited in the field assignment was truly impressive. Students encountered wildlife or sign for their portfolio while:

- working (various jobs including landscaping, farming, running sawmill, pet store, wildlife removal business, etc.)
- in Louisiana over Thanksgiving break (saw a new species, armadillo)
- hunting (red fox investigates gut pile of deer, deer attracted to food plots that student helped create, watching squirrels while waiting for deer to arrive)
- encountering animals while cleaning the sap house (maple sugaring)
- controlling nuisance animals in home and garden.
- walking the dog
- participating in a Civil War re-enactment
- putting items in the compost pile
- riding ATV, snowmobile, or hiking
As the list above illustrates, the students in this activity had rich and varied practices in which they encountered wild mammals or their sign. I may not have known of all of these practices just from a survey or classroom discussions with students, so an out of class assignment was key in discovering these FOK. For example, there was no place on the survey to indicate riding ATVs or snowmobiles. Participating in a Civil War re-enactment and much of the employment situations were also FOK that was not indicated on the survey. Other activities that were directly or indirectly related to wildlife, like hunting or gardening, were indicated on the survey. In short, it seems the field assignment served to elicit FOK that may have been unrelated to wildlife or otherwise be difficult to survey for in advance due to the rareness of it or the difficulty in assessing its relevance to the course in advance, as well as confirm some of the information from the survey.

4.3.1. Direct and Indirect Wildlife FOK

I define direct wildlife FOK to mean those skills and bodies of knowledge that are acquired due to practices directly related to wildlife. Trapping furbearers, for example, would require a person to develop FOK directly related to the species they were trying to catch. I define indirect wildlife FOK to mean those skills and bodies of knowledge that are acquired as a by-product of a practice, but where wildlife FOK was not the main goal. An example of this would be a person learning to deal with dead mice on the porch because s/he owns a cat. Since there are numerous instances where a FOK would produce both direct and indirect wildlife FOK (e.g. hunters often learn about other wildlife besides their prey due to encounters in the field), I have made no effort to separate these
FOK from each other. Therefore, each of the categories below contains FOK that are direct, indirect and/or a combination of those two characteristics.

All of the students had experiences or practices that they could draw from that would be classified as direct or indirect wildlife FOK. For example, all students had encountered some or many of the species we studied in class. All of the students listed one or more outdoor activity (hiking, hunting, fishing, etc) that would have put them in direct contact with animals and their natural habitats. The results of the survey alone showed this and data from the other elicitation sources provided some additional FOK in this area as well as a better understanding of the nature and depth of the FOK. Since the survey was designed to be a comprehensive look at the direct and indirect wildlife FOK students had, I have organized this section of the results to correspond to the categories in the survey, in the same order they appeared on the survey. No additional direct or indirect wildlife FOK were revealed from the field assignment or targeted questioning, however additional details about those FOK were elicited from these sources.

**Pet ownership** Table 4.1 shows the results for the pet ownership questions from the FOK survey (for complete survey questions, see Appendix B.7). Here, students provided both direct and indirect evidence that they had relevant FOK regarding wildlife. Direct FOK included the 88% of students that reported they had some experience with pet/wildlife interactions. The most commonly reported interaction was dogs chasing squirrels, but I also had reports of dogs being stuck with porcupine quills, killing rabbits, chasing deer and barking at a black bear. Sixty percent of students had reported caring for a sick or injured wild animal at one time, while 83% of them had kept wild creatures as pets.
Table 4.1. Student responses to FOK survey questions regarding pet ownership

<table>
<thead>
<tr>
<th>Pets. Please check all of the pet ownership and related activities you have practiced:</th>
<th>Total number of students answering yes</th>
<th>% of students answering yes (n=42)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Owned a dog</td>
<td>40</td>
<td>95%</td>
</tr>
<tr>
<td>Owned a cat</td>
<td>33</td>
<td>79%</td>
</tr>
<tr>
<td>Owned a rabbit</td>
<td>25</td>
<td>60%</td>
</tr>
<tr>
<td>Owned a hamster, guinea pig or other rodent</td>
<td>21</td>
<td>50%</td>
</tr>
<tr>
<td>Owned a ferret</td>
<td>4</td>
<td>10%</td>
</tr>
<tr>
<td>Other pets (list):</td>
<td>15</td>
<td>36%</td>
</tr>
<tr>
<td>Cared for injured wildlife</td>
<td>25</td>
<td>60%</td>
</tr>
<tr>
<td>Caught and kept bugs, frogs, etc.</td>
<td>35</td>
<td>83%</td>
</tr>
<tr>
<td>Pet/wildlife interactions</td>
<td>37</td>
<td>88%</td>
</tr>
</tbody>
</table>

Additionally, owning pets of any kind can produce indirect FOK relating to wildlife. For all the pets listed, we were to study related species that were in the same Family or Genus. For example, we learned about four wild species in the Canidae Family; the same Family domestic dog is a member of.

Students were allowed to use a domestic dog or house cat as an entry in their field assignment and several chose to observe and report on their own pets. Here, the field
assignment acted as a confirmation of the FOK reported in the survey (as well as a vehicle for activating the FOK, discussed later).

*Attracting wildlife.* Nearly four out of five students had experience feeding birds (Table 4.2). However, most people who feed birds also end up attracting squirrels and other rodents, which would be directly applicable to the course.

Table 4.2. Student responses to FOK survey questions regarding attracting wildlife

<table>
<thead>
<tr>
<th>Attracting wildlife. Please check all of the wildlife attracting and wildlife attracting related activities you have practiced:</th>
<th>Total number of students answering yes</th>
<th>% of students answering yes (n=42)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Feeding birds</td>
<td>33</td>
<td>79%</td>
</tr>
<tr>
<td>Feeding other wildlife</td>
<td>15</td>
<td>36%</td>
</tr>
<tr>
<td>Erecting birdhouses</td>
<td>28</td>
<td>67%</td>
</tr>
<tr>
<td>Erecting bat houses</td>
<td>03</td>
<td>07%</td>
</tr>
<tr>
<td>Plantings for food or cover</td>
<td>11</td>
<td>26%</td>
</tr>
<tr>
<td>Creating a water source</td>
<td>18</td>
<td>43%</td>
</tr>
<tr>
<td>Land management</td>
<td>28</td>
<td>67%</td>
</tr>
<tr>
<td>Other</td>
<td>03</td>
<td>07%</td>
</tr>
</tbody>
</table>

Only three students indicated any experience putting up bat houses, the most direct relevant FOK listed in this section. I suspect the high number of students indicating that they participated in land management activities (67%) is due to my using the word “mowing” in the question. I had intended this to mean mowing fields as a way of
maintaining grassland habitat, but believe students included mowing their lawns as this number is quite high.

_Fishing_. When asked, a very large number (90%) of students indicated they had participated in some form of fishing (see Table 4.3). Fishing can best be described as indirect skills or bodies of knowledge relating to the course goals.

Table 4.3. Student responses to FOK survey questions regarding fishing

<table>
<thead>
<tr>
<th>Fishing, Please check all of the fishing and fishing related activities you have practiced:</th>
<th>Total number of students answering yes</th>
<th>% of students answering yes (n=42)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ice fishing</td>
<td>21</td>
<td>50%</td>
</tr>
<tr>
<td>Trolling</td>
<td>24</td>
<td>57%</td>
</tr>
<tr>
<td>Fly fishing</td>
<td>16</td>
<td>38%</td>
</tr>
<tr>
<td>Bow fishing</td>
<td>06</td>
<td>14%</td>
</tr>
<tr>
<td>Clean fish</td>
<td>33</td>
<td>79%</td>
</tr>
<tr>
<td>Prepare/eat fish</td>
<td>34</td>
<td>81%</td>
</tr>
<tr>
<td>Catch/release fish</td>
<td>38</td>
<td>90%</td>
</tr>
<tr>
<td>Fly tying</td>
<td>06</td>
<td>14%</td>
</tr>
<tr>
<td>Other</td>
<td>04</td>
<td>09%</td>
</tr>
</tbody>
</table>

Students could accumulate wildlife FOK while involved with fishing through peripheral experiences such as random encounters with mammals. For example, one student recounted a story of seeing a mammal that neither he nor his father could identify while fishing along the Niagara River. They used a field guide when returning home to
try to identify it correctly. Others capitalized on their time fishing to observe wildlife or their sign as part of their field assignment.

*Trapping.* Some students had experiences with trapping animals (See Table 4.4), either for their fur or as a form of nuisance control. Typically, these activities involve the use of scents and baits to attract animals to the traps, which would produce relevant FOK for this course.

Table 4.4. Student responses regarding FOK survey questions on trapping

<table>
<thead>
<tr>
<th>Trapping. Please check all of the trapping and trapping related activities you have practiced:</th>
<th>Total number of students answering yes</th>
<th>% of students answering yes (n=42)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nuisance trapping</td>
<td>09</td>
<td>21%</td>
</tr>
<tr>
<td>Pre-season scouting</td>
<td>08</td>
<td>19%</td>
</tr>
<tr>
<td>Skinning animals</td>
<td>15</td>
<td>36%</td>
</tr>
<tr>
<td>Tanning hides</td>
<td>06</td>
<td>14%</td>
</tr>
<tr>
<td>Selling furs</td>
<td>03</td>
<td>07%</td>
</tr>
<tr>
<td>Other</td>
<td>02</td>
<td>05%</td>
</tr>
</tbody>
</table>

Trapping furbearers often involves different skills than nuisance trapping, since the goal of furbearer trapping is usually to bring a product to market. Skinning animals provides a wealth of information regarding internal anatomy, and selling the furs can provide a familiarity with the differences in fur quality at different seasons, among different species and even among different individuals of the same species. Successful trapping also requires knowledge of the animals’ natural history such as preferred habitat,
food preference and in some cases, mating habits. Targeting different species would require knowledge about each of the species. Students who trapped furbearers indicated a variety of target animals (Table 4.5).

Table 4.5. Student responses on FOK survey regarding species targeted while trapping

<table>
<thead>
<tr>
<th>Targeting furbearers (n=5)</th>
<th>Total number of students answering yes</th>
<th>% of students answering yes (n=42)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Muskrat</td>
<td>04</td>
<td>10%</td>
</tr>
<tr>
<td>Beaver</td>
<td>02</td>
<td>05%</td>
</tr>
<tr>
<td>Mink</td>
<td>03</td>
<td>07%</td>
</tr>
<tr>
<td>Coyote</td>
<td>03</td>
<td>07%</td>
</tr>
<tr>
<td>Fox</td>
<td>02</td>
<td>05%</td>
</tr>
<tr>
<td>Other</td>
<td>01</td>
<td>02%</td>
</tr>
</tbody>
</table>

Aaron, a student who frequently missed class and almost never spoke when he was present was one of the two students who indicated he had trapped fox:

I (referring to the two species of fox in New York): Do you catch reds and grays?

Aaron: Both.

I: Which do you get more of?

Aaron: Red.

I: Do you think it is because there are more reds than grays or are reds easier to catch or…?

Aaron: Um, I don’t know. We catch more grays in brush.
I: Ah! Good. Gray fox are more likely to be found in brush. So maybe it is a habitat thing.

In this instance, Aaron revealed a relevant FOK about fox habitat preference that no one else in the class had.

I was able to use these results to ask two students to provide information to the class regarding their family experiences with muskrat trapping, as reported later in this chapter. Their presentation did not reveal any unusual or new FOK related to trapping, but it did serve to elicit a greater depth of knowledge.

**Hunting.** As expected from my previous experiences, many of the students had participated in hunting at a rate higher than would be expected from a random group (See Table 4.6). In 2006, 6% of Americans, 16 years of age or older, hunted (United States Department of the Interior, 2008). This number cannot be directly compared to my results as the 74% of my students indicated that they had ever hunted, not just if they had hunted within the past year, however I am confident that the huge disparity in the results of these two surveys indicates a significant difference in participation in the practice of hunting.

There are many obvious direct FOK that one would acquire from hunting. The identification of animals and their tracks and other sign, the ability to attract animals, developing an eye for finding the animals or their sign in the wild and knowledge of the legal status of animals are all examples. In fact, nearly all of the skills associated with hunting other than the actual taking of the animal are directly or indirectly relevant to the course goals. Forty-three percent of the students reported that they spent time in the field scouting for game species before or after the hunting season. These assumptions were borne out in several instances as students completed parts of their field assignment while
hunting. In some instances, the students wrote about the very species they were hunting, but in the majority of cases, the students wrote entries about mammals or sign from species that were encountered while hunting other species.

Table 4.6. Student responses on FOK survey regarding hunting

<table>
<thead>
<tr>
<th>Hunting</th>
<th>Total number of students answering yes</th>
<th>% of students answering yes (n=42)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Checked one or more type of hunting</td>
<td>31</td>
<td>74%</td>
</tr>
<tr>
<td>Deer hunting (firearm)</td>
<td>26</td>
<td>62%</td>
</tr>
<tr>
<td>Deer hunting (archery)</td>
<td>15</td>
<td>36%</td>
</tr>
<tr>
<td>Turkey hunting</td>
<td>19</td>
<td>45%</td>
</tr>
<tr>
<td>Waterfowl hunting</td>
<td>06</td>
<td>14%</td>
</tr>
<tr>
<td>Small game hunting</td>
<td>28</td>
<td>67%</td>
</tr>
<tr>
<td>-squirrel</td>
<td>27</td>
<td>64%</td>
</tr>
<tr>
<td>-rabbit</td>
<td>15</td>
<td>36%</td>
</tr>
<tr>
<td>-pheasant</td>
<td>09</td>
<td>21%</td>
</tr>
<tr>
<td>-other</td>
<td>08</td>
<td>19%</td>
</tr>
<tr>
<td>Scouting</td>
<td>18</td>
<td>43%</td>
</tr>
<tr>
<td>Search for shed antlers</td>
<td>09</td>
<td>21%</td>
</tr>
<tr>
<td>Trail cameras</td>
<td>12</td>
<td>29%</td>
</tr>
<tr>
<td>QDM techniques</td>
<td>08</td>
<td>19%</td>
</tr>
</tbody>
</table>
In addition, many students had hunting experiences, which may have involved the use of attracting scents (for example, archery hunting for deer) or remote sensing trail cameras (29% of students reported experience with these devices). These same tools are used by wildlife professionals, and the knowledge of how they worked allowed the students to easily see how they can be adapted to other uses beyond their current practices. For example, I use bait and scent to attract animals for photographs rather than to hunt or trap them.

As evidenced in the following excerpt, even butchering game can lead to FOK that are useful:

I (talking about butchering deer): So I am picturing you at an ahh…… what, like at the kitchen table or the dining room table or?

Megan: Outside. Like under one of those tent things that people set up to park their cars under. And we have a heater and there’s like 6 or 7 of us in there all doing our own stuff. Just like a little assembly line.

I: Excellent. Can you think of anything you have learned about deer by butchering deer? (in response to the odd look on her face) I know that is an odd question and I will explain it if you need me to, and I don’t mean to put you on the spot….

Megan: (embarrassed): Not really…(pause) They are not really fatty I guess. Like they’re really… lean. They got a lot of muscle.
I: So now take that….. I’m just gonna try this, if this doesn’t work I apologize.

Now take that and tell me how you think that could be helpful in a class, like a wildlife class or a biology class. How could you apply that? Like, how could you turn that piece of knowledge into something that’s ‘college knowledge’? (She looks embarrassed). Do you know what I mean?

Megan: Not really.

I: What does that tell you about a deer, that it doesn’t have a lot of fat on it?

Katelyn: That they are moving around a lot. Burning a lot of energy.

I: And if he doesn’t eat for a couple days?

Katelyn: He will probably die. Not a lot of storage. (Transcript, Discussion Group 1)

Students also acquired FOK about species other than the game they were targeting. One student reported seeing an uncommonly observed woodchuck behavior while hunting:

I: Ok, who has ever seen a woodchuck in a tree?

(2 students raise their hands.) How about you Danika?

Danika: Well, it was my first year turkey hunting and there were two woodchucks playing and they climbed the tree and kept falling out of it. They would climb, fell back down, run up to another tree and do it again (chuckles).

In this example, it is the mere act of being observant in the woods that led to this FOK. The more time one spends outdoors, the more experiences one will have to draw upon.

*Non-consumptive recreation.* I also inquired about student experiences with various non-consumptive outdoor recreational activities, ones that could produce indirect
FOK pertaining to wildlife (Table 4.7). For example, camping routinely involves interactions with wildlife, both solicited and unsolicited.

Table 4.7. Student answers to FOK survey regarding non-consumptive activities

<table>
<thead>
<tr>
<th>Recreational activities.</th>
<th>Total number of students answering yes</th>
<th>% of students answering yes (n=42)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Scouts</td>
<td>12</td>
<td>29%</td>
</tr>
<tr>
<td>FFA</td>
<td>03</td>
<td>07%</td>
</tr>
<tr>
<td>Hiking</td>
<td>37</td>
<td>88%</td>
</tr>
<tr>
<td>Camping</td>
<td>38</td>
<td>90%</td>
</tr>
<tr>
<td>Bird watching</td>
<td>14</td>
<td>33%</td>
</tr>
<tr>
<td>Canoeing</td>
<td>28</td>
<td>67%</td>
</tr>
<tr>
<td>Visits to parks, etc.</td>
<td>29</td>
<td>69%</td>
</tr>
<tr>
<td>Photography</td>
<td>13</td>
<td>31%</td>
</tr>
<tr>
<td>Other</td>
<td>01</td>
<td>02%</td>
</tr>
</tbody>
</table>

One student, Katelyn, had very deep FOK from camping:

Katelyn: …my family goes camping at Alleghany every year and we look for beavers and go hiking and my mom does wildflower identification and we always look for tracks and stuff like that (Transcript, Discussion Group 1)
Here Katelyn shows that for her family, camping is a vehicle to actively learn about the natural world they were immersed in. Her experiences with animals while camping were valuable:

Katelyn: We actually had bears go right through in front of the camp. We actually had… the rangers came and said ‘Stay in your cabins until the bears are gone’ because they had cubs with them.

I: Oh, nice.

Katelyn: So, um, I learned (laughing) that people aren’t as smart as you think they are.

I: So some of your knowledge from camping is about how humans and wildlife interact.

Katelyn: Right. Well, some people are smart about it. They will watch it but stay safe distances from it. Its not really effecting how the animal is. Then you’ve got people who say ‘Oh, look a bear. Let’s shine a spotlight right in its face.’

(Transcript, Discussion Group 1)

It was obvious Katelyn had learned much from her camping experiences. Other students shared their experiences as well. For example, Courtney had observed something about rabbit behavior that really made an impression on her and would have been easy to capitalize on in a classroom setting:

I: I am curious if anyone would say they have a large body of knowledge about wildlife from their hiking or camping. If you have ever been hiking or camping you have to have certainly encountered wildlife and maybe have a smaller body of knowledge but has anybody done those kinds of things and I am wondering if
anyone thinks they… (Courtney and Katelyn both want to talk. I tell Katelyn “I will get to you in a second.” Since Courtney has hardly talked)

Courtney: Like what do you mean? Like animals, like noticing stuff?

Katelyn: Tracks

I: Anything at all, like tracks would be a good example or noticing animal’s behavior.

Courtney: Like rabbits, I know they will circle you. Like if you pick up their spot, they will circle you, they will run in a figure eight.

I: That is a great observation to have. That’s a great thing to learn rather than to read about. That’s the kind of stuff I am talking about. Did you know a rabbit’s best defense is knowing his territory better than the predator does? (Transcript, Discussion Group 1)

Here, Courtney shares an observation that she has made but doesn’t understand the significance of (later, she calls the behavior “weird”).

**Nuisance wildlife encounters.** Nuisance wildlife mitigation is a way of life in a rural setting, but may also be encountered in suburban and urban settings as well.

Students had direct experience with some of the mammals (like mice and rats) that we investigated in the class in a variety of ways (See Table 4.7). One student reported that she lived in a 200 year old house and dealing with mice was a constant battle. Effectively preventing wildlife from becoming a nuisance can provide FOK regarding the animals’ habits such as food preference, seasonal or daily movements, and habitat usage. In some cases, such as the student that had trapped mice in her house, it can also lead to knowledge of the animal’s identifying characteristics and anatomy.
Table 4.8. Student survey-reported experiences with nuisance wildlife

<table>
<thead>
<tr>
<th>Nuisance wildlife. Please note all of the wildlife control activities you have practiced:</th>
<th>Total number of students answering yes</th>
<th>% of students answering yes (n=42)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mice and rats</td>
<td>27</td>
<td>64%</td>
</tr>
<tr>
<td>Feral cats</td>
<td>13</td>
<td>31%</td>
</tr>
<tr>
<td>Protecting the garden</td>
<td>27</td>
<td>64%</td>
</tr>
<tr>
<td>Bird nests</td>
<td>14</td>
<td>33%</td>
</tr>
<tr>
<td>Garbage</td>
<td>25</td>
<td>60%</td>
</tr>
<tr>
<td>Other</td>
<td>02</td>
<td>05%</td>
</tr>
</tbody>
</table>

_Farming._ Many farming practices lead to direct wildlife knowledge (See Table 4.8). Raising crops or livestock requires interactions, often negative, with wild animals. In fact, 26% of the students noted that they had experience with controlling nuisance wildlife. Other knowledge or skills gained from the above experiences can lead to indirect wildlife FOK. For example, cutting firewood might lead students to have knowledge of hollow trees that are used by animals such as flying squirrels for shelter.

Table 4.9. Student survey-reported experiences with different farming-related experiences

| Farming. Please check all of the farming and farming related activities | Total number of students answering yes | % of students answering yes (n=42) |
you have practiced:

<table>
<thead>
<tr>
<th>Activity</th>
<th>Count</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Livestock</td>
<td>08</td>
<td>19%</td>
</tr>
<tr>
<td>Crops</td>
<td>15</td>
<td>36%</td>
</tr>
<tr>
<td>Nuisance animal control</td>
<td>11</td>
<td>26%</td>
</tr>
<tr>
<td>Tractor/equipment operation</td>
<td>17</td>
<td>40%</td>
</tr>
<tr>
<td>Land management</td>
<td>11</td>
<td>26%</td>
</tr>
<tr>
<td>Christmas tree farming</td>
<td>03</td>
<td>07%</td>
</tr>
<tr>
<td>Maple sugaring</td>
<td>09</td>
<td>21%</td>
</tr>
<tr>
<td>Firewood processing</td>
<td>24</td>
<td>57%</td>
</tr>
<tr>
<td>Other</td>
<td>01</td>
<td>02%</td>
</tr>
</tbody>
</table>

**Depth of FOK in the above categories**

I asked students to list the activities mentioned in the survey that they felt they had the most experience with. Whereas the two questions addressed immediately above were open-ended as students could literally list any geographical location or animal species they wanted, options for this question consisted of a closed list as it asked students to specifically identify things from the survey. Thirty-eight students answered this question by listing one or more activities they had the most experience with. Table 4.10 shows the four most common answers. All other answers were reported by only one or two students. Several students listed broad categories in answer to this question like “recreational activities” or “outside activities”, making precise reporting of the findings more difficult. Ignoring those broad answers, students on average reported just over two
activities each for this question. Students listed between one and four activities for this question (See Table 4.11)

Table 4.10. Student responses to the survey question regarding activities they had the most experience participating in

<table>
<thead>
<tr>
<th>Of the activities listed in this survey, which would you say you have the most experience with? List as many as you wish:</th>
<th>Number of students reporting</th>
<th>% of total students</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hunting</td>
<td>21</td>
<td>50%</td>
</tr>
<tr>
<td>Hiking</td>
<td>10</td>
<td>24%</td>
</tr>
<tr>
<td>Camping</td>
<td>10</td>
<td>24%</td>
</tr>
<tr>
<td>Farming</td>
<td>06</td>
<td>14%</td>
</tr>
<tr>
<td>Pets</td>
<td>06</td>
<td>14%</td>
</tr>
</tbody>
</table>

Table 4.11. Number of activities students reported having the “most” experience with

<table>
<thead>
<tr>
<th>Number of activities listed:</th>
<th>Number of students reporting:</th>
<th>% of total students:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Four</td>
<td>03</td>
<td>07%</td>
</tr>
<tr>
<td>Three</td>
<td>08</td>
<td>19%</td>
</tr>
<tr>
<td>Two</td>
<td>14</td>
<td>33%</td>
</tr>
<tr>
<td>One</td>
<td>09</td>
<td>21%</td>
</tr>
<tr>
<td>None</td>
<td>04</td>
<td>10%</td>
</tr>
<tr>
<td>Non-specific</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Of course, these findings are only a self-reported relative measure of the depth of a FOK. I was not surprised that many students felt that hunting was the activity they had the most experience with. As stated above, 31 students indicated they participated in one or more forms of hunting and 21 of those students (see Table 4.15) indicated that of all the activities listed on the FOK survey, hunting was the one they had the most experience with.

**Direct wildlife FOK related to place**

The final section of the survey consisted of three questions that allowed students a more open-ended format to provide information on the depth of their FOK. These questions were included as a direct result of the findings of the pilot survey and analysis of the first discussion group. Of the 42 students who completed the survey, one student left all three questions blank, one student left two questions blank, 19 students left one question blank, and 21 students answered all three questions.

The first open ended question asked students to list any location where they had wildlife experiences outside of the Finger Lakes region of New York State. Twenty-four students responded with one or more geographic locations (See Table 4.12). Many students (40%) listed a wide variety of locations outside of New York where they had wildlife experiences. Other states listed were: Florida, North Dakota South Dakota, Georgia, Wyoming, Idaho, Washington, Maine, Massachusetts, and Texas. Other countries listed were: Canada, Mexico, Chile, and Iraq. A few students had extensive travel experience. One student, a USMC veteran listed “North Carolina, Iraq, Mojave
desert, Virginia, South Carolina, Ocean.” Students had either lived or traveled outside of the Finger Lakes. Consistently, the students who had lived or traveled outside of the Finger Lakes were able to contribute knowledge from direct or indirect experiences with animals in several ways. First, some had FOK regarding wildlife that were rare or non-existent in our part of the state. Second, some had experiences with animals that are not found in New York at all. For example, Aaron had been elk hunting in Montana while most of his peers had never seen an elk in the wild, and many could not identify one. Throughout the semester, these FOK were again elicited and often activated during course lectures and activities.

Table 4.12. Geographic locations where students accumulated wildlife experience

<table>
<thead>
<tr>
<th>Do you have wildlife experience from places other than the Finger Lakes region of NY? If so, list where:</th>
<th>Number of students reporting</th>
<th>% of total students</th>
</tr>
</thead>
<tbody>
<tr>
<td>Adirondacks</td>
<td>09</td>
<td>21%</td>
</tr>
<tr>
<td>Southern Tier</td>
<td>03</td>
<td>10%</td>
</tr>
<tr>
<td>Other NY locations</td>
<td>04</td>
<td>07%</td>
</tr>
<tr>
<td>Outside of NY</td>
<td>17</td>
<td>40%</td>
</tr>
</tbody>
</table>

Direct wildlife FOK about a particular species

Students were also asked to identify the mammal or mammals they were most knowledgeable about or had the most experience with. Students were further directed to
list as many as they wished. Thirty-eight students listed one or more species they felt knowledgeable about, the most common of which are reported below (See Table 4.13).

Table 4.13. Top three species students were most familiar with (as reported in the FOK survey)

<table>
<thead>
<tr>
<th>Most FOK with:</th>
<th>Number of students reporting</th>
<th>% of total students</th>
</tr>
</thead>
<tbody>
<tr>
<td>Deer</td>
<td>24</td>
<td>57%</td>
</tr>
<tr>
<td>Dog</td>
<td>17</td>
<td>40%</td>
</tr>
<tr>
<td>Squirrel</td>
<td>06</td>
<td>14%</td>
</tr>
</tbody>
</table>

Three students did not list any species, while one stated he knew “a little about most.” Among the other students, there was an average of just over two species listed per student; with one student listing seven (the highest number of species). As expected, common species ranked high. Given the large number of students that indicated they had experience deer hunting, it is not surprising that species ranked so high here. There were many other species noted here including wolves, moose, skunks, bear, elk, and opossum that were only mentioned by a single student. Still, this is only a relative measure of the depth of a student’s FOK for any species. Merely noting that “deer” are the mammals you are most knowledgeable or experienced with does not indicate how deep that FOK, only that the student reports he/she feels that they know more about that species than any other. However, for the students that identified one or more species they knew the most about, it would seem logical to conclude that those students would have FOK deep enough to draw from in an academic setting.
4.3.2. Other Relevant FOK

Finally, there were instances of FOK that proved useful to the class but were outside of what one would call direct or even indirect animal experience. FOK related to classification skills, communication and popular culture all became evident throughout the intervention.

In addition, some instances of FOK were elicited (and activated) during the field assignment that are harder to categorize, as listed above. These were FOK that were relevant to the class only because students were undertaking these practices when they encountered a mammal or mammal sign for their field assignment. Driving to work, for example, would not be a FOK I would attempt to elicit, however several students were able to witness mammals while partaking of that skill and therefore it became relevant to the course goals.

Classification FOK

Much of the material presented in the course is organized around the taxonomic classification of the mammals being studied. Students are required to know the Orders and Families of every species covered as well as possess a basic understanding of how the classification system is structured. I wondered what FOK students possessed regarding other forms of organizing, so one section of the FOK survey asked students to indicate if they had ever had a collection of something or held a job that required organizing items (See Table 4.14). This was the only section of the survey that measured FOK that was not categorized as direct or indirect wildlife FOK. It appeared that many students had a variety of experiences organizing things, including their jobs. One student
listed he had worked in a warehouse and had to sort items when the arrived by truck.

Another student works in a clothing store and must sort clothing for display.

Table 4.14. Student responses to FOK survey question asking for their experiences with organizing items

<table>
<thead>
<tr>
<th>In addition to learning about the animals themselves, we will learn how they are organized and sorted. Do you have any of the following organizing experiences?</th>
<th>Total number of students answering yes</th>
<th>% of students answering yes (n=42)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Card collection</td>
<td>17</td>
<td>40%</td>
</tr>
<tr>
<td>Stamps or coins</td>
<td>13</td>
<td>31%</td>
</tr>
<tr>
<td>Comic books</td>
<td>05</td>
<td>12%</td>
</tr>
<tr>
<td>Other</td>
<td>07</td>
<td>17%</td>
</tr>
<tr>
<td>Job that required sorting/organizing</td>
<td>12</td>
<td>29%</td>
</tr>
</tbody>
</table>

**Communication FOK**

Students exhibited a wide range of FOK when communicating information per course assignments. Although there were strict guidelines as to the content of the field assignment, no such limits were placed on the format, and students were encouraged to explore different options. For example, to document a sighting I encouraged students to write a quality description, include original photographs, provide sketches of the situation or any combination of the above. I received entries that included each of the possible
combinations from the above suggestions. One student even used original video to
document his sightings. Final products were also submitted in a variety of digital formats
including PowerPoint and digital video software. Allowing the students flexibility in this
assignment allowed them to activate particular FOK that they may otherwise not have
accessed in this course.

**Cultural FOK**

During the course of the semester, many examples of FOK were elicited that
proved to be relevant to the goals of the course, yet were beyond the scope of direct or
indirect wildlife knowledge. These included everything from pop cultural references to
knowledge from entirely different disciplines. An example is when Shane knew the genus
of bears was *Ursa* because he knew the constellation known as the great bear was “Ursa
Major.” Jeff knew that golfers refer to a fairway with a large bend in it as a “dog leg.”
We then applied that term to an actual dog’s leg and talked about how digitigrade animals
have an ankle joint high up the leg and off the ground giving it a “crooked” appearance.
In another instance, I introduced the concept of taxonomy by comparing the similarities
to the organizational structure of Major League Baseball, since the first game of the
World Series was being played that evening. This example worked well because many of
the students had at least a passing familiarity with how sports leagues and play off
systems are organized. Later in that same unit, I used images of animal characters from
popular cartoons to allow them to practice the names of Orders and Families we had
learned. The transcripts from this lesson indicate that the students not only enjoyed this
activity but were also able to identify the individual cartoon characters by name
(However, this approach worked regardless of whether the students recognized the exact
character or not, because the animals were recognizable. So if a student was not familiar with the cartoon character Pluto, he/she could still identify it as a dog and determine which Order and Family went with “dog”). When covering mole species, I projected an image of Mole Man from the television show “The Simpson’s,” and students correctly stated that he and real moles shared the characteristic of poor eyesight.

In other examples, I made cultural references during the lecture without asking students to directly respond to them, yet, because of their reactions, presumably capitalized on their popular cultural FOK. When showing a photograph of the front foot of a star-nosed mole and remarking on the pebbled surface, I compared it to the rhinestone studded glove of Michael Jackson. In this exchange, I reinforce the idea that shrews have small ears while mice have large ears, one important identifying characteristic to tell these similar species apart:

I: I found this photo on someone’s blog and they wrote that this little shrew died after being stuck in this watering can. Tell me what’s wrong with this story.

Female voice: Ears!

Male voice: That’s a mouse; look at the size of the ears.

I: Right! Walt Disney would have had a hard time selling hats if Mickey was a shrew (Laughter). (Transcript, Nov 16, Section 01)

When discussing the fact that animals like woodchucks that live in holes have evolved flat heads, I asked students to recall scenes from war movies such as Saving Private Ryan that depict soldiers cautiously peering up from cover to look for danger. I compare how low the eyes of a human sit in the skull compared to how high they are located in animals that use holes for safety. When teaching students that squirrels have five toes on their
hind feet but only four on their front feet, I said “Remember, squirrels can’t text.” In these instances, the reference was assumed to be common knowledge among the students and allowed them to utilize these cultural FOK to either understand the material more deeply or remember it in a more relevant way.

In summary, students possessed a host of FOK that was not directly related to wildlife but could be capitalized on to make the material more accessible. I completed this intervention having the distinct feeling that I have only scratched the surface of the subject of cultural FOK in the service of course goals.

4.3.3. Where did these FOK come from?

Although this was not a focus of my study, I found it interesting and important that my initial findings regarding the root of the FOK that were elicited during the course of this intervention was often the home. For example, the field assignment entries revealed that many of my students continued to have ties to their parents’ homes, either through visits over weekends and breaks or by continued residence. Further, the FOK they were revealing were skills or bodies of knowledge developed in those homes rather than in their new residences or through outside sources like friends. In one section of the FOK survey, I asked students to report on the people in their lives that have contributed to their wildlife related FOK (See Table 4.15). Ninety-three percent of students indicated “Parents” played a role in their education on this subject. Just over half of the students listed their grandparents as a source of information also, indicating a multi-generational sharing of knowledge and skills. These results are consistent with other FOK studies in that the elicitation techniques were effective when understanding families’/home FOK.
Of the 17% of students that indicated “Other,” many of them listed the name of a person with no indication of what role that person played in the student’s life.

Table 4.15. Human resources that contributed to students’ understandings of wildlife

<table>
<thead>
<tr>
<th>Human resources.</th>
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<tbody>
<tr>
<td>Which of the following have taught you about wildlife?</td>
</tr>
<tr>
<td>Parents</td>
</tr>
<tr>
<td>Siblings</td>
</tr>
<tr>
<td>Grandparents</td>
</tr>
<tr>
<td>Other relatives</td>
</tr>
<tr>
<td>Friends</td>
</tr>
<tr>
<td>Teacher</td>
</tr>
<tr>
<td>Other</td>
</tr>
</tbody>
</table>

Of course, there were some students in the class that had substantial FOK from their “own” homes, rather than the ones they grew up in. At least two of the students were military veterans and several had established households and/or families of their own. In this study, like studies of FOK of elementary students, my college students were drawing on their home life for valuable information.
4.4. Research Question 3: What were instances where FOK were activated in the course?

FOK were elicited in literally every class period throughout the semester (See Appendix D.1 for a table of these elicitations). Each section had a unique set of FOK to activate, creating a difference in how each lesson was taught. For the most part, this did not require the creation of two sets of lesson plans. A notable exception was the trapping presentation given in one class but not the other (discussed below).

At times, the elicitation was done in a way that did not involve the student’s active participation. In these instances, the activation was more of a recognition of their knowledge. For example, I would often start the lessons on common mammals with a statement acknowledging that many of the students in the class had probably seen the animal in the wild and could identify it easily, but then build on their knowledge from that point. With the identification of rarer animals or lesser known information about animals’ natural history, I would often ask for a show of hands of who knew the information in question, had experience with the species, engaged in a certain practice or had a particular experience, or a similar form of questioning as appropriate. Appendix D provides a look at the FOK I activated in the major topics of the course. It can be assumed that I activated some identification FOK for each of the animals and their sign and will only report below those instances where I paid special attention to that activation. In addition, there were instances when a FOK was only present in one section or the other, however the information presented is for both sections combined. There was a great variety of FOK activated in every unit of the course. These activations were often
quick and involved a very specific fact or instance. At other times, the activation was more detailed.

Below are several instances where FOK were activated in a substantial way. These examples were chosen for their depth and impact they had on the class based on responses received during the end-of-year discussion. I will spend more time in the next section describing and discussing the variety of specific techniques involved in activating FOK.

4.4.1. Trail Camera presentations

A trail camera is a device that is left in the field attached to a stationary object such as a tree that takes images of animals as they walk by. Many of the images I use throughout the semester are from these devices so I wanted my students to have a basic understanding of what they were. From the FOK survey, I knew that I had students in both sections of the class that had trail camera experience. I asked them if they would be willing to volunteer pictures and/or to speak to the class about the cameras to supplement my lesson on these cameras. In Section 01, several students agreed to talk and provide photographs, but only Megan followed through:

I: Have a look here (referring to the photo on the screen). Megan brought in a couple of pictures. Megan, how do you use these cameras?
Megan: How? Uh, we set them up in the woods near where we uh, are going to or want to hunt so we can see uh, the deer and the things that are out there.
I: So you use them exactly the way they advertise them in the hunting catalogs, as a scout for deer (transcript 11/09 Section 01).

In the second Section, Mark agreed to share his photos and experiences:
I: Where are these pictures from?

Mark: From my camp down by Cortland.

I: Does everyone know where Cortland is? How do you use your cameras?

Mark: We keep them up all year just to see what is going on, to see what is out there.

I: Yes, I noticed that from the pictures you gave me. I thought that was very cool.

So you don’t just use it for scouting for deer (transcript 11/09 Section 02).

Student presentations were a supplement to my photos and presentation and lasted about five minutes each. I explained how scientists use the cameras and how we will use them in class to compare sizes, document species presence, habitat usage and other natural history facts such as when antlers begin to grow or when spots disappear on deer.

4.4.2. BATS! Worksheet

One class that stands out for the amount and quality of student FOK that were activated was the lesson on bats. I randomly assigned students to groups of 3 or 4 and gave them a worksheet to complete. The worksheet asked for each student to record some of their knowledge about bats, starting with the things they knew from first hand experiences. They completed the worksheets in class. I then asked each group to choose one thing they wished to share. In past years, this day would have simply been a lecture I gave about bats that was injected with stories from my own experiences. This approach resulted in a far richer experience in that students were actively engaged, there were many voices to be heard from and the amount of cross talk and sharing reinforced the content in ways a simple lecture never does. There was not a single thing shared that I was not able to weave into the course as valuable. For example, part of the lecture is to
explain to students what to do if they encounter a bat indoors. This year in one section, a student not only told the story of how there was a bat in her bedroom and her grandfather had to come in and remove it, but had the actual event video recorded on her cell phone and shared it first with her group and then with the rest of the class. Another student had a different experience:

Austin: A number of years ago I was sleeping at Camp Bristol Harbor and a bat flew into our cabin and the next morning we all had to go to the hospital to get rabies shots. They said they couldn’t be sure that the bat bit or get saliva on one of us. So that was a couple month process getting shots every other week or so.

I: Has anyone else had a similar experience? (no one responds). I have a similar story myself but as a counselor at the camp, not a camper. NY has a very aggressive policy against rabies.

I was able to affirm that story with my own experience and believe that there was a bigger impact than there would have been with my story alone.

In the final group discussion, six weeks later, several students mentioned the bat activity as one that was interesting. One student recalled that Jeff had experience removing bats from attics. Another student recalled two other stories from that day:

I: How about B? Can you think of a time that you or someone else in class shared knowledge or experience that was particularly interesting to you? There have been lots of times when people have talked about things. Shane is pantomiming the bat, the bat in the helmet story from Courtney. It was a good story.

Shane: Its stuck in my head.

I: (laughing) Ohhh! Stuck in my head…. Good one.
Shane: Third cup of coffee (raising mug).

I: Anybody else? We’ve had a lot of people talk in here.

Shane: Socks. Throwing them up and having bats come down.

Although Shane made a joke out of it, he seemed sincere that the bat stories did have an impact on his learning.

4.4.3. Pet discussions

This year, I asked students to bring in photos of their dogs and cats to supplement my presentation. Usually, I show a few pictures of my brother’s dogs and briefly make the connection between domestic dogs and wild wolves. This year, since 95% of the students said they own or had owned a dog, I decided to emphasize the relationship between the two animals and explore what dog ownership could teach one about wolf natural history. I received photos from about 20% of the students and was pleased with that result. Each student was allowed to talk a little about their pet, and some spoke with great pride. I then asked students to tell me what they have learned about wolves from owning a dog. In my teacher log, I note that the class mentioned only a few things. Jeff’s was notable:

Jeff: My dogs beat trails into our yard because we have an electric fence. And one time when I was out deer hunting, I found the same kind of trails. I thought they were deer. But we are getting more and more fox in our area and when I looked closer I saw they were fox trails. It shows that dogs like to use the same trails over and over again. (Transcript 12/07 Section 02)

Although Jeff’s example actually compared his knowledge of dogs to foxes instead of wolves, he was clearly making a connection among animals in the same Family. I had
made a list of FOK dogs teach us about wolves that I thought of and presented that list on the screen when the conversation lagged. Once the list was presented, the students had an easy time applying the items, but had a much harder time making the list themselves. One example was the fact that dog ownership helps one understand that wild animals have nails that continuously grow since to maintain a dog properly, one has to trim its claws:

I: How about grooming? What do you gotta do to your dog’s nails?
Several: Clip them.
I: What do you do to a wolf’s nails?
Dylan: You don’t.
I: Why not? Because they don’t grow?
Katelyn begins to answer but someone answers over her: They groom them themselves.
I: Right, they groom them themselves. You think about…. I don’t know if anyone ever put that together…. You think about how much you have to clip your dog’s nails. That’s a reflection of how much less activity that dog is participating in than it would have if it had led a wild existence. So all of that running and jumping and playing that your dog does still isn’t enough. All that walking to the Alpo in the dish is very different than chasing their prey. (Transcript 12/7 Section 01)

Another example I gave was the acuity of canine senses:

I: How about a dog’s senses versus you own? What do you know about a wolf’s senses based on your dog?
Katelyn: Much better senses.
I: Much better. How so? Give me an example?
Katelyn: One time we were camping and the dog started freaking out and about an hour later, a bear came to the dumpster.

I: So you think the bear was close enough that the dog sensed it some how? Like maybe smelled it?

Katelyn: Yeah. Like before the bear showed up she was running around the campsite barking, like she was protecting it.

I: Interesting. Who’s ever had a dog spot something way before they did?

Male voice: Our dog spotted a bear. There was a bear walking down the street and our dog spotted it before, well while it was in the bushes actually and our dog spotted it before it came out.

I: Interesting that you both had similar experiences. (Transcript 12/7 Section 01)

Certainly the dog owners in class must know that their dogs possess senses more acute than humans, however when asked, they did not think to note that as something that could be applied to wild canines.

The eating habits of dogs also represent a FOK that can be directly related to wolves. Below, I ask the students specific questions about feeding more than one pet dog:

I: Who’s got a trick to keep their one dog from stealing all the other dog’s food?

Randy: One bowl on one side of the room and one on the other.

I: Yep. Ever hear the expression ‘wolfing down your food’? That literally comes from wolves. That a wolf can eat 20 pounds of meat at one sitting.

Laura: Yep.

I: That gorging, that expandable stomach is a great adaptation when you don’t know when your next meal will be. So you don’t hear dogs tell their puppies
“Chew your food better.” They don’t. They bolt it right down. (Transcript 12/7 Section 02)

The students were very knowledgeable about dogs and dog ownership. The information they shared was valuable to the class goals and was limited by the availability of time, not content.

4.4.4. Trapping lecture

I only had two students willing to speak to the class about trapping beaver and muskrat. They both happened to be in the same section (02). I would normally talk a little about trapping of these animals in my lecture; however I have no direct experience with trapping. The students were nervous but shared interesting and valuable information:

Amy: Um, we also trapped mink. And for the mink, we would, um, my Dad would get fish from the supermarket to like lure the mink in.
I: uh, huh.
Amy: And we would find where the mink was traveling and we would put it by where like, maybe a little foot trap, like maybe one of these (reaches for one of the traps I brought in). And he would set it, because I would probably chop my finger off. (Transcript December 04 Section 02)

Amy was remembering events that occurred when she was very young. She was a peripheral participant to the process. Before the class started, she confided in me that she was worried she wouldn’t have anything valuable to contribute. I assured her that whatever she said would be fine. Although she had been asked to talk about beaver and muskrat trapping, Amy remembers that her father also trapped mink. I allow the deviation as we will be studying mink shortly. Mink are common but seldom seen due to
their nocturnal and secretive habits. Amy provides the first insight into that species by
describing their diet (fish), an important natural history fact for any species covered in
class.

Mark, on the other hand, had recently maintained a trap line with his brother. Not
only were his experiences fresher, he was a primary participant in the activity:

Mark: Well basically, me and my brother, our Uncle, he’s a trapper and we
bought our own conibears (a type of trap) and decided to go muskrat trapping
behind our house. And we caught like 50 or so.

This was a family FOK, where Mark and his brother learned together from their
uncle. Mark had an opportunity to participate in this activity literally in his backyard.
Mark is an extremely quiet individual. This was his second time speaking to this class
(trail cameras was the other). Due to his nature, I had to literally goad every statement
from him. Despite his reluctance to speak, he provided valuable information:

I: Did you do it just one season or?
Mark: He continues to do it, but I’m not.

I: Your brother?
Mark: Yeah, he is more interested in it.

I: What about it didn’t interest you, I’m just curious.
Mark: Probably the going out every single day. Even when you don’t catch
anything.

I: Ah, going out every single day. If you set out 20 traps, you have to check 20
traps every single day unless you Adirondack people are in here, then you have 48
hours to check them in the Adirondacks.
I: What else can you tell me about setting the muskrat traps? Did you guys use any kind of lure or bait? No?

Mark: What we did is find areas like in the creek where there were trails, where stuff was pushed up where they go and put a log over the top and put the conibear under it on the trail and put a stick there to hold it in.

I: So what was the log about? Why did you put a log there?

Mark: That’s so they wouldn’t go up over the trap.

I: Ahhh. So you are modifying the trail to make them go through where you want them to go.

Mark tells us that he did not like going out every single day to check the traps. This is an important fact. In New York, traps must be checked every 24 hours except in the Adirondacks where harsh conditions may make that impractical or unsafe for the trappers. The legal status of the animals we studied was a common theme throughout the semester. In addition, Mark explains how he and his brother selected locations to trap. They looked for trails left by muskrats and areas where they had pushed up material. These mounds were referenced again later in my lecture on muskrats and are an important behavior for muskrats as they are used as feeding platforms as well as scent markers.

At the end, I tried drawing out anything that the students learned ancillary to the trapping process. The goal of FOK utilization is not to replicate the process (i.e., teach the students to become trappers) but rather to present information in a new way, a way that may be easier to grasp or more meaningful due to its relevance. Below, Mark shares that beavers slap their tails on the water when they are alarmed, something he learned
while trapping and something we would have covered normally in class anyway. Amy, drawing on experiences that were less direct and farther in her past recalls the excitement she felt checking the traps with her father and specifically recounts a very rare color phase of muskrat they captured once. Color variation is a running theme throughout the course. And as Amy relates later, having her stories and experiences accepted in the class with such interest made her feel like they were valuable.

I: I just want to ask you one last question and I hope this isn’t an unfair question but I’ll start with Mark since he was the one that really did the trapping recently in his memory. So can you think of anything that you learned while you were trapping about the animals other than ‘Don’t get your finger caught in the trap’ stuff, you know?

Mark: We would find that they would den in the sides of the crick beds, they would dig holes and stuff.

I: Awesome. And did you learn anything about other animals? I know when I talk to hunters they say half the fun of hunting is all the other stuff they get to see besides the…

Mark: Well, one year we did trap mink near a beaver dam area and we would be walking and we would go check our mink traps and they [the beaver] would always slap their tails at us.

I: So you learned a lot about beaver as well as muskrat? How about you Amy? How about being a kid growing up in a house where somebody trapped?
Amy: I was excited because like I could go out there and it was a surprise, kind of like Christmas (laughter) because I just liked seeing the animals, even though they were dead, I didn’t care. And one time, we caught a black muskrat…

I: Oh really?

Amy: Which was pretty cool. (Transcript December 04 Section 02)

Each of the student presenters was able to share from their experiences and both answered questions posed by myself and students. Their peers were genuinely curious about the practice of trapping.

In summary, I presented here a sampling of some of the most compelling instances of FOK activation, not all of the instances of activation. As one student wrote in her evaluation of the course “[In] every class ideas are shared.” What made these particular instances so powerful? I believe the answer lies in the specific techniques I used to activate these FOK.

4.5. Research Question 4: What are effective strategies for activating FOK that may be generalized to the practices of other college instructors?

I used numerous methods to activate students’ FOK throughout the course. I will describe five of these techniques below. The first four techniques activated FOK in the classroom, while the final technique allowed students some freedom to decide which FOK they could activate during an out of class assignment. However, before I discuss these techniques specifically, I will report on key characteristics of the learning context that students perceived to have a significant impact on the effectiveness of FOK elicitation and utilization. Specifically, I created a safe classroom culture that expected
sharing but provided safety nets for students in order to make the experience safe as well as valuable.

4.5.1. Collegial atmosphere of sharing

I set the expectation on the first day I entered the course that first hand experiences were going to be valued in the wildlife portion of the class in ways they were not in the fish portion:

I: What’s really cool about this class is the amount of first hand interactions we can have with wildlife. You have so many opportunities to interact with these animals, not like with the fish. I am not saying which you LIKE more than the other; I am just saying it is different. It’s just that when I drove to work this morning I saw wild mammals, I didn’t see a single fish. (Transcript10/30 Section 01)

I feel that these direct experiences are so valuable to the understanding of the subject matter, that I have made a concerted effort to build my own FOK through practices that encourage direct experience. The quotation below tells students that the images they will see throughout the semester are largely my own, but that I want them to view my vast experience as motivating rather than intimidating:

I: To get you excited about having wildlife experiences of your own, I have some pictures that I have taken or my trail camera has taken. None of this (referring to the pictures on the screen) is meant to be 8 weeks of me telling you how great I am and how ‘sucky’ your life is. All of this is supposed to be ‘Look what you can do if you make this a priority.’ I decided at a very young age that travel was important to me, and that was because we never did it when I was a kid. I was always afraid that I wasn’t going to be able to go anywhere. So travel became a
priority and I traveled all throughout North America, and when I met my wife she and I traveled together and now that we are a little bit better off we are able to travel to more exotic locations like visiting my brother in Australia. We went to Belize. We went to Peru this summer. We went back to Hawaii last year and showed our daughter where we used to live before she was born, cursing us “WHY did you move from here?” So I’ve got a great, a great pile of experiences to share with you and hopefully this can be the start of your own pile or adding to your pile of experiences as well. (Transcript10/30 Section 01)

My past experience has led me to consider how to best share the value of my wide range of experiences without intimidating students who may not have extensive travel or other FOK. Acknowledging that I had a vast array of experiences, but still valued the experiences of others, right in the beginning of the course was one technique for creating an atmosphere where they felt as comfortable sharing as I did.

There is evidence that I was able to create an atmosphere where students felt comfortable sharing by some of the comments in the final discussion group session:

Amy: Well, um, I got to like share what I experience with people who shared the same ideas and interests as I do. So that was pretty neat.

I: Why?

Amy: Because they don’t look at me like ‘Wow, you’re a hick.’ Or ‘Wow, you actually like looking at dead animals? What??’ (laughing) So that was pretty cool.

I: So you thought you felt comfortable sharing stuff (Amy: Yep) and you didn’t think people judged you harshly?

Amy: No. Not at all.
Laura: You feel more a part. I don’t know if anybody else had the same experience, but it’s similar to what she said you know, sometimes you feel kind of freakish because you’re the weird one ought of the bunch and you’re so ‘down home and country’ and ‘earthy’ and they’re all looking at you like ‘wow, you’re really weird.’ (laughs)

Jason: Um, sharing the stories was fun.

I: And do you think it was helpful for the class goals? Was it just fun or educational?

Several voices: Both.

I: Oh, you think it was both. Good. Anything specific? Because if I just go back and say ‘they thought it was good’ that’s not gonna explain everything as well… Have you articulated it in writing perhaps a little bit?

Jeff: Yeah, classmates are comfortable with each other and that makes for a better learning environment. (transcript, final discussion group Section 02)

In the above exchange, two of the students, Amy and Laura indicated that sharing their experiences made them feel more a part of the group and that membership in the group equaled acceptance. Further, Jeff specifically articulates that being in a collegial classroom made for a better learning environment.

If I expect students to share, I need to create a “safe” space for them to do that, one where questions and mistakes are handled with professionalism. An example of my success with this was an exchange where I had asked students early in the course to raise their hands if they had seen shrews and then did the same for moles. These two species are a little tricky to identify and I find a large amount of misidentification occurs. In fact,
after I explain the habits of these two animals, many students in the past have concluded that their initial identification was in error. Despite this, I think it is a valuable experience to have the students raise their hands to see what others are saying they have seen, rather than concocting some way to allow them to answer anonymously. I want them to share in their answers, right or wrong, but I also don’t want them to be intimidated if they end up concluding that they were mistaken. I have already asked students to raise their hands if they have seen a mole and the majority did. I then ask them to raise their hands if they have seen a shrew and only a few did. The results should be the opposite as shrews are much more commonly encountered above ground. One student indicated she had seen something once but couldn’t be sure if it was a mole or a shrew:

I: I’m not trying to say that you’re wrong. I am trying to say that you might be. See the difference? I’m not yelling at anybody, I’m just saying many people don’t know [what they are looking at]. And I liked how Courtney said this in the beginning: ‘I might have seen this, it was dark…’ I like that much better than saying ‘Yep, saw it. You think I didn’t?’ (laughter) And I get that a lot. The chest comes out ‘Yeah? You calling me a liar? Outside.’ And I tell them ‘After you’ and I close the door behind them cuz I’m not going out to fight. (Transcript 11/13 Section 01)

And I believe it was the ability to address meaty issue as a group was a large part of creating this collegial atmosphere. Students participated in meaningful ways to the discussion and all opinions were accepted, however factual information was also the standard. In other words, it was important that I corrected misinformation accurately, not
just *sensitively*. This opinion was shared more than once by students. For example, here is what one student said about what he liked most about sharing information:

> Austin: I liked how somebody would bring up something, some fact or some information that they weren’t sure if it was true and you could correct that and everybody would get the correct information instead of walking around thinking one thing… (Transcript, Final Discussion Group, Section 01)

Here, a student recognizes that I was able to play the role as “expert” and that made the sharing more meaningful because the information would be vetted. On the other hand, another student pointed out that having information from direct sources was more valuable than just having the teacher state it. Below is an exchange in a Final Group Discussion prompted by the question of how sharing impacted student learning:

> Ray: I’d say it increased it. It wasn’t just in the book, it wasn’t just on the screen, it was somebody that actually been there, done that.

> Jason: They had the experience.

> I: A couple of other people are nodding their heads in agreement. Why does that make a difference? How does that work in your head?

> Jason: They can translate it better.

> Paul: You can stand up there and say this is the way it is but if we have somebody from the Adirondacks saying “Oh yeah, I have seen that.” Its like, you’re not just lying to us (laughing). (Transcript, Final Group Discussion, Section 02)

Here, all three students express the value of firsthand experience, even over what the “textbook” or teacher says.
However, despite these positive comments, there were still students that felt uncomfortable sharing. Here are five anonymous comments submitted in writing as part of the Final Group Discussion regarding whether there was value to the sharing:

- In ways yes and no. Yes because I was able to listen. No because I never shared any of my experiences
- I really don’t share experiences. I enjoy listening to others.
- Don’t like to talk in class
- I’m not the type of person to talk in front of a class
- It is awkward at times because I can be shy around people

(Written responses, Final Class, Section 01)

I wonder if there was anything else I could have done to address this issue of reluctance on the part of some students to share.

Another aspect of creating a tone that encourages sharing was my willingness to honestly portray my lack of experience when such was the case. The following transcription is from the start of the pet lecture where students were asked to share their experiences owning dogs:

I: Now I have to say one of the things that I found absolutely fascinating about that survey I gave you guys was that almost every single person in both sections said they either owned a dog now or had a dog at one time in their life. What fascinated me about that was I am the one that doesn’t. I never grew up with a dog, never had a dog in the house. My father was afraid of dogs from some sad experiences he had as a child and biting issues. And my mom also didn’t like cats so I was allowed to have turtles, goldfish and anything I could catch in the creek.
So I didn’t grow up in a house that was pet friendly. Animals were things that were outside which is probably why I got into wildlife instead of veterinary science. But for me, I literally have no background in having dogs at all. Creating an atmosphere where students felt safe to participate was integral to the success of this study, especially if I was expecting students who are normally marginalized to participate.

4.5.2. Elicit and activate at the same time.

Often, I would ask students to participate in a class discussion by asking who knew of something or had had an experience relevant to the discussion at hand. In these cases, I was eliciting a FOK and immediately activating it in the course. For example, I was teaching the rabbit unit and I asked if anyone had any experience with orphaned rabbits. Brandon volunteered that he and his wife tried to raise them once without success. I was able to use his experience to illustrate the difficulty of raising wildlife, reassure Brandon that they probably did everything they could and present information on rabbit natural history.

One obvious advantage to this strategy is the lack of prior preparation it takes. Simply remembering to ask students to share their FOK before doing so myself took little effort. Another advantage was the flexibility of this approach. If time was running short in a particular class period, I could eliminate this step entirely or only select a single student to speak even if several were willing to volunteer information. Finally, there was a certain genuineness to this approach that I found appealing. In the pre-planned student presentations I knew students were going to speak and had a rough idea of what they were going to say. When asking for students to share in this unplanned way, I was never
sure if anyone was going to volunteer to speak or if they did, exactly what they were likely to say. To me, this was a far livelier and effective way of teaching than a “canned” lecture could provide. There is a feeling of being part of a conversation, not just on the receiving end of information. We were a community of learners and when a student relayed something that was new to me, I expressed my genuine pleasure at learning something new. I believe the students felt the difference as well. Their comments above made me feel that they recognized this class was being taught differently than how what they were used to.

4.5.3. Pre-planned student presentations. I utilized this technique twice in the semester. The first time was when students explained their experiences with the trail cameras, and the second was when Mark and Amy discussed trapping. Also, I chose these two particular topics for the pre-planned sharing because both were activities that the majority of the class had no experiences of their own to draw upon. Only four (10%) of the students said they had experience trapping muskrat and 12 (29%) said they had experience with trail cameras. Of those, only two agreed to speak in front of the class about muskrat trapping and four volunteered to speak about trail cameras. I believe this rarity of FOK was important to the success of this activation strategy.

As stated above, I believe it was helpful, perhaps essential, that I had first established a collegial atmosphere in the classroom. It is hard to imagine that students would have been willing to share otherwise. Further, in both instances, students were allowed to share their knowledge and experiences to the level they were comfortable with and I gave them no restrictions as to the content they needed to cover within the topic. Their experiences were valid regardless of the ways they practiced them, not only if they
did them the same way I, or someone else, would have. This is a core tenet of FOK. The classroom transcripts are full of short confirming comments from me after students speak ("Excellent", "Thank you for that.", "Good, good, good.", "Wow, cool.", etc.). Also, my directions to the presenters were general: Tell me how you do “this”. I never pre-approved what they were going to say. I did not ask questions ahead of time to make sure they used their cameras or trapped in ways that fit my preconceived notion of how that should be done.

Additionally, each of the presentations utilized artifacts. In the case of the trail camera presentations, students provided images that they had taken using their own trail cameras. In the case of the trapping lesson, students relied on traps and furs that I brought to class. In both instances, the use of artifacts provided the student-presenters a more comfortable environment in which to share their FOK. Simply put, artifacts help tell the story. Although this artifact usage was not by design, I wonder how important this was to the success of the technique.

I think this strategy was particularly useful as applied to rare FOK. The fact that so few students besides the presenters had direct experience with these practices meant that the audience members were universally novices. This may have given the student presenters more confidence in their roles as “experts” as they were not likely to be challenged by their peers. Likewise, the latitude I gave the presenters to tell their stories their way gave them confidence that I was also not going to challenge their authority.

Finally, in each case the presentations were a part of important components of the course, not merely additions that were never referenced again. The trail camera presentation came early in the semester and I refer to trail cameras throughout the course.
because many of my images come from these devices. For the majority of my students, the presentation they heard from their peers was their introduction to this new technology and I reinforced the value of the FOK associated with these cameras as the semester progressed. The trapping presentation came after the half way point of the course but was also an integral part of the natural history lesson of several species.

A disadvantage of how I conducted the pre-planned student presentations was the amount of time they took. In both cases, the students spent a greater amount of time on the subjects than I had in the past. However, I believe this is only an apparent disadvantage as this was time well spent, not just for the students that presented, but for the rest of their classmates as well. Below is an excerpt taken from the final discussion group at which time I had asked the students what things students shared that might inspire them to try new things:

James: I liked the presentation on trapping.
I: You liked that?
James: Yeah, I never did any trapping but I hunt a lot so that was interesting.
I: Thanks James. And were you saying the same thing?
Jason: Yeah, it was very interesting and it made me kind of want to get into trapping.
I (after pause): I will add that nobody in the other class trapped so this was the only class that got that piece. (transcript, Final Discussion, Section 01)

Another student responded to the same question with:
Jeff: Seeing the trail camera pictures. I had a trail camera and it broke and I never had much luck with it but seeing all the different things you can do with it made me want to get a better one (transcript, Final Discussion, Section 01).

In the future, to address the issue of time, I will simply budget more time for these presentations from the beginning as they certainly appear valuable enough to continue.

4.5.4. Large group presentations. As mentioned above, dog ownership was nearly universal among my students. This, coupled with the fact that students were likely to have images of their pets that could add to the discussion, were the reasons I chose to use large group presentations with pets rather than with some other student FOK.

These “large group presentations” involved students providing me with digital images of their pets two weeks before the actual lesson as well as participation in the group discussion about their pet when it appeared on screen. Students remained in their regular seats as they shared their lived experiences about their pets and images were arranged in the order I received them. I created a different presentation for each section of the class, so students only saw the images that their classmates provided. It took minimal effort to create the two different presentations, however I did also have to create an organizational system for the submitted images. Once images were no longer attached to an email, it was harder to identify the sender. Therefore, I renamed photos as they were being saved and created different folders for each species (cat and dog) and then for each section within those folders.

In the instances of pre-planned presentations discussed above, a few students formally presented their FOK to the class on a topic that was unusual among their classmates. They acted as experts in something few others had experience in and
therefore had to explain their experiences from a very basic and introductory experience. Their peers reacted with interest and fascination at these novel practices. By contrast, these large group discussions were something almost everyone could participate in from direct experience. It was more like communal sharing among peers knowledgeable about a topic. In fact, students relayed information even if they did not provide photos for the discussion and many asked questions of their peers as well. It reminded me of attending a club meeting where everyone was a member because they shared a similar passion.

From the number of students who owned dogs, I anticipated that the discussion would be interesting and informative. What I was not prepared for, was the absolute passion students brought to this discussion. That is a reflection of my own lack of experience in owning a pet. When reviewing the transcripts of both of the sections’ pet lectures, I am struck by how much it feels like the students were in the driver seat and I was along for the ride. It was not until I asked them to apply their knowledge to wild animals did my FOK become relevant to this discussion.

I offered students the opportunity to submit photos of both their dogs and cats. Far more students submitted photos of their dogs (even when comparing the percentage that owned dogs compared to cats) although the students that spoke about their cats seemed to do so with as much interest as those that spoke about their dogs.

To review, this technique worked so well because most of the students could relate to and participate in the discussion because they possessed similar FOK. The discussion was made more rich by the images students presented of their own pets and the passion of which students felt about those animals.
4.5.5. Small group activities. As with the large group discussion, the small group activities were utilized when nearly every individual student had FOK to contribute. It is possible therefore, to have switched the activation techniques among these various FOK and I can honestly say that I am not entirely sure why I chose which exact topics to activate in large groups and which to activate in smaller groups.

Both the bat worksheet and the index card activities (the sets of cards with mammal names written on them) allowed students to share FOK directly with each other around a given task in small groups. An advantage of this method is that it encourages students to participate when they may be reluctant to do so in the larger groups. Katelyn, who is quoted above as saying she liked sharing stories from her seat, also said directly of small group sharing: “It was nicer when we had a smaller group because you only had to talk in front of one or two people instead of the whole class” (transcript, Final Group Discussion Section 01). This willingness to speak in a smaller group instead of a large one may reflect a general lack of comfort with public speaking or perhaps uncertainty that what they had to share was worth sharing with the whole group.

An obvious disadvantage of this method would be the chance for misinformation to be spread, so I took precautions against that. In the case of the index card activities, the answers to the questions were presented to the class immediately following the activity. For example, students were greeted with a pile of cards upon entering the room one day and were asked to work with everyone in their row to create three piles: one for herbivores, one for carnivores and one for omnivores. Since we had not covered these species in class, groups had to rely on their FOK to make their best choices for each. After a few minutes, I projected the answers on the screen and discussed which ones may
have given the students trouble or which ones they wanted to question me about. All of
the animals on the index cards were eventually covered during the course, so students
were able to hear the correct feeding strategy for each again at later dates.

Whereas we used the index cards several times, the worksheet was used only with
bats. In this activity, I randomly assigned students into groups of three or four and
stressed that each student should be sharing information. Bats are common enough that I
was confident that all students would have at least brief first hand experiences with them
and all had some knowledge of them through other sources. The students seemed to enjoy
the activity and I noted in my Teacher Log that some of it may just have been the chance
to socialize in a novel way. If that is true, then the effectiveness of this technique would
likely diminish once the novelty wore off. Likewise, I am not sure how this would have
worked for a topic where many students would not have had something to say, like
trapping.

I gave the students about ten minutes to complete the worksheet and noted that
although some groups were still highly engaged, others were sitting quietly by that time. I
asked each group to select one thing they wished to share. I specifically did not qualify
what they should share (such as the “best” or “most important”), trusting that what they
felt was interesting enough to share would also be interesting to their peers. Every story
or fact that was shared by the groups in both sections was directly relevant to the goals I
had for the bat unit. Although I am not certain that will happen if I do this again, I was
impressed with these initial results.

4.5.6. Field assignment. The assignment I term the Mammal Portfolio was an out of class
assignment that allowed students to activate their FOK in several ways. To review, the
assignment was for students to observe eight mammals or their sign from a checklist provided and document their sighting and enhance that description with information gleaned from reliable sources (See Appendix A.2 for the entire assignment). Almost by definition, students have to access FOK to complete the project. They cannot complete the work without actually being “in the field.” All of the students had indicated one or more practices that would put them in direct or indirect contact with items on the checklist (animals or their physical sign). Most students completed at least part of their assignment while participating in these activities like hunting, camping, hiking or otherwise experiencing nature. One of the strengths of this assignment was that it allowed students to activate a wide variety of FOK to their advantage. First, the work was done out of class. This requirement allowed students flexibility in time and location(s) to complete the project. This advantage is made clear to the students in their written directions:

Some sightings will happen at odd times. Others will happen because you have planned them. Both of these are valuable. I am hoping this assignment will make you more conscious of the wildlife in your world when driving, walking or staring out the window. But I hope each of you takes the time to actually target some of these encounters (Mammal Portfolio).

Second, the checklist of possibilities was broad, making it more likely that students would be able to find opportunities to use one or more FOK to assist them in the project. For example, students were allowed to use a pet dog or cat as an observation, as well as the tracks those animals leave. Also, I made sure there were enough options for students to complete the assignment without difficulty no matter where they lived. As I tell them
in class, they could find more than enough mammals and their sign right on campus.
Since this class is usually taught in the spring, I modified the checklist to reflect some things that are more common in the fall. For example, a “scrape” made by a white tailed deer are difficult to find in the spring as they are made in the fall months. Finally, I allowed students to document the required information in a variety of ways. This allowed them to access FOK that are unrelated to wildlife. For example, students could hand write the assignment, which is unusual at the college level. On the other hand, students could chose to provide only electronic copies of their assignment, using whatever format they desire. Most students used some form of word processing software, but some used PowerPoint and one student converted all of his assignments to PDF files. They were encouraged to document their sightings with written descriptions of the event, sketches and/or photographs. I had one student this year use video to document his sightings. It is conceivable that these “communications FOK” (e.g. digital literacies), when tapped, could motivate further engagement with the material.

The field assignment was due in two parts. Half of the entries were due four weeks from the start of the wildlife section and the last four entries were due four weeks later, at the end of the semester. This timing allowed students to receive feedback on their progress and correct any deficiencies in technique or quality for their second part. This timing also spread the assignment out over the entire semester to allow students to take advantage of natural seasonal variations like the arrival of snow to make tracking easy or the onset of a certain behavior such as the mating season for deer and human induced variations like the start of a particular hunting season or traveling home for Thanksgiving Break.
A potential disadvantage of this assignment is misidentification of either mammals or mammal signs by the students due to the out of class nature of the work. For example, one student this year identified a pile of sticks as a beaver lodge, but her photos left me convinced it was only debris deposited by high water. To counter that potential disadvantage, I created a rubric that allowed the student to still receive partial credit on an entry even if the mammal or sign was misidentified. In the instance above, for example, the student provided accurate information about beaver lodges on the Natural History portion of the entry and created several interesting questions for the Further Study section despite misidentifying the pile of sticks for a beaver lodge. This particular student responded to her error by making a point of finding a REAL beaver lodge and completing an entry for her Portfolio Part II.

I sought feedback on this assignment through a written evaluation (Appendix B.5). Essentially, students were asked to describe two things: The most valuable thing about completing the field assignment and specific suggestions for making the assignment better. Thirty-four students completed this evaluation. Overwhelmingly (74%), the students stated in various ways that the value of the assignment was in obtaining first-hand experiences with wildlife and their sign. Below is a particularly articulate example of this:

James: The most valuable aspect of the portfolio to me was that it made me really examine and take in details I would normally overlook. For example, I found rabbit browse while looking @ a trail. To me, it would have been nothing more than broken twigs.
Here James says that he learned what made the “broken twigs” in class and became aware of them by actively looking for such sign because of the field assignment. Other students reported similar things saying that they became more aware of their surroundings while outdoors or that they never realized how abundant animals and their sign are. This is significant. Students modified their existing practices to complete this assignment and saw that as valuable. Several students wrote about gaining a deeper understanding of the animals around them while others wrote they gained a greater appreciation of them. Students were taking a more professional approach to their time in the field.

Another example of this increased movement towards a more professional approach to their outdoor experiences was the number of students who said they thought that researching information for the natural history segment of the entries was the most valuable part of the assignment. One student said “I didn’t expect some of the animal behavior I was seeing to be so well documented.” The understanding that animals are something to be studied rather than just enjoyed or utilized (or ignored) is a big step in many students’ emerging identities as students and future professionals in the conservation field.

Many students did not provide any suggestions for improving the assignment or answered that they liked it the way it was. Few students wanted to change it with suggestions ranging from the practical like adding specific species to the list of possible animals to more complex like changing the due dates or requirements for each entry.

Specifically this assignment seemed to work well because of its authentic nature and flexibility. Students were able to activate FOK that they otherwise would not in a
college class ranging from direct and indirect wildlife FOK such as hiking and hunting to other FOK such as digital literacies. The field assignment also provided evidence that students were changing their practices in ways that were beneficial to their college and future careers. In other words, students refined or matured their practices often in ways that would be considered “professional”. As the next section addresses, students were also changing how they thought of their practices due to the sharing of information from their peers.

4.6. Research Question 5: What evidence was there that students took up new practices due to the intervention?

I felt it was important to know if students took up any new practices, or in other words, began to develop new FOK as a result of this intervention. One reason I was hoping to see changes in practices was because of the value these practices hold for the students both academically and in future careers in conservation. Students would benefit academically in other environmental courses that build on this and other introductory classes. For example, Principles of Ecology is a required course for Environmental majors and contains a field project where students inventory the species present in a given area. These types of projects are in anticipation of careers that would require similar skills. A wildlife technician would be expected to be able to identify the species of animals found in an area by sight or by the signs they leave behind. I spent the entire intervention activating FOK accrued through a variety of practices thereby showing their value. Therefore, starting new practices can be thought of as an indirect measure of the success of the intervention. Perhaps students see the value in the FOK gained from these practices.
Additionally, taking up or planning to take up new practices in relation to this intervention can be seen as a way that peers influences each other. As you will see, the students who indicated they were planning to make changes to their practices did so as a result of what their peers had shared in class rather than what they heard me, the teacher say. These changed practices then are not coming about because there is a grade associated with the action. Rather, these changes came about naturally.

Students indicated that they were impacted positively by their peers during our final discussion session. For example, Laura expressed her feelings about student stories this way:

Laura: And explaining how things are done and different things they have experienced or whatever, I don’t know, it peaks your imagination. You know, it gets you going. It makes you think.

For the final group discussion, I allowed students to answer the questions in writing instead of aloud if they were more comfortable with that option. These anonymous answers also revealed that students were inspired by their peers. Specifically I asked: “This semester, many of your classmates have shared personal experiences relating to wildlife or animals. Have any of these stories inspired you to try and gain any similar experiences yourself?” Thirty-three students returned written responses, with 23 (68%) responding in the affirmative. A few of the responses were short: “Yes.” Others were more compelling:

-Yes, people have had experiences which I believe would be enjoyable and when they talk about their experiences it gets me interested and helps me learn.
-Yes, in many ways I thought I was outside often and had many experiences, although I
have realized I hardly had any experiences compared to many.

-Many of the stories told have. Just hearing other’s talk about experiences with wildlife
gets me excited to have my own experiences.

-Absolutely! I want to travel to Alaska, Canada and other places to do field studies,
schooling, internships, and whatever else I can to educate myself. I want to have lots of
hands on experiences with animals. Also, to help animals and study them.

-Getting more knowledge on different wildlife, made it more fun to go out and look
deeper into wildlife and nature.

Of the ten students that did not answer in the affirmative, four left this question blank,
three simply answered “No” and two responded with answers that indicated they already
had vast outdoor experiences and were not inspired to try anything new.

Further, I incorporated a question regarding these new practices (see Figure 4.1)
to an existing course evaluation. The question asked not only what new practices the
students may start but what motivated them to do so.

Figure 4.1: Survey of New Practices

<table>
<thead>
<tr>
<th>“NEW PRACTICES” SURVEY: For my research, I am curious to know if this class inspired you to try any new things or modify any existing activities.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Please list any new practices or activities you have started or modified during the semester that relate to wildlife (Some examples: hiking, hunting, photography, tracking, etc.). For each, please indicate what has motivated you to try the new practice.</td>
</tr>
<tr>
<td>Description of new practice:</td>
</tr>
</tbody>
</table>

Thirty four students (77%) returned the survey with three students leaving this question
blank (but answering other items). Table 4.16 shows all of the responses from the 31
students responding that returned this survey (students were able to provide more than one answer).

Table 4.16. Student descriptions of new practices started or contemplated due to the intervention

<table>
<thead>
<tr>
<th>New practice started or contemplated:</th>
<th>Number of students reporting this</th>
<th>% of total students in the intervention</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tracking</td>
<td>16</td>
<td>38%</td>
</tr>
<tr>
<td>Observing wildlife</td>
<td>08</td>
<td>19%</td>
</tr>
<tr>
<td>Photography (including trail camera usage)</td>
<td>06</td>
<td>14%</td>
</tr>
<tr>
<td>Hunting</td>
<td>02</td>
<td>05%</td>
</tr>
<tr>
<td>Writing about wildlife</td>
<td>02</td>
<td>05%</td>
</tr>
<tr>
<td>Other (10 different):</td>
<td>01 for each practice</td>
<td>02% each</td>
</tr>
<tr>
<td>- Trapping</td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Collecting animal skulls</td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Skinning/tanning hides</td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Baiting animals</td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Constructing brush piles for rabbits</td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Attracting bats by throwing sock in the air</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Some of these new practices can be traced directly to student FOK sharing. Attracting the bat by throwing a sock in the air was a story told by a student (Jackson, while he was in the military in Georgia). The flying squirrel attraction may have also been from a student story or from my own, since both were presented. Of the six students that wanted to try or increase their photography practice, two mentioned trail camera usage specifically. Students shared their trail camera photos and may have contributed to other students wanting to participate in that activity. In addition, many students shared stories of wildlife observation and I assume that helped motivate their peers.

At first, I was surprised to see tracking so high since I do not spend a lot of time in class talking about tracks, but perhaps this is a reflection of just how little they know about tracks to start with (so that it is a “new” practice).

In conclusion, there is ample evidence that students both took up new practices and/or enhanced existing ones. The students often reported that their motivation for trying something new was due to the experiences fellow classmates shared throughout the intervention. This is an important finding because it shows that students changed or planned to change their behavior due to an academic experience but without it being an assignment. The students chose to pursue these actions on their own.
4.7 Conclusion

The findings of this study indicate that using a FOK teaching approach can draw students into a course, allowing them to access skills and knowledge that would otherwise may have gone unrecognized in an academic setting. Students shared freely with each other and inspired their classmates to acquire similar experiences.

I elicited FOK through a written survey, asking targeted questions and through a field assignment. Students possessed a wide array of FOK that were relevant to the course goals. All students had some FOK and some students had deep FOK in particular areas. I found FOK that were directly and indirectly related to wildlife as well as other FOK that were relevant such as classification skills and cultural knowledge that could be pressed into service to meet learning objectives. FOK were activated throughout the course in nearly every lesson. Some notable instances of activation included student presentations on both trapping and trail camera usage; small group work during the bat unit; and class-wide discussions regarding the pet dogs and cats of the students in the class. These instances were representatives of the five effective strategies I describe in the intervention: elicitation and activation at the same time, pre-planned student presentations, large group discussions, small group activities, and the field assignment. Each of these strategies presented particular strengths and weaknesses that made them appropriate for different situations. Finally, I was able to uncover compelling evidence that students were interested in changing their practices as they related to wildlife due to the influence of their peers.

The encouraging results of this action research intervention will lead to changes in my practice in all the courses I teach. In addition, I plan to continue my research of
eliciting and activating FOK through future action research cycles. Finally, it is my hope that the conclusion I will draw can inform the practices of other researchers and practitioners.

CHAPTER FIVE: ACTIONS RESULTING FROM THIS STUDY

In this chapter, I will outline the future action research cycles this study has inspired and discuss the implications of this study on my future practice in CON 102 and other courses.

5.1. Next stages of the Action Research Cycle

Action research, by definition, can be a never ending process as long as the researcher is willing to continue to systematically improve her or his practice. This intervention has inspired me to continue using action research to refine and expand the elicitation and activation of FOK in my practice. Having multiple sections of this course each semester will allow me to address a range of questions within a given semester as well as conduct a variety of action research spirals as appropriate.

5.1.1. Future Action Research on Eliciting FOK

As the discussion in Chapter Four indicates, I was able to elicit a tremendous amount and variety of FOK in my students. I focused on the direct and indirect skills and bodies of knowledge related to wildlife as I believe that was the most important FOK relevant to the course goals. I wish to further refine the FOK survey to make it a more efficient tool. I plan to redesign a few of the questions to provide better data. For example, I will add questions regarding hunting, fishing and pet ownership that will
allow me to directly compare my results to the published results of the national surveys I found on those topics. In addition, I will look to reword any questions I feel did not adequately survey the skills or practices I had intended. For example, in Chapter Four, I expressed concern that the wording of one question led students to check off their experiences mowing a manicured lawn when my intent was to measure which of them had experience mowing or brush hogging a fallow field as a management tool to suppress succession. Upon further review, other questions may also lend themselves to refinement.

I was also intrigued by the other, non-wildlife, FOK that were elicited in the course of the study. I mentioned a few of these in Chapter Four. For example, a student knew the genus of bears was “Ursa” through the constellation Ursa Major (the Big Bear). In my next action research cycle, I would like to focus on these other cultural FOK with a particular focus on popular culture that may make the course material more accessible to students. I will use one or more of the methods for eliciting FOK that proved successful in this study. For example, comprehensively surveying popular culture, as I did with direct and indirect wildlife FOK, may not be feasible given the vast amount of information that topic covers, but small group activities may be modified to allow students to relay some of their popular culture FOK. I could mimic the bat worksheet for a species or group of species and add spaces for students to record what they have learned from popular culture like movies, songs, television, etc. Another effective method for activating popular culture may be to elicit and activate at once. I would be able to utilize my experience in the class to anticipate some of what students may bring to bear that is relevant from popular culture. For example, there are many popular movies with a wildlife or environmental theme that could be drawn on to help meet the goals of this
course that are common enough that they fall into the category of popular culture. The Lion King, Madagascar and Avatar are three that come to mind.

5.1.2. Future Action Research on Activating FOK

There are several areas relating to the activation of FOK that I wish to continue researching in my practice.

First, there were a few categories of FOK that I elicited but made little effort to activate. One example of this was Section 11 of the FOK survey where I asked students about their sorting or categorizing experiences. The intent was to use these FOK to assist in teaching the taxonomic system used in classifying living things. I would like to incorporate those FOK into the next action research cycle. I believe the elicitation method was appropriate; I just need to activate it. In reviewing my teacher journal, I noted “lack of time” as the reason for not doing it this year. Therefore, I would like to create a take-home assignment that would allow students to connect their previous skills and knowledge to what is usually a new organizational system. I believe this idea has the potential to be a valuable experience because the concept of organizing items into groups based on similarities is certainly not new. What is new, when students are presented with taxonomic instruction, is the terminology of both the names for the groups (Phyla, Genra, etc.) and the names of the groups (Artiodactyla, castoridae, etc.). If students can see that the organizational structure is one that they are similar to from their existing FOK (particularly the two concepts that like “items” are put together and once items are separated they never are reunited later in the process), they should be able to better understand the taxonomy scientist apply to living organisms. My initial thought is to have the students describe an organizational system they use in their lives, whether it be a
collection or an action they undertake at work or even something as simple as deciding where groceries go in the cupboards or clothing in the closet. I can then ask them to defend their rationale for creating such a system. Why not organize it differently? Asking them to justify their own organizational structures may allow them to see that there are other valid ways to organize things. This would lead me to compare those results to living things: there is more than one way to organize them. Learning the taxonomic system of organization is one (very important) way.

Another area for further research is the pet presentation portion of the class. In this study, I only included cats and dogs, however a large number of students indicated they owned other pets that would have direct relevance to this course as well as some that would have indirect value. Rabbit, rodent and ferret ownership were all surveyed for but never activated directly in the course. One student did activate her FOK during a lecture on Eastern cottontails when she shared that she had seen her pet rabbit engage in coprophagy (re-ingestion of fecal pellets). In my next action research cycle, I would like to invite students to share pet photos of these other mammals as well as their cat and dog pictures for the three groups mentioned above, rabbits, rodents and ferrets as I cover the related wild species in class. Since fewer students have these pets, I anticipate that I will be able to spend less time on the pet sharing portion of this process with these additional pets than I will spend with dogs and cats. However, I will take advantage of this rarity in FOK, especially in the case of ferret ownership, to allow students to participate more as experts for their peers as Mark and Michelle did with their trapping lesson during the intervention. As a researcher, I am also interested to see if the students react as strongly and positively to these other pets as they did to the dogs and cats. Will covering more
pets dilute this technique and take away from its value by making it more pedestrian and less novel? If so, practitioners would need to choose their use of this technique wisely.

During my analysis of the small and large group discussions, I noticed that each of the main instances of these techniques (the trail camera and trapping pre-planned presentations and the large group dog and cat discussions) incorporated some sorts of artifacts. The presentation on trapping used furs, traps and a hide stretcher while the other discussions used images provided by the students themselves. I would like to develop an action research intervention that explores the impact of artifacts on the activation of FOK. As stated above, I plan to expand the large group discussions to include other pets, but beyond that there are other instances where students could utilize artifacts to facilitate discussions. For example, there are other tools employed by hunters that are also of value to those studying wildlife as the trail cameras proved to be. Students may have enough proficiency with calls, scents, decoys or other non-firearm hunting implements that they would be willing to share their knowledge with others in the class. In fact, these discussions could become more like demonstrations in some cases, with the students utilizing classroom or outdoor space to show their classmates these tools in action.

Finally, there was evidence that students inspired each other to try new practices. I would like to try a new way to allow students to share their practices with each other in a way that would allow their peers the opportunity to adopt some of these practices immediately in service of the course goals. In Chapter Four, I reported on the vast array of practices the students employed to accumulate their mammal and mammal sign encounters for their field assignment. The assignment is due in two parts. For my next action research cycle, I plan to allow students time to share out in small groups after the
first part of the field assignment is due and discuss which entries they completed and how and where they encountered the mammals and sign. If I conduct this similarly to the bat worksheet, I can capitalize on a participatory framework that is familiar to the students. I will ask each group to report one or two methods for finding the required mammals or sign. This may inspire students to modify old or take up new practices to complete their remaining entries. I see the value in having students describe HOW they hike or camp or hunt, etc. because not every camping trip or hunting experience or hike functions equally in providing FOK related to wildlife. I would like to increase the opportunities for students with rich practices to share those with others as a model for how they could make more of their current experiences. For example, maybe riding an ATV is suddenly about fun AND seeing animal sign or camping is still a time to socialize with family but also an opportunity to concentrate on learning about local mammal behavior.

5.2. Implications for My Practice

I think this intervention has changed the way I view students. One of the things a FOK approach is supposed to do is stand in stark contrast to a deficit model where students are looked at as missing things or under-privileged. Rather, throughout this intervention I was constantly looking at my students as sources of information and relevant content. That had a dramatic effect on planning and implementing lessons. For every topic I covered I had to assess the value of this new resource weighed against the others I had available. I could not simply add more to each lecture, but rather had to decide when to replace teacher-driven components of my lessons with student-directed content. Further, I worked hard to have them see themselves as well as each other in this same light. I did not keep secret the ways students were contributing; rather I celebrated
them through instant and sincere positive feedback. In this new light, all of my courses will change, not just CON 102 where the intervention took place. A discussion of those specific changes for each of my courses follows.

5.2.1. Instructing CON 102

I plan to continue many of the techniques for eliciting and activating FOK that were utilized in the intervention. I will continue to use and modify the FOK survey as a primary means of discovering the FOK the students possess beginning with the action research projects described above.

However, including these new things in the course meant that there were things I had to take out. In the intervention, I nearly eliminated the mammal skull identification portion of the course for lack of time. Given the value of the FOK elicitation and activation, I felt it was a justifiable trade off. In the upcoming semesters, I will pre-plan this mammal skull identification portion of the course to be small. Given the time constraint, I am anxious to find ways to incorporate FOK outside of the class period. I have considered creating a blog or website that students can create content. Though I am certain I would like to do something along these lines, I am just not sure what the format should be. This format would give the students a chance to incorporate their FOK in a wide variety of ways, from sharing written stories to photos to sketches to asking questions. I have toyed with trying to do this as a “living” bulletin board in the classroom, rather than a virtual one in cyberspace, where students can add and change items throughout the semester.
5.2.2. Instructing CON 100

In CON 100: Introduction to Environmental Conservation, I teach mostly freshmen, most of who are in their first semester. As the name implies, the course is an overview of their chosen field, but it also serves as our “freshman seminar” course where they are introduced to the expectations that come with college level reading and writing in an applied science degree. Giving students an opportunity to draw on FOK as well as teaching them that they can develop or enhance skills and bodies of knowledge from outside of the classroom could be an empowering activity. I already ask the students to consider what it was that led them to pursue a college degree and presumably a career in conservation where FOK are elicited. The next step is to help them activate their FOK and scaffold the students to continue their participation in acquiring FOK they enjoy in ways that make it valuable to their college experience. Laura said as much in the final discussion session when she said she had been an animal lover her whole life, but now she is learning new ways to help them (she specifically referred to tagging and collaring as scientific methods to help animals). She had always helped them one individual at a time (rescuing orphaned or injured animals) and was now interested in learning how to help entire species through proactive and reactive methods. Specifically, I hope to change two units initially.

The first unit I plan to modify is the field identification portion of the course. As it is taught now, students spend a class period indoors learning about field guides and taxonomic keys and a class period outside actually practicing identifying trees with a key provided. I am anxious to devote some of the in-class time to students sharing their FOK related to field identification with the goal being to have students see first hand the
various values to possessing field identification skills. In addition, I would like to
restructure the outdoor portion of the unit to allow time for students to work in small
groups to show each other some of the plants, animals and animal sign they can identify
and describe how they acquired this knowledge and skill.

The second unit I would like to modify is the one that presents career information.
I already ask students to begin to take a sophisticated look at what they might wish to
pursue as a career. I would like to make explicit connections among their existing FOK
and the skills and knowledge that are required for their chosen profession. We could
discuss what strengths they already have as a result of their existing FOK and how they
can activate these to further their career goals.

5.2.3. Instructing CON 200 and 201

In CON 200 and 201: Conservation Field Experiences I and II respectively, the
students are required to complete internships as well as prepare a resume and practice
interview techniques essential for employment. The connections between FOK and
completing an internship are potentially rich and can be made explicit in order to give full
advantage of their backgrounds. Asking students to view even their non-academic skills
and knowledge through the lens of FOK would be beneficial and not to be taken for
granted. I wish to make explicit the ways in which they learned skills that make them
employable, like being punctual and trustworthy and reliable, so they understand to apply
those traits to an internship. For some of the students, an internship is viewed as another
hurdle to get over before graduation rather than as an opportunity to learn and grow in
knowledge. Perhaps connecting the skills and knowledge they have gained though their
FOK can make the experience more meaningful for those students by allowing them to
see the practical purpose of the assignment. If I make the changes proposed in CON 100 above in regards to the career unit, the changes to the Field Experience courses can be seen as a check point in their progress or an expansion of their work to date on this goal.

5.2.4. Instructing PE 150

In PE 150: Beginning Camping, I often have experienced campers who take this introductory course to help fulfill their PE requirement because they enjoy the activity so much. And in the past, I have relied on students to assist each other, but strictly informally. I am interested now in creating a FOK survey for this class that I can administer during our organizational meeting that will allow me to elicit and then activate their FOK better. One of the students in the intervention compared what we did in CON 102 with sharing “campfire stories” and that is what got me thinking of how well a fit this approach would be with a camping class. The survey for this class could be different from the CON 102 FOK survey in several ways. First, I could survey a much smaller range of FOK that are directly related to camping. In this case, I would ask students to provide more details about their FOK with the skills being directly transferred to the tasks performed during the camping trip (setting up tents, starting a fire, outdoor cooking techniques, lighting a lantern, etc.) with the students serving as co-instructors with me.

5.2.5. Conclusion

It is clear to see that, though I have learned much from this study, there is still much to learn. The next cycles of this project promise to further the conversation regarding FOK in college settings by refining the activation and elicitation techniques uncovered and applying them to a wider range of courses. Further, I hope to develop new
methods of eliciting and activating FOK as well as continue exploring the effects this
FOK sharing has on the development of new practices among the participants.

Specifically, my next action research cycles would focus on eliciting popular
culture FOK that would be useful for the course goals as well as activating FOK from
potentially rich areas such as sorting and categorizing skills and pet ownership beyond
dogs and cats. Finally, my next action research cycle would include more opportunities
for students to share their existing practices with each other in an attempt to have peers
emulate these practices and adopt them for their own benefits.

Additionally, I plan to make several significant changes to my practice in each
course I teach outside of the formal realm of research. Keeping nearly all of the new
practices in CON 102, the course in which the intervention occurred plus the addition of
the action research outlined above, leaves little room for additional changes. The one
additional change I hope to incorporate though is the creation of some forum in which
students can share their FOK through words and images alike. I envision a blog or even
just dedicated wall space in the classroom where students can contribute content in the
form of stories, journal entries, questions, photos and artifacts related to the course. Two
units are slated for change in the introductory conservation course I teach to all freshmen
in the program. First, I plan to utilize the small group activity technique while in the field
during our unit on identification skills. I am intrigued by this approach as having the
students share FOK outside of the classroom should prove to be rewarding academically
and socially and perhaps in other ways. Students will not be describing their FOK but
rather they will be showcasing them as they demonstrate their skills and knowledge
directly. In that same class, I have several ideas of how to incorporate a FOK approach to
the career unit. Helping students see the valuable FOK they possess while they are at the start of their college careers may help them to draw on them in other classes, expand on them in ways that would make them more employable and further promote their growth as professionals. These benefits will be reinforced again in the Field Experiences (internships) courses I teach to sophomores. This ability to follow through and “check in” with them regarding their progress in developing new FOK and enhancing old ones is a particularly meaningful extension of my teaching.

Finally, I teach an introductory camping class where the students vary from expert campers to those that have never camped a night in their lives. Taking the time to assess the FOK these students bring to the course and then activating them during the trip can prove just as fruitful as activating FOK in a more traditional classroom setting. As with the field identification FOK mentioned above, these FOK would be demonstrated first hand and perhaps immediately tried by the other students (say in the case of fire building or the proper techniques of splitting firewood) rather than just discussed in a classroom setting.

These changes, whether conducted as part of a formal action research spiral or not, are all informed by the conclusions I made based on the results of this intervention. As Chapter Six will show, I believe this intervention was a success and produced results that have the potential to be widely applicable in the practices of others.
CHAPTER 6: CONCLUSIONS

6.1. Introduction and Overview

In this chapter, I present a summary of the results as they relate to the research questions that informed this study. Then I detail the significant theoretical, methodological and practical contributions of this study to the field of FOK. Next, I present a discussion of the limitations and contributions of the study. Finally, I conclude with suggested research options for future work on this subject and concluding thoughts.

6.2. Summary of Results and their Significance

I designed this study with the intent to better understand the FOK my students brought to bear on a particular course in Environmental Science and how to capitalize on those FOK once recognized. I also sought evidence to show whether students changed or desired to change their practices based on what they learned from their peers. The specific research questions informing this study were:

1) What are effective strategies for eliciting FOK that may be generalized to the practices of other college instructors?

2) What relevant FOK do students bring to this class?

3) What are instances where FOK were activated in the course?

4) What are effective strategies for activating FOK that may be generalized to the practices of other college instructors?
5) What new practices to facilitate the development of new FOK did students take up due to the intervention?

The study began with the administration of a pilot FOK survey to roughly half of the participants. Analysis of this pilot and the transcripts of a discussion group session regarding student FOK lead to the creation of a final FOK survey that was administered to the entire study population just before the wildlife section of the course began. The results of this final survey served as a large data source for the question of what FOK students possessed while the survey construction process served as data for the question of how to effectively elicit FOK from students. Throughout the semester, opportunities were sought to both elicit and activate FOK in a variety of ways. Since action research was the chosen methodology, this process was often fluid and overlapping, providing a vehicle for exploring opportunities to elicit and/or activate as they arose. The results of this study were encouraging. The data suggests that I was able to both elicit and activate FOK in the classroom and further, that students were influencing their peers’ practices in positive ways. I uncovered relevant FOK through the use of techniques that could be replicated by others without being unduly time consuming. Many of these FOK were activated in ways that other teachers could incorporate into their practices. Finally, one measure of the success of the intervention was the encouraging result regarding the taking up of new practices. Many students indicated that they were interested in modifying existing practices or taking up new ones as a result of what they heard and saw from their peers. Although more work needs to be done in each of these areas, the conclusions I present below represent a significant contribution to the discussion around the value of FOK in the classroom.
6.2.1. **Effective strategies for eliciting FOK.**

I found students to be very forthcoming with their FOK when asked, both in writing and verbally. The majority of previously published FOK research dealt with much younger students and capitalized on home visitation as a means of eliciting FOK. Having an older student population and seeking targeted FOK allowed me to successfully uncover valuable, relevant skills and bodies of knowledge in every one of my students. Therefore, I believe the biggest contribution of this part of the study was the demonstration that the students themselves could be relied on to be valuable, yet still limited sources of their own FOK.

One main concern regarding the use of a FOK in a classroom is that it takes a large amount of time and effort to elicit FOK through home visits (Gonzalez et al., 2005). The techniques I utilized to uncover FOK did not involve home visits yet managed to be reliable and not too time consuming. Further, I believe the techniques could be applied to not only the practices of other college instructors in other disciplines, but also to teachers in K-12 settings.

The method I utilized for eliciting the most FOK was the written survey. I believe this method was successful for several key reasons. First, based on my extensive experience teaching this course, I was able to create a comprehensive set of questions regarding direct and indirect wildlife FOK that my students may have acquired. The fact that no new categories of direct or indirect wildlife FOK emerged during the study leads me to conclude that the written survey was very thorough. The survey provided a large amount of information in a short amount of time. Other teachers may choose to only survey their students regarding the categories they felt would be most rich or otherwise
useful to the course goals rather than taking the more broad approach to surveying that I did. In fact, there were several entire categories that I surveyed for but never activated throughout this intervention. However, there is a risk that surveying only for a subset of FOK may exclude some students and lead them to conclude they have no relevant FOK. Further, deciding on which areas to survey may lead one to miss FOK that would otherwise prove relevant and useful or may perpetuate one's own biases regarding what is valuable and what is not.

The most time consuming part of surveying the students was the creation of the survey instrument in the first place. Since I had access to the students before my portion of the course began, I chose a research design that took advantage of that where I piloted the survey with one of the sections of the course and then invited those students to a discussion group session to further uncover FOK. I used the results of the pilot survey and the discussion group session to refine the survey and begin to develop my other elicitation techniques. Although this access to students before the intervention began proved valuable, it was not essential. I recommend that anyone having the ability to utilize one or both of these techniques to do so, but the absence of either should not be considered a limiting factor. For me, the pilot survey provided a quick action research spiral and allowed for a more refined version to inform this study, while the discussion group session revealed that my students were not only bringing a wealth of experiences with them to the course but that at least some of them were willing and able to speak to them.

An additional conclusion regarding the survey: I believe I was able to create such a comprehensive survey due to the years of experience I had teaching this course and the
expertise I enjoy in this field of study. However, I do not conclude that this is a necessary condition for another practitioner to utilize a survey to elicit FOK.

I was encouraged by the results of the above mentioned discussion group in that the participants were readily sharing their FOK in articulate ways. However, the discussion group was comprised of only six volunteers, so in addition to it being self-selecting in nature (meaning, students who volunteered may have been those that were predisposed to speak freely while those who chose not to come may have done so partly out of their reluctance to speak in a group), the setting was different than a classroom because there were fewer individuals present. I found that the small group setting became a technique for eliciting FOK in itself. Some students commented that they felt more at ease in the smaller groups and spoke up where they may not have in the larger classroom setting. I found it insufficient to just verbally survey the entire class in regards to FOK that I wanted to know about. Some students just did not participate in these large group settings. The survey and the small group activities were ways to include these students and elicit their FOK. This reluctance was present despite my efforts to maintain a safe and respectful space for sharing.

Due to what I had read in the literature (Moje et.al 2004), I was prepared for students to not be forthcoming with their FOK. Therefore, I was acutely aware of the atmosphere in the classroom and maintained a respectful and safe space where the students and I could share facts, opinions and questions. I believe this awareness is essential in any elicitation of FOK where the students themselves are the primary sources of the FOK. Without the benefit of home visits, I relied on the students to provide not only a complete record of their FOK but also a reliable one. My status as “expert in the
field” was not used only to deliver information from the podium but rather was
capitalized on as a way to verify the FOK students shared with each other. My powerful
classroom role as teacher allowed me to establish and model the expectations for sharing
among the class in ways that made many of the students feel safe in speaking while also
serving as a quality controller. Students understood that the stories and ideas shared by
their peers were going to be handled with respect but also assessed for accuracy. One
without the other would be far less valuable in a class that requires the learning of factual
information. And in the rare occasions when students shared information that was not
accurate, I handled that in a delicate and respectful manner as well.

Finally, I elicited FOK through an authentic field assignment that proved to be an
invaluable way to elicit FOK that I may otherwise not have uncovered. In my case, the
assignment was to view mammals or signs of their presence such as tracks or scat and
report on those encounters by giving information on the actual encounter supplemented
with literature from reliable published sources. Students were allowed a large list of
possible animals and signs to draw from and further had few restrictions as to how the
assignment could be physically constructed. For example, students could document their
sighting using any combination of original photographs, drawings and written
descriptions. Since the entire assignment was completed outside of class, students often
revealed FOK from their regular routines as well as more specialized activities. Often,
this assignment was a way for me to get a glimpse into the homes of my students without
actually visiting.

In summary, the elicitation methods I used proved to be effective and efficient.
Students were very forthcoming with their FOK. Some students were willing to share
their FOK in large group settings while others did so in smaller groups or during the written survey. Finally, utilizing an authentic out of class assignment allowed students to reveal both new FOK and new details about ones they had already revealed. These techniques uncovered a wealth of relevant FOK as shown in the next section.

6.2.2. FOK of the participants.

Perhaps my most important conclusion related to the FOK my students possessed was that each and every student in this intervention (n=42) had at least some direct and indirect wildlife FOK that were relevant to the course and many of them had vast amounts. I have no reason to think this group of students was special in that regard. These students were not selected or advised into these sections for any reason other than this was a required class for graduation. The intervention focused mostly on the wildlife FOK students possessed but as the data was analyzed, there emerged a pattern of other FOK that were not only elicited, but pressed into service as well.

This result is not necessarily surprising, as I am merely concluding that it is rare for students taking a course in their given major to have little or no relevant FOK. However, taking this observation as a given challenges us, as instructors, to make the most of such a valuable resource.

In this study, the students demonstrated a wide range of FOK directly and indirectly related to wildlife. Students gained their experiences through jobs, recreational activities, and household practices. Some students had a wide range of FOK. Others had deep funds to draw on. Since all of the students in the intervention were Environmental majors, it is not surprising that their experiences outside of school match their chosen
area of study. The most important finding in this area was that the students represented a vast reservoir of information, often practical and available in compelling formats.

Students had a broad range of wildlife content knowledge. In my section of the course, six of the eight weeks are spent learning about individual species of mammals. Most of the species covered are found in New York State, while the others are charismatic megafauna of the Western States. There were very few of these discussions where I felt I had no student FOK to tap. Only the lessons related to the rarest of mammals lacked direct student FOK. Students had deep content about some common mammals such as white tail deer and gray squirrels. Therefore, most lessons allowed me the opportunity to build on student wildlife knowledge directly.

In addition to direct wildlife knowledge, students possessed skills related to wildlife such as hunting, attracting and observation. These FOK were evident for species that were commonly hunted or commonly encountered. Students also had skills that related to the controlling of wildlife pests such as trapping mice or keeping animals out of the garden. These skills also required direct wildlife knowledge and that knowledge proved to be valuable in the classroom.

I also found that students had vast amounts of indirect wildlife FOK. For example, a student might consider “camping” to be their practice, however in many cases participation in that activity requires knowledge of or leads to encounters with wildlife. In another case, a student shared that her family tapped maple trees to make syrup and the squirrels would chew through the sap lines. Although her FOK could be considered “maple sugaring”, she had developed knowledge related to wildlife as a by-product of her practice.
I was also able to document FOK that were not directly or indirectly related to wildlife but served to further the goals of the course. Students exhibited digital literacies when documenting their field assignment. Students used digital cameras (including one student that used digital video), word processors, and various software programs to create a final product in various formats. In addition, students exhibited communication skills in both large and small group settings to present information and teach their peers facts and techniques. Finally, students showed a wide array of popular culture FOK that was made central to the course through analogy.

**6.2.3. FOK activation techniques**

Uncovering strategies for activating FOK is one of the most important contributions of this intervention. Acknowledging that students have FOK is only the first step; encouraging them to capitalize on them in an academic setting is the applied value. In this study, students were allowed opportunities to activate their FOK in writing during the portfolio assignment, in small group activities, in large group discussion, spontaneously during a lecture and, in the case of some students with specialized FOK, during pre-planned student presentations. As previously discussed, each of these techniques had strengths and weaknesses so that a combined approach has the greatest chances of activating the largest amount of FOK in ways that effectively support student learning and identity development. Students who were reluctant to speak in front of the entire class had opportunities to participate in smaller groups of three or four as well as to activate their FOK directly during the out of class field assignment. I should also note that in this study I was specifically looking for explicit, identifiable evidence of activation of FOK. It is entirely plausible that a student could have remained silent but made mental
connections between their FOK and the materials being presented by myself or their peers. In essence, most of the examples I presented of FOK activation can be thought of as the case study for that particular FOK and all the other students that held similar FOK could apply and activate their own FOK without ever speaking up.

*Elicit and activate at the same time.* I used this technique often and usually when I wanted students to contribute only a small amount to the lesson. In this way, if no student possessed the FOK in question, I would provide it myself. It allowed the lesson to be flexible and required less outside planning on my part. Students were given the opportunity to share their FOK briefly as part of class lessons, allowing them the opportunity to engage directly with the material while also providing their classmates with a richer, “real life” narrative rather than simply a lecture from the teacher. This process, when genuine and organic, nurtures a sense of community within a class. It creates safe spaces for future sharing, broadening the resource base for all students far beyond the teacher, and holds the potential to nurture a more positive academic identity for participating students. So the application of FOK during a class through sharing of information became a way to activate the FOK in the sharing student(s) directly, a vehicle to teach information to students that did not possess the same FOK as the sharer(s) and a way to model FOK activation for those that did have similar FOK but chose not to share.

*Pre-planned student presentations.* On two occasions during the eight weeks, I solicited student volunteers to present on two direct wildlife skills that were uncommon among the students in the intervention. In the first instance, I had volunteers describe what trail cameras were and projected images they provided from their own cameras. In the second
instance, two volunteers discussed muskrat trapping while showing the class the traps one would use during this activity. Both pre-planned lessons shared many common characteristics. In both cases, the activities the students were describing were not commonly practiced among their fellow students. Secondly, I provided little structure to the students before the presentation. I simply asked them to speak to their experiences however they were comfortable and we would ask questions as a class. Third, each of the presentations involved artifacts. The projected images and the traps added a concrete element to the presentation that helped the listeners visualize what was being described, as well as helped the presenters focus their energies on the task at hand. If the conversation started to lag, I could always advance to the next image or pick up a different trap and ask about it. Finally, in both instances I allowed the students to present right from their seats rather than standing in front of the class or otherwise re-arranging the classroom. I believe this made the students more comfortable, but it also sent the message that the “expert” didn’t have to be the one standing in the front of the room. When other students participated from their seats in a more unplanned way during a lesson, they were doing so in a very similar way as the few students that gave pre-planned presentations because of the rare FOK they had to share. Therefore, it was not just a way of making the speaker feel comfortable, it was a technique that helped remove real or perceived hierarchies.

Large group presentations. The sharing of information among the class became a powerful tool. Student story-tellers contributed meaningful information to the class. Although there were numerous examples of students as narrators, the large group discussions of pets appeared to be the richest. The transcripts and my teacher log entries
for the large group presentations focusing on students’ dogs and cats revealed that the passion these students felt for their pets came out in class when they were allowed to share not just images of these animals, but stories about their behaviors and interactions. I was fortunate to find a subject that was both dearly regarded and universally practiced. The results of the survey indicated that literally every student in the class had either a dog or cat as a pet. Students were asked to provide photos of their pets and I created a visual presentation that was specific to each class section, so each photo shown on the screen was of a pet whose owner was in the room. These artifacts were literally a glimpse into the homes of the students and their narrative further explained the home practices surrounding their pet ownership. Likewise, the students that presented to the classes on the technique of using a trail camera provided their own pictures to supplement their presentation. We were all able to take a virtual journey into these student’s personal lives. Although these are not substitutes for a home visit, they clearly serve the same purpose: to uncover the beneficial ways others undertake individual and household practices.

In summary, I think the commonality of practice of pet ownership among the students was a large part of the success of this technique; however the use of student-provided artifacts was also important. Hearing students speak about their pets while being able to see images of those very animals on the screen added a dimension to the effectiveness of this technique. As each student spoke about her/his pet, I asked questions to either clarify their statements, get at a particular facet of relationship that was important or simply because I was curious to learn more myself. Finally, for each species (dog and cat) I had prepared a summary slide of the FOK one could acquire from ownership that would be transferable to the goals of the course and used that as the last
projection for each discussion. In this way, connections with the subject matter of the course were made both as students spoke and as a review at the end.

*Small group activities.* I used small group tasks in situations where all or most students were able to contribute in meaningful ways, but not necessarily with deep FOK. Students collaborated during the intervention to complete assignments and since I chose topics where everyone had something to contribute, students were set up for success. I utilized two very different types of small group activities. One was designed as a consensus-building exercise where there was an ultimate right answer (revealed after each group made their conclusions). This allowed students to activate any relevant FOK they possessed while sometimes being challenged to explain or justify said FOK to other group members while reaching consensus. Students were also able to share knowledge that they were less than certain about.

The other instance where I utilized a small group activity was a more open-ended activity where students were able to contribute their personal experiences and begin to make connections about what they had experienced and the relevance of those experiences to the course goals. This allowed students the opportunity to begin building of a personal narrative when the small groups shared out with the class as a whole. I was able to assist students in activating their FOK by asking questions and explaining the significance of experiences as they related to class goals.

As stated previously, there seemed to be some perception of the small groups as safe space, so consideration of how to structure the activity should also include the collegial atmosphere previously described.
Field assignment. Another technique used to activate FOK was the authentic field assignment. This technique was discussed previously as it both elicited and activated FOK. Specifically, this assignment addressed some of the core objectives of the course, namely the ability to identify mammal species and their sign in the field. I believe one of the keys to the success of this strategy was that it was a meaningful assignment that provided instant application to the course. Some students were able to relate their encounters to the rest of the class and thereby activate new FOK. As an elicitation technique, I described this as a smaller version of a home visit; a window into the students’ lives. As an activation technique, this activity allowed students’ current practices to serve as the vehicle for completing a college level assignment. I am unable to find a more direct way of using FOK than this. In my review of the literature, it is clear that FOK as a pedagogical technique is not intended to replicate practices like carpentry, but rather to draw on the skills and bodies of knowledge one learns while engaged in that practice. The same was true for the authentic assignment I devised for this course. For example, the goal was not to teach students to be hunters, but rather to capitalize on the skills and bodies of knowledge one would develop as a hunter. Therefore, the students who hunted in class could transfer the skills of animal detection and identification to the assignment directly. I believe this technique was extremely important to the individual students as a way of validating their practices.

6.2.5. New practices

Evidence showing that the intervention led students to show an interest in or actually begin new practices was plentiful. This finding in itself is a measure of success of the intervention. It may be concluded that students saw value in the practices of their
peers and chose to emulate them in order to gain that value. In addition, since the practices were validated in an educational setting, one may conclude that the students saw value beyond just enjoyment, but rather they saw the academic value as well.

6.3 Contributions of the Study

I am pleased to conclude that this study has made some significant contributions to the published research on FOK. First, I present the theoretical contributions related to the revised definition of FOK I utilized for this intervention, the implications of a FOK study without home visits as that relates to recommendations presented in the literature regarding elements of a successful FOK study and my decision not to redefine the activated FOK as Cultural Capital. Next, I present the ways this dissertation extends the literature on FOK to new populations, followed by methodological contributions to the literature organized around my five research questions. Finally, I provide practical recommendations for other practitioners wishing to utilize a FOK approach to teaching.

6.3.1. Theoretical contributions

Looking back, I believe a key component of the success of this intervention occurred in the planning stage when I operationalized the definition of FOK to include skills and bodies of knowledge “beneficial for” rather than strictly “essential for” individual and household functioning and well being. This freed me from worrying about meeting the very high standard of documenting that something was “essential” while still adhering to the intent of the theoretical framework of FOK. I did not have to spend time arguing that using trail cameras or trapping or participating in Civil War re-enactments
were essential activities, but rather let them speak for themselves in terms of the beneficial value they brought to the practitioners’ households. Simply being activities they enjoyed was enough. Perhaps this new definition will assist in expanding the acceptance of FOK as a theoretical framework in educational settings that are currently underrepresented in the literature (e.g. college classrooms, high schools, non-traditional classrooms).

An additional contribution to the theory of FOK is a revision to the recommended elements of a FOK project. Gonzalez, et al. (2005) proposed a list of four minimal conditions for a successful FOK project:

1. Theoretical preparation of the teacher/researcher.
2. Home visits as participant observers.
3. Study groups to discuss, reflect and analyze the home visits.
4. Voluntary participation by teachers.

I propose a modification of this list based on the results of my study. I did not find it necessary to conduct home visit in order to conduct a successful FOK study. I believe the key element was not the home visit itself, but rather an awareness of and appreciation for the ways the households functioned. Home visits are simply not practical for many teachers, especially college instructors, as outlined earlier in this document. My students were able to speak for themselves and provide insights into the practices of their households that proved adequate reflections of the FOK they possessed. However, I needed to have the same mindset as those teacher/researchers that did visit homes however and that was one in which I valued the practices of my students.
Therefore, I would recommend to those wishing to conduct their own FOK project, they amend the second condition to read: “Elicit household or individual practices relevant to the project.” In this way, home visits are not precluded but they are no longer considered essential to the success of a FOK project. The teacher still acts as “participant observer” however without visiting the home they may be considered virtual observers as they visualize what practices might look like after hearing what their students had to say or reading what they report. Remember, the original first condition is still in effect (as are the last two), so that there is no change in the philosophy that there is value in the way others maintain their household functioning. I am simply suggesting that a teacher or researcher need not witness said practices first-hand in order to deem them valuable or further, to incorporate them into a classroom.

Finally, I believe my decision to use the theoretical framework of FOK alone rather than in conjunction with Cultural Capital (CC) or using CC alone is significant. I do not believe it is my goal as a researcher to make FOK “extinct” by recognizing their significance, activating them and therefore “transforming” them into CC. Rather, my goal was to show the value of the specific FOK my students had and therefore the value in the way I thought about them and their practices. Turning FOK into CC feels like a form of replication of (and often unfair) ways of thinking. Valuing FOK and celebrating that value feels like a new way of viewing the world. I helped my students “cash in” some of their funds not “exchange them” for a different currency altogether. Re-framing FOK into CC after the FOK were used in a college classroom makes it seem as if FOK they possessed didn’t have value until they were exchanged.

6.3.2. Extending the literature
In my review of the literature, I was unable to find any other studies involving FOK of college students. This study, then, may be the first to document the rich and diverse FOK that college students bring to bear in a college course. These FOK were readily elicited and proved to be of great value throughout the course. Some students only had shallow pools of FOK to draw from while others had deep reservoirs that were dipped into again and again to the benefit of the entire class, not just those with the FOK. These results should be encouraging to other practitioners as there was nothing extraordinary about the students in my study. In fact, many of them were from backgrounds that others may perceive of as lacking. Some of my students were from rural homes and went to high school in small districts with fewer course opportunities. Several of the students were first-generation college students. One had already failed out of a large four-year institution. In short, they were exactly like most other community college students; therefore there is no reason to conclude that these results are atypical.

Because of the demographics of the college where the intervention took place, this study was comprised of a largely (if not entirely) White population. The majority of FOK studies in the literature are of student populations that are largely non-White. Race aside, many of the students in the intervention did not come from a privileged background and were ideal candidates for a FOK approach.

6.3.3. Methodological contributions

*Research Question One: What are effective strategies for eliciting FOK that may be generalized to the practices of other college instructors?* In previous studies, the main vehicle for eliciting FOK was home visitation. Although this method proved successful, it was also time consuming. I took advantage of the fact that my students were old enough
to report on their FOK themselves. In addition, I targeted specific kinds of FOK, mostly
direct and indirect wildlife FOK. These elicitation methods certainly couldn’t be counted
on to uncover all FOK a student possessed, but neither would home visits.

I used a survey as the main tool for eliciting FOK. The survey was designed to
measure mostly the direct and indirect FOK students had gained regarding wildlife, the
subject of the course. Anyone wishing to survey their own students would do well to
begin by conceiving of the FOK that would be most directly relevant to the subject matter
and work from there.

I also elicited FOK through direct, targeted questioning of students. This method
worked well, although the literature led me to believe that students may be reluctant to
share information. I did find that to be true for some of my students, but I believe a large
part of the success of this method lied in the fostering of a collegial atmosphere.
Practitioners wishing to engage students about their FOK in class should consider
creating a safe space as a priority as well. Also, the types of questions asked may be
important as well. I chose questions that could be answered quickly by the students and
did not require a large amount of expertise. Student voices were welcomed even when the
funds they had to share were small.

Finally, I discovered FOK in my students through a field assignment that allowed
students to access their FOK directly. This assignment was similar to other researcher’s
techniques such as home visits or writing projects that allowed students to choose the
topic. My project had enough structure to ensure that students were going to be working
towards course goals as they worked on the assignment, yet enough flexibility that they
could take advantage of their FOK as they wished. Therefore, this technique served as a way to activate FOK as well.

The advantage of my methods is their broad applicability. “Lack of time” on the teacher’s part is no longer an adequate reason for ignoring the FOK of students.

With that said, I must admit to not covering all of the material that I normally would in the wildlife section of the course due to lack of time. However, some of that was due to the newness of the technique for me, making it difficult to anticipate time needs as well as I will in the future. A large part of that was also due to the exploratory nature of an intervention being completed as research, perhaps especially one being conducted as part of a doctoral program.

Research Question Two: What relevant FOK do students bring to this class? Although I could not find any other studies that measured FOK in college students, it is not surprising that they had a wealth of relevant FOK. After all, these were environmental majors in a required course. I uncovered more FOK than I was able to activate in the eight-week intervention. The breadth and depth of FOK found is a testament to the effectiveness of the elicitation methods. I believe the FOK found in this study are instructive to other practitioners in several ways. First, This is one of the first studies to systematically document the FOK college students had that were relevant to a specific college course. Second, instructors of similar courses can draw on these examples directly to inform their own practice since their students may have similar FOK. Finally, college instructors in other disciplines may be encouraged to try their own FOK project within their own class based on the encouraging results found here. I had no indication that these students did not possess relevant FOK in other subjects.
Research Question Four: What are effective strategies for activating FOK that may be generalized to the practices of other college instructors? The frequency of FOK activation in this study was higher than I had expected, with literally every single class session having at least one, and sometimes several, instances of activation. In fact, far more relevant FOK were elicited than were activated. The strategies I used worked. I believe this is a significant contribution as these techniques are not unique to my discipline and therefore could be transferred to the practices of others. In addition, I do not think they should be considered applicable only at the college level. As a former middle and high school teacher, I can certainly envision these techniques being used at those levels and perhaps even with younger students as well. I believe these techniques represent a significant contribution to the field of FOK, as much has been written about the difficulties of incorporating FOK due to a lack of time.

The techniques I used for activation, discussed in greater detail in Chapter Four and earlier in this Chapter, drew upon the work of previous researchers. For example, relatives of young students have been employed as guest speakers. In this study, I was able to let my older students speak for themselves. Others used writing assignments that drew on the home, as I allowed students to do in their field assignment. The lessons became dynamic and unpredictable at times. As Moll and colleagues (1992) predicted, classroom would be richer when FOK were tapped as opposed to a traditional “rote-like” instruction students commonly face.

Research Question Five: What evidence was there that students took up new practices due to the intervention? Finally, no other FOK study I found looked for this behavioral change. Therefore, this becomes a starting point for other researchers to explore similar
evidence of the success of their interventions. The fact that students began to see
themselves taking up new practices is a significant indication of the impact of this work.

6.3.4. Practical recommendations for other practitioners

Perhaps the best way to frame recommendations for other practitioners is to
remember/acknowledge that no two groups of students will have the same FOK. For
example, in this study, there were some similarities between the two classes and I did
capitalize on that fact by constructing a lesson around the nearly universal practice of dog
ownership among my students, however I did not shy away from activating FOK that
were only found in one section or the other. For example, the trapping presentation was
only given to a single section as no students in the other section had similar FOK. I
minimally changed the lesson plans from one section to the other. Rather, the learning
objectives remained the same and when possible, the expertise in the room was tapped.
When no student FOK was available to activate, I was capable and competent in
providing the information myself. In fact, there was enough FOK elicited that I had some
to draw on and activate in every class session, however the FOK activated were not
always the same as the ones in the other section of the same lesson. Therefore, the
suggestions I give are generalizable, not only to different teaching situations, but from
section to section and year to year to accommodate this expected variation in available
FOK. I suggest these solutions to the following scenarios:

1. When a FOK is rare, consider asking the students who possess that FOK to
   present to the class. Allow the students to remain in their seats if they choose for their
   comfort and for the development of the expectation that meaningful contributions can
   come from anywhere in the room.
2. When a FOK is common, consider whether a whole group discussion or a small group activity is warranted. Small group activities work well when everyone can contribute, but the contributions may be small or shallow. Being in a small group may allow the student to feel more comfortable sharing his/her contribution rather than worrying about its value. Having each group share some of their work with the rest of the class is a way to disseminate the information from the smaller groups to the class as a whole. Whole-group discussions worked well when students had more confidence or passion about a subject.

3. When content or skills are central to the course, utilize pre-planned discussions where students present their FOK to the class. Artifacts or images proved to be helpful to the students in telling their stories. These main FOK will be referred to in the course numerous times, so having the information come directly from peers instead of just from the instructor can have a significant value.

4. To introduce a new unit and thus to assess prior knowledge, use small group activities. These have the advantage of allowing greater participation for each individual and less anxiety for those that may not be able to contribute as much to the conversation.

5. Allow students to personalize their FOK sharing. Certainly, having students speak in their own voice is a great start, but consider if there are ways to take this further. For example, in the trail camera presentation as well as the pet discussion, students were encouraged to bring in their own artifacts in the form of digital images. There is almost an endless variety of artifacts one could press into service.

6. Allow current students to help modify surveys or other elicitation tools for the next students. This may not only provide great insights, but invests the students in ways
that may benefit them for the remainder of the course. By allowing them to think deeply about the FOK that would be valuable for the course, they can make additional connections regarding their own FOK.

7. Once FOK are elicited, quickly key in on several important or interesting facets and move on. I found that I have so much to draw from that at first I felt overwhelmed. I was worried (as a teacher and as a researcher) that because I had elicited a FOK, it was my obligation to then activate it. But that would have proved impossible. In an eight-week section, there was not enough time to have done much more than we did. Keeping lessons fluid and spontaneous was far more exciting for the students and I than the rigid structure I had envisioned before the study began.

8. There is a balance between eliciting the breadth and the depth of FOK. I suspect that there is no “right answer” but that there certainly are some wrong ones. I found that once I knew the breadth of student experiences, I could choose which ones I wanted to know more about and which I didn’t need to. Knowing more is almost always beneficial, but perhaps not cost effective in terms of the time and energy one has available for any particular course.

6.4 Limitations of the Study

One limitation of the study was the setting. This study took place with Environmental majors at a community college. About half of the students in the study were pursuing an Associate’s in Applied Science (AAS) degree, making it easier to find a course that valued “practical” or “applied” skills. This was a core class required of all Environmental majors. These students have already self-selected by their interests and experiences. Perhaps these factors contributed to the ease at which a FOK approach
worked so well and it would be less effective in other subjects (such as required courses outside of the major or subjects of a more abstract nature). Another limitation was the length of the intervention. The wildlife unit of this course consists of 23 class periods that are 50 minutes in length, or 19 hours of total instructional time. That includes all of the time available for in-class assignments, administering tests, recording attendance, transitions from one activity or unit to another, and all the other aspects common in a classroom. I feel that if I had an entire semester, I could have shown more results.

Another potential limitation of the study is the level of familiarity I had with the subject matter in this course; a familiarity that may not be shared by other practitioners thereby limiting the applicability of this work. I am unsure how much weight to place on my expert knowledge to the success of the elicitation and activation techniques employed. I am tempted to conclude that these techniques would work for anyone; however more research would have to be completed for me to have substantial evidence to back up that claim.

Perhaps the greatest limitation to this study was the lack of any direct measure of the impact of FOK on student learning or performance. Did the intervention help students meet course goals?

6.5 Future Research

Based on the results of this study and the limitations identified above, I present here some areas for future FOK study.

First, as stated in section 6.4, this study did not attempt to measure the impact of FOK elicitation and activation directly. I found that to be the case in most of the published studies. This is no coincidence, as this outcome is difficult to measure. However,
documenting the value of a FOK teaching approach would address an important gap in
the literature and help to encourage more instructors to try out this approach.

Second, written student comments at the end-of-semester discussion revealed that
some felt that they had no FOK and/or they were not the type of person to share in class.
Despite my best efforts, I realized that there were still students that felt they had nothing
to contribute or were inhibited from contributing for whatever reason. Researching ways
to incorporate those individuals and explicitly nurturing a self-image that allows them to
recognize their valuable role as an active participant could prove valuable.

In a related question, I wonder how much FOK activation is taking place that is
not readily visible to the teacher or perhaps even to the individual student. All of the
measures I used of FOK utilization were ones I could directly witness, either through
class participation in some way or through their written work on the portfolio. How many
students activated their FOK by making conscious connections to the class without ever
revealing them? Are there instances of FOK being activated that the students are not even
consciously aware of? If so, how would one go about measuring that?

Finally, I believe it is important to discover how a broader range of FOK can be
elicited and activated in a college classroom. As mentioned above, not every course may
lend itself so nicely to the targeted FOK elicitation that I was able to take advantage of.
However other instructors may be able to utilize cultural or popular FOK to their
students’ advantage. The potential benefits of a FOK approach, where no one is viewed
through the lens of a deficit model, are great enough to warrant a closer look.

6.6 Concluding Thoughts
This study provided me the opportunity to gain insights that will improve my practice, not only in the particular course used for the intervention, but within my entire teaching load. Utilizing the FOK that my students brought to the classroom changed the course in ways that were obvious to me because of my insider status. After 16 years of teaching the class, I believe I have found ways to make major improvements to the quality of the educational experience. Taking the time to systematically investigate how to uncover and utilize relevant FOK provided new perspectives on the wealth of skills and knowledge adult students have and how these mostly non-academic acquisitions can contribute to a richer learning environment. These insights should prove valuable to others as well, especially other members of my department who serve the same population in similar courses.
References


Practices in households, communities, and classrooms (pp. 143-151).
Mahwah, NJ: Erlbaum.


Appendices

A.1. CON 102 Syllabus

CON 102 WILDLIFE SECTION 2009
John Van Niel B-200  (585) 394-3500 ext. 7254
vanniejj@flcc.edu

Although this section is entitled "wildlife", class time will be devoted almost exclusively to mammals. We will focus on local mammals and other significant North American mammals as time allows. You are expected to learn how to identify the animal by its pelt and skull and to a lesser extent track and scat. In addition, we will cover the life history of each animal in some detail.

Required texts: Stoke’s Guide to Animal Tracking and Behavior AND Mountain States Mammals (at the bookstore)
Recommended: Animal Tracks

Other requirements:
1. Practice Time: You should spend time practicing identifying animals and their sign by reading and spending time in the field. I fully expect you to review the skull identification techniques using the skulls in the display case.
2. Portfolio: See handout for specifics
3. Tests: A midterm and a final will be given for the wildlife section. No material covered in the fish section will be included.
4. Grading: 25% midterm, 35% portfolio, 40% final

WEEK OF:                  TOPIC                   READING
Oct 26      Introduction to mammals         Handouts
            Characteristics and habits         Stokes:
            opossum,

Nov 2       Marsupials,                        Handouts, Stokes:
            Insectivores, bats
Nov 9    Rodents                    Stokes: “squirrels”, beaver
Nov 16   Rodents, Lagomorphs,      Stokes: Other Rodents “rabbits/hares”
         MIDTERM, PORTFOLIO I
Nov 23   Canids, Felids,            Stokes: “dogs, cats”
Nov 30   bears, coons, weasels      Stokes: bear, raccoon, All “weasels”

Dec 7    Artiodactyla               Stokes: Whitetail, Moose
Dec 14   Artiodactyla, FINAL, PORTFOLIO II None

**If you are absent for the midterm or final, I expect to be called at ext. 7254 before the test or immediately after. You must make up the exam within 24 hours unless you make special arrangements with me. Points will be deducted after 24 hours for those not following these instructions and will be deducted every day thereafter. Also, College Code of Conduct policies apply for classroom behavior.

Grade scale: A= 94-100% A- 90-93% B+ 87-89%  B 84-86%  B- 80-83%  
C+ 77-79%  C 74-76%  C- 70-73%  D+ 67-69%  D 64-66%  D-60-63%  
F= 59% and below.
REMEMBER!! Your final grade for the COURSE will be an average of the Fish section and the Wildlife section.
A.2. Field Assignment for CON 102

CON 102: MAMMAL PORTFOLIO ASSIGNMENT (40 points) Fall 2009

Directions: Create a portfolio of observations of mammals and the signs they leave behind from the list provided. You may only use observations made from today until the due date. Please feel free to draw upon your previous experiences to enhance your portfolio, but you may not use a previous observation as a sole entry. You must have at least 3 sightings of live animals and at least 3 sightings of signs.

Document your personal sightings of the mammals and mammal signs on this list. Documentation can take several forms. As far as your grade is concerned, no form of documentation is preferred over another. Choose whatever form works best for you or the situation. But remember, quality is essential for your written work.

Your final portfolio may be submitted in a variety of forms. You may create an electronic version that is emailed to me, posted online or transferred to me via a CD or thumb drive. In that case, NO HARD COPY is required. If you chose to create your portfolio in non-electronic form, it can take the form of handwritten passages, photos, sketches or a combination of all of those. Again, I have no preference as to which you chose, just do quality work…

Grading:
- Each entry is worth up to 5 points.
- You may submit up to 10 entries.
- Each item on the checklist may be used only once. In other words, you may not submit multiple gray squirrel sightings. You can use those multiple sightings to make one very detailed entry to help ensure it earns you that 5 points.

5 points = an entry that is rich with detail and provides information of the actual sighting supplemented with information from the text or other reliable sources. Entry must include the date, time and a description of the environment of the encounter. A photo, sketch or detailed written description of the animal or sign is required documentation. The entry ends with two or more questions that the encounter left you wondering about.
3 points = an entry that is lacking in several of the details listed above. Student made little attempt to provide a detailed description of the encounter. Entry includes some of the following: date, time and description of the environment of the encounter. There is only a single source cited or unreliable sources are used to supplement the text. Photo, sketch or description lacks the detail needed to make a positive identification. The entry ends with only a single question of interest to the student.

1 points = an entry that is lacking in most areas. Photo, sketch or description is poor. No sources are used to enhance text. The entry does not include any questions for future study.

Additional information:
- You may work in groups, but each person must create and submit their own entries.
- Refer to the attached list for the animals and signs that are allowed for this assignment.
- Several species of mammals are found right on campus. See me for tips!
- DO NOT wait until the end of the semester!
- Some sightings will happen at odd times. Others will happen because you have planned them. Both of these are valuable. I am hoping this assignment will make you more conscious of the wildlife in your world when driving, walking or staring out the window. But I hope each of you takes the time to actually target some of these encounters (‘OK, I want to find a muskrat lodge. Where can I go to find that? The book says they like marshy areas with cattails. Oh! I know a good spot...').

Due dates:

Nov 20th: AT LEAST 4 entries are due.

Dec. 16th: NO MORE THAN 6 entries may be turned in.
Mammal Observation
Portfolio Entry # _________

Observation Title: ___________________________
Date of Observation: ____________ , 2009

Location of sighting:

Physical description of location:

Describe the sighting. Provide any photo or sketch documentation. Include measurements (time, distance, etc), details of the situation (what other senses besides sight did you use to collect data?), factual description of behaviors of animal (if a live sighting), etc.

Natural history. This section is a combination of your impressions of the sighting supplemented by two or more reliable sources. For example, for a live animal encounter, provide some interesting or biologically important facets of its natural history. Perhaps you can address some of the behavior you witnessed or what the animal may be doing at this time of year (breeding? emerging from hibernation? etc?). If this is a sighting of animal sign, provide the details of what the animal was doing to leave this sign. Perhaps you can address the importance of this to the animal’s life (How and why do beaver build dams? Why do squirrel tracks look the way they do? Why do voles make tunnels?).
For future study. What has this made you more curious about? What do you now want to know about this animal or sign?

Sources: Use at least two reliable sources for full credit. One may be your text.

Mammal Observation
Portfolio Entry # EXAMPLE #1

Observation Title: ___Striped Skunk__________
Date of Observation: __March 14__, 2009

Location of sighting: My backyard, Seneca Falls

Physical description of location: We have a fairly large mowed lawn in a rural area surrounded by brush and old fields. We have several bird feeders on the edge of our lawn and one really tall one in the center, mounted on a pole.

Describe the sighting. One night, I arrived home after teaching a night class and decided to fill the bird feeders. It was warmer than it had been in a while and I was enjoying being outside. In the moonlight, I had to stand on my toes to reach the top of the tallest feeder. My brain was slow to tell me that I was hearing a noise at my feet but I finally recognized that something was stamping on the ground. I looked down to see a bold white patch of fur and realized I had been standing almost on top of a striped skunk. He did not want to leave the seeds that the birds and squirrels had scattered. Startled, I jumped back and spilled the seeds all over him, me and the ground. I backed up about 20 feet and listened to him feed for a while. I could hear him chewing, making smacking sounds with his mouth.

Natural history. Although skunks do not hibernate, they use torpidity as a strategy. Torpidity is shorter than hibernation and the animal only lowers its body temperature and metabolism slightly (Whitaker and Hamilton, 1998) and the skunk I saw was taking advantage of one of the first evening we have had with above-freezing temperatures. Skunks breed in February and March (Stokes and Stokes, 1986) so perhaps this was a female that was already needing extra calories due to a pregnancy.
Skunks are omnivores and eat a variety of things such as insects, berries, carrion, fruit and bird seed. I was using black oil sunflower seed in this feeder. That seed is very high in calories and probably explained some of why the skunk was so hesitant to move from his spot!

The foot stomping of a skunk was new to me. What a great warning device! It reminded me of what I have been taught about the rattle of a rattlesnake… that it may have evolved to warn bison away from stepping on them. The skunk had every opportunity to spray me, but apparently wanted to warn me away instead. According to Stokes and Stokes (1986) and Whitaker and Hamilton (1998), it is the front feet that are stamped and they follow that with a backward shuffle.

For future study. What does spraying “cost” a skunk? Are they bothered by the smell themselves or is it hard to “reload”? Why didn’t I get sprayed? If I never did hear the skunk, would it have interpreted my staying there as defiance instead of ignorance? How many people have been sprayed because they own ipods? 😊


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Mammal Observation
Portfolio Entry # EXAMPLE 2

Observation Title: __Red Fox Den________
Date of Observation: __May 5th__, 2009

Location of sighting: My backyard, Seneca Falls

Physical description of location: We have a fairly large mowed lawn in a rural area surrounded by brush and old fields. This den is at the very edge of our yard in the brush.

Describe the sighting. We used to compost more regularly than we do. I built a small wire tube to hold the material. Woodchucks quickly built a tunnel system next to the composting operation and we would regularly see them leaving the pile and scurrying down the hole. I purchased a trail camera and wanted some woodchuck photos, so I set it out at the hole. Further, I baited the hole with some apple slices as I have read woodchucks like apples. I checked the camera a few days later and found the apples were still present (covered in ants) but the card in the camera was full. Who was I getting pictures of? Turns out that red fox had taken over this hole and had young! (How embarrassing that I had fox living a few feet from my back door and never knew it.)

Natural history. According to our Stokes book, red fox pups start leaving the den at 4-6 weeks of age. That would mean my pups were born in early April. Several books stated that red fox can dig their own dens but also use woodchuck burrows that they modify. Elbroch (2003) goes a step further and describes a study that was done that found red fox typically den within 100 yards of water. That was true in this case, as there are two ponds
within that range of the den. I know from personal experience that red fox will move their pups. Whitaker and Hamilton (1998) say it is because of disturbance, but an old timer once told me it was when the fleas and other parasites got to be too bad in the first den.

**For future study.** Do red fox move their dens because of external parasite loads? Whitaker and Hamilton say “By mid-June the young, now called ‘kits,’ are two-thirds the size of adults....” (p. 417). Why the name change? What is the history behind that? Who decided to call a dog a kit?

**Sources:** Elbroch, M. 2003. Mammal Tracks & Sign

**Mammals Check List F09**

Name______________________________

_____ Opossum:

_____ Shrew sp.

_____ Mole sp.:

____ Mole hill

_____ Bat sp.:

____ Guano (scat)

_____ E. Cottontail:

____ Track

____ Scat

_____ Beaver:

____ Dam

____ Lodge

____ Chewing

_____ Muskrat:

____ Lodge

_____ Porcupine

_____ Woodchuck:

____ Burrow

____ Whistle-stop

_____ Gray Squirrel:

____ Track

____ Drey

____ Call – chatter
Red Squirrel:
- Drey
- Call – chatter
- Larder – cones
- Midden

E. Chipmunk:
- Burrow
- Call

Flying Squirrel

Meadow Vole:
- Tunnel system
- Scat

White-footed Mouse

Norway Rat

House Mouse

Domestic Dog:
- Track

Coyote:
- Track
- Call

Red Fox:
- Track
- Scat
- Den

Gray Fox

House Cat:
- Track

Black Bear:
- Track
- Scat

River Otter:
- Toilet site
____ Mink:
    _____ Track
    _____ Scat

____ Weasel sp.

____ Striped Skunk

____ Raccoon:
    _____ Scat
    _____ Track

____ White-tailed Deer:
    _____ Track
    _____ Scat
    _____ Bed
    _____ Rub
    _____ Scrape
    _____ Vocalization
B.1. Pilot FOK Survey

The purpose of this survey is to identify skills or bodies of knowledge that are relevant to the goals of this course. I will be happy to clarify any of the statements in the survey or answer any other questions you may have.

Please answer each question as completely as you can.

1. Recreational activities. Please check all of the activities you have engaged in that may have led to wildlife experiences:
   ___ Scouts
   ___ FFA
   ___ Hiking
   ___ Camping
   ___ Bird watching
   ___ Canoeing
   ___ Visits to parks or other natural areas
   ___ Photography
   ___ Other (list): ____________________________________________________________

2. Pets. Please check all of the pet ownership and related activities you have practiced:
   ___ Owned a dog
   ___ Owned a cat
   ___ Owned a rabbit
   ___ Owned a hamster, guinea pig or other rodent
   ___ Owned a ferret
   ___ Cared for injured wildlife
   ___ Caught and kept bugs, tadpoles, frogs, snakes, etc.
   ___ Other pets (list):
   ___ Dealt with pet-wildlife interactions (dogs chasing squirrels, cats bringing home mice, etc): __________________________________________________________
3. Attracting wildlife. Please check all of the wildlife attracting and wildlife attracting related activities you have practiced:
   _____ Feeding birds
   _____ Feeding other wildlife
   _____ Erecting birdhouses
   _____ Erecting bat houses
   _____ Plantings for food or cover
   _____ Creating a water source (from a pond to a bird bath)
   _____ Land management techniques such as mowing or letting an area “go”
   _____ Other (describe): ______________________________________________________

4. Nuisance wildlife. Please check all of the wildlife control activities you have practiced:
   _____ Setting traps or poison for mice/rats
   _____ Dealing with unwanted feral or “barn” cats
   _____ Keeping animals out of the garden
   _____ Preventing birds from nesting in undesirable locations
   _____ Keeping animals out of garbage
   _____ Other (describe): ______________________________________________________

5. Farming. Please check all of the farming and farming related activities you have practiced:
   _____ Raised/tended livestock
   _____ Raised/tended crops
   _____ Responsible for nuisance animal control (predators, rodents, etc.)
   _____ Tractor or other equipment operation
   _____ Land management practices such as erosion or flood control, crop or herd rotation, land clearing, windrow planting, etc.
   _____ Christmas tree farming
   _____ Maple sugar processing
   _____ Firewood processing
   _____ Other (describe): ______________________________________________________

6. Fishing. Please check all of the fishing and fishing related activities you have practiced:
   _____ Ice fishing
   _____ Trolling
   _____ Fly fishing
   _____ Bow fishing
   _____ Fly tying
   _____ Clean fish
   _____ Prepare/eat fish
   _____ Catch and release
   _____ Other (describe): ______________________________________________________

7. Hunting. Please check all of the hunting and hunting related activities you have practiced:
____ Deer hunting (firearm)
____ Deer hunting (archery)
____ Turkey hunting
____ Waterfowl hunting
____ Small game hunting (list species): _____________________________________
____ Pre/Post-season scouting
____ Trail camera usage
____ Quality Deer Management techniques
____ Land enhancement including food plots, plantings, mowing, etc.
____ Shed hunting
____ Processing game
____ Preparing/Eating game
____ Other (describe): ___________________________________________________

8. Trapping. Please check all of the trapping and trapping related activities you have practiced:
____ Nuisance trapping
____ Furbearer trapping to target:
   ____ Muskrat  ____ Beaver  ____ Mink  ____ Coyote  ____ Fox
   ____ Other (list):
____ Pre-season scouting
____ Skinning animals
____ Tanning hides
____ Selling furs
____ Other (describe):

9. TV, internet and other media. Please check all of the media you have used to gain knowledge about animals:

____ Television shows like Nova, National Geographic, etc.
____ Movies
____ Internet sites
____ Magazines
____ Other (describe):

10. Human resources. Who have you learned animal information from?

____ Parents
____ Siblings
____ Grandparents
____ Other relatives
____ Friends
____ Teachers
11. In addition to learning about the animals themselves, we will learn how they are organized and sorted. Do you have any of the following organizing experiences?

Collections of:

_____ cards (sports, etc)  _____ stamps or coins  _____ comic books
_____ other collections (describe): __________________________________

Have you ever had a job that required you to sort or organize? If so, please describe:
____________________________________________________________________

B.2. Discussion Group Questions for initial two meetings (including follow up questions)

The purpose of this discussion is to explore further the skills and bodies of knowledge you possess related to animals that is relevant to this course. I will refer to some of the answers you gave on the survey as well as ask you new questions today. I would also like to remind you that participation in this session is voluntary and you may chose to not answer any question or opt out of the study at any time. Choosing not to participate in the discussion group or any part of it will in no way affect other aspects of your participation in this course including your grade.

1. Take a few minutes to walk around the room and look at the items on the tables. I am going to ask to talk about a few of the ones that you are familiar with because of your recreational or occupational activities. While walking around, use this paper and pencil to write yourself some notes about any memories or impressions these items arouse in you.

List of artifacts for the initial discussion group

- Large set of deer antlers
- John Deere and Farmall paraphernalia
- Boy and Girl Scout manuals for wildlife merit badges
- Binoculars
- Traps (one commonly used to trap furbearers and one commonly used to trap nuisance animals)
- Horse tack
- Bird feeders (including one “squirrel-proof” feeder)
- Various skulls and furs of animals
- Brochures from the Seneca Park Zoo
- Baseball cards
- Photos of animals
- Hunting, fishing and trapping magazines
- Bird houses
- Canoe paddle
• Camping gear
• Hiking boots
• Casts of animal tracks (from the college collection)

2. Now that you have had a chance to view the items, let me ask you to share some activities that you have engaged in that involved wild or domestic animals. What items in the room have you used for activities involving wild or domestic animals? Are there items that you have used for _____ that are not in this room?

3. Some of you indicated on your survey that you hunt. Tell us about what you hunt and how long you have been doing that. What items in this room have you used when you hunt? Are there items that you have used for _____ that are not in this room?

Follow up: What do you do with the animals once you harvest them?

Follow up: Do you spend a lot of time scouting?

4. I would like to ask you all about the pets you have or have had in the past. I want to hear about anything from dogs and cats to goldfish to tadpoles or insects you may have had for even a little while. What were your responsibilities in relation to your pets?

5. Some of you indicated that you trap. What do you need to know in order to be a “successful” trapper? 
Follow up: What do you do with the furs?

6. For those of you with bird feeders, how do you deal with squirrels or other animals at the feeders?

7. Some of you indicated you have farming experience. Tell us about that experience. What kind of farm? What animals did you raise? What were/are your duties/chores?

8. Can any of you think of things that you have been taught about animals from either family or friends that has had an impact on you? For example, my mom has been afraid of cats ever since she was in fifth grade. I have heard the story of the cat that leaped out of a tree and attacked her while she was on the way to school many times. So I grew up being told that cats were not to be trusted. My example was a negative one, but your experiences could be positive.

9. Are there any experiences you can think of that you engage in that bring you in contact with animals that we haven’t already mentioned?

Follow up: For those of you that like to camp or hike, have you had encounters with wildlife that have taught you things? What items in this room do you use when you camp or hike? Are there items that you have used for _____ that are not in this room?
Follow up: What about other animal experiences? Does anyone regularly visit the zoo or ride horses? Describe what these experiences have been like for you.

10. Do any of you make it a habit of learning about wildlife from media like TV, magazines or the internet? How so? What have you learned about wildlife from media?

11. We are going to spend some time learning how mammals are organized and classified based on their characteristics. What experiences do you have organizing or cataloging things? Maybe you collect something or had a job where you were required to sort things.

12. Are there any other animal experiences you have had that you can think of that have not been covered yet?
13. Some of you have revealed FOK that you did not describe in the written survey. What, if anything, could I have asked you on the survey that would have invited you to share this FOK through the survey?
B.3. Questions for mid-course check point

CON 102: Introduction to Wildlife and Fish          Name:_____________
Fall 2009                                          Van Niel

You may recall that at the beginning of the semester, I gave you an information letter describing my doctoral research this semester regarding “funds of knowledge” (abbreviated FOK). Let me remind you of a few things about my study.

The formal definition of “funds of knowledge” is a skill or body of knowledge that is beneficial for individual or household functioning or well-being. Often, they are things that go unrecognized by teachers in most classes. My goal has been to uncover some of these skills and knowledge you have that can be useful for understanding the concepts taught in this class. You all filled out a survey for me that helped me understand some of your previous experiences and I have tried to foster student participation in class as well so we can all learn from each other.

For the remainder of the semester, I would like to try several other ideas that I have as well as ask for your help in thinking of other ways I can use the FOK you and your classmates have. Below are a few questions that can help me both as a researcher and as the teacher of this course. Please take a few moments over the break and answer the following:

1. Can you remember any examples of students sharing their skills or knowledge in class so far? If so, please list a few specific examples that come to mind:

2. Do you have any suggestions as to how I can utilize the previous experiences you and my other students bring to the course? All suggestions are welcome!
3. We still have all the rodents (beaver, porcupine, muskrat, woodchuck and the other squirrels, mice and rats), Carnivora (cat family, dog family, bears, raccoon, weasel family, skunk) and the hoofed mammals (deer family, bison, bighorn mountain goat, pronghorn) to cover!!

Do you personally have any experiences or knowledge with any of these species that you would like to share with me and perhaps the class? I may not be able to use everyone for every thing they list, but will try my best. Be specific please.

**B.4. Questions for in-class discussion group**

A. This semester, many of your classmates have shared personal experiences relating to wildlife or animals. Have any of these stories inspired you to try and gain any similar experiences yourself?

B. There are a few instances in class this semester where the discussion seemed particularly interesting. One was when ______ shared ______________. What kind of an impact did that have on your understanding of the material?

C. What did you like most about sharing experiences among classmates? What was most helpful for the course goals?

D. What did you like least about sharing experiences among classmates? What was least helpful for the course goals?

E. Do you have any specific suggestions for me in regards to future class use of funds of knowledge?
### B.5. Written questions regarding new practices taken up during the intervention (as part of Portfolio Assignment Evaluation)

Please list any new practices you have started during the semester that relate to wildlife (For example, hunting, photography, tracking, etc). For each, please indicate what has motivated you to try the new practice.

<table>
<thead>
<tr>
<th>Description of new practice:</th>
<th>Motivation for trying new practice:</th>
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<tbody>
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</tbody>
</table>
B.6. Teacher Log prompts

A. Were there any FOK elicited outside of the survey, classroom, or Discussion Groups? If so, list the FOK and describe the circumstances in which it was discovered including the context of the encounter, who initiated the conversation, how the FOK was communicated and any other details that may seem relevant to explaining how this FOK was missed during the survey. Finally, discuss how this encounter may have an impact on the survey development for the future.

B. What new FOK were elicited today? (during the 8-week wildlife section)

C. What was the process by which I elicited each FOK today? (during the 8-week wildlife section)

D. What strategies were effective today in eliciting FOK in my students? (during the 8-week wildlife section)

E. What FOK were used in class today? (during the 8-week wildlife section)

F. What strategies were effective today in activating FOK in my students? (during the 8-week wildlife section)

G. What were the processes by which I activated FOK today? (during the 8-week wildlife section)

H. What new practice acquisitions were revealed today, and how? (during the 8-week wildlife section)

I. What other interesting things happened relevant to this intervention?
B.7. Revised FOK Survey

CON 102: Introduction to Wildlife and Fish Name___________________
Funds of Knowledge Survey (revised) Fall 2009

The purpose of this survey is to identify skills or bodies of knowledge that are relevant to the goals of this course. I will be happy to clarify any of the statements in the survey or answer any other questions you may have.

Please answer each question as completely as you can.

1. Pets. Please check all of the pet ownership and related activities you have practiced:
   ____ Owned a dog    ____ Owned a cat
   ____ Owned a rabbit  ____ Owned a hamster, guinea pig or other rodent
   ____ Owned a ferret
   ____ Cared for injured wildlife
   ____ Caught and kept bugs, tadpoles, frogs, snakes, etc.
   ____ Other pets (list):
   ____ Dealt with pet-wildlife interactions (dogs chasing squirrels, cats bringing home mice, etc):

2. Attracting wildlife. Please check all of the wildlife attracting and wildlife attracting related activities you have practiced:
   ____ Feeding birds    ____ Feeding other wildlife
   ____ Erecting birdhouses  ____ Erecting bat houses
   ____ Plantings for food or cover
   ____ Creating a water source (from a pond to a bird bath)
   ____ Land management techniques such as mowing or letting an area “go”
   ____ Other (describe):

3. Fishing. Please check all of the fishing and fishing related activities you have practiced:
   ____ Ice fishing  ____ Trolling
   ____ Fly fishing  ____ Bow fishing
206

4. **Trapping.** Please check all of the trapping and trapping related activities you have practiced:

- Nuisance trapping
- Furbearer trapping to target:
  - Muskrat
  - Beaver
  - Mink
  - Coyote
  - Fox
  - Other (list):
- Pre-season scouting
- Skinning animals
- Tanning hides
- Selling furs
- Other (describe):

5. **Hunting.** Please check all of the hunting and hunting related activities you have practiced:

- Deer hunting (firearm)
- Deer hunting (archery)
- Turkey hunting
- Waterfowl hunting
- Small game hunting:
  - Squirrel
  - Rabbit
  - Pheasant
  - Other (list):
- Pre/Post-season scouting
- Shed hunting
- Trail camera usage
- Quality Deer Management techniques
- Land enhancement including food plots, plantings, mowing, etc.
- Processing game
- Preparing/Eating game
- Other (describe):

6. **Recreational activities.** Please check all of the other activities you have engaged in that have led to *wildlife experiences*:

- Scouts
- FFA
- Hiking
- Camping
- Bird watching
- Canoeing
- Visits to parks or other natural areas
- Photography
- Other (list):

7. **Nuisance wildlife.** Please note all of the wildlife control activities you have practiced:

- Setting traps or poison for mice/rats
- Dealing with unwanted feral or “barn” cats
- Keeping animals out of the garden
- Preventing birds from nesting in undesirable locations
- Keeping animals out of garbage
- Other (describe):

8. **Farming.** Please check all of the farming and farming related activities you have practiced:

- Raised/tended livestock
- Raised/tended crops
____ Responsible for nuisance animal control (predators, rodents, etc.)
____ Tractor or other equipment operation
____ Land management practices such as erosion or flood control, crop or herd rotation, land clearing, windrow planting, etc.
____ Christmas tree farming  ____ Maple sugar processing
____ Firewood processing
____ Other (describe): _______________________________________________________

9. TV, internet and other media. Please check all of the media you have used to gain knowledge about animals:

____ Television shows like Nova, National Geographic, etc.  
____ Movies  ____ Internet sites  ____ Magazines
____ Other (describe): _______________________________________________________

10. Human resources. Which of the following have taught you about wildlife?

____ Parents  ____ Siblings
____ Grandparents  ____ Other relatives
____ Friends  ____ Teachers
____ Other (describe): _______________________________________________________

11. In addition to learning about the animals themselves, we will learn how they are organized and sorted. Do you have any of the following organizing experiences?

Collections of:

____ cards (sports, etc)  ____ stamps or coins  ____ comic books
____ other collections (describe): _____________________________________________

Have you ever had a job that required you to sort or organize? If so, please describe:
____________________________________________________________________

12. Other

Do you have wildlife experience from places other than the Finger Lakes region of NY? If so, list where:
____________________________________________________________________
____________________________________________________________________
____________________________________________________________________
____________________________________________________________________
____________________________________________________________________
____________________________________________________________________
Which species of mammals do you have the most knowledge or experience with? List as many as you wish:
________________________________________________________________________
________________________________________________________________________
________________________________________________________________________
________________________________________________________________________

Of the activities listed in this survey, which would you say you have the most experience with? List as many as you wish:
________________________________________________________________________
________________________________________________________________________
________________________________________________________________________
________________________________________________________________________

THANK YOU!
C.1 Draft code book

A. How was FOK elicited?
   Phase 1:                  Phase 2:
   Survey                   Survey
   Artifacts                Artifacts (will display in classroom)
   Focus group discussion   In-class discussion
   Out-of-class discussion  OOC discussion
   Other                    Other

B. How was FOK incorporated?
   Phase 1:                  Phase 2:
   N/A                      Spotlighting
   Student volunteered FOK in class
                           -Emerging practice
                           -Existing FOK

C. What was the FOK?
   Phase 1 and 2:
   Skill
   Body of knowledge (BOK)
   JVN’s 9 potential FOK (H/F/T; Farm; Attracting Wildlife; Pest control; Pets;
   Family lore; Non-consumptive recreation; Media; Classification)
   Other
   Scouts or other group (FFA, BOCES)

   Current routine
   Past routine
   Recreation
   Livelihood

   Species specific
   Generalizable across species
### C.2 Overview of Data Collection and Analysis Design

<table>
<thead>
<tr>
<th>Research Question #1</th>
<th>Data Sources</th>
<th>Data Analysis</th>
<th>Prompts</th>
</tr>
</thead>
<tbody>
<tr>
<td>What are effective strategies for eliciting FOK that may be generalized to the practices of other college instructors?</td>
<td>Pilot Survey, Teacher Log, and Discussion Group Transcripts</td>
<td>These data sources served to inform the creation of the Revised Survey. The Pilot Survey was analyzed for its effectiveness as a tool for eliciting FOK. The Teacher Log was where I recorded a meta-discourse regarding the survey’s creation, distribution, administration and compilation in order to determine if this method would likely translate to the practices of others. Finally, the discussion group transcripts were analyzed and coded to determine if there were any categories missing from the survey.</td>
<td></td>
</tr>
<tr>
<td>Revised Survey</td>
<td>Revised Survey</td>
<td>-The Revised Survey became the actual elicitation method rather than the Pilot Survey</td>
<td></td>
</tr>
<tr>
<td>Teacher Log</td>
<td>-Coded for elicitation strategies</td>
<td>-Daily Prompt: “What were the processes by which I elicited each FOK today?”</td>
<td></td>
</tr>
<tr>
<td>Classroom Transcripts</td>
<td>-Coded for elicitation strategies</td>
<td>Daily Prompt: “What strategies were effective today in eliciting FOK in my students?”</td>
<td></td>
</tr>
<tr>
<td>Field Assignment</td>
<td>-The Field Assignment became an elicitation technique. FOK revealed and recorded.</td>
<td>Field Assignment Instructions</td>
<td></td>
</tr>
<tr>
<td>Research Question #2</td>
<td>Data Sources</td>
<td>Data Analysis</td>
<td>Prompts</td>
</tr>
<tr>
<td>----------------------</td>
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</tr>
</tbody>
</table>
| What relevant FOK do students bring to this class? | Revised survey | - Created a spreadsheet of FOK frequencies  
- Compiled skills and bodies of knowledge that were relevant to the course objectives  
- (essentially, the purpose of the survey was to determine what FOK the students possess. All students in CON 102-01 completed this survey) | Revised Survey |
| | Classroom Audio, Field Assignment and Teacher Journal | -Created a list of newly discovered FOK that were not assessed in the survey.  
- Compiled skills and bodies of knowledge that will be relevant to the course objectives via a table that matches students’ FOK with course content and objectives  
- (essentially, the purpose of these data sources is to continue to elicit FOK in a different format. This allowed me to compare what was learned from the Survey alone versus what was learned through discussion with students) | Daily prompt: What new FOK were elicited today? |

<table>
<thead>
<tr>
<th>Research Question #3</th>
<th>Data Sources</th>
<th>Data Analysis</th>
<th>Prompts</th>
</tr>
</thead>
</table>
| What were instances where FOK were activated in the course? | Classroom Transcripts and Field Assignment | -Classroom transcripts and the field assignment served as the primary data source for RQ3.  
- (essentially, the purpose of the classroom transcripts and field assignment were to show exactly when FOK were used throughout | Daily Prompt: What FOK were used in class today? |
<table>
<thead>
<tr>
<th>Section</th>
<th>Description</th>
</tr>
</thead>
</table>
| **Results of Mid-course Checkpoint** | - This data source will focus more on how the intervention is proceeding rather than serving to collect background information. This can be thought of as a formative evaluation.  
End product: list of student stories about how and when they saw FOK being utilized. This was used to help determine which activation examples had a greater impact on the students.  
-A copy of the questions I asked can be found in Appendix B.3  
-Participants will be asked to identify instances of FOK utilization so far in the class sessions.  
Participants will be asked to describe the impact of using these FOK in class. |
| **Transcript of In-class Discussion at the end of the semester (Sections 01 and 02)** | End product: list of student stories about how and when they saw FOK being utilized.  
Comparison of this list to my list from teacher notes  
Description of students’ perceptions of impact of utilization  
-This session served as more of a summative evaluation than the mid-course checkpoint.  
- (essentially, the purpose of this discussion was to obtain examples of FOK activation throughout the intervention.)  
-A copy of the questions I asked in this session can be found in Appendix B.4 |
| **Teacher Log** | - The Teacher Log is where I noted and discussed instances of FOK activation.  
Daily Prompt: “What FOK were used in class today?” |
<table>
<thead>
<tr>
<th>Research Question #4</th>
<th>Data Sources</th>
<th>Data Analysis</th>
<th>Prompts</th>
</tr>
</thead>
<tbody>
<tr>
<td>What are effective strategies for activating FOK that may be generalized to the practices of other college instructors?</td>
<td>Classroom Transcripts, In-class Discussion Group, and Teacher Log</td>
<td>-The transcripts served to show how FOK were activated during a class discussion. - (essentially, the classroom transcripts served as records of what was occurring in the classroom before, during and after the FOK were activated. The discussion group transcript allowed the students to describe in their own words some of what they felt made the FOK activation effective. Finally, the Teacher Log was a place where I could sort out the details of what was happening in the classroom. Analysis revealed conditions, trends or other factors that would lend themselves to being transferable to the practices of others.)</td>
<td>Daily Prompt: “What were the processes by which I activated FOK today?”</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Research Question #5</th>
<th>Data Sources</th>
<th>Data Analysis</th>
<th>Prompts</th>
</tr>
</thead>
<tbody>
<tr>
<td>What evidence was there that students took up new practices due to the intervention?</td>
<td>Field Assignment Evaluation</td>
<td>-Recorded instances of participants discussing new practices they were exploring due to the intervention; provided a brief narrative description</td>
<td>Daily Prompt: “What new practice acquisitions were revealed today, and how?”</td>
</tr>
</tbody>
</table>
### D. FOK Elicited Throughout the Intervention

<table>
<thead>
<tr>
<th>Main Topic</th>
<th>Direct or indirect wildlife FOK elicited:</th>
<th>Other FOK elicited</th>
</tr>
</thead>
<tbody>
<tr>
<td>Characteristics of Mammals</td>
<td>-knowledge of what defines a mammal&lt;br&gt; -young mammals drink milk</td>
<td>-Parenting skills (as a characteristic of mammals)</td>
</tr>
<tr>
<td>Orders and Families of Mammals</td>
<td>-knowledge of which animals are related to others&lt;br&gt; -Terms like carnivore, canine, feline, etc.</td>
<td>-knowledge of Ursa from astronomy&lt;br&gt; -categorization or organization FOK&lt;br&gt; -some Latin root words are familiar like “-dent” for teeth” or “–ivore” for “eat”</td>
</tr>
<tr>
<td>Feeding Strategies</td>
<td>-FOK related to what familiar animals eat</td>
<td>-familiarity with the term “Carne” from Latin or Spanish.</td>
</tr>
<tr>
<td>Locomotion Strategies</td>
<td>-FOK related to how familiar animals move or what habitats they use</td>
<td>-knew plantar warts are on the bottom of the foot&lt;br&gt; -knew dogs nails need to be groomed</td>
</tr>
<tr>
<td>Birthing Strategies</td>
<td>-knew some mammals have ouches while others lay eggs&lt;br&gt; -familiarity with gestation periods</td>
<td>-Easter references (Why do rabbits deliver eggs?)</td>
</tr>
<tr>
<td>Animal</td>
<td>Students' Experiences</td>
<td>References</td>
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<tr>
<td>Opossum</td>
<td>-students had experiences with dogs attacking opossums and opossums “playing dead”</td>
<td>-references to the movie “Over the Hedge” that featured opossum cartoon characters</td>
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<td>-students were familiar with opossum as a commonly killed animal on the road</td>
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<tr>
<td>Shrews and Moles</td>
<td>-some had experience with moles as a nuisance species and were familiar with mole traps and other removal techniques</td>
<td>-references to “The Taming of the Shrew” and the meaning of shrew in that work</td>
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<td></td>
<td>-many students shared a misconception about moles and had been misidentifying other animals as moles</td>
<td>-students knew the character Mole Man from “The Simpson’s”</td>
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<tr>
<td>Bats</td>
<td>-all students had first hand sightings of bats</td>
<td>-students were familiar with the negative cultural references to bats</td>
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<td>-many had stories of bat removal from homes, cabins</td>
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<tr>
<td></td>
<td>-some had colonies of bats in barns or attics</td>
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<tr>
<td></td>
<td>-one student had worked in animal</td>
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nuisance control and had worked to bat-proof buildings and clean up their guano (droppings). Many students knew bats were common over water from their fishing experiences. - Students had a variety of other experiences that are detailed in the next section.

| Rabbits and Hares | - Experiences with rabbit nests, sometimes negatively as when dogs disturb them. - Experience trying to raise orphaned rabbits. - Some students had experience identifying the more uncommon snowshoe hare. - Several students had hunted rabbits. - Several students had pet rabbits and knew of rabbit behavior through that. | - Easter references - “Alice in Wonderland” and “Watership Down” were referenced along with the cartoon character Bugs Bunny to discuss the different habits of rabbits outside of New York (especially digging). |
| Rodents: Beaver and | - Several students had direct | - “Alice in Wonderland” |
| **Muskrat** | Knowledge of beaver dams and lodges  
- Some students knew of muskrats from seeing them while fishing  
- Two students had experience trapping muskrats and described the process in a pre-planned discussion presented in the next section | Was referenced again to explain how the term “mad as a hatter” came about  
- Students were familiar with cartoons incorrectly portraying beavers building dams with their tails |
| **Rodents: Porcupine** | - Several students from other parts of the state had direct experience with porcupines and their habits  
- Two students had dogs that had to have veterinary care due to porcupine encounters | |
| **Rodents: Squirrels** | - A few students had witnessed woodchucks in trees  
- Several students hunted gray squirrels and knew much about their behavior  
- Most students knew of gray squirrels burying nuts  
- Several students knew how to | - References to Groundhog Day |
| Rodents: Rats and Mice | - Several students had mice or other rodents as pets  
- Many students had experiences nuisance rodent removal in their homes or barns  
- A few students knew mice were altricial (helpless at birth) from working at a pet store or purchasing baby mice from pet stores as food for pet snakes | - References to Mickey Mouse |
|------------------------|-------------------------------------------------|--------------------------|
| Carnivora: Dogs and Cats | - Students had extensive pet ownership of the domestic varieties of these species that was capitalized on in a large group discussion detailed later in this chapter  
- A few students had experience hunting or trapping coyotes and fox |
<table>
<thead>
<tr>
<th>Category</th>
<th>Details</th>
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<tbody>
<tr>
<td>Carnivora: Weasels and Skunks</td>
<td>- Some students had dogs that were sprayed by skunks</td>
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<td></td>
<td>- A few students had trapped mink</td>
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<td></td>
<td>- Several students owned ferrets</td>
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<tr>
<td>Bovines</td>
<td>- Some students had farm experience with domestic bovines that transferred to wild species such as shape of track and physiology of horns</td>
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<tr>
<td>Cervidae (Deer Family)</td>
<td>- Many students had experience hunting white tailed deer.</td>
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<td>- Students also had experience processing, cooking and eating venison.</td>
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