SCIENCE FOR ALASKA: PLACE FOR CURIOUS LEARNERS

By

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Abstract

For over 25 years, Alaskans have been attending Science for Alaska Lecture Series, held during the coldest part of an Alaskan winter. The hour-long evening lectures would see from around 100 to almost 300 people attend each event. The scientific literature is quiet in regard to audience preferences in regard to the recieving end of science communication. This qualitative study looked at the audience of a science lecture series: who are they, why do they come and what do they do with the information. In nine taped audio interviews, the research participants described themselves as smart, curious lifelong learners who felt a sense of place to the Arctic for its practical and esoteric values. Attending the events constructed their social identity that they felt important to share with children. The findings suggest that addressing the audience's sense of place and mirroring their view as smart, curious people would be an effective avenue to communicate science.

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Acknowledgements

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Mostly, I would like to thank my research participants who told an excellent story. Finally, thank you to my husband who has always told me "You can do it."

Chapter 1: Introduction

It's a quarter to seven on a cold, frosty night. I'm anxiously looking at the doors of the Westmark Fairbanks Hotel and Convention Center. I've helped three others to prepare for this event, "Science for Alaska Lecture Series," and, as usual, the crowds are waiting for the last minute to arrive. And they do. By 7 p.m. over 200 of them are seated to hear "Weird stuff you ought to know about snow," by Matthew Sturm, a snow, ice and permafrost geophysicist. The temperature was about -5 F and it was already dark as the sun set at 3:51 p.m. that day, for a total of five hours, 38 minutes and 12 seconds of sunlight. That meant a gain of over six minutes from the day before.

January and February tend to be the toughest winter months for Fairbanksans to deal with. The darkness encompasses most of the day and it is usually the coldest part of the winter. It's tiring trying to keep oneself warm, as well as homes and vehicles. Many residents joke that these months lend themselves to human hibernation until a real sign of spring.

Yet, by the end of January, crowds fill the room, ready for a science lecture from one of the local researchers. Sturm held their attention with tales of 1,000-mile winter snowmachine trip to gather snow and snowflakes. He showed his photos of snowflakes. Particularly memorable was his explanation that snow has elasticity, i.e., look at the snow curling off your roof, one woman told me.

The series would include five more lectures, once a week, going into February. The temperatures would drop a bit, but the faithful kept coming. There were about 200 people each night, an amazing number for the dead of winter, noted William Wrobel, director of NASA Wallops Flight Facility, in Fairbanks for a rocket launch. Wallops holds similar public lectures and they don't see this type of crowds, he said.

I looked over the crowd after Wrobel made the comment. About a third of them appeared to be retired, older white people. Another third appeared to be over 40. The rest were younger. There were

graduate students and parents with children, some babies and preschool but mostly elementary aged. It looked to me some others were couples on dates and some were friends on a night out. Some well-dressed career women stood out to me, as well as about 20 teenagers with someone who looked to be a teacher.

That the Science for Alaska Lecture Series has always drawn these crowds in its 25-year history fascinated me. I wanted to know who they were, why they came and what they did with the information. I chose this for my qualitative research project required for my master's degree in professional communication.

The Geophysical Institute at the University of Alaska started the lecture series. It grew out of Neil Davis's free science column called Alaska Science Forum which began in 1976. The Alaska public loved the science nuggets the column provided. The GI started other outreach activities, and by the early 1990's, hosted the first Science for Alaska Lecture Series. About 100 people attended each night.

The crowds grew, as did the cost of holding them. By 2015, the year I did my research, the GI spent about $25,000, which covered employee time, advertising, posters, venue and supplies. For three years, I was a member of GI Public Relations office, which organized the event. We carefully chose the speakers and topics. The criterion was based how interesting the subject was to us and therefore the public, what we had done in the past and how well the speaker addressed public audiences.

Once the speakers agree to do the lecture they are careful in their preparations for presentations and take the lecture as seriously as an academic talk. The series starts promptly at 7 p.m. with a five-minute introduction. The speaker then gets about 45 minutes to speak. The evening ends with a 15-minute question and answer period. The audience can be depended upon to ask good questions on the night's topic, often surprising the speaker. The lecture is filmed by the GI Design Services department, and made available by compact disc on the GI's website.

I wrote stories about five of the six lectures in 2015, that were available on the GI and UAF websites, as well as several of Alaska's newspapers. I also sent links to the stories out on Twitter and Facebook. I wrote the stories for several reasons, to help spread the science around, to get recognition for UAF, the speakers and the GI, and to sharpen my skills as a science writer.

I don't have a science background, but I am drawn to science stories. Maybe it was because in first grade, our teacher used a colorful space curriculum, complete with records and posters. The colorful planets were such a contrast to the winter's dark school year. Later I would look at colorful photos of cancer cells in magazines, and wonder if I might find the cure for cancer.

I didn't go into a science career, but wrote quite a few science stories in my time as a journalist, including an award-winning series on Alaska Natives and cancer. When I switched into public information at the University of Alaska Fairbanks, I wrote many press releases, reports and stories about some science topic or another.

The crowds at the lecture series fascinated me. I had no idea that so many people held the same yearn for science knowledge as I did, at least that's one of the reasons I assumed they came out of warm homes to learn about snow, drones, weather, moose and earthquakes and the land as I was. I am Alaska Native and my mother taught me to pay attention to the natural environment. She took my brother and I for walks in the woods and told us things about the plants, the wildlife and the weather. We paid attention to the cold and dressed accordingly. I was a little afraid of the aurora because Mom would wake me up and excitedly urge me out of bed to see the Northern Lights. I've encountered moose on my way to school many times. I learned to identify wild forest dwellers by the scat they left behind.

I knew when spring and summer was coming by the smell of melting snow, ice and soils, sometimes before the temperatures noticeably changed. Later a cold wind would blow into town and

signal the waning days of summer. I lived through earthquakes and floods, stunningly hot summer days and frigid -50-degree winters.

Alaska was such an exotic land and this was surely the main reason those hundreds attended the Science for Alaska Lecture Series, I assumed. But it was not.

The academic literature argues that there is a good case to make science accessible to the public and scientists have an obligation, a public contract, to do so. Studies show there is a paucity of willing researchers to share. This is for many reasons, but one that stands out is that providing information for public consumption is not a top priority when faced with funding, teaching, research and administration issues. Also, when scientists and public relations people hold a public science forum to educate people about an important research finding, they attract people who already are lay people on the subject.

Neil DeGrasse Tyson, at a 2012 science communication conference, made the argument that people want to know about science and it is within the scientist's purview to find ways to do communicate. At the same conference, Robert Kulrich, one of the founders of RadioLab, a podcast about science, said people will seek out information that interests them, hence RadioLab had grown to over a million listeners.

At the Science for Alaska Lecture Series, I was seeing audiences that were proving the literature and comments about them were true. They came because the topics - snow, earthquakes, research ships, weather satellites, drones and wildlife research - were interesting to them.

More significantly, when I interviewed them they told me was they came because they were curious learners who loved to find out new things. Arctic geophysics and biology were important to the participants, but they were interested in all types of science. They also were people who held highly demanding jobs and came for entertainment, either alone or with family or friends. The series were fun and free.

They really didn't share what they learned with other people, mostly people weren't interested in having the discussion. A few said they will share tidbits with co-workers and friends. The remarks made me think of these "community of curious souls" as science loners in their real life, content to join other learners at the lecture series. Many have attended for years, some even from the beginning.

Not all the audience members knew one another, nor did they socialize outside of the lecture, they told me. They were surprised that so many people attended and they were content to be part of the crowd. That they were part of a large group of people attending a free public science lecture seemed to fulfill a sense of belonging and self-actualization that Mazlow spoke of in his hierarchy of needs.

I'd have to argue that Fairbanksans have the benefit of being a college town in the Arctic. The University of Alaska Fairbanks is home to many world-renowned scientists and has sent out graduates to other places who have further earned names for themselves. The GI is home to some of the world's best geophysicists, and UAF scientists are experts in Arctic biology and climate. The lecture series during over its history has hosted over 100 researchers who shared their knowledge.

The university played a big part in my life, too. My mother worked at UAF for most of my childhood. It has been the center of my formal education in office professions, journalism and now communication. I was a reporter for Alaska newspapers and told stories about the government, people and economics of Alaska for over 13 years. I also worked as a communication specialist in two of the university's research institutes, where I wrote for the public about Alaska Native health, the greening of the Arctic, drones, space physics, volcanoes, earthquakes, remote sensing, glaciers, sea ice, the atmosphere, snow, ice and permafrost.

That combined with the teachings of my Alaska Native mother helped me know I belonged at the Science for Alaska Lecture Series to study that audience.

Chapter 2: Literature review

2.1 The Crossroads: Public and Science

I came to the literature review as a qualitative researcher looking for meaning in the stories my research participants told me. The subsequent review gave contours and edges to their recounting. From that, the first thing to discuss in the literature review is looking at the interactions between scientists and the public. There is long history of this, but I will narrow my focus to the notion of a "public contract," (Gibbons, 1999) that scientists have an obligation to communicate their work to the public. The next question would be to look at who scientists think the public is and compare it to what my research subjects told me. I then looked for academic literature that might explain the participants' self-description of themselves as smart, curious lifelong learners. From the data, I saw a sense of place, the Arctic, defined the audience participants of Science for Alaska Lecture Series.

2.2 Science Communication between Scientists and the Public

From the first time when people engaged in conducting scientific activities, a public audience has wanted to know what's happening. The idea of science communication has formalized in the last 100 years, and by the 1950s, science communication to the public and the public's level of science literacy fell on scientist's shoulders as their responsibility. It is that attitude that most science communication literature is based upon. Based on that premise Retzbach and Maier (2015), using current findings, looked at out how the public's attitude about science and research might change when faced scientific uncertainty research tends to employ. Their findings showed interested people want to hear the good and the bad about scientific progress to make informed decisions and hold forth in public debate.

The Royal Society in 1985 issued a 39-page report that is now considered one of the basic

documents that underpin the public understanding of science, a field of study that was gaining popularity that time. The Royal Society says science information for the public is important for a host of reasons, including making better informed citizens who can make good decisions about health, safety and public policy. The society said they found the public is interested in science, but they don't have basic science literacy. This must be addressed by educational systems, mass media and in particularly, scientists themselves. Notably, the society said public science events are an important tool in reaching young children and should be given resources to continue, the study urged.

In 1993, F. Sherwood Rowland gave a speech, later published in Science, to the American Association of the Advancement of Science. Rowland urgently calls upon scientists to engage the public in scientific discourse because "science and technology must play major roles in solving the problems we all see around us (p. 1576)."

In discussing environmental and social problems, Rowland said the public's understanding of the serious issues were left to the willingness of scientists to provide content. He worried about the irregularities in the public discussion about ozone depletion, greenhouse gases and volcanic eruptions and urged scientists to provide accurate information, but not worry about in-depth discourse.

Again, the top/down approach of science communication is in play. Accurate information falls on scientists and it must be used to steer the public by providing sound information, necessary for citizens to make good decisions, Rowland said. If a good working relationship might be established between science and the public, then perhaps the abundant problems of the world might have a better chance of being solved (p. 1576).

By 1999, the call to scientists to provide public information is now a "new social contract" (p. 11) wrote Michael Gibbons in 1999. Up until that point, science has always been expected to provide

reliable information to the public, but now it needs to be "socially robust" (p. 11). After WWII and the end of the Cold War, the traditional framework of research and development has been crumbling. In effect, "clear lines of demarcation" (p.12) between university science and industrial science are blurring. The silos are falling or at least, opening, and now scientists must adjust their contribution to public discourse from just being reliable, to being inclusive. Scientists must give the public a chance to "speak back" and under this new social contract, can no longer work autonomously (p.15).

As scientists began to heed the call to public outreach in the changing world, their idea of who the public was began to evolve. In 2003, an article by Elam and Bertilsson addressed the emerging citizen scientist, a term used to describe a non-scientist with a vested interest in science. Science's efforts, "a kind of missionary work" (p. 239), to bring scientific literacy to the public means the new citizen scientist now has responsibilities. Previously scientists took the lead in science communication. Now the public must add scientific literacy to their resumes as part of upholding democracy, because "this is your future we're talking about" (p.247).

Scientists have long been told the public's education is necessary for a functioning democracy, and needed for its "civilizing role" (p. 239). Scientists view the public as deficit in science knowledge (Besley, 2014). Those scientists who engage with the public do so to remedy that deficit to "ensure a society that values science (p. 210). A deficit view of the public could cause the scientist to be less robust in his engagement with the public, Besley noted. He noted not enough research has been done to definitively find out how public engagement is working, but there should be if science is serious about reaching the public, he said.

The National Science Foundation, in their publication Science and Engineering Indicators 2016, wanted to understand if a gap existed between public knowledge of science and the actual work of scientists. The article did not state how to correct the issues of poor public science literacy, but clearly

showed a large disconnect between the science community and the public.

Lewenstein (2003) holds it is difficult to measure the success of science engagement with the public because "there is no consensus about the goal, about what constitutes improved public understanding of science" (p. 1). He identities four models of communication activities, deficit model, contextual model, lay expertise model and public participation models (p. 1). The deficit model is the gap of knowledge between science and the public that science is called upon to fill. The contextual model sees people as more than a receptacle for knowledge, and that they process information according to their own experiences. The lay expertise model acknowledges local knowledge and indigenous knowledge that could be incorporated with science. The public participation model is where science provide activities "intended to enhance public participation and hence trust in science policy" (p. 5). None of these really address who is the public.

Navid's and Einsiedel's 2003 public engagement study unintentionally caught a glimmer of who attends public science events: highly educated people who are already interested in the topic. The pair initially thought the public viewed science as too hard to understand and is usually discussed in formal settings. They held a series of science cafés to measure how much the public understood about synthetic biology and if this type of outreach would be successful. About half of the participants knew something of synthetic biology but some of the café demographic to have higher education and already knew quite a bit about the science (p. 7). This is one of the first glimpses into who the public might be and is what I found in the audience of the Science for Alaska Lecture Series.

2.3 Who is the Public?

The literature needs to be developed in this area. Most of what I read about the public is from science's point of view, which is the deficit model (Lewenstein, 2003). Navid's and Einsiedel's 2012 study pointed to educated people as audience members, but in understanding who my audience was, I found

the answer in why they attended the Science for Alaska Lecture Series. They called themselves smart, curious lifelong learners who appreciated the Arctic for practical living and its sense of place. Attending the lectures enforced their identities as intelligent people.

2.3.1 Lifelong Learning. I needed to distinguish what type of lifelong learner I was seeing. Some of the literature I read referred to lifelong learning as adult education, which is helping adults gain a basic education. This does not fit with my research participants since in all but one case, had advance degrees. They were curious and directed their curiosity to what interests them. Lawson (2016) described lifelong learners as people who pedagogical teaching would be lost upon. They much prefer an andragogical approach, where they are self-directed and in control of their learning (p.26). Helterbran (2017) looked at older people who returned to college and found it was important to complete their learning by getting a college degree. It was a lifelong dream (p. 14). She noted that other findings found that adult learners needed to learn for life enjoyment and is part of their older years (p. 14).

The people in my study specifically said they wanted to learn more about science. A 2012 study by Bultitude and Sardo examined the participants who went to three different types of science events and found they were drawing people interested in science and wanted to learn more. The events had entry fees and people had to travel to some of the venues, and the authors' noted the determination of people to attend by crossing those potential roadblocks. Their participants reported a high interest or understanding of science.

2.3.2. Arctic in Real Life. Lawson's work also applies here. She said adults want to learn what is practical to them and urges teachers to make lessons relevant to their adult students (2016). Tsai, et al's 2017 study of adult science competencies found that "engagement in science held explanatory powers for scientific competencies (p. 43). In other words, the act of adults attending a science event showed a level of learning. My research participants said they wanted to learn more about Alaska snow,

earthquakes and weather because each is prominent where they live. Learning more about those natural phenomena made sense.

2.3.3 Arctic Sense of Place. Learning about the Arctic held more than practical aspects for the science lecture participants. The Arctic holds a "sense of place" (Kaltenborn, 1998), which he describes as the "emotional and symbolic identification with place" (p. 170). His study looked at whether sense of place in the people of Svalbard, Norway could produce a typology in relation to environmental impact statements. Kaltenborn described the Arctic almost 20 years ago as rapidly changing, which is still true today. He developed a scale to determine if respondents felt a sense of place, how important they view the Arctic wilderness and how they viewed anthropological impacts. While he could not make the case that a sense of place is a good predictor of environmental perception, Kaltenborn certainly showed a link to sense of place and the Arctic. This confirmed my original thinking that the major reason people attended Science for Alaska Lectures was because of their connection to the Arctic.

2.4 Identity

As I really started looking at my data, I realized that lecture attendance also had to do with reinforcing the audience's self-identity. Tajfel and Turner (1979) described this as social identity theory, where a person's identity comes from the group they belong to. The two explain this has three tiers: social categorization, where people order objects and other people into groupings to understand them; second is social identification, where people adopt the identity of a group they belong to; and lastly is social comparison, where after people identify with a group, they will compare that group with another. McLeod (2008) further explains this as "a real, true and vital part of a person" (para. 14).

Accordingly, then people who go to science lectures do so enjoy themselves (Tsai, et al, 2017) and by default would assume others are in attendance for the same reason. My research participants

reckoned others were there for the same reasons as they and those who didn't attend, nor had the same interest in science as they, were different. Falk, Storksdieck and Dierking (2007) that adults gain understanding of science over the course of their lives, and they do it by choice. They are curious and science was a personal interest (p. 455). Lawson (2016) said adult love of learning related to their self-esteem.

To further enforce identity, people will expose their children to things that they consider important. Adults brought children to the Science for Alaska Lectures. Bultitude and Sardo (2012) said adults felt it was important to expose their children to science activities. In the study by Archer, et al, (2012), looked at a family's sense of identity, "who we are" (p. 883), as a reason parents encouraged their children to study science topics. "The desire for science was often embedded within narratives of family identity" (p. 891). The authors found that attitude didn't always produce a child headed to a career in science. But in families where the child developed a high interest in science, "the alignment between family habitus, capital, and the child's personal interests and identifications produces a strong, mutually reinforcing consensus" (p. 892).

2.5 What Next?

Outside of love of learning and providing information to children, the literature is quiet on what people do with their science learning. Science communication literature supposes that science engagement with the public provides a more literate democracy (The Royal Society, 1985), but there is little specific proof that it does. As for the deficit model (Lewenstein, 2003) where science sees people as the receptacles for knowledge, but they generally are not interested in learning, I've always believed the opposite. People are smarter than most think. Neil DeGrasse Tyson has long advocated for who he calls the "blue collar scientist" (2006), people who don't have the educational opportunities as those in science or with college degrees, but are intensely interested in science and technology. It appears that

science communication literature is catching up to that idea. In a 2016 survey of live science events, Durant, et al, noticed that the public may be more interested in science than once believed.

Overall, there is a shortage of literature that looks at the public in the public understanding or engagement of science.

Chapter 3: Methodology

3.1 Purpose of Study

The purpose of the study was to understand who was coming to Science for Alaska Lectures, why they were coming, and what they did with the information they learned from the lectures. I used qualitative research because I believed participants' narratives would yield a rich robust data set, and would be better suited to a smaller sample size that I anticipated getting. I wanted to hear my participants explain in their own words their connection to Science for Alaska Lecture Series. I used open-ended questions designed to get the respondents to tell their own stories. I recorded, transcribed and analyzed their narratives for emergent themes to answer my three basic questions, who are they, why do they come and what do they do with the information.

3.2 Epistemology and Theoretical Perspective:

The epistemology of my research is social constructionism, meaning people's realities, or their stories, are shaped by their subjective social interactions in their quest to understand and derive meaning of their worlds. This centralizes the research participants' experiences into narratives that can be examined for "complexity of views rather than narrow the meanings" (Lindlof, p. 24). The people who attend Science for Alaska Lecture series appear to derive meaning to their lives by attending a science lecture and be part of an audience made up of like-minded people. As a social constructionist researcher, I seek the participants' view of the situation (Creswell, p. 25).

The theoretical viewpoint of my research methodology is symbolic interactionism. The theory holds that society is constructed by how people interpret their lives and the world they live. My participants view themselves as curious learners interested in the natural world around them, particularly how it is shaped in the Arctic. They confirm that knowledge within themselves by attending science lectures from the local university. My research participants did not really know the other science lecture attendees,

but made observations that they were there for the same reasons as they were. Therefore, according to Blumer, asking the participants of science lectures who are they, why do they attend and what do they do with the information is the best way to understand their culture.

3.3. Methodology Perspective

My methodological perspective is phenomenology. This perspective looks at subjective experience as lived experience. This perspective allows me to search for meaning and to understand the nature of a group of people who voluntarily attend a public science lecture in during the coldest period of an Alaskan winter. The interviewees all have that in common, and , is a phenomenon, allowing me to "grasp the very nature of a thing" (van Manen, 1990, p. 163). While I had my own ideas about what they would tell me in the interviews, it was most important to hear what they had to say, to tell their own stories

3.4 Methods

I used a conversational interview method to gather the research participants' stories. The method considers that knowledge is produced by both the interviewee and the interviewer, (Kvale, 2009, p.18). I wrote up open-ended questions designed to allow the participants to feel free to answer any way they wanted to get the conversations started. I didn't ask all the questions, because I let the conversations unfold, wanting to use my inquiries as nudges and not hammers. I've had experience doing this as a journalist and have interviewed hundreds of people, all with the goal of hearing their stories from their perspective. I learned as a journalist that I needed to be objective and leave myself out of a story. I also had to understand where I fit in the relationship I had with the interviewee and what my own beliefs and prejudices were, to craft a story for public consumption and the public good. Kvale notes journalistic interviews in part of the history of conversational research (p. 8), so my experience would help in my research interviews. The interviewees' stories mattered most, but I'm the one asking the questions and

interpreting them. The issue with using conversational interview method is that it takes a skilled interviewer dedicated to the craft (p. 17).

The participants were people who attended the Science for Alaska Lecture series, and over 18. I recruited them at the lectures with an announcement before the science presentations. They were volunteers and were not compensated.

Since this study involved human participants I had to gain approval from the UAF Institutional Review Board. I submitted seven documents that included a description of the project, interview questions, a verbal informed script, a verbal recruitment script, personnel list, contact information for participants, protocol and exemption request. The UAF IRB approved my request before the lecture series began. or the project.

I read each person an informed consent (Appendix A) message, gave them a description of the study, explained their risk for participating was minimal as we were not keeping any information that would identify them, and the study was voluntary from which they could withdraw at any time. I provided them with hard copies of the consent form that included contact information for me, my advisor and the UAF Institutional Review Board.

I initially thought I would meet with interviewees after the lectures at the venue. This did not work out as expected, because most people left immediately after the lectures. Also, the interviews lasted 20 minutes so I could only interview one or two people after the lecture. I got only a few interviews onsite so I asked people to leave contact information with me so I might make a later appointment with them. About a dozen people did but not all responded when I contacted them.

I chose a public location, because I didn't want them to feel uncomfortable, so we met at the West Fairbanks Fred Meyers at the Bistro. I met with a woman and a man in their home, as well.

I taped the interview on a small digital recorder and took notes. The transcriptions applications for my Samsung Android-based tablet were not adequate and since I worked full time, and was the vice president of a very busy board of directors, I just didn't have the time to devote to transcription. Kvale (1996), agrees that transcription is time consuming and stressful. I sent my digital recordings to online companies to be transcribed.

I used two services, VoiceBase and SpeakWrite. I liked VoiceBase's services best and used them for the bulk of the transcriptions. The company provided a website with the recording, marked by speakers, as well as keywords and online transcripts. They also sent me a digital, editable document. The price was more reasonable than SpeakWrite. The recordings and the transcriptions were accurate, with some inaudible or garbled spots.

I got completed transcripts back, read them through and starting listing various answers into groupings. On two interviews, the digital recorder failed so I had to rely on my extensive notes, sorting themes the same way as I did the transcriptions. I reread and resorted the interviews many times. Themes emerged and subsided. I tried marking with colored pens the different themes but found pulling out phrases or words and grouping them together made more sense to me.

I also went back over sections of the interviews, narrowing down longer sentences or paragraphs into my theme groupings. Kvale calls this meaning condensation, and for phenomenological researchers, "it becomes paramount to obtain rich and nuanced descriptions of the phenomena investigated in the subject's everyday language. (p. 207).

The themes guided my literature review, too. I started out broadly based on my own ideas of what I thought I needed to know relating to science communication. What I ended up doing was considering articles that explained a "sense of place," "lifelong learners" and "curious learners" to find something that might explain what I was finding out about my science lecture audience. This turned into a much

narrower field and I ended up culling much of the literature I had originally selected.

3.5 Researcher Reflexivity

At the time of my research, I worked for UAF's Geophysical Institute's Public Relations office, and was part of the team that put together the lecture series. This included suggesting lecturers, advertising, attending the lectures as onsite staff and writing feature stories. I also believed people attended because they were as connected to the land as I am, a trait of my Alaska Native heritage. As such, this bias shaped my research questions of who, why and what. I do think the bias is mitigated because they are legitimate research questions to ask the audiences of public science events, since there is a paucity of research done on them.

3.6 Methods of Analysis

Thematic analysis is a way group meaning, patterns and themes out of qualitative data. In my case, the data I used was the interviews I had with the volunteer participants and I looked for meaning, patterns and themes. My research questions had some order, in that I asked who they were why did they attend and what did they do with the information. As a longtime reporter, I came to understand that truth had many facets, depending on whose lens it was viewed from. This is known as crystallization, according to Richardson, (1994). I looked at the data with a "curiosity of sensemaking" (Lindlof, 2002) (Richey, class notes, 2015). I also had to take into consideration my own biases. For example, the transcripts also held my conversations with the interviews and I had to wonder if I influenced answers with my conversations, though some researchers might say we constructed shared meaning of the lecture series. However, because of this, I had to make sure I maintained an emic approach to the data, so I went back over the transcripts to see what the people were really telling me and to differentiate their answers from what they may have wanted me to hear.

Chapter 4: Data Representation

4.1 Introduction to Data

I could hardly wait to hear what people had to tell me about why they came to the Science for Alaska Lecture Series. It just seemed like such odd, but compelling, behavior because so many people attended. I was grateful to those who volunteered to be in my research and their answers surprised me. I interviewed 10 people altogether, however the digital recording failed on one sessions. I was not able to reschedule that person. I have nine transcripts.

4.2 Interviewee One:

This woman was my first interview, which we did following the second lecture in the series at the venue. She was white, 42 years old, a veterinarian and university professor. This woman brought her two young children, 7- and 5-years old, to the lecture The Next Big Alaska Earthquake, by Michael West. Her husband heard about the lecture on the radio and wanted her to take the children. The older child was more interested and even asked a question during the Q&A part of the lecture. The younger was not. It was their first time to the series and their first Alaskan winter. They planned to come to more lectures and were looking forward to the Sikuliaq talk, which was about UAF's arctic research vessel. She and her husband felt it was important to expose their children to science.

"Of course, as a parent, I like to give my kids an opportunity to hear about everything they can hear about. Especially things that are not my area of expertise, because they ask me questions that I can't explain..."

She planned to tell her husband about the earthquake lecture because she now understood the family lives in an earthquake prone state. What I found interesting is that besides gathering knowledge about the risk her family faced, she also reflected that it is important for leaders of infrastructure trades to consider how to build and construct buildings, roads and the like in earthquake country. She hoped

they would "not build infrastructure in areas that are extremely vulnerable to earthquakes."

The woman really came alive in her narrative when she spoke about life sciences and the Arctic, in part due to her science background as a veterinarian. She used the phrase, "I wonder" quite a bit and I would characterize her interview in those terms. She got right to the heart of one of the most interesting things about the Arctic, wondering how organisms survive freezing temperatures in the winter. She also wondered how climate change might affect this and thought it bore further research.

"There are adaptations in the living organisms here that aren't present anywhere else. . . such as mosquitos that can be frozen sold and then spring to life in the springtime. Or frogs that can be frozen solid and not die."

4.3 Interviewee Two

I also interviewed this man, who was 56 and white, at the lecture venue. This gentleman had been attending the lecture series for ten years. He called himself "self-educated" with an active curiosity, which is how I would coin this interview. He came from a family of scientists, "but choose to go a different route," and was a locomotive engineer. He has a wide range of interest that he thought college would not satisfy, even though he attended for a bit studying computer science. He dropped out when he got an opportunity to "pick up a sledgehammer to work on a railroad bridge gang."

He didn't drop learning and actively searched for outlets to his self-education. "I try to take in information wherever I can." The science lectures were perfect venues for that, he said.

"This is a place that's quick and easy, in one hour. . .I can learn a bunch in one hour." I interviewed him after the "The Next Big Alaska Earthquake" lecture. He drew his interest because the train he drives crosses the Denali Fault, which caused the 7.9 magnitude 2002 Alaska earthquake. The

railroad has policies and procedures for earthquakes, and the track always needs realignment in the Denali Fault area, he said.

"If I know something more about earthquakes, then when we're stopping for these inspections, I'll feel a little more like I know what's going on."

Other people in his life don't share the same enthusiasm for learning. He doesn't discuss the lectures with his co-workers nor most of his friends, but will discuss topics with people he knows attended, if the opportunity came up. Sometimes he attends the lecture with a friend or take a date. He assumes that other people attend for the same reason he does, either because the topic draws them or they "come to learn more about the world around us."

Interviewee Three

This Caucasian woman, 56, was the third person I interviewed at the venue. She said she was a social worker with a master's degree. This lady attended the lectures sporadically over 15 years and estimated she had come to about 10 lectures altogether. She doesn't come to the lectures if it's too cold and missed the previous lecture because of that, but also because she wasn't feeling well. The topics do influence her attendance, and she had already attended the snow lecture and that night had listened to the research ship presentation.

She comes because the topics are tied to Alaska, important because she lives in Alaska. "Alaska's pretty unique and there's a lotta different things about Alaska." She found the snow lecture fascinating. She skis and understands there are different types of snow. Sturm had spoken about snow's plasticity, that is, the ability of snow to hang off a roof or wire in a loop and not break. She posted about that on her Facebook account, drawing some comments.

The other reason for her attendance is that she likes "to learn, in general, and I would sum up her interview in those terms. Arctic science is important to her. but more important is learning about the "natural world." She studied it in college and taught nature studies as a camp director. Some of her answers suggested that she liked to learn about how events in the natural world affected quality of living. She spoke of air quality and earthquake lectures she attended. "Your natural world is a little bit more accessible than other places. You're 15 minutes away from the wilderness."

Attending the lectures has become a solitary adventure for her. She had brought her children when they were younger and had attended with a coworker the previous year. Sometimes she sees people she knows at the lectures, but not often. She doesn't talk about the lectures with coworkers or friends, as she doesn't think they are interested. She thinks the crowd has changed and observed, as I did, that many older people than younger attend the series. She assumes people attend because they want to learn.

She did have some complaint. The room had huge chandeliers that blocked the view. She was disappointed that the lecture about the Sikuliaq that night didn't include what type of research would be done on the ship. Her comments were a foreshadow of other complaints I would hear from others.

Interviewee Four

This white, 56-year-old man had a bachelor's and master's degrees in mining engineering. I also interviewed him after the lecture at the venue. He said he'd been interested in science since attending West Anchorage High School. In fact, he it was there he studied geology and earthquakes because of the 9.2 magnitude Great Alaska Earthquake. He earned his degrees from the University of Alaska Fairbanks and worked in Alaska a while but left because the economy was bad. A trans-Alaska oil pipeline construction job drew him back. He then ran the instrumented pigs, devices that would be sent through the pipeline to monitor it, for nearly 30 years. He was invested in Alaska.

"You kind of go where the jobs are, but then I decided it was more important where you lived than what you did." These words framed his worldview and how I characterize his interview. He said he was drawn to the lectures because of the topics and was really excited about the lecture about the Sikuliaq, the UAF research ship. In fact, later that week, he and his family would go to Seward, Alaska for the official christening. He also attended the lectures because of the Arctic science, such auroras and frozen ground. "That's different than what you find in Arizona. There's a lot of unique things about this place."

He discusses the lectures with his wife or maybe a former professor, who he often attends the lectures with. He notices from the crowd that the series is an opportunity to meet up with friends or somewhere to go with family.

He wasn't impressed with that night's lecture, which was about drones and was presented by a graduate student. "Like I said, this was probably not one of the better ones." The comments from the interviewees are starting to point toward them having a keen understanding of what they want to get from the lecture series.

Interviewee Five

Not many minorities attend the lecture series, so this 30-year old, African American lady stood out. She attended the "Weather and Satellites" lecture. I approached her for an interview and she accepted. Unfortunately, the recorder was off for the first half, and I had to rely on my notes for that part.

She said her social worker job was stressful. One night she was watching the news and saw a feature about the Eric Stevens, the man who gave that night's lecture. She decided to attend. "That guy has character!" So, she and her sister attended the event "It was so different from my line of work. I am now a little bit of a satellite enthusiast."

She was born in Alaska and grew up here. As such, she thinks residents are the "best candidates to see climate change at its best and worst." She understands Alaska is America's claim to the Arctic. She has a keen interest in science, and though the evening's presentation was the first she attended, she says she goes to other public science offerings. She also watches the Discovery Channel or any science related TV show.

"I like history. I like the present. I like what we can do in the future. Science is so futuristic, you know? Always looking to the next best thing." I think this part of our conversation captures her tone.

Interviewee Six

I met this 68-year-old white woman at Fred Meyers. It was a cold day and winter storms had kept her from making a previous appointment with me. She moved to Fairbanks in 2011 and started coming to the science lectures then. Although she was retired school teacher, she worked as an Alaska Native Education instructor at a local high school. Previously she monitored in-school intervention room at a junior high school.

She comes to the lectures because of her science background as a math teacher, but also because it's fun and it's free. She was the first person to name one of the reoccurring themes, lifelong learners, I was finding in my interviews. "...Also, we all need to be lifelong learners, and every time I go, I learn something." She marvels at how large the crowds at the lectures are, and in a small community like Fairbanks, most are strangers to her. She muses they must come because the it's appealing. She has noticed people she is sure are teachers, like herself.

She, like others, like learning about all science, but thought Arctic science topics in the lectures were relevant. Her story explaining why she felt that way became deeply personal. She had worked as a teacher in rural Alaska for 12 years, some of the time in or near coastal communities. She has witnessed coastal erosion due to climate change and has taught specific lessons to students about how climate

change is affecting their homes. She had a friend who was the principal teacher in Little Diomede, a small island off Alaska's northwest coast. In the winter, the community builds an ice runway for daily airplanes with food and other supplies to land. The friend reported to her that last winter the ice never got thick enough for the runway, the weekly supply helicopter couldn't land.

"And then the helicopter went down for a while. I mean, down, as in needing repairs, not operational. And they had six weeks with nothing. No supplies coming in, no anything. I mean, talk about being remote and cut off."

Interestingly, her memorable lecture topics had to do with Arctic topics, such as, earthquakes, ice and snow. She recounted a lecture about a pilot project using a drone to monitor sea ice, important for people who live with and use this dynamic feature. She told her students about the plasticity of snow. She found the earthquake information personally useful.

Although she tried to get other people to attend the lectures or try to draw them into conversations, she has yet to get people to come. She would point out the posters at the school and made sure people would know she was attending. "It's not everybody's interested in going to science lectures, I guess, but to me it sounds like fun."

Interviewee Seven

I also interviewed this Caucasian man, 59, at West Fred Meyer's, and his wife sat with us, but did not contribute to the interview. He was celebrating his one-year anniversary in Alaska. He worked at Fort Wainwright in computers systems, which he loves. He seemed enamored by Alaska and the Arctic, and described how at home he was with the cold and snow, and he tolerated much better than his wife. In fact, after he heard about the lecture series, he walked to the earthquake lecture in -35 F to attend.

He described himself as someone who would have gotten a science degree if linear algebra hadn't defeated him. He decided it was best to finish college and get on with life, so he majored in history, even though "he had a decent amount of math." He spoke wistfully about trying for a degree in "physics or chemistry or something." For fun, aside from attending science lectures, he accesses weather information from the National Oceanographic and Atmospheric Administration, making note of temperature, dew point, relative humidity, sunrise and sunset.

He, out of all the participants, appeared to crave what he refers to as "pure science" which is what the others talked about having but he was more articulate. He loved the that the earthquake speaker included partial differential equations. He attended the lecture series on earthquakes and snow because he thought it applied to him as a new Alaskan. He was also surprised by the crowds that attend the lecture series and assumed they were people like him but he didn't know them. He noted the potential for more lecture topics related to the Alaska, such as the Arctic desert or how animals survive the winters. He spoke in deeper detail about the different science topics he was interested in and wanted to know more about.

"There are small animals that carry on under the snow in the winter…The oceans, stream life, salmon are fascinating…Why does (auroras) happen up here and not in Dallas?"

He discussed the lectures with his wife but not many others. He also found that he did not know many people like him. "So many people aren't interested…Today was the first day we had more darkness that light, and it's like, who cares? …Seven or eight types of snow. Well, that's kind of interesting but nobody cares. Earthquakes. They care if it shakes them but other than that?" His theory for this is that science and math intimidate people. People prefer to keep inside their own "spheres," he said. The people who attend the lecture series are "the unicorns," he said.

Interviewee Eight and Nine

This was a dual interview with a white couple in a home setting. The male, a bush pilot, did not stay for the whole interview, but contributed a meaningful section. The woman, 44 and an attorney, gave most of the interview, which was her home. She was in the process of moving but what furnishings and décor remained indicated a household stock with learning activities for children, with a large dining area for family meals.

She had been in Fairbanks for two years and had attended the lecture series both years. She had an elementary school-aged son and her boyfriend had two young daughters They didn't live together but both looked for activities to blend their families. He flew passenger and freight to rural communities for a small airline, and while she was an attorney, she was looking for work at the time. She had a juris doctorate and he had an undergraduate degree in geology and had started a master's program in soil science at UAF.

The couple take their young children to the lectures. "It's for us to do as family and have a world, you know, a world larger than ourselves," she said. Her boyfriend joked it was because they were "bored out of our skulls," but added that they attend because they are "smart people with curiosity." They will talk about the lectures afterwards, looking up more information or make an art project out of the things they've learned.

They viewed themselves as people with demanding jobs who went to science lectures for fun. The boyfriend, also saw a practical need for why he and other people to attend the science lectures. It's to understand the world they live in. For the girlfriend, beside using the lectures for outside learning with her children, she sought connection. "Maybe because honestly, I need to justify why I'm here," she said.

She drew two distinctions of the kind of people who gave the lectures. She derived that some were not part of the community, while others clearly were. "I mean, they may be teaching here or at the

Geophysical Institute… I get the impression sometimes I feel I'm learning science but I'm not necessarily learning more about the place from people who are here or are rooted here."

She herself had a deep knowledge of subsistence, climate change and federal law, having spent much of her career working in those fields. She would say she didn't have a good working knowledge of the science, but spoke in detail about climate change and its social and economic impacts. She displayed a keen curiosity, asking rhetorical questions as she explained her worldview, saying "why?" or "how?"

She wanted future lectures to include a broader range of science outside of the Geophysical Institute. She liked the lectures but sometimes wondered why she attended. She seemed to be looking for meaning and answers. It may be because she was looking for a job and was having to move. She also wanted to continue her education and perhaps get a Ph.D.

"I mean, we are the north and we're unique and we're special, but other populations have dealt with disruptions and maybe it would be helpful if we saw ourselves in the larger history."

"

Chapter 5: Analysis

"Most of the fundamental ideas of science are essentially simple, and may, as a rule, be expressed in a language comprehensible to everyone."

-Albert Einstein

5.1 Introduction to Analysis

This chapter is the analysis section of my research. I would describe my approach as gold mining, where I removed the overburden of excess in the literature, my own thoughts, the advice of teachers, mentors, colleagues and friends and the conversations of the research participants, and then sifted through the remains for nuggets of meaning. Once I found those rich bits, I sorted them into categories, themes and tools of understanding.

To put into research terms, my research project started with one of my first observations as a public information officer working in university research units. I noted that trying to get information to the public was difficult. My previous training as a journalist formed a deep guiding principle in me that the public had a right to know about publicly funded science. Scientists would agree, however, we had conflicts in the definition what is a news story, what medium would be best way to inform people, and what style to use to tell the story. It was a challenge to my credibility and expertise as the person who was the mediator between the public and the scientist. At the heart of the conflict would be me saying the public gets their information in this way, in this form, and if we digress from that, we take the risk of losing credibility. The retort would be that the public must adapt to the rigid, systematic way scientists talk and publish among themselves.

The conflict, and how to solve it, took much of my attention for many of the 10 years I was in science public relations. My thought was that the public doesn't understand the culture and language of scientists, though they will if I translated to them. I found many, but not all, scientists weren't interested in changing their language for the public because they feared meaning would be lost, and in turn,

cheapen their academic currency. I thought this would be the focus of my research for my master's degree. I started searching the science communication literature to see what others were saying. What I found was the argument that scientists have a duty to communicate science to the public, but efforts weren't very successful.

Later when I discussed this with Dr. Karen Taylor, my committee chair, she saw something that I was missing. What does the public want, she asked. The literature isn't clear. I needed to study the public side of this triangle, she pointed out, and who better than a classically trained reporter of the Fourth Estate and advocate for the public? We decided I would study the audience of the Science for Alaska Lecture Series, because they would pack the room nearly every lecture, despite freezing temperatures. Who are they? Why do they come? What do they do with the information? Surely, they had something to say and we needed to hear it.

In this analysis, I will explain who, why and what of the Science for Alaska Lecture Series audience, according to their stories and my understanding, and how it fits in academic literature. I will expound on the themes of lifelong learning and curiosity, Arctic as a sense of place, identity reinforcement. I will end with suggestions for next steps and future needs.

5.2 Science Communication

Science communication is a practice, profession and field of study that provides scientific information to the public, either directly from scientists themselves, or through media such as newspapers, magazines television, radio, public events or social media. Science communication began to take real form and substance in the early 19th century with the invention of the steam-powered printing press and the rise of the middle class. The presses produced inexpensive, mass produced textbooks that contained knowledge that once belonged to only the elite and privileged and made available to the public. Consumers developed a taste for science literature and science lectures and drove the

production. By the 1950s, science communication began to develop into a scientist's responsibility, whose main concern was that "*information* presented to the public and *scientific literacy* of laypeople: noted Retzbach and Maier (2015).

5.3 Public understanding of science

The Royal Society published a widely-regarded report in 1985 that turned the conversation toward the need of the public's understanding of science. It matters, they argue, because "a better public understanding of science can be a major element in promoting national prosperity, raising the quality of public and private decision-making and in enriching the life of the individual (The Royal Society, 1985, p.9). Public understanding of science leads to better informed democracy and appreciation and support of science research. Furthermore, the Society charged that scientists had to be the ones to tell the public about their science.

"Given the importance of public understanding of science and the extent to which scientists must be democratically accountable to those who support their training and research through public taxation, **it is clearly a part of each scientist's professional responsibility to promote the public understanding of science (**p. 34).

In a 1993 president's report to the American Association of the Advancement of Science, F. Sherwood Rowland, then AAAS president, said the need for an informed public was becoming critical in face of climate change, economic security and an increasingly technology dependent world. He pointed to two problems preventing this, one was the rapid growth of scientific knowledge and that while the public was interested in science, they didn't have a basic understanding of it. Further confounding the problems was that a growing number of inaccurate information was making its way to the public sphere through television, radio and newspapers, he said.

"The remedy must lie in greater emphasis by all of us in increasing both the base level of

knowledge of science and communication about science with all levels of society (Science, 1993, p. 1571)

Michael Gibbons (Nature, 1999) charged that scientists had a "new social contract (p. 11)" to make sure the science information provided for public discourse was robust, transparent and participative (p. 11). He noted "science and society are invading each other's domain, requiring a rethinking of previous responsibilities" (p. 11).

Now that social media and the internet are quickly replacing the hard copy delivery of scientific information to the public, the relationship between scientists and the public is changing, too. But it has always been a top down approach. The literature speaks volumes about the need for the public understanding and engagement of science and that scientists must take charge of that task as part of a social contract. However, little is written about the audiences of science information.

5.3 Who is the public from the scientist's point of view?

I did not interview the scientists who presented at SFALS about their ideas of who is the public as that wasn't my focus. I did look at what for what the literature presented as scientists' points of view about the public. They see is the receptacle of their knowledge which is meant for the common good by providing an informed public. The public is unruly regarding science learning and that science outreach plays a "civilizing role" (Elam and Bertilsson, 2003, p.239) toward "combatting pubic hostility and resistance to new technology" (p.239). The public's education would lead to a "stronger role for science in society" (Besley, 2015, p. 201).

Scientists see the public as interested in science, but lack the basic understanding of science, according to the National Science Board's 2016 Science & Engineering Indicators report (p.7-41). This is echoed in other literature, hence the call for scientist to fill the gap. Lewenstein (2003) calls the scientist view of the public the "deficit model" (p. 2). "Science has yielded measures of "science literacy" that

show, depending on the year and the particular method of interpretation, that only 5 percent of the American public is scientifically literate, and only 20 percent are interested and informed" (p. 2).

This deficit model appeared in one study about public engagement of science. The premise of Navid's and Einsiedel's 2012 public engagement study was that it is difficult to interest people in science, because it was difficult for them to understand and was not fun. They held a five Science Cafes to engage scientists and the public in an informal setting to discuss synthetic biology. They discovered a percentage of the participants they attracted were highly educated people who already had an interest in the topic and had an impact on the findings. "However, it is important to note that the participant demographic observed at some of our Science Café venues may have been overrepresented by more highly-educated individuals" (p. 7)." The findings were like what I found in the audience for Science for Alaska Lecture Series.

5.4 Who the public told me they are

I noted in my observations that the audiences were mostly white, with some Alaska Natives, Asian Americans and African Americans in attendances. About a third of them were a mix of young children, high school students, young adults, another third were middle aged and the rest were seniors. I noted that some came as families, in groups of friends or a class, or in pairs or single. Those who participated in the question and answer period of the lecture asked thoughtful and salient questions, and I heard more than one presenter remark about the high quality of questions.

Those who participated in my research told me they had a high level of education, which was consistent with part of Navid's and Einsiedel's findings (2012). Three had doctoral degrees, 8 had master's degrees and one of those had two masters'. One person had some college. Five women and four men participated in the research and they ranged in age from 30 to 68. They either were actively working stressful, responsible jobs or had retired from them. The respondents where all white, except

for one, who was African American.

5.5 Why do they come?

There aren't many studies that ask this question, although it appears to be growing. This made it difficult to compare my research participants with others who attend public science events. As I combed through the transcripts of interviews looking for themes, three apparent ones appeared consist, that they were lifelong, curious learners, that they derived a sense of place living in the Arctic and attending the lectures reinforce their identities of themselves as people who enjoyed learning and science.

5.5.1 Lifelong curious learners

My first look through the literature at lifelong learning took me to the concept of adult learning. Most Americans, as children, have been taught using the pedagogical model, whereas the teacher is responsible for the learning process and the learner is the receptacle of the teacher's knowledge (Lawson, 2014, p. 25). As noted previously, this is the same way scientists view the public. However, a training handbook says adults learn by the andragogy theory, part of which says that adult learners are self-directed and their life experiences provide a base for learning (p. 26-27). This thought certainly appeared in my interviews. "I always have all of this interest and I'll try to take in information wherever I can" (I2).

My research participants were mostly older, as was part of the lecture audiences, according to my observations. This is significant. Helterbran, (2017) studied a group of older people who earned bachelor's degree after retirement. In her literature review, she noted findings that said learning was a part of later life, adding to the quality and enjoyment of life, kept their minds active and alert, and increased self-confidence (p. 13). My oldest participant, at 68, indicated this was true for her. "We all need to be lifelong learners, and every time I go, I learn something" (Interviewee Six).

Two of my respondents indicated that they would like to complete graduate degrees, which Helterbran called "unfinished business" (p. 14). Her participants described a desire throughout their lives to get a college degree and had found the time in their later years. One of my respondents had felt unfulfilled he earned a history degree and not a science one because of issues with learning math. "Linear algebra…It may be that's my Waterloo…I died in that section of the woods in statistics and probability and I needed to get something ready…before I died at an old age of 100 without a degree" (I7). One woman, who already had a law degree, spent a bit of time talking about all the things that she wanted to learn more about. "It's funny that I'm telling you all this stuff. I'm also searching for possible topics for myself and Ph.D. topics" (I9).

Another study that looked at people who attended public science events found that out 28 percent of interviewees were interested in science, another 20 percent said they liked science and only 4 percent claimed to love science (Bultitude, Sardo, 2012, p. 20). All my interviewees said they loved learning but one of my interviewees said he his love of science started in high school and as a result got an engineering degree (I4).

5.5.2 Arctic and a sense of place in real life

My respondents said they came to the lectures because the topics applied to living in the Arctic. I think this topic can be divided into two answers as to why: it's relevant in current life and the extreme nature of the Arctic gives inhabitants a sense of place. Relevant learning is part of andrological theory of adult learning. "They want the learning experience to be practical and realistic, problem-centered rather than subject-centered" (Lawson, p. 27). But the place is just as important, they said. It made sense to learn more about snow, auroras, earthquakes, weather and climate change. "There's a lot of unique things about this place" (I4)

On the first reason, research notes people want information that is relevant to everyday living.

Lawson said teachers of adult learners should make learning relevant to them, "that is, show them how it will help them, by using "real world" examples and activities that connect with their frames of reference" (p. 37). In an article in the Adult Education Quarterly, Tsai et al (2016) noted that findings that said "Adults are often motivated by the science related events or information relevant to their lives (p 44). `My respondents said that's why they attended. One man walked to the lecture at 40 below to listen to a snow lecture.

"I'm trudging through it every day. We got a car now, but there are things that applied to me and earthquakes. It would be good to be kind of prepared for one because the likelihood, I imagine something will come one day that'll be a little bit more significant than the 5.6s (magnitudes) I've noticed. I'd say those things just apply to me." (I7)

Another woman said climate change was so apparent in Alaska, therefore learning anything about it was important. She described seeing or hearing about coastal erosion while teaching in rural Alaska. She also put together a science fair about climate change for her students to help them understand what they were witnessing. Friends also told her of what was happening in their communities because of the lack of sea ice, due to climate change. The changes were affecting a community's ability to get supplies to them in the winter.

"Speaker 1: What concerns you the most about Arctic science that you've heard?

Speaker 2: I'm going to say probably all the climate changing, the melting of the sea ice, and how that's changing the weather and our coastal villages, of which I've lived in some. Or close to some. Or know people." (I6).

Kaltenborn (1998), in his study of the residents of Svalbard in the Norwegian Arctic, said human values .and environmental meanings are affected by rapid changes in the Arctic (170). He refers to that connection, an "emotional and symbolic identification" to the environment as a "sense of place" (p.

170). In Jack London's book, The Call of the Wild, he spoke of the lure of Alaska's ruggedness that was a foil to those who shaped their characters by pitting themselves against nature and winning. While my respondents weren't gold seekers, the Arctic wildness seemed to give them a sense of place. Kaltenborn found that Svalbards considered wilderness as giving meaning to place (p.177), and comparably, Alaska has wilderness.

"Because for 15 years I was in the wilderness. I think it's the, your natural world is a little bit more accessible than other places" (I3) said one research participant. Living in Alaska made her more aware of her surroundings.

One interviewee had a developed a sense of place that directed her thinking about the types of people who lived in Alaska. She didn't like what she perceived as "outsiders" giving science lectures about the Arctic. She preferred hearing from people who were connected to Alaska as place. "I don't know why have that sense that he's been here. He's known in the community… I just get the impression sometimes I feel I'm learning about science but I'm not necessarily learning more about the place …" (I9). Another interviewee said that he gave up a good job to come back to Alaska. "You kind of go where the jobs are, but then I decided it was more important where you lived than what you did" (I4).

5.5.3 Identity

Alaskans have long given names to themselves and others that identify what type of Alaskan citizen they are. Cheechakos are newcomers and the name connotes that they haven't earned the right to be a real Alaskan. Sourdoughs, old-timers and pioneers are the names of the people, mostly white, who arrived in Alaska a long time ago and have earned the right to be called Alaskans. Alaska Natives, with a capital "n" are the indigenous people, while Alaska natives are not indigenous but were born here.

On the website, simplypsychology.org, McLeod, (2008) surmised the work of Tajfel and Turner

who call this social identity theory which is "a person's sense of who they are based on their group membership(s) (para.1) and three mental processes can be understood to explain it. First people "categorize people and objects to make sense of a social environment" (para. 12). Second is "social identification" (para. 15) where people identify with a group they chose to be a part of. Lastly, once a person's identification with a group has been made, then the person makes a "social comparison" (para. 16) of their group to others.

Adults who attend participate in science outreach scenarios appear to have a "higher interest in and greater enjoyment in science" (Tsai et al, p. 42). Falk, Storksdieck and Dierking, (2007) point out that people chose to go to public science events in their leisure time and "science understanding was primarily acquired for reasons related to personal interest, need and/or curiosity" (p. 455). The SFALS audiences chose to attend so they self identify as a person who enjoys learning about science. They assumed people were there for the same reasons as they were. In other words, they categorize the science lecture as a place of learning for like-minded people.

"Speaker One: You got to wonder why 200 people show up in the middle of winter…

Speaker Three; Most of the people are smart people with curiosity. At least that's what we are." (I8).

Another said, "I would assume that people come to learn more about the world around us" (I2). Lawson said adult learners want to learn because of "natural curiosity, innate love of learning…or the opportunity to self-actualize" (p. 27). "They have an interest in the world around them. Fairbanks has a pretty good population of well-educated, well-opinionated people. They want to know what's going on" (I4).

Another person called the SFALS audiences "unicorns" (I7) because they, like himself, where interested in learning, unlike the people in his world outside of the lecture series. "I just don't find other

people interested in that" (I7). Others didn't really discuss the series before or after because most people in their lives were not interested. "It's not everybody's interested in going to science lectures, I guess, but to me it sounds like fun" (I6). This is in keeping with "social comparison"

Families and teachers have taken advantage of social identity theory by exposing children to the Science for Alaska Lecture Series. They bring their children to learn about the things that interest them and hope the children will develop the same interest. Bultitude and Sardo (2012) said adults who participated in public science events "associated their involvement with encouraging learning or enjoyment in others, particularly their children" (p. 23). That parents bring their children to SFALS shows a deeper identity of themselves as smart, curious people "It's for us to do things as a family and have a world, you know, a world larger than ourselves" (I9).

Families play an important role in inspiring science learning in their children, according to a study by Archer, DeWitt, Osborne, Dillon, Willis, and Wong (2012). To those families who encouraged and supported their children's science endeavors, "science was not "just another subject," it suffused all aspects of family life, such as daily topics of conversations, leisure time, and family activities and joint interests" (p. 891). A Fairbanks mother, who was a university professor and veterinarian, described her main purpose for attending the Alaska lecture series was to expose her children, ages 5 and 7, to science. "Of course, as a parent, I like to give my kids an opportunity to hear about everything they can hear about. Especially things that aren't in my area of expertise, because they ask me questions I can't explain" (I1). A grandfather who spoke to me said he planned to take his children and grandchildren to science event that involved taking a long car ride. He also noticed that parents and their children attended the lectures. (I4).

5.6 What do they do with the information?

For the most part, the interviewees didn't do much with what they learned, and the reason they

can't talk about the lecture series because they perceive a lack of interest by others. They sometimes spoke about topics they learned with coworkers, friends and family, but not much. "Well, most of the people I'm around, like most of my coworkers, are not particularly interested in stuff. I'll talk to them sometimes but they don't listen very much" (I2). Looking at this through a social identity theory lens, the interviewees are describing their identity as smart, curious people by describing others as not. They are reinforcing their identity as smart, curious people.

5.7: Conclusions:

I can say confidently that the people who allowed me to interview them are smart, curious people. The Arctic clearly defines them and gives the participants a sense of place. They derive identity as smart, curious people because they attend the lectures and because they identify the audience the same. My findings further support current science communication literature that suggests that public events that are meant to increase public understanding of science instead draw like-minded people. Neil DeGrasse Tyson calls these the "blue collar scientists." Many science communicators understand the need for broader understanding of science among the public but early research show they don't have a clear understanding of those who do attend or are recipients of their science information.

I think that this group of self-selecting people are defining themselves as a part of the public that is not clearly understood in the literature as most publications don't take into account this dedicated group of learners. The comments from my participants speak of themselves as lifelong learners, but they see a distinct group of those who are not. The literature backs up the view that the public is not interested in science but a recent study suggests this may be changing (Durant, et al, 2016). Their study of live science events shows an "emerging community dedicated to science events" (p. 37). Lifelong curious adult learners certainly have defined the segment of the public they belong to.

The Arctic also a main theme in reasons for attending Science for Alaska, which suggests place

may influence an audience's appetite for science lecture topics. My own Athabascan culture has a saying, "Dena' Hene' Henash" or "Our land speaks." Alaska defined my people so I think it would be true to those who pay attention and listen. Inspiring a sense of place might be a useful tool for other audiences.

This was a small look at the Science for Alaska Lecture Series audience and the more I studied their answers, the more I wanted to know. A long-term qualitative project would provide more details. Surveying past audiences would add depth in answering my questions of who attends, why and what do they do with the information. A broader look at how place defines curiosity would be apt. Furthermore, another question needs answering. Does providing science information make a better-informed public and citizenry?

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Appendices

Appendix A:

Science for Alaska: Public Understanding of University Research Priorities

IRB 699275-1

Date Approved (put study approval date or revision approval date here)

Description of the Study: Jan. 26, 2015

You are being asked to take part in a research study about the public understanding of local science research. The goal of this study is to learn why people go to science lectures, who goes and what do they do with the information. You are being asked to take part in this study because you attended the 2015 Science for Alaska Lecture Series.

If you decide to take part, you will be asked your age, biological sex, level of education, why you attended and what you do with the information. The interview will take about 20 minutes.

Study participation is for those 18 or older. By agreeing to the study, you are confirming you are 18 or older.

The risks to you for participating are minimal as we are not collecting or keeping any information that would identify you. The benefit to you, I hope, is satisfaction that you are contributing to the public understanding of science research. The study is voluntary. You may withdraw at any time.

If you have any questions, you may contact me at dlcampbell@alaska.edu, or Karen Taylor, my advisor and principal investigator on this project, at kmtaylor4@alaska.edu. She is faculty at UAF in the Communications Department.

The UAF Institutional Review Board (IRB) is a group that examines research projects involving people. This review is done to protect the people like you involved the research. If you have questions

or concerns about your rights as a research participant, you can contact the UAF Office of Research Integrity at 474-7800 (Fairbanks area) or 1-866-876-7800 (toll-free outside the Fairbanks area) or uaf-irb@alaska.edu.

Do you have any questions?

Do you understand and give your consent verbally?

Appendix B: Questions

Science for Alaska: Public Understanding of University Research Priorities.

Research Questions

Note: This are guideline questions intended to get people to open up and tell me more about why they go to the SFALS.

Age:

Gender

Race:

How did you hear about Science for Alaska?

Newspaper

Radio

Web

GI Newsletter

How long have you been attending Science for Alaska?

Of the six lectures, which one interests you the most?

Why do you attend the lectures?

Do you talk about the topics after you leave?

Do you talk about the lectures before you attend?

Do you have a formal science background?

High school

Teacher

College

Personal interest

Why are you interested in arctic science?

What concerns you most about arctic science?

What have you learned the most from the lecture series?

Do you want to learn more about?

Where would you go to learn more?

Why do you think other people attend the lectures?

What did the lecturer do that engaged you?

Did the lecturer keep your attention?

Is there anything else you might like to add?