PROMOTING INTERGENERATIONAL ENVIRONMENTAL EDUCATION: TEACHER-PARENT PERCEPTIONS OF EFFECTIVE METHODS

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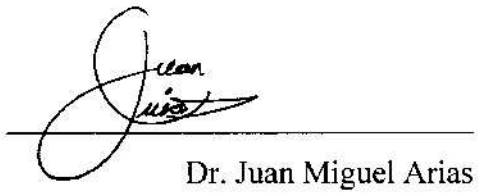

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Abstract

A fifth-grade environmental education program in rural Colorado served as a case study to examine how and what teacher-parents (i.e., parents who are also k-12 teachers) learn about the environment from their children and how environmental education (EE) programs can best promote intergenerational learning. Interviews were conducted with two teacher-parents and one former principal and elemental coding methods were used to draw hypotheses from interview data. Interview data and established theory support three hypotheses: (1) the success of intergenerational learning from an EE program relies on a stable network of communication between the parents, students, school, and EE program; (2) intergenerational learning is greatest when students feel a responsibility and power to share their knowledge of an emotionally stimulating subject; and (3) to promote intergenerational learning, an EE program must operate with specific goals of transferring knowledge from students to parents. Suggestions are made to modify an existing EE program that seeks to promote knowledge transfer from children to parents.

Keywords: Environmental education, intergenerational learning, children and adult learning, teacher-parents

Promoting Intergenerational Environmental Education:

Teacher-Parent Perceptions of Effective Methods

As the field of environmental education (EE) first became formalized in the 1970s, goals, objectives, and guiding principles were set at an intergovernmental conference in Tbilisi, Georgia to clarify the framework, principles, and guidelines that still guide the field to this day (UNESCO-UNEP, 1977). These recommendations covered a large set of possible aims for the field, but emphasized throughout that the goals, objectives, and principles applied to all groups and individuals, across all ages (UNESCO-UNEP, 1977). As the EE field strives to meet these goals, its audience's age range is often limited. Typically, it is easiest to engage younger audiences since they attend school, enroll in summer camps, and have more free time than adults. While giving children environmental skills and knowledge will eventually have an impact on society, it is often the parents or grandparents of those children that make the most impactful environmental decisions in our society. These older generations are no longer consistently engaged with opportunities for EE in the same way their children are and thus may have a dated understanding of environmental topics (Duvall and Zint, 2007). Although knowledge does not directly lead to action (e.g. Hungerford and Volk, 1990), adults can act as more informed voters, consumers, and authority figures by gaining basic knowledge about the environment. As issues such as climate change, biodiversity loss, and deforestation are rapidly intensifying, it is essential that adults act with these concerns in mind rather than waiting for well-informed children to inherit a planet that is beyond repair.

To meet the recommendations in the Tbilisi Declaration and improve the environmental conditions of the future and present, older generations must be given opportunities to develop their environmental knowledge and skills. While environmental educators must walk a fine line between educating students on relevant environmental issues and acting as advocates (Hug, 1977), they have a responsibility to empower students with the ability to advocate for themselves and their truths. Intergenerational learning provides an avenue through which both needs can be met. As children are subjected to EE programs at school or otherwise, they have a capability to bring newly acquired knowledge home to their parents, thus acting as conduits to bring environmental knowledge and skills to older generations.

To develop an understanding of how to promote intergenerational learning in existing school EE programs, this study focused on a partnership between a local EE center and a rural Colorado elementary school's 5th grade class. This program, known as Outdoor Learning School (OLS) does not currently have goals related to intergenerational learning but does incorporate factors that may contribute to intergenerational learning. OLS provided a case study to examine how intergenerational learning is currently occurring and how it can better be promoted through the perspective of teacher-parent interviewees.

Literature Review

Intergenerational Learning

Past research on intergenerational learning in EE provides insight on program factors that promote intergenerational learning and the general conditions that make

intergenerational learning effective. Programs that effectively engage students on environmental topics, especially local ones, are also effective at encouraging these students to teach their parents about the environment. Duvall and Zint's (2007) review of seven studies of intergenerational learning in EE identified a focus on local issues as a common factor important for creating a sense of ownership in students. Local issues provided the most effective stimulation for intergenerational learning when students were encouraged to formulate and implement actual solutions (Duvall and Zint, 2007). Also referenced by Duvall and Zint (2007), some studies suggested that teachers must be enthusiastic about the environmental topics they are teaching so as to encourage students to discuss their learning with their parents (Ballantyne, 2001; Legault and Pelletier, 2000). This engaging instruction should also reach a level of depth most easily achieved over the course of longer term programs (Ballantyne, 2001). Alongside a depth of engagement for students, many studies suggest that programs must involve parents to successfully stimulate intergenerational learning. This can be done by encouraging students to collaborate with parents on homework and projects (Duvall and Zint, 2007) or by actively including them in instructional activities (Zimmerman and McClain, 2014).

Further, literature identifies broader conditions that make intergenerational learning an effective approach to educating older generations on environmental topics. Schools already promote social change by encouraging their associated communities to engage with social issues and by fostering a sense of responsibility, making them appropriate sources of intergenerational learning that will impact communities and broader society (Duvall and Zint, 2007). Additionally, children can hold great influence on environmental issues when given the opportunity, making them appropriate agents for

environmental change (Anderson, 2016). This aspect is especially important in promoting intergenerational learning since children tend to be more informed on more current environmental knowledge than their parents (Duvall and Zint, 2007). The influence of children has shown to be effective even with politicized and controversial topics such as climate change, where children can build concern even in conservative parents (Lawson et al, 2019). However, children and parents alike tend to report that children have little to no influence on parents' environmental attitudes and behavior, making this influence difficult to determine conclusively (Straub and Leahy, 2017).

Throughout the existing literature on intergenerational learning, it is clear that most EE programs do not automatically promote intergenerational knowledge transfer or behavior change. Indeed, much of the past research on the topic focused on programs that were designed to promote intergenerational learning and still often found that intergenerational learning was difficult to achieve. Accordingly, current research must seek information on how best to incorporate intergenerational learning into a wider variety of schools and classrooms. This case study provides insight into past findings on intergenerational learning by bringing more nuance to previously identified factors that encourage intergenerational learning. OLS already includes factors (identified above) that may promote intergenerational learning: enthusiastic teachers, local issues, continuity over a semester, and parent participation in closing events. Still, this is not enough to facilitate significant intergenerational learning. This study investigated barriers to intergenerational learning and aspects of the program that could be modified in order to better facilitate intergenerational learning.

Parent-Teachers and Teacher-Parents

There are not published studies specifically on the experience of teacher-parents (parents who happen to be teachers). However, there is literature on parent-teachers (teachers who happen to be parents). Past research has shown that parent-teachers' understanding of their teaching is guided and improved by their experiences as parents (Sikes, 1998). This finding indicates that people who both teach and parent children cannot separate these two identities and each is informed by the other to a significant degree. As they approach their role as parents, teachers come equipped with knowledge and skills to facilitate learning and communicate with children. This knowledge is likely to give teacher-parents a greater-than-average level of competence when engaging with their own children's education. Teacher-parent interviewees in this study served as an authority on learning and parent-child communication to bring deeper insights into how program factors interplay with intergenerational learning on a parent-child level. This group provided a depth of understanding that allowed the small sample size of this study to yield rich results and insight into intergenerational learning at OLS.

Research Concern

Parents may be unreliable reporters of their own intergenerational learning, tending to underexaggerate the extent to which they learn from their children (Damerell et al, 2013). Thus, this study was not designed to quantitatively evaluate the degree of intergenerational learning that occurs at OLS. Instead, research concerns centered around qualitative aspects of what type of learning occurs, how it occurs, and how it can be improved. Teacher-parents were consulted in pursuit of the following research concerns:

- How and when do teacher-parents learn from their children?
- What do teacher-parents learn from their children?

- How can OLS better facilitate knowledge transfer from child to parent?

Methods

This study sought to develop an understanding of how and what teacher-parents learn from their children during and after their children's completion of an EE program. The methodologies of this study are dictated by the qualitative nature of the research, grounded theory, constructivism, and critical theory. Teacher-parents, as interview participants and authorities on the research concerns, contributed to the construction of knowledge through qualitative interviews. These interview transcripts yielded theories grounded in the opinions and experiences of interviewees. This study was also guided by critical theory since a primary motivation to promote intergenerational learning is a desire to alter the status quo by shifting societal power to young people to help build the environmental knowledge base of adults.

Positionality

As I approached this study from constructivist and critical perspectives, my positionality as a researcher and collaborator with participants influenced the construction of theories through my personal background and identity. Additionally, I conducted interviews while actively involved with the OLS program as a student-teacher. This positionality was valuable for the depth of understanding of the program that it provided but may have decreased interviewees willingness to criticize the program. My identity as a white, cisgender woman who grew up in a middle class family affords me several intersecting and varying degrees of privilege that constitute my experience and understanding of power in society. I spent my childhood living in Minneapolis, MN, its

surrounding suburbs, and in Lund, Sweden and I currently reside in Colorado Springs, CO. As a student, I have studied at public schools in suburban Minnesota, a Waldorf school and international school in Sweden, and currently an elite private liberal arts college in Colorado. I come to this study with an understanding of societal power and environmental conditions that leads me to desire a deep restructuring of societal values and structures. My approach to this study is dictated largely by this desire and a hope that, by giving more power to younger generations to build and disseminate environmental knowledge, society will begin to shift towards a more socially, environmentally, and economically sustainable structure.

Participants

I deliberately placed teacher-parents as the primary source of data to elevate their expertise in the topic as their lived experience by conducting in-depth interviews with two teacher-parents and one administrator from an elementary school in Woodland Park, Colorado. Following the principles of developing interview questions through a series of expanding hermeneutic circles (Guba and Lincoln 1989), the questions were initially structured to gather a broader perspective on the research concern. Then, questions were edited to narrow in on compelling points of interest in subsequent interviews (see Appendix A).

Given the relatively unexplored nature of intergenerational learning (IGL) by teacher-parents in EE, gaining a qualitative understanding through the perspective of teacher-parents was key to this study. The participant selection process began by focusing on the rural elementary school's (hereafter referred to as RES) 5th grade EE program. Each fall, 5th grade students spend their Fridays in Outdoor Learning School (OLS).

Hosted by a local outdoor EE center, RES 5th graders learn about environmental science from undergraduate student-teachers and graduate Fellows. The program culminates with a "Learning Expo" event where parents are invited to view student presentations on their work during a five-week scientific inquiry project from the semester.

The first participant interviewed was the former principal of RES who helped start the 5th grade program in 2014. Subsequent participants were selected from a pool provided by the principal that consisted of teachers and former teachers at the school whose own children had completed the 5th grade EE program in past years. I contacted this pool of five potential participants, here referred to as "teacher-parents," by email. The first two teacher-parents who agreed to participate became the second and third participants after the school's principal. Interviews with two teacher-parents were conducted over video call and the principal interview was conducted in person.

Instruments

By using methodologies rooted in grounded theory, I drew insights directly from study participants who have personal expertise in the topic. This approach required in-depth interviews with each participant and a focus on gaining participants' own insights into the ways in which intergenerational learning occurs as a result of this EE program and in their own homes, if applicable. Interview questions are included in Appendix A.

The first interview was structured to gain insight into the EE program as part of the 5th grade curriculum and an overview of how parents are involved with school programming from a principal's perspective. The initial questions explored the creation of the program under the leadership of this principal and her perceptions of important aspects of the program. Subsequent questions were designed to gain an understanding of

successful parent involvement in their children's learning and ways in which this was facilitated in school programming.

Following this initial interview, I wrote interview questions for the first teacher-parent. These questions were more personal than questions for the principal and pertained mainly to the teacher's role in their child's education. Following the hermeneutic circle approach (Guba and Lincoln, 1989), the new questions were influenced by the information gained from the first interview and dove deeper into the evolving research concern. Beginning more broadly, I asked the teacher to describe their role in their child's education and then narrowed down to their memories of their child's time in the EE program. Questions were designed to gain insight into the way they interacted with their child and the knowledge that was exchanged during these interactions. The final questions asked about changes in the teacher's behavior including how they spent time with their child after the program.

Based on the results of the first interview, the interview protocol was modified to probe key points from the first interview. These changes consisted of the addition of two new questions asking the teacher to elaborate on barriers to their involvement with the child's learning and ways the program could have encouraged intergenerational learning. This included proposing ideas suggested by the previous participant in request of the next participant's opinions.

Data Analysis

Data analysis took the form of a three-stage coding process following elemental coding methods as described by Saldaña (2016, pp. 97-124). First, each interview was transcribed and initial codes were made immediately after completion. Next, after all

interviews were complete, initial codes were placed into second-level categories and third level themes (Saldaña, 2016, p. 14). These three themes dictated the creation of three hypotheses (see discussion section for elaboration on hypotheses).

After each interview was transcribed, NVivo 12 was used to assist initial coding of passages from each participant that related to the research concern. Focusing on the sentence level or smaller, I named 2- to 4-word codes for each idea brought up by a participant pertaining to my research concern. A mixture of in vivo and process coding (Saldaña, 2016, pp. 105-115) was used in this initial round of coding.

Following completion of all three interviews and open coding, second order coding was used to separate the first level codes into categories. Categories were then combined into three themes that yielded the topic of three central hypotheses. To create these hypotheses, each transcript was again coded, specifically grouping by the three major themes. The central claims of each participant within each theme were then summarized as hypotheses.

Results

Initial coding yielded 70 codes (Appendix B). Second order coding grouped these into eight categories. Third level themes contained two to four second-level categories each. Below, solid bullet points designate each theme and subpoints designate included categories. Example quotes from interviews are provided to demonstrate the content of each category.

- Communication Network
    - Greater Interconnectedness

        - "I would advocate for more interactions between the school staff and stewards and fellows."
    - Parent-Child Communication
        - "That's what children need. They need adults, role models, modeling for them."
- Empower Kids
    - Giving Kids Responsibility
        - "Having him take more ownership of that sort of stewardship or awareness [was new.]"
    - Kids' Feelings
        - "He was a lot more motivated to be outside."
- Function Dictates Form
    - Barriers
        - "We never had enough time to interact with the stewards and even the Fellows."
    - OLS Design
        - "I needed people, real people who will teach real children."
    - OLS Potential
        - "I think there is a potential [for intergenerational learning] and I don't think we truly mind the entire potential there."
    - OLS Success
        - "He would spend the entire day outdoors, which I thought was phenomenal, even in wretched weather."

Discussion

The following section will address each of the theme-based hypotheses, analyzing notable quotes from participants and relevant theories. The three hypotheses dictate recommendations to improve existing EE programs and aid in development of EE programs that desire to facilitate intergenerational learning. Hypothesis 1 results from data and codes within Theme 1 (Communication Network) and suggests that intergenerational learning relies on a network of communication with strong links between the parents, students, school, and program. Hypothesis 2 results from data and codes in Theme 2 (Empower Kids) and describes the link between students' emotional experience in an EE program and the resulting intergenerational learning. Finally, Hypothesis 3 results from data and codes in Theme 3 (Function Dictates Form) and recommends that program design be dictated by the goals of the program, in this case, programs should be designed to facilitate intergenerational learning.

Hypothesis 1: The success of intergenerational learning from an EE program relies on a stable network for communication between the parents, students, school, and program.

During interviews, each participant brought up concerns and commented on the nature of communication and connection between Outdoor Learning School (OLS) and RES during the program's duration. Teacher-parents described their varying levels of success when communicating with their children about school and suggested several ways that OLS could provide structure to parent-child communication to increase

engagement and intergenerational learning. Interview data leads me to the first hypothesis.

OLS is an outdoor EE program taught primarily by undergraduate student-teachers at a local EE center. Given these aspects of the program, there is an inherent disconnect between classroom learning at RES and environmental education at OLS. Students spend most of their week in the classroom and on Fridays their teachers pass them off to Fellows and student-teachers at OLS to spend the day outside learning about environmental science. While the OLS curriculum does address Colorado Academic Standards and there is communication between RES and OLS teachers, one teacher-parent raised concern over the amount of collaboration that actually occurs:

> I guess my curiosities are more about how much collaboration there is with classroom teachers, and to see if there was any way that the two could overlap maybe a little bit more, or if they need to overlap a little bit more.

This teacher was not a 5th grade teacher at RES and thus would have an understanding of the amount of communication occurring comparable to that of a non-teacher-parent. While there may be adequate collaboration between classroom teachers and OLS teachers, it is not evident to teacher-parents that this collaboration is occurring. This study is not intended to evaluate the actual extent to which OLS and RES are successfully interconnected. Regardless, it is clear that participants desire and value a strong connection between the program and classroom learning. Another interviewee discussed concern over this connection after observing an OLS lesson:

> Yeah, [the student-teachers] did a great job, okay "you [students] write your sentences." Now they wrote their sentences, now what? Who is going to give

> feedback on those sentences? And if we take it further with the 5th graders, yes great, they spent a day here and they have their scribbles in their journals and then those scribbles need to be transferred into a coherent language. It has to be done at school.

Interview data shows that a stronger connection between OLS learning and RES learning is essential to providing a meaningful experience for students. David Orr (2011) claims that "all education is environmental education" and argues that effective education in any subject must build links to knowledge about the natural world. As students are learning about environmental science through the OLS program, an opportunity is provided for environmental education to permeate their learning in the classroom as well. Equipped with an understanding of the learning that occurs at OLS, RES classroom teachers can build connections between any subject and environmental science.

Fostering a connection between OLS and RES is essential for 5th grade students to experience maximally effective environmental education. To pass quality knowledge on to their parents, a student's understanding of environmental content must be grounded, nuanced, and reliable. Thus, before intergenerational learning can occur, EE programs must ensure effective pedagogy for the students themselves. Based on interview data, this can be improved by building a strong element of interconnectedness between a sending school and receiving EE program. In particular, this will aid OLS and RES in grounding students' EE learning in their daily lives and classroom education. Subsequently, other aspects of an EE program can encourage students to bring this valuable knowledge home to their families.

As an EE program builds a connection with the cooperating school, it must simultaneously connect with parents. The decision to include teacher-parents in this study

was partially influenced by an assumption that, as teachers, they would have an intentional and robust engagement with their own children's education. A goal of the study was to elevate the wisdom and skills teacher-parents may have in structuring their role in their children's learning. This assumption was reinforced in interviews as parents described their desire to play a significant role in their children's education and the ways in which they engage their children in conversation about their learning. In interviews, this parental role was brought up and described in several different ways, yielding the following codes:

- Parent as Facilitator
- Parent as Guide
- Parent as Model
- Parents Asking
- Parents Expecting Communication
- Parents Teaching Kids
- Parents Giving

While each interviewee had a distinct understanding of what the nature of a parent-child learning relationship should be, each philosophy was largely driven by parental effort. Teacher-parents described their roles as facilitators, guides, and models for their children and described interactions in which they probed for information and reflection from their children. One participant brought up the importance of parents

“genuinely giving to [children] their time and attention” and feeling safe to do so in a school environment.

Ideally, parents and children would contribute equally to a conversation about their child’s learning, but even these parents with expertise in education have difficulty encouraging their children to engage with academic topics at home. One teacher-parent described success with setting an expectation for dinner conversation to revolve around each child’s day at school:

> We have a general practice at our house that every dinner time is kind of “let's reflect on our days.” And so, it's just always been the way it is… at our dinner table the kids just kind of start talking about their days.

Instead of the parent needing to question their children for information, each child grew accustomed to describing their day to the rest of the family. Although largely out of the control of the program, this practice is likely to be effective at stimulating conversation about an EE program between parents and children (Ballantyne et al, 1998). Otherwise, teacher-parents expressed frustration with their ability to engage their children in conversation after a day at OLS:

> Instead of us just going "How did it go? What did you learn?" Because, you know, you get a lot of "oh nothing." "It was good."…And not always the conversations are very deep.

The first teacher-parent interviewee brought up an idea to improve the quality of these conversations. They explained their limited understanding of what their child was learning at OLS that would have benefitted from regular communication from OLS to inform parents of the weekly goals and topics.

> It would be wonderful to have specific objectives that parents would know. Like, "Oh, this week, this is the goal. And so, these are ways that you can converse with your child about it."

Communication between parents and their children's school is essential to promoting parent-child engagement (Jeynes, 2018). Furthermore, according to David Uzzell's (1994) research on intergenerational influence, communication between an EE program and parents is needed to catalyze environmental change through intergenerational learning. Ideally, this would take the form of a direct and simultaneous working relationship between the program, parents, and children. In the case of OLS, however, intergenerational influence is not the primary goal of the program and thus, it makes more sense to emphasize the parent-program connection in ways that align with the established OLS system.

Student-teachers at OLS already write lesson plans that include descriptions of the topics and objectives of each lesson. Thus, distributing this information to parents would be a simple change likely to improve parent-child communication. Additionally, these communications could include information about the EE center more broadly as one parent described curiosity about the site of the OLS program: "I just remember at the time going to the computer. 'What is this place? Where are you going?'"

By increasing the amount of information parents are given about the curriculum and site, parent-child communication is likely to improve while the connection between parents and the program is also strengthened. Parent-child discussion is known to be an effective way to initiate intergenerational learning, especially with younger students (Ballantyne et al, 1998; Uzzell, 1994) For intergenerational learning to result in

environmental change, families need to be able to communicate readily about the environment and see it as a legitimate conversation topic (Uzzell, 1994). If parents are given a foundational understanding about OLS and the topics their children learn about, they will be better equipped to engage in these conversations.

In this study, instances in which interviewees actually reported intergenerational learning from the OLS program were rare. When this transfer of knowledge did occur, it resulted from a conversation in which both the parent and the child were engaged. This confirms Uzzell's (1994) and Ballantyne's (1998) points, as previously mentioned, and aligns with psychologist Lev Vygotsky's (1978) theories on learning and development. Vygotsky described the socially constructed nature of knowledge and the ways in which working with a group of peers or an adult can elevate a child's developmental level and understanding of material. It follows that, in conversation with a parent, a child would deepen their understanding of program material and perhaps the pair could develop new layers of knowledge on an environmental topic. Parents may not be initially influenced by trivia and stories their children bring home from an EE program; however, if these conversations can develop further, parents and children may both gain a deeper understanding of the material and its implications. In this position, parents act as guides, models, or facilitators while simultaneously giving their children an opportunity to teach about their newly acquired knowledge on the topic. This is where a great potential for intergenerational learning comes along. Uzzell (1994) found that discussions in which a parent and child are equally likely to take the role of an "expert" lead to the greatest transfer of intergenerational knowledge. The nuances of a conversation between parent and child are dictated by a wide variety of factors, but by improving the base of

knowledge parents have on their children's learning, EE programs can improve the quality of parent-child communication.

Below, I discuss the success OLS has had with building a connection with students during the course of the program. The points brought up in this section lead me to propose an increased focus on strengthening the communication between OLS and RES, between OLS and RES parents, and between RES parents and students when discussing the program. With the suggestions above, a system of communication could be established to build a stronger network between all involved parties, improving the likelihood that intergenerational learning will result from the OLS program.

Hypothesis 2: Intergenerational learning is greatest when students feel a responsibility and power to share their knowledge of an emotionally stimulating subject.

Another prominent theme from the interview data was an emphasis on students' feelings during the program. Primarily, interviewees noticed that the OLS program allowed students to feel special and excited. The interviewees also repeatedly mentioned the importance of students feeling as though they have expertise and ownership over a topic as they share their knowledge with their family. The apparent importance of these feelings in student-parent interactions led me to the second hypothesis.

Immordino-Yang and Damasio (2007) claim that affective factors play a very significant role in learning, attention, memory, decision making, and social function and that emotion is highly important for knowledge and skills learned in school to be transferred back to the real lives of students. This information should encourage educators to take student emotions into account in program and curriculum design to

maximize positive educational outcomes. In the case of intergenerational learning, students whose learning gives them a nuanced and reliable understanding of a topic can better convey valuable knowledge to their parents. This is supported by Ballantyne's (2001) evidence that emotionally charged information has the greatest effect on student learning in an EE program. Thus, student emotions are inherently essential to promote quality intergenerational knowledge transfer in EE. This study brought more clarity to other ways in which student emotions impact intergenerational learning.

One of the greatest areas of success for the OLS program is in the joy that students experience while learning about the environment. This will be discussed in more detail below; however, student enjoyment seems to play a key role in exciting students to discuss environmental topics with their parents. When asked about the emotions that parents noticed their children experiencing during the OLS program, the emotion that was mentioned most frequently was excitedness: interviewees stated that "it was exciting" and "he was really excited." Although this was likely not the most common emotion that all students felt during each day at OLS, it is the one that was conveyed most frequently to their parents at home. This corroborates past findings that exciting experiences spur children to discuss school with their parents more often (Ballantyne et al, 2000; Calabria, 2018). Calabria's (2018) research on EE in the same school district as this study found that excited students tended to tell their parents what they learned in an EE program.

While Ballantyne (2000) found similar results about excited students discussing school with their parents, his study noted a concern that, while excited students may talk with their parents, these discussions tend to focus on the program rather than actual

environmental issues. This dynamic was also observed in Armstrong's (2004) study of an EE program's impact on a school and community level. However, my interview data does not support this conclusion. Instead, parents noticed that their children were excited to actually teach about the environmental topics they were studying. One teacher-parent described their child's enthusiasm during and after the program:

> I do remember quite a bit about when he was learning about tree rings. And he was super excited to tell us all about tree rings when we were going on hikes or he still identifies a number of the trees when we're going on hikes and [says] "roll these needles like this."

This leads to my hypothesis that there may be something distinct about the type of excitement that OLS can engender in students, motivating them to teach their parents.

Interviewees frequently observed that OLS students seemed to feel a sense of ownership and empowerment during the program. As one teacher-parent said, "the students, of course, they're top of the school. So that was also like, 'we're cool. We get to get out.'" As 5th graders, the students are the oldest in the school and this opportunity to spend their Fridays outside of school seems to make them feel "special" according to the interviewees. As discussed previously, this feeling of being "cool" or "special" is important because of the affective impact on students' learning. Simultaneously, although less thoroughly documented, these feelings of students' empowerment can contribute to a higher degree of intergenerational influence (Armstrong, 2004; Uzzell, 1994).

Uzzell (1994) emphasized the importance of building skills and a sense of self-efficacy in students to make them feel more confident as experts on an environmental topic in their families. Along the same lines, students must also be empowered to see

themselves as “a respected group within the community” and recognize their ability to “have an effect on the environment” to be comfortable passing on environmental knowledge to others (Uzzell, 1994). This sense of self-efficacy and confidence building is already an evident component of the OLS program. Interviewees noticed that OLS helped their children gained skills and a sense of ownership over the outdoors:

> I think that gave him a piece of ownership. This special place to study.
>
> [He was] more interested in being a better observer, rather than just walking. Being able to point out things.

This development of skills and a sense of ownership over outdoor spaces is critical for EE students to gain confidence in their own actions and recognize that they can “have an effect on the environment” as Uzzell (1994) recommends.

Additionally, Armstrong (2004) observed self-esteem improvement in students who were given a sense of ownership and the responsibility to communicate to others about what they had learned in an EE program. This responsibility to communicate is already a component of the OLS program as well, although relatively concentrated in the end of the program. Students participate in an event called “learning expo” during which they present on their inquiry project at OLS. OLS teachers, parents, and younger students at the school are invited to hear these presentations and parents continuously express positive feedback about the experience:

> I’ve seen many parents including, let’s say less functional than others, coming to the presentations, coming to Learning Expo. Being proud of their kids, being amazed that they can do that and deliver that.

This event seems to be a very successful piece of the program and OLS could benefit from extending the expectation that students communicate about their learning across more of the duration of the program each year.

Two interviewees independently brought up the idea of students taking the role of an "expert" during OLS. One parent described this expert role as very motivating for their child:

> I definitely feel like being the expert and having an experience outside that he was able to bring to us, was very motivating for him.

As mentioned previously, Uzzell's (1994) work emphasizes the importance of students being able to take the role of an "expert" in conversation with their parents. As students gain experience feeling like an expert at OLS, they are likely to take on this role more often at home. This interview data is not sufficient to claim that most students at OLS tend to feel like the expert. However, it is clear that this feeling is a potential outcome of the program and could be strengthened to ensure that all OLS students have the chance to feel like an expert. Another interviewee suggested that this be a goal of the program that is communicated to students:

> You could have the goal, from the program, telling the students "Make sure when you go home, ask your parents, what do they know about this? Because now you're the expert."

Students at OLS already tend to have a very positive emotional experience and tend to be very excited about the content they are learning. To increase transmission of this learning to their homes and families, OLS should emphasize students' responsibility and power to pass on knowledge and skills to their community. While the existing

communication network between OLS, RES, parents, and students is strengthened, this effort can be incorporated into communications. As suggested by interviewees, OLS could emphasize to both parents and students that this program is designed to give students expertise in environmental topics and that students are fully capable of conveying their new knowledge to others. Lessons at OLS can continue to facilitate this by building student confidence and teaching science communication skills.

Hypothesis 3: To promote intergenerational learning, an EE program must operate with specific goals of transferring knowledge from students to parents.

This study approached questions about intergenerational learning partially to evaluate the ways OLS does and does not facilitate intergenerational learning in RES 5th grader's families. Currently, intergenerational learning is not among the primary goals of the OLS program, and thus, this study sought to explore ways in which OLS could incorporate intergenerational learning into the existing program. Interview data makes it clear that a primary reason that intergenerational learning is not occurring to a significant extent at OLS is because it is not an intention of the program. OLS has had great success reaching objectives that were built into the program from its conception in 2014: teaching scientific inquiry, connecting students with the outdoors, and inspiring stewardship. If OLS and EE programs desire to encourage intergenerational learning, they must set specific objectives that outline how this will be accomplished, primarily through curricula.

The first interviewee and former principal of RES was essential to the creation of OLS. This interviewee discussed the values and goals that were prioritized in creating the program. An overarching philosophy used in the design of OLS, according to this

principal, was the idea that "function dictates the form." Thus, the program would take whatever form was necessary to accomplish the intended goals and objectives. According to the former principal, one desired function of the program is for students to gain authentic experiences with science and inquiry:

> What really, really matters… [is] the idea that the students will be invited into functioning in the scaffolding of the scientific process, of the inquiry process… At that very time, we were very much debating how to part with science fair in elementary school because to many of us it lacked authenticity and integrity of the process and it's just one of those things we do because "we do that."

Thus, the current OLS spends a large portion of the semester working through an inquiry project. Students are given agency to ask questions they are interested in, investigate answers through field work, and present their findings to their community at the end of the program.

A second goal of the program, according to this principal, was "the idea of students spending an entire day every week in this environment." With the goal of providing an authentic experience of environmental education for students, the form the program took already made sense. Spending time outdoors and ensuring that learning is place-based is highly valued in the field of environmental education as a method of grounding learning in student's reality and the place in which it occurs (Sobel, 2008). Additionally, giving students the opportunity to know a natural area near their homes contributes to a final goal described by this principal:

> [It was important to] build a capacity for the kids and give them skills to be intelligent residents of their place; this is where they live. They know this place.

> Many of them, many of their families are very outdoor-oriented families. And, to give them an opportunity to grow more intelligent about it, to become the voices for stewardship and just better people.

An overarching goal of OLS is to inspire stewardship in its students. According to interview data, this was intended to be accomplished by teaching students skills to learn about the outdoors near their home and allowing them to use their knowledge to become more informed stewards.

While this study was not intended to evaluate the extent to which the goals of OLS are accomplished, teacher-parents provided evidence that the program intentions were indeed being realized. More direct surveys of student learning at OLS provide better evidence, but parent responses showed that goals of teaching inquiry, connecting with the outdoors, and inspiring stewardship were successful, at least for their children. Thus, it is evident that this philosophy that "function dictates the form" works well for OLS. Below, quotes from teacher-parents demonstrate their perception of the program. Quotes are categorized by the goals presented by the former principal that they pertain to:

Teaching scientific inquiry:

> I think inspiring questions. You know, being outside and learning that there was so much to learn. So, if that makes sense, instead of just having the information, learning that "wow, there's a whole lot out there that I don't know" and being inspired that way.

> More interested in being a better observer, rather than just walking. Being able to point out things. If that makes sense.

Connecting students with the outdoors:

> You know, but they loved it. The students. Yeah, they felt very special. And like they were being gifted this, like, access to learning outside the classroom and to nature. I think it was very, very valuable.
>
> That outdoor component was huge in keeping us in public school… he would spend the entire day outdoors, which I thought was phenomenal, even in wretched weather.
>
> That opportunity to get outside of the school walls is so valuable for so many reasons.
>
> [It was] impactful in terms of, like, being in nature and what it'd be like for the animals to try to hide and that sort of thing. And that was kind of impactful.
>
> I guess in my mind, it was building relationship with the world around us, as that being the main focus.
>
> He was a lot more motivated to be outside.

Inspiring stewardship:

> [The main goal seemed to be] to create young environmental stewards and scientists, educate them and give them that, give, give them that wonder of the outdoors and help them become stewards.
>
> Having him take more ownership of that sort of stewardship or awareness is what would have been new.
>
> I think we're generally a pretty environmentally conscious family anyways, so I'm not sure that it changed a lot. It definitely reinforced a lot of the things that we've already been trying to do.

According to this interview data, program goals at OLS and the areas in which teacher-parents gave positive feedback are aligned very closely. Parent had many positive things to say about their students learning inquiry skills, connecting to nature, and becoming stewards, but they did not report much intergenerational learning, aside from quotes included earlier in this paper. Still, interviewees expressed excitement and hope for the potential of intergenerational learning at OLS:

> I think there is a potential there [for intergenerational learning] and I don't think we truly mind the entire potential there.

A promising method of bringing intergenerational learning into the existing OLS program would align with some principles that define learning organizations. The concept of schools as learning organizations has been developing since the end of the 20th century and relies primarily on systems thinking in educational leadership (Kools and Stoll, 2016). According to Kools and Stoll (2016), a school that can be considered a learning organization should be made up of members with a shared vision who learn and help the school change as its needs and circumstances change. In the case of OLS, the organization members include OLS and RES staff, students, and parents. The shared enthusiasm evident in interviews for facilitating intergenerational learning at OLS is a first step towards incorporating it more formally in the program. By creating specific objectives and communicating these with the organization members, a shared vision of intergenerational learning at OLS can be built and used to dictate changes in the form and function of the program.

Program Recommendations

This section outlines action steps for OLS to promote intergenerational learning according to the above hypotheses. If implemented, these changes can create a baseline from which to begin quantitatively evaluating the success of intergenerational learning efforts at OLS.

Hypothesis 1: The success of intergenerational learning from an EE program relies on a stable network for communication between the parents, students, school, and program.

Strengthening the network of communication between OLS, RES, and parents can be done primarily through a small effort from student-teachers at OLS. Each student-teacher at OLS should communicate with their students' classroom teacher and parents weekly. These interactions can be brief and occur via e-mail so as not to overwhelm teachers with greater responsibilities. Interactions should primarily consist of conveying the list of learning objectives for the week's OLS lesson and any other pertinent information for the specific group of students. RES classroom teachers should then pass this information on to parents or give student-teachers access to parent contact information if possible.

Ideally, student-teachers would write short weekly newsletters to the parents that include learning objectives and related conversation starters for parents to use with their children. The first of these newsletters should include an introduction from the student-teachers and an overview of the program location and curriculum. These newsletters should also emphasize the "expert" role that students can now take in conversations about their learning at OLS. Conversation starters should be written in a way that encourages

parents to take the role of a learner while guiding their children to communicate about their learning.

Student-teachers hold the greatest responsibility for maintaining this communication, but parents and classroom teachers should be responsive when appropriate. Classroom teachers could help by sending student-teachers a short summary of the week's main topics to increase opportunities for consistency and connectivity between OLS and classroom learning. Parents can be invited to communicate with student-teachers when necessary.

Hypothesis 2: Intergenerational learning is greatest when students feel a responsibility and power to share their knowledge of an emotionally stimulating subject.

OLS programming tends to already involve a great deal of emotionally stimulating content (e.g. time outside, games, cooperative work, etc.) and ensuring that this continues will be essential to promoting intergenerational learning. Student-teachers should carefully build in opportunities for students to safely experience emotionally stimulating activities. In an effort to improve intergenerational learning, these activities should center around topics that will be beneficial for parents to understand as they will likely be the parts of the program that parents may hear most about.

Student-teachers at OLS should also include conversations about intergenerational learning in their lesson plans. These conversations should emphasize students' ability to take the role of the expert at home with their parents. For example, lessons could include helping students write scripts or letters to teach their family members about what they learned at OLS.

Finally, OLS student-teachers should strive to build student confidence throughout the program. This can be done by ensuring students understand the idea of stewardship and their own role as residents or visitors of a natural area. Additionally, students should be given opportunities to practice and build confidence with science communication (e.g. giving presentations, explaining concepts to the rest of their group).

Hypothesis 3: To promote intergenerational learning, an EE program must operate with specific goals of transferring knowledge from students to parents.

Alongside the existing goals that OLS operates on, goals must be established to promote intergenerational learning. These goals should dictate changes in the current form of OLS, including the changes recommended above. The goals should also specify topics that are most important to convey to parents to ensure that these are given attention by student-teachers in a way that will promote intergenerational learning, as described above.

The success of intergenerational learning goals at OLS should be evaluated regularly to ensure that the form is facilitating the desired function. Once the goals are implemented and changes have been made in OLS programming to promote intergenerational learning, pre- and post-program tests and surveys should be delivered to parents each year to quantitatively assess their learning as a result of the program. Long-term retention of intergenerational learning can also be assessed through tests and surveys delivered to parents several months after the program.

Limitations

The greatest limitations to this study were the limited sample-size of interviewees and potential sampling bias. No incentive was offered to participate, and interviews were conducted while school was in session, making it difficult for many teacher-parents to participate. This may have skewed data to represent intergenerational learning at OLS more favorably than other interviewees might have reported since the two teacher-parents willing to participate were likely among the most excited to speak about the program. Similar studies may benefit from conducting interviews during a time that is less busy for teachers or by offering an incentive to compensate for participation. Additionally, the study was limited by my personal involvement with the OLS program. My positionality as an OLS student-teacher may have led interviewees to refrain from expressing negative opinions of the OLS program during interviews. This could be mitigated by maintaining a greater degree of anonymity with interviewees, although this could yield other consequences related to decreased transparency. Finally, some aspects of the study were limited by the lack of past research on teacher-parents. This required the study to design interview protocols for these interviewees based on assumptions rather than research data.

Conclusion

This study brought further clarity on how EE programs can promote intergenerational learning without directly including parents in programming. The unique perspective of teacher-parents in this study raised nuanced hypotheses that are supported by past research but require further research to confirm the utility of each approach to facilitating intergenerational learning. By building a strong communication network,

empowering students, and operating on goals for intergenerational learning, programs similar to OLS may see increased levels of knowledge transfer from students to parents. According to established educational theories, these aspects of a program also tend to improve student learning and thus will benefit a program whether or not they are successful in promoting intergenerational learning. EE programs that do implement changes based on these hypotheses should seek to gather further data on the level and type of intergenerational learning that occurs as a result of program changes.

Interviewees in this study consistently expressed positive views of intergenerational learning and confirmed the importance of extending environmental education to older generations. As the EE field continues to grow, best practices for promoting intergenerational learning should be further developed and implemented with some urgency. Currently, EE reaches a much larger audience of young people than ever before and has the potential to spread modern environmental knowledge to other age groups. This study extends the reach of EE by giving action steps for school-based programs to begin intentionally promoting intergenerational learning without massive modification of the existing program.

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Appendix A.

Interview Questions

Interview 1 Questions: Principal

1. Could you please tell me about your background?
    a. How did you get started in education?
    b. How long did you work at RES?
    c. How have you been involved with the 5th grade OLS program?
    d. Any other important background information you would like to share?
2. What was your motivation behind including the OLS program in the 5th grade curriculum?
    a. What topics do they learn about?
    b. What are the most important aspects of the program?
    c. Would you change, add or remove anything to the program if you had complete control?
3. What is the nature of RES's interaction with parents?
    a. What are some of the most successful ways that parents become involved with their student's learning?
    b. PTA involvement?
    c. Parent chaperones?
    d. Do you remember any specific parent responses about TREE?
4. How else is environmental education included in RES curricula?
    a. Are parents involved in any of this?

Interview 2 Questions: Teacher-Parent 1

1. Can you please tell me about your background?
    a. How long have you been teaching? Has that all been at RES?
    b. When did your child complete the OLS program?
    c. Any other background information you think may be important?
2. How active are you in your child's education? What is the nature of your role in your child's education?
3. What do you remember about your child's participation in OLS?
    a. What do you believe was the aim of the program?
    b. What topics did your child learn about?
    c. Can you recall a moment where your child seemed to have an emotional reaction to the program, positive or negative?
    d. What was most interesting to you about the program?
    e. Based on your experiences, would you suggest any changes or additions to the program?
4. What do you remember about conversations you had with your child about OLS?
    a. Can you recall a time when you spoke with your child about OLS?
    b. Who or what initiated these conversations?
    c. What do you remember speaking about in these conversations?
    d. Did your child bring up any topics you hadn't heard of before?
5. What did you learn from your child during their participation in OLS?
    a. New ways to connect with nature?
    b. Local ecology?

6. What actions did you take as a result of your child's participation in OLS?
    a. Did you research any topics they were learning about? Which ones and to what extent?
    b. Did anything change about how you spent time with your child? If so, how did it change?

Interview 3 Questions: Teacher-Parent 2

1. Can you please tell me about your background?
    a. How long have you been working in education? How long at RES?
    b. When did your child complete the OLS program?
    c. Any other background information you think may be important?
2. How would you describe your role in your child's learning?
3. What do you remember about your child's participation in OLS?
    a. From your perception, what was the aim of the program?
    b. What topics do you remember your child learning about?
    c. Can you recall a moment where your child seemed to have an emotional reaction to the program, whether that was positive or negative?
    d. What was most interesting to you about the program?
    e. Based on your experiences, would you suggest any changes or additions to the program?
4. What do you remember about conversations you had with your child about OLS?
    a. Can you recall a time when you spoke with your child about OLS?
    b. Who or what initiated these conversations?

   c. What do you remember speaking about in these conversations?

5. Did your child bring up any topics you hadn't heard of before?
   a. Did you do any further research about these topics? What did that look like?
6. Did anything change about how you spent time with your child during or after OLS? If so, how did it change?
   a. Spending time outdoors?
   b. New topics?
   c. Environmental behaviors?
7. What barriers were there to your involvement with your child's learning during the time they spent in the OLS program?
8. In your opinion, is there anything the program could have done to encourage your child to teach you more about what they learned from OLS?
   a. To encourage better communication between TREE and parents?

Appendix B.

Codebook

Code	Files	References
Communication Network	0	0
Greater Interconnectedness	0	0
RES Inviting	1	6
Conflicting agendas	1	1
Involving Parents	2	6
Involving Parents Safely	1	3
Marrying College to Life	1	1
Meaningful Parent Involvement	1	3
OLS and RES Interacting	2	2
OLS Inviting	1	2
Parents Investing	2	2
Parents Partnering with Teachers	1	1
Parents Researching Catamount Center	1	1
Parents Supporting Program	1	1
Tying Programs Together	1	1
Ways of Involving Parents	3	14
Parent-Child Communication	2	10

Code	Files	References
Building Parent-Child Relationship	1	1
Children need adults	2	2
Parent as Facilitator	1	3
Parent as Guide	1	1
Parent as Model	1	1
Parent Remembering	1	1
Parents Asking	2	6
Parents Expecting Communication	1	2
Parents Giving	1	2
Parents Researching	2	2
Parents teaching kids	1	5
Reflecting on Conversations	1	1
Superficial Parent-Child Communication	2	2
Empower Kids	0	0
Giving Kids Responsibility	0	0
Giving Kids Skills	1	1
Kids as Stewards	2	4
Kids Having Ownership	2	4
Kids Presenting	1	2

Code	Files	References
Kids Showing Parents	1	1
Kids Teaching Parents	3	7
Kids Teaching Siblings	1	1
Kids Visiting College	1	1
Treating Kids as Experts	2	6
Kids' Feelings	0	0
Feeling Excited	2	3
Kids Emotions	1	5
Kids Feeling Cool	1	3
Kids Feeling Motivated	1	2
Kids Feeling Proud	1	1
Function Dictates Form	0	0
Barriers	0	0
Busy Parents	3	8
Kids Not Caring	1	1
Never Enough Time	1	1
Parents Not Invested	1	1
Unclear Goals	1	3
OLS Design	0	0

Code	Files	References
Authentic Instructors	1	1
Authentic Learning	2	4
Function Dictates Form	2	2
OLS Potential	0	0
Giving Parents Background Knowledge	1	1
IGL as Program Goal	1	1
IGL Potential	1	2
Kids Asking Parents	1	2
Lack of IGL	1	3
OLS expectations	1	1
Parents Learning at OLS	1	1
Parents Visiting OLS	1	1
Program-Parent Communication	2	7
OLS Success	0	0
Being Outside	3	6
Building Relationship to World	1	2
Encouraging Inquiry	2	6
Fostering Wonder	1	2

Code	Files	References
Kids Loving It	2	7
Learning About Trees	1	2
Memorable Games	1	3
Parents Loving It	3	12
Parents Remembering	1	2
Program Strength in People	1	1
Reinforcing Environmental Behaviors	1	1
Unique and Special Program	1	1