

Building a Foundation for Sustainable Principles: Case Studies of K-6 Green Ribbon Schools

Linda Plevyak, PhD, University of Cincinnati
Sara Tamsukhin, MS, RD, University of Cincinnati
Randy Gibson, MEd, University of Cincinnati

Abstract: As schools provide students with choice, support the development of critical thinking skills and promote project-based learning, incorporating a focus on sustainability is a natural progression of the learning process. In 2012, the US Department of Education (DoE) developed a federal outreach initiative entitled Green Ribbon Schools (GRS) that promotes sustainability, healthy living, and collaborative efforts. The catalyst behind this initiative was a group of non-profit organizations, including the Center for Green Schools at the U.S. Green Building Council (USGBC). This research focuses on case studies of K-6 schools that have been awarded the Green Ribbon School designation and how these schools build a foundation for adopting and continuing sustainable principles. Specific K-6 schools were identified and teachers and administrators from those schools were interviewed as to how they incorporated the three pillars of green ribbon schools (reducing environmental impact, improving health and wellness and offering effective environmental and sustainability education) into their existing curriculum and physical structure. Nine thematic categories were found to be the driving factors that supported the GRS success in their sustainable policies. The themes from this research help to articulate the conditions needed to create and advance sustainability initiatives.

Keywords: Sustainability, Green Schools, US Department of Education Green Ribbon Schools (ED-GRS), K-6 Education

Linda H. Plevyak, (linda.plevyak@uc.edu), Associate Director of the School of Education, has served as a member of the University of Cincinnati, OH (USA) faculty since 2000. Research interests include a focus on the development of green schools based on the three pillar framework of reducing environmental impact, improving health and wellness and offering effective environmental sustainability education.

Sara M. Tamsukhin is a registered dietitian and a graduate student at the University of Cincinnati pursuing a doctor of philosophy degree in Educational Studies. Research interests include curriculum development and assessment practices in health-related higher education programs.

Randall Gibson has been teaching middle school science at Cincinnati Public School over twenty years. He obtained his Masters Degree at Miami University. He is currently working on his PhD at the University of Cincinnati.

National US Initiative: Green Ribbon Schools

In 2011, the US Department of Education (DoE) developed a federal outreach initiative entitled *Green Ribbon Schools* (GRS) that promotes sustainability curriculum, healthy living, and reducing the environmental impact of the school facilities, grounds and operations. The catalyst behind this initiative was a group of non-profit organizations, including the Center for Green Schools (CGS) at the US Green Building Council (2018). The CGS has a mission to have every school in the US be a green school within the current generation of students. Presently, there are 50.7 million students in Prek-12 public schools and the CGS states that approximately 18 million of these students are in schools that have green building policies, which constitutes 35.5% of US Prek-12 schools. Barr, Cross, and Dunbar (2014) have attempted to understand how an environmentally-focused school is developed and how that evolution occurs. They created a research-based framework that allows schools or school districts to shift toward the use of a sustainability curriculum, healthy living and greening the school facilities and operations. The framework encompasses the following items:

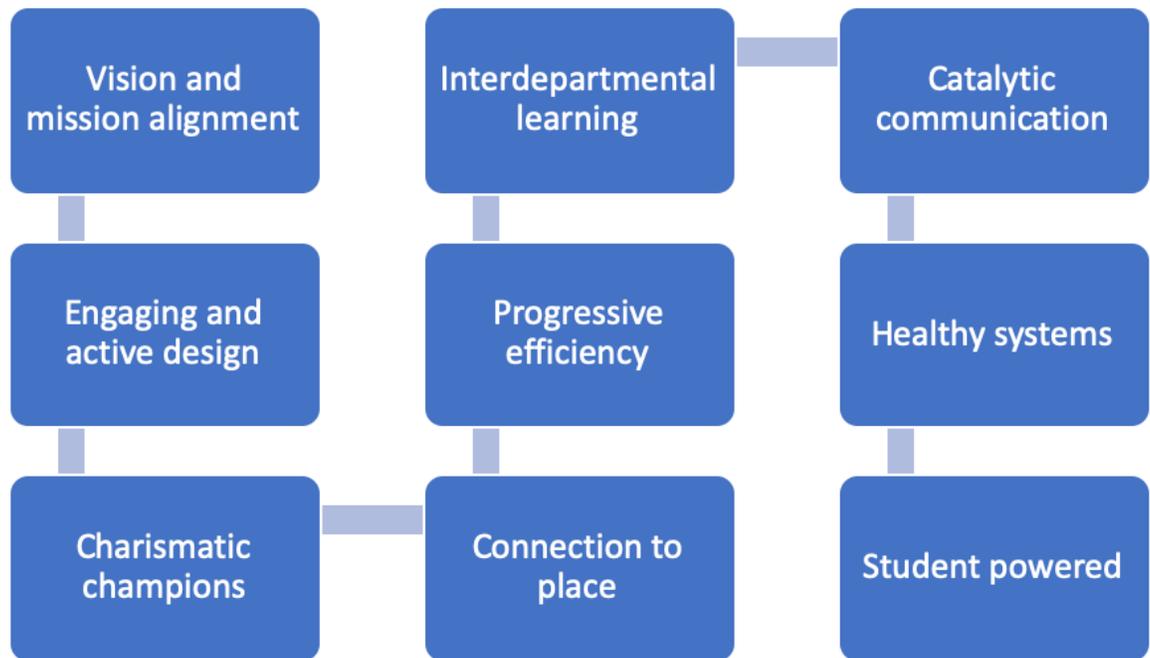


Figure 1. Barr, Cross and Dunbar (2014) framework.

If school administrators and teachers use the framework as a guide to sustainable development, it stands to reason, they should be able to develop a successful program within any budget. The ‘charismatic champions’ will likely be at the forefront of the development process as they will be the catalyst for change. Over the last seven years, the DoE has selected 386 schools, 62 school districts and 40 postsecondary institutions to

earn a Green Ribbon designation. Any of the 50 states can nominate up to two schools per year, though on average, only 29 states are actually participating in the Green Ribbon award.

As there are 132,853 K-12 schools in the US, the GRS award is set up to highlight schools that have made a commitment to sustainability practices, not to try to achieve permeation across all school districts. There are certainly schools that implement environmental concepts without having the GRS designation, though they are difficult to track. For example, Children and Nature Network's research action initiative for promoting Green Schoolyards aims to expand on the Green Ribbon Schools premise, specifically to create education and health equity in low income communities (C&NN, 2018). Spaces for children to experience nature in child care and preschools have also been shown to promote self-efficacy (Kochanowski & Carr, 2014) and executive function (Carr, Brown, Schlembach, & Kochanowski, 2017), as well as being value-added for children's play and development (Carr & Luken, 2014; Elliott, 2016). Therefore, guiding teachers, caregivers, faculty, administrators, and state boards of education toward incorporating environmental concepts into both early childhood education as well as upper grades is crucial as children need to experience and learn about nature, the environment and their place in it.

This research focuses on case studies of K-12 schools that have been awarded the Green Ribbon School designation. Specific K-12 schools were identified and teachers and administrators from those schools were interviewed as to how they incorporated the three pillars of Green Ribbon Schools (reducing environmental impact, improving health and wellness and offering effective environmental and sustainability education) into their existing curriculum and physical structure. Hence, the research question for this study is: How do green ribbon schools build a foundation for adopting and continuing sustainable principles?

Literature Review

While research has looked at sustainability principles, the interconnectedness of projects within GRS, and the role of leadership in sustainability projects, there is limited information about how schools take the initial steps to become a GRS. From the current research available some deductions can be made, such as individuals and leaders within schools must understand sustainability principles and the commitment to sustainability, recognize the characteristics of sustainable schools, have supportive leadership, and be aware of supports and barriers to whole school sustainability.

Defining Sustainability

Sustainability is a key component of GRS but sustainability can be defined in many ways. Veronese and Kensler (2013) define sustainability as "...the capacity of living systems to satisfy their needs in the present without diminishing their capacity to do so in the future and integrates ecological, social, and economic needs" (p. 2). Similarly, Wang (2015) echoes this role of sustainability in green schools for improving "...social, environmental, and financial performance" (p. 334). However, these definitions go beyond environmental practices and include the importance of human connections and cumulative financial savings over time. Principles related to green

schools focus not only on pro-environmental practices but also tend to the social and financial needs of schools (Veronese & Kensler, 2013, p. 2). Simply stated by Birney and Reed (2009): “Sustainability is about the relationship between people, their purpose, and their place” (p. 3).

Initiatives across the globe are emphasizing the need for whole school sustainability. In Australia, the Sustainable School Initiative encourages holistic programs which include measuring outcomes related to finances, environmental changes, and curriculum changes (Tilbury & Wortman, 2005). Schools are encouraged not just to add on to current practices but to consider the changes and reordering that may be necessary in curriculum, leadership, and community (Birney & Reed, 2009). The ED-GRS framework encourages the creation of projects that span across several areas within a school (Warner & Elser, 2015). Warner and Elser (2015) have studied this interconnectedness of initiatives or projects implemented by GRS in the United States. Projects that are interconnected are those that connect with multiple areas in the school such as starting a school garden and utilizing it within the curriculum. Through interviews and then creation of an interconnectedness scale, Warner and Elser (2015) made several observations. They noted that schools in the least interconnected group often had a different approach to sustainability than those schools with high interconnectedness ratios (Warner & Elser, 2015). For those with a higher interconnectedness ratio, they approached sustainability as a new paradigm and not as an additional undertaking (Warner & Elser, 2015). While some simple changes may seem adequate, sustainability is a shift in mindset. In one case study, a school principal and her School Improvement Team recognized projects that already fell under the three pillars, and with further examination they recognized the other strategies that could be used to improve sustainability at their school (Sterrett, Kensler, & McKey, 2016). Whole school sustainability means making changes, reorganizing, and shifting the way that people think.

Models for Sustainability Education

Two similar models for sustainability education have been proposed by Wang (2015) and Veronese and Kensler (2013). In the model asserted by Wang (2015), there are four components to consider in sustainability education: “...school leaders’ attitudes, social pressure, potential impact, and student awareness of environmental protection” (p. 333). The other model from Veronese and Kensler (2013) lists attitudes, subjective norms, and perceived behavioral control as influencing sustainability education. Attitude, which is addressed in both models, is about the perceptions that leaders may have towards sustainable practices. Social pressure from Wang’s model (2015) and subjective norms from the Veronese and Kensler model (2013) are about the internal and external perceptions of sustainability practices and how those might influence school leaders’ decisions. Potential impact (Wang, 2015) and perceived behavioral control (Veronese & Kensler, 2013) also overlap and can be explained as the benefits or difficulties that might come from integrating sustainability, and include funding, support

from administration, stakeholder support, and time. Student awareness is an additional component added in Wang's model (2015) and emphasizes that sustainability within the school environment can help students better understand environmental issues. However, outside influences such as parents, professionals at school, and people in society may also influence students' perceptions.

The models discussed provide guidance to schools interested in implementing sustainability practices. As with any initiative that might be considered in a school, planning requires reflection on attitudes, pressure from students, teachers, parents and stakeholders and the impacts that the change may have. Most of all, the impact that Green School principles have on students is central to the decision.

Characteristics of Sustainable Schools

With planning and reflection, schools must next consider what components or characteristics are part of sustainable schools. In addition to the ED-GRS framework that guides GRS development, Birney and Reed (2009) list seven characteristics of sustainable schools:

1. Sustainable schools give attention to their broader social and ecological footprint;
2. Sustainable schools view their ethos and purpose within a broader global context, and develop an understanding among stakeholders, including students, of that purpose;
3. Sustainable schools create positive benefits for pupils including student engagement, participation, and leadership;
4. Sustainable schools allow development, integration, and connection with other educational policies and initiatives;
5. Sustainable schools provide direction and focus that bring about school improvements, including the ECM outcomes and supports raising achievement and attainment;
6. Sustainable schools focus specifically on improving the learning of children; and
7. Sustainable schools engage in curriculum change and development as sustainability is embedded across the whole curriculum (pgs. 24-32).

These characteristics echo much of what has already been discussed related to sustainability and whole school sustainability. Across the characteristics, there again is the theme of promoting sustainability in all areas of the school, from environment, physical structure, curriculum and permeating the community, with students as an integral part of the process. Hands-on learning, the use of real-life experiences, and opportunities to involve students are beneficial to student learning as well as to developing environmentally friendly citizens (Tilbury and Wortman, 2005; Sterrett, Kensler, & McKey, 2016).

Examination of GRS shows that these schools are displaying sustainable school characteristics by making changes within the environment and curriculum and through wellness projects (Warner & Elser, 2015). However, interviews with GRS indicate less focus on long-term energy reducing savings and projects that had large upfront costs. (Warner & Elser, 2015). This indicates that there is still a lack of interconnectedness of sustainability components even among some Green Ribbon Schools.

Supports and Barriers

Recognizing the need to shift away from a traditional curriculum, as well as identify supports and barriers, are important steps that schools must consider as they adopt or maintain sustainability practices and policies. Finances, time, and resources have been identified as factors that can inhibit the adoption of sustainability practices (Veronese & Kensler, 2013; Warner & Elser, 2015; Sterrett, Kensler, and McKey, 2016). Other barriers may be geographical location or climate which could impact the building of a school garden or other outdoor spaces (Warner & Elser, 2015). Santorello (2019) also noted "...knowledge of stakeholders, resistance to change, teaching staff disruptions, and logistics..." as potential barriers to sustainability practice (p. 82). Identifying ways to overcome these barriers and gaining the support of leadership can advance the implementation of sustainability practices.

While finances or cost are often seen as a barrier, with some sustainability practices an initial investment can lead to savings over time. Looking for reduced cost or no cost opportunities is an option as well (Santorello, 2019). Next, forming partnerships can help with resources. Educating stakeholders, involving and/or incentivizing students, and integrating sustainability into the curriculum all create a more conducive setting for the implementation of sustainability practices (Santorello, 2019). With awareness and planning, schools can be prepared to overcome any barriers that may arise.

Leadership has a major impact on the decision to adopt sustainable practices and pursue the GRS award. School leaders who support and have positive attitudes towards sustainability are necessary in the implementation of these initiatives (Wang, 2015; Santorello, 2019). Essential leadership qualities that are necessary for sustainability include "having outward-focused passion," "cultivating the potential of others," and "demonstrating courageous agency" (Birney and Reed, 2009, p. 38-40). On the other hand, interconnectedness is reduced when the school leaders lack a sense of urgency in implementing sustainability practices or do not fulfill funding or support promises (Warner & Elser, 2015). Overall, leadership plays an essential role in implementing and maintaining sustainable practices.

Incorporating sustainability into education requires a whole school approach incorporating not only environmentally-focused practices but those practices that involve students, faculty, and staff. These practices help to build future generations that will have concern for both the environment and society. The GRS initiative can provide the guidance schools need to embrace environmentally-friendly practices. Schools interested in pursuing GRS recognition may look to schools that have already pursued this award or they may consider principles of sustainability, such as those identified by Birney and Reed (2009). Building this foundation for sustainable practices is one part of the equation, schools must also maintain these practices amidst budget discrepancies, lack of leadership, or other barriers.

Methods

Participants

Eight schools were identified from the 2018 Green Ribbon awardees as part of this study in how schools evolved in using sustainable practices. All applications from the preK-12 schools (46 total) that were chosen as 2018 Green Ribbon awardees were reviewed. The eight schools chosen was based on the depth and quality of how they implement the three pillars of the green ribbon award. The eight schools are located in Florida, Washington state (2), New York, Kentucky, Minnesota, Illinois and Alabama which allows for a diverse regional focus. Principals and/or teachers from each of these schools were interviewed to better understand how they developed a foundation for adopting and continuing sustainable principles. The eight interviews were conducted by the first author and a graduate student. Prior to the phone conversations, the interviewees were sent a questionnaire that was further discussed during the interviews. Each interview lasted between 30-40 minutes and were recorded. Interviews were transcribed and analyzed for common themes by three researchers. Table 1 highlights the specific case studies in this article, including demographics. Of the eight schools, three were suburban, three were rural, and two were urban. Eligibility for free or reduced lunch (FRPL) ranged from two to ninety-six percent.

Table 1 School Participants

School	Location	Demographics
Carnation Elementary	Carnation, WA	K-5th grades, suburban, 430 students, 21% of students eligible for free or reduced lunch (FRPL)
Eatonville Elementary	Eatonville, WA	K-5th grades, rural, 391 students with 48% of students eligible for FRPL
Gove Elementary	Belle Glade, FL	Pre-K-6th grades, rural, Title One school, 730 students with 96% of students eligible for FRPL
Legacy Elementary	Madison, AL	PreK-5th grades, suburban, 740 students with 20% of students eligible for FRPL
Meadowthorpe Elementary	Lexington, KY	PreK-5th grades, urban, 630 students, 44% of students eligible for FRPL
Monroe Elementary	Hinsdale, IL	K-5th grades, suburban,

		405 students, 2% of students eligible for FRPL
North Park Elementary	Fridley, MN	K-5th grades, urban, 477 students, 82% of students eligible for FRPL, 32% limited English proficient
Park Avenue	Warwick, NY	K-4th grades, rural, 480 students, 17% of students eligible for FRPL

Framework

As the theoretical basis for this study, symbolic interactionism, a theoretical focus that emphasizes how individuals act based on a shared understanding of meaning (through language) and how that meaning is interpreted by other people was used (Blumer, 1969). Consistent with this viewpoint, the researchers looked at how administrators and teachers were interpreting what sustainable practices mean to them by focusing on their individual perspectives and experiences. The case study was the preferred methodology for this project as they allow for exploration and understanding of complex issues (Gillham, 2000). As a research tool, case studies help with understanding behavioral conditions through the participant's perspective (Yin, 1984). To examine intervening variables, within-case and cross-case comparisons were used to help identify what conditions were present in the cases that "activate the causal mechanism" (George and Bennett, 2004, p. 21). This causal mechanism is viewed as "the elucidation of the processes that generate the objects, events, and actions we seek to explain" (Ekstrom 1992, p. 115). The eight case studies were analyzed to better understand how administrators and teachers create an environment where adopting and continuing sustainable practices is possible.

Data Analysis

The format for analysing the data followed the constant comparative method by Glaser and Strauss (1967). Each researcher reviewed the interview transcripts and created codes based on important points being made by the interviewees. These codes were continually compared with the previous incidents. From the codes, preliminary themes were developed that emphasized both researcher and respondent categories that used local language and terms (Glaser and Strauss, 1967). Discussion amongst the researchers served to refine the themes into nine categories that embodied the eight schools, though not all schools are highlighted in each theme. The themes are highlighted below and discussed in more detail in the results section:

- School Culture

- Curriculum Integration (connectedness between curriculum and sustainability projects)
- Common Student Experiences (recycling, gardening, water quality, energy, student clubs)
- Longevity (leadership, community)
- Student Voice (empowered by teachers)
- Personal Passion of People Involved and administrative oversight (to help guide the process)
- Supportive Community/Partnerships with non-profits, universities and companies
- Location (school grounds)
- Finances (grants, budgetary item)

Results

The focus of this study is to understand how GRS build a foundation for adopting and continuing sustainable principles. The results section will highlight how the eight GRS focused on the thematic categories as part of their sustainable policies.

School Culture

There was a wide disparity in how sustainable practices permeated school culture. A few of the schools had a very entrenched focus on sustainable practices with leadership, teachers, students and the community very engaged. For example, Eatonville Elementary has overhauled their curriculum, received an inflow of state funding due to low test scores and used those funds for teacher training and support. The national park service staff are members of the school staff and the school now focuses on STEM and sustainability. Other schools are developing a school culture by creating sustainability committees that encompass staff, parents and leadership. Monroe Elementary emphasizes self esteem and life skills through environmental projects and gardening. Three years after revitalizing the living classroom, Monroe Elementary won the US Blue Ribbon award for academics (test scores are good and have seen an increase in student self-esteem and engagement) (J. Horne, D. Riehle and M. Miks, personal communication, Oct. 17, 2018).

A couple of schools struggle with permeating the school culture with sustainability practices, such as Meadowthorpe Elementary, even though they have an energy and sustainability coordinator, who monitors school energy usage, and a STEM coordinator. The STEM coordinator has a personal passion for implementing sustainability practices and does the extra work for the students because she believes they will be ‘better citizens’ (T. Drury, personal communication, Nov. 1, 2018). This lack of whole-school focus may be due to initiatives coming from the district rather than school leadership or grass-roots support from students, parents or other teachers.

Curriculum Integration

As with the school culture, those schools that view sustainability as a whole systems process which permeates everything in and outside of the school, have a high

connectedness between curriculum and sustainability projects. Roughly half of the eight schools have some type of curriculum integration. For example, at North Park Elementary, the science lab has a aeroponic growing system which allows the students to grow 28 different types of vegetables, herbs, fruits, and flowers (the science lab also collects gray water). At Eatonville Elementary they are creating a curiosity room that will include a makerspace. The Eatonville principal views sustainability as a defining factor for the success of her school. It is embedded in the school curriculum with teachers incorporating environmental concepts into all content areas.

At Monroe Elementary, they have had an outside living classroom for over two decades. It includes a prairie, butterfly and vegetable garden, Japanese garden, pond and bee habitat. They take a transdisciplinary approach to learning by integrating problem-based learning with sustainability. For example, the milkweed was slowly disappearing from the Monroe Elementary garden and they used this as a learning tool to figure out the cause. The principal at Gove Elementary highly recommends that each grade level complete a green project.

Common Student Experiences

This subcategory highlights experiences that many of the students may have, though it doesn't meet the threshold of curriculum integration. For example, students may participate in recycling, gardening or energy audits, but it is likely not integrated into their daily schedule or a required part of the curriculum. All of the eight schools had some type of common student experience that allowed them to participate in sustainability projects. For example at Park Avenue Elementary, 8th graders are required to take 10 weeks of environmental education and at Meadowthorpe, students are taken camping for two days with no electronics.

Some of the schools focus on the social/emotional aspects of learning and growing, with a focus on the whole child. Students are encouraged to help in the greenhouse, join a garden club, plant trees or participate in energy audits. Legacy Elementary uses the pond on school grounds for practicing math concepts such as area and mapping. Some of the fifth graders help with maintenance around the pond such as mulching and clearing beds. They also build birdhouses for local bird species and plant sunflowers, oregano, cilantro, orka, and tomatoes. Emphasizing skill sets such as scratch cooking and bee keeping is part of North Park Elementary's future goals. Problem-solving, such as finding out why the milkweed disappeared last year, is embedded in Monroe Elementary's common student experience. The school wants the students to experience sustainability so they internalize and began incorporating the experiences in their daily lives. Monroe Elementary began composting lunchroom waste and has a company that collects it to be used elsewhere. The students and parents are welcomed back to school with a garden party, honey from beehives, and a cooking demonstration with the central office in attendance.

Longevity

Of the eight schools, three have been focusing on sustainable practices for over twenty years, with three more schools emphasizing sustainability over ten years and two schools practicing sustainability between 5-7 years. The majority of the schools have a team or 'green' committee that support the implementation of sustainable projects and/or obtain support from the superintendent's office or leadership within the school such as a principal or sustainability/STEM coordinator. The superintendent for Park Avenue Elementary conducts a teacher mentoring program every year and sustainability practices are part of this orientation. At Park Avenue Elementary, there is a "fantastic (cohesive) team of people who support the green school effort and we have a great relationship with the teacher's union" (J. Yap, personal communication, October, 31, 2018).

The district office in Fayette County, where Meadowthorpe Elementary is located, has a district sustainability and wellness plan. Since the inception of the Green Ribbon School in 2012, Fayette County School District has had a school win the Green Ribbon School award every year. The strongest programs that integrate sustainability into the curriculum, empower students, incorporate community partners and continue to grow their environmental initiatives have strong leadership and teachers working as a team.

Student Voice

Empowering students to make decisions, be responsible and create their own sustainability projects requires mentoring and support from teachers, parents, volunteers or community members. Due to the continual monitoring and guidance required, it is not surprising that only half of the schools supported a student voice in their sustainability initiatives. North Park Elementary has a student green team club and after school ENCORE classes that focus on the environment (in collaboration with Spring Brook Nature Center). A Meadowthorpe Elementary teacher has trained a student group 'green team' to monitor classrooms to see if equipment is turned off. Fifth graders at Legacy Elementary teach the second graders about environmental concepts using the pond as a resource. The upper elementary students are also taking ownership of the pond and adjacent area. At Carnation Elementary the student club is focused on decreasing the metal utensils that are thrown away during lunch, have engaged with the director of food services and are considering compostable utensils.

Personal Passion of People Involved

All of the eight schools had at least one passionate person who maintained oversight of the sustainability projects. In the majority of the schools, administration served as a major support and are integral to the success of sustaining initiatives. All of the people interviewed (except one) felt that if they left their school, others would continue the sustainability momentum as there is now an established culture in the building. Involving others in supporting change is crucial and helps in spreading responsibility across school personnel. Both the principals at Park Avenue Elementary and North Park Elementary took their head custodians to an environmental conference to get their support in making a change to using environmental practices (all school custodians went through training). The sustainability coordinator/science teacher at Meadowthorpe Elementary has an energy and sustainability coordinator from the district

office that helps schools monitor energy usage. The district coordinator also helped Meadowthorpe with the Green Ribbon School application process.

With any organization that has turnover in staff, there is a need to get continual buy-in from new teachers and administrators so training and yearly orientations are required. Monroe Elementary's principal has new staff go through an orientation to school culture and training on how to integrate the outdoors with the school curriculum. At Gove Elementary there is a teacher from each grade level on the green committee so that when the two teachers that share the STEAM coordinator position leave, the outdoor work will continue.

Supportive Community/Partnerships with Nonprofit Organizations, Universities and Companies

Each of the schools use their outdoors in substantial ways, such as creating a butterfly, hummingbird or edible garden, building paths through the woods, developing a living classroom learning lab, using a beehive as an observation area, and planting native fauna to repair a riverbank. This type of integration of the outdoors with the learning process wouldn't happen without volunteers and support from the community. All of the schools had established ties to non-profit organizations, universities or companies. Working with a Lexington recycling company, the Meadowthorpe Elementary recycling team coordinates emptying every classroom and office recycling bin each week. The school also works with the University of Kentucky to renovate the garden area to avoid the use of lawnmowers.

Using parent expertise, Monroe Elementary had volunteers plan the vegetable, Japanese, prairie, pond, and observational beehive areas. The school also donates vegetables and fruits from the garden to a food pantry. At Legacy Elementary, Lowe's and Home Depot donated plants for the outdoor area and the Alabama Outdoor Wildlife Federation donated fish for the pond. Parents, high school students and boy scouts help with weeding and gardening. The University of Florida helped Gove Elementary create a barn owl house. The school also has a strong connection with the two high schools in their district, with the high school students volunteering their time to support sustainability projects. Carnation Elementary works with local Native American tribes in planting trees and restoring the riparian zone on local rivers, with parents supporting the initiatives.

Location (School Grounds)

Five of the eight schools were located near an ideal environmental location such as a mountain range, the Florida Everglades, pond, lake or river. Eatonville Elementary, located at the base of Mt. Rainier in Washington, was gifted a farm close to the school and has national park service staff that have become members of the school staff. Carnation Elementary is located close to two rivers and the teachers can take the students hiking in local forests and create project-based initiatives that highlight the flora and

fauna of the area. Located in the Florida Everglades, Gove Elementary is also near Lake Okeechobee. Around a decade ago, Legacy Elementary used soil to increase the height of the football field and in so doing, created an ideal location for a pond and outdoor garden area. The school itself is also fairly new and they built with energy efficiency in mind.

All of the schools had some type of energy efficient lighting and a reduce/recycle program. In Warrick County, where Park Avenue Elementary is located, an affluent rural neighborhood approximately 55 miles north of New York City has its own culture related to sustainable practices with biking being a frequent mode of travel and farmer's markets in abundance. The school itself conserves energy by using LED bulbs, reconfigured bus transportation routes to reduce runs by 30% and has the largest solar array (10 acres, 9,000 panels) that is school district-owned in New York. Meadowthorpe has permeable pavers, a green certified pest management system and 75% of cleaning projects are environmentally preferable. Carnation Elementary completed a major renovation in 2010 and installed energy-efficient systems, low-flow faucets and toilets, and is an irrigation-free school while using native plants in the landscaping. With LEED silver certification, Gove Elementary has reduced energy usage by 75% and water usage by 57% by using automatic faucets/toilets/lights.

Finances

Applying for grants and finding ways to make a small budget go a long way is a reality for the people involved with the sustainability projects at the eight schools. Despite differences in location and FRPL status, all schools interviewed have worked within budgets or have applied for external funds in order to incorporate sustainability principles. Though the majority of the schools had a budget for sustainability projects, to renovate, update or increase the number of initiatives, external funds are needed. Acquiring a \$90,000 EPA grant in 2014 allowed Park Avenue Elementary to fund a large solar array project. Using funds from the district office, the school has also been able to renovate and update physical space with a new library and physical plant. Some of the funds from energy savings at Meadowthorpe Elementary is given to the school to purchase environmental items (recycling containers, energy efficient soda machines, rain barrels). The STEM coordinator also submits for small grants to purchase things like a raised garden bed.

There are upfront costs to environmental initiatives such as buying solar panels and recycle bins or replacing windows and changing to LED lighting, though over time there will be an overall savings to the school. North Park Elementary's district office was initially resistant to costs for compostable garbage bags and recycle bins, though realized that over time they would have a cost benefit. North Park Elementary will soon expand the 60 kw rooftop array to 80 kw as well. After receiving a grant from an energy company, they are looking for funds to add LED lighting and expand the garden area.

Having multiple funding avenues is helpful to maintain forward momentum. Monroe Elementary received funds from a car company to build a green power car, holds fundraisers to support their garden, received funding through the PTO and also has a budget allocated from school funds. As part of a student club, Carnation Elementary had students help write a grant for water bottle stations. Getting students engaged with Beyond the financial benefit, is student learning quality and health and wellness of students. Eatonville went from the lowest percentile in test scores to a school of

distinction while focusing on STEM and sustainability. Gove Elementary received wellness grants which they believe tie in nicely with the environment (also includes a social/emotional focus).

Discussion

This paper explored how administrators and teachers from GRS create an environment where adopting and continuing sustainable practices is possible. The thematic categories highlighted in this paper show that to have a successful sustainability program, an integral web of support, cultural change, leadership, financial commitment and passion is needed. As the themes were created using local language and terms, they emphasize different terminology than the three pillars of the GRS award program (environmental impact, human health and ecoliteracy), though there is overlap between them (US Green Building Council, 2018). The themes from this research help to articulate the conditions needed to create and advance sustainability initiatives. These conditions provide the underlying support and guidance required to implement the three pillars of the Green Ribbon Schools award program.

The results explored nine different categories, though not all GRS are emphasizing all of them. The process to build a quality GRS is gradual and can take years to build, typically 3-5 years on average (Tilbury & Wortman, 2005). A few of the schools are successfully implementing sustainability projects with a limited budget and just a couple of people or small committees. Due to a lack of interconnectedness, this type of school can maintain, though likely it won't be sustainable, especially if one of the involved staff members leave or retire (Warner & Elser, 2015). Support from a school's district office adds a layer of leadership and can shepherd the sustainability process as well as district policy and procedures that focus on sustainable practices.

All of the schools had 'people of passion' involved with the sustainability program, though differences between schools was marked. Reliance on 1-2 people versus numerous committees, administrative commitment and district office support can be the difference between a large, sustainable program and one that is difficult to sustain. Those programs that had an administrative leader were more likely to have larger numbers of engaged people (staff, teachers, parents and community members) and total school buy-in. The GRS with engaged teachers were also the ones integrating the sustainability projects within the school curriculum. Having buy-in from administrators and teachers tended to mean that students were empowered to be involved in committees, share responsibility with sustainability initiatives and be involved with decision making.

Though this study didn't focus on the impact sustainability programs had on student learning and test scores, it does seem that the majority of the GRS are considered top schools in their region or state. The value of the process is more about saving energy, being less of a burden on the earth and creating better citizens, including a focus on life skills, appreciation for nature, opportunity for failure, and problem solving.

Conclusion

While the percent of schools receiving Green Ribbon School recognition is low, future research could be directed at surveying schools across the US to understand more about overall sustainability practices. Similarly, researchers may ask why schools are not applying for Green Ribbon School awards. Questions about financial concerns could help to better understand the role that location or budget concerns have on the adoption of whole-school sustainability practices. Promoting green schools at the state and local level may also help to increase applications and sustainability practices. Educational policies for sustainability would promote environmentally friendly practices and a healthy society.

Schools that are interested in applying for Green Ribbon School awards can use the themes as a guide in creating sustainability practices and a school culture that fits with these practices. Each of the categories identified through this research contribute to the overall formation of a sustainable education program. The category of ‘personal passion of people involved’ is a necessity for schools that are interested in applying for GRS recognition. These people are champions for sustainability practices and, without their voice and support, programs will likely not develop. Successful Green Ribbon Schools are able to turn this passion into cultural expectations within the school by integrating green practices daily. This is accomplished by utilizing green working teams and collaborative efforts with community and nonprofit organizations. They work within budgetary constraints and recognize outside resources that can be used to foster sustainability. Furthermore, these individuals help to create a sustainability culture that will continue beyond their tenure. Also necessary for maintaining the sustainability culture is the integration of sustainability practices into the curriculum. Creating curriculum interconnectedness allows students, teachers, and staff to recognize the importance of sustainability and will promote further sustainable initiatives within the schools themselves.

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Linda Plevyak



Sara Tamsukhin



Randy Gibson