

U.S. Department of Education Green Ribbon Schools Award

by

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Abstract

This study was conducted in two phases. The first phase was a deep descriptive analysis of the schools who received the United States Department of Education Green Ribbon School (ED-GRS) award over the first three years of the program: 2012, 2013, and 2014. In addition to a descriptive overview, the Ecological Democracy for Whole School Sustainability (ED-WSS) framework (Kensler, 2012) was used to conduct a deeper analysis of the award winning applications. Formal grounded theory allowed me to verify and extend the ED-WSS framework and descriptive statistics summarized the quantifiable trends in the data. The second phase of the study was a descriptive and correlational quantitative study of ED-GRS teachers' perceptions of ecological and democratic principles in their schools. Descriptive statistics described the ED-GRS teachers' perceptions of how the ecological and democratic principles operate in their schools. Correlations were used to look deeper at the ecological and democratic principles and to what extent these principles were related.

This dissertation relied on a mixed-method, descriptive analysis and correlational study. In phase 1, there were three main characteristics of the ED-GRS award winners: (1) They had established strong partnerships or networks within or outside of their school communities; (2) They had provided choice for students and staff with respect to health and wellness; and (3) They had a clear purpose or vision for the school that has been communicated to all stakeholders. Three schools of the ED-GRS award winners qualified as the "greenest of the green schools" based on evidence of their practicing both ecological and democratic principles; these schools

are described in detail. The six ecological principles were consistently evident in all of the ED-GRS award winners. The ten democratic principles were less evident, with the exception of a few schools.

In phase 2, teachers in ED-GRS award winning schools reported evidence of ecological and democratic principles. The findings suggested that ecological and democratic principles had a positive relationship among them. In addition, there were seven principles that had strong, positive relationships among each other as perceived by teachers in ED-GRS award winning schools. I concluded from the data that sustaining ecological change requires evidence of democratic leadership and community.

This study contributes to the field of educational leadership by providing a descriptive analysis of a newly-created United States Department of Education award. In addition, this study provides schools and school leaders with information as how to make sustainable changes that lead to healthy, high performance schools including a theoretical framework to provide guidance in making the sustainable changes.

Table of Contents

Abstract.....	ii
List of Tables	viii
Chapter I: Introduction.....	1
Statement of the Problem.....	1
Purpose of the Study	4
Research Questions.....	4
Significance of the Study	5
What is the Importance of the ED-GRS Award?.....	6
Key Terms and Definitions.....	7
Limitations	8
Organization of the Study	9
Chapter II: Manuscript #1: An Integrative Literature Review: U.S. Department of Education Green Ribbon Schools Award 2012–2014	11
Literature Review.....	13
Literature Supporting ED-GRS.....	17
How Do Sustainable Schools Integrate Sustainability Education?.....	17
Leadership Insights and Implications of the ED-GRS.....	20
Learning Green: Perspectives from ED-GRS School Educators.....	23
Theoretical Frameworks for Green Schools	26
Whole-School Sustainability Framework (WSS).....	27

Organizational Culture.....	27
Physical Place	28
Educational Program.....	28
Ecological Democracy for Whole School Sustainability (ED-WSS).....	29
Ecological Principles	29
Democratic Principles.....	30
Laying the Foundation of “Green Schools” in the U.S. and Internationally	31
Importance of School Leader Preparation	33
Importance of Role Models	33
Charismatic or Transformative Leader	34
An Integrated Environmental or Sustainability Curriculum.....	34
Improvement of Health and Wellness.....	35
Environmental Design and Cost-Savings	36
What are the Available Research Reports Saying About “Green Schools”?.....	38
Benefits of “Green Schools”	39
Financial Benefits	40
Energy Enhancements.....	41
Sustainability Professionals	42
Summary	43
Conclusion	43

Chapter III: Manuscript #2: Analysis of the First Three Years	45
What is the ED-GRS Award Program?	46
Literature Review.....	49
Theoretical Frameworks for Green School.....	51
Methods.....	53
Research Design.....	54
Research Questions.....	54
Sample.....	54
Analysis.....	55
Limitations	55
Results.....	56
Overview of the Ecological Democracy for Whole School Sustainability (ED-WSS) Data	63
Ecological Principles Data.....	64
Democratic Principles Data	66
Summary.....	70
Discussion.....	72
Chapter IV: Manuscript #3: Teacher Perceptions of Ecological and Democratic Principles.....	74
ED-GRS Award Program	76
Ecological Democracy for Whole School Sustainability (ED-WSS) Framework.....	77
Literature Review.....	80
Methods.....	83
Research Design.....	83
Research Questions.....	84

Sample.....	84
Sampling Method.....	85
Instrument and Data Collection Method.....	85
Data Analysis	89
Limitations	89
Results.....	90
Discussion.....	95
Chapter V: Findings, Conclusions, and Recommendations.....	98
Purpose of the Study and Research Questions.....	98
Summary of Findings and Conclusions	100
Phase 1 of the Study.....	100
Phase 2 of the Study.....	102
Recommendations for Practice	104
Accessibility and Availability of Information	104
School Leadership.....	105
Sustaining Beyond the Initial Award.....	106
Future Research	106
Summary.....	107
References	109

List of Tables

Table 1 ED-GRS Framework.....	16
Table 2 ED-GRS Winners by State, 2012–2014	58
Table 3 ED-GRS Award Winners, 2012–2014 — Type of School.....	60
Table 4 ED-GRS Award Winners, 2012–2014 — Type of Funding.....	61
Table 5 ED-GRS Award Winners, 2012–2014 — Grade Configurations	62
Table 6 Overview of the ED-WSS Principles.....	64
Table 7 Ecological Principles	65
Table 8 Democratic Principles	67
Table 9 Evidence of Ecological Principles in ED-GRS Award Winners, 2012–2014	78
Table 10 Evidence of Democratic Principles in ED-GRS Award Winners, 2012-2014	79
Table 11 Sample Survey Questions – Section 1 Ecological Principles	87
Table 12 Sample Survey Questions – Section 2 Democratic Principles	88
Table 13 Phase 2 – Teacher Perceptions of ED-WSS in ED-GRS Award Winners, 2012-14 ...	91
Table 14 Correlations of the Ecological and Democratic Principles	94

CHAPTER I: INTRODUCTION

Students spend approximately seven hours a day, 35 hours a week, 140 hours per month, 178 days per year, and 2,314 days or 16,198 hours in K–12 facilities. According to the 2016 State of Our Schools report, school facilities are significantly underfunded (Filardo, 2016). There were three critical points discussed in this timely publication: (1) the scale of elementary and secondary public school infrastructure; (2) the significant effort that communities are making to provide safe, healthy, and adequate public facilities; and (3) the future investment needed to ensure adequate and equitable public school facilities for all students, including those in low-income communities (p. 4). These critical points about school facilities in addition to staff and students' health and wellness and the implementation of environmental and sustainability education reflect the need for school leaders, teachers, policy makers, and communities to redirect attention, energy, and funding to create healthy, high performance or green schools for all K–12 students.

Statement of the Problem

In the spring of 2011, Arne Duncan, then the nation's Secretary of Education, announced the concept of the U.S. Department of Education Green Ribbon School (ED-GRS) award. Applications for the inaugural year of the award were made available in the fall of that year with the first school award winners announced on Earth Day 2012. The ED-GRS award was created 41 years after the first Earth Day celebration in the United States. "Earth Day had reached into its current status as the largest secular observance in the world, celebrated by more than a billion

people every year, and a day of actions that changes human behavior and provokes policy changes” (earthday.org, n.d.). As of April 2016, more than 350 schools, school districts, and institutes of higher education have been recognized as ED-GRS award winners. Yet, these award winners only represent less than one half of one percent of schools in the United States. Every student can benefit from learning in schools that are safe, promote their health and wellness and provide high quality curriculum that integrates environmental and sustainability concepts seamlessly in their daily required subjects, all in order to prepare them in becoming our future leaders in an ever changing world.

One of the many issues that arises is defining healthy, high performance, green school or whole school sustainability – terms that are often used interchangeably. Edwards (2006) from his study in the United Kingdom explored four characteristics of green schools: (1) resource-efficient, energy use; (2) healthy, both physically and psychologically; (3) comfortable, responsive and flexible; and (4) based on ecological principles (pg. 18). The ED-GRS award framework is focused on three pillars: (1) reducing environmental impact and costs; (2) improving the health and wellness of schools, students and staff; and (3) providing effective environmental and sustainability education (U.S. Department of Education [E], n.d.).

Birney and Reed (2009) suggested seven characteristics of sustainable schools.

They state that ‘sustainable schools (1) give attention to their broader social and ecological footprint; (2) view their ethos and purpose within a broader global context, and develop an understanding among stakeholders, including students, of that purpose; (3) create positive benefits for pupils including student engagement, participation and leadership; (4) allow the development, integration and connection with other educational policies and initiatives; (5) provide direction and focus that bring about school

improvements, including ECM (every child matters) outcomes, and supports raising achievement and attainment; (6) focus specifically on improving the learning of children; and (7) engage in curriculum change and development as sustainability is embedded across the whole curriculum.’ (pgs. 5–7)

Schelly, Cross, Franzen, Hall and Reeve advocated in their 2012 publication that “Schools are the focus of sustainability efforts because they are both extremely important sites of learning and significant consumers of natural resources” (p. 154). Gadotti (2010) expressed that

One of the greatest challenges of reorienting educational practices toward sustainability is to overcome the naturalistic view of the environment and to embrace a systemic view containing multiple, undetermined and interdependent causalities to conceive a learning environment of sustainable management beyond the promotion of isolated actions (reducing, reusing, recycling, etc.). (p. 206)

Selby (2009), in an article about schools in Toronto, Canada, introduced a “dark green” philosophy; moving from “green” being synonymous with “environmental”. He stated that dark green philosophy “view issues of culture, development, environmental and social justice, equity, health and peace to be seamless and inseparable” (p. 89).

Edwards (2006), Birney and Reed (2009), Schelly et al. (2012), Gadotti (2010), Selby (2009), and the U.S. Department of Education provided some guidance in defining healthy, high performance, green schools and sustainability. The “green schools” movement is still in its early stages, yet the available literature and research reports are limited in comparison to other educational issues like testing, the achievement gap, and student behavior. For this reason, I initiated my study into the ED-GRS award in the spring of 2014 after three years of school and school district winners being announced. My interest in the ED-GRS award framework, the

schools, leaders, teachers, students and communities who have received this award stemmed from the lack of available literature on this topic and my deep passion for all students attending healthy, high performance or green schools. I wanted to find out what the framework of the award included, who were the schools that were being recognized, what exemplar practices these schools had implemented, were the practices being sustained past the award, and how did teachers in these schools perceive the practices of whole school sustainability.

Purpose of the Study

This study was divided into two phases. Phase one was a mixed-method, descriptive analysis. Formal grounded theory provided a process in which researchers use a set of *a priori* codes from a concept, model or theory to develop theoretical ideas in the data (Salkind, 2012). I used an extensive set of *a priori* codes derived from the Ecological Democracy for Whole School Sustainability (ED-WSS) framework (Kensler, 2012). Formal grounded theory allowed me to verify and extend this framework (Glaser, 2006). Descriptive statistics were used to summarize the quantifiable trends in the data.

Phase two was a descriptive and correlational quantitative study (Johnson, 2001). Descriptive statistics were used to inform the audience of the ecological and democratic principles perceived by the ED-GRS teachers in the study. An online survey, designed for this study, gathered teacher perceptions about the practice of the ED-WSS framework in their school. The use of Qualtrics was appropriate for collecting the survey data from the ED-GRS teachers because it is user-friendly, readily available, and convenient for teachers.

Research Questions

Phase one of the study was designed to address the following questions regarding characteristics of ED-GRS award winners from 2012, 2013, and 2014. Additionally, this phase

was to dig deeper into the applications of award winners to uncover evidence of ecological and democratic principles.

(1) What characterizes ED-GRS award winners?

(2) To what extent do the ED-GRS award winning applications provide evidence that these schools fit a theoretical model of whole school sustainability (ED-WSS)?

Phase two of the study was also designed to address the following questions regarding ecological and democratic principles (ED-WSS) in schools that received the ED-GRS award during the first three years of the award.

(3) To what extent do teachers from Green Ribbon Schools (2012, 2013, and 2014) report evidence of ED-WSS?

(4) To what extent is there a relationship between teachers' perceptions of practicing ecological and democratic principles in ED-GRS 2012, 2013 and 2014 schools?

Significance of the Study

This two-phased study of the ED-GRS award is just the beginning of a conversation amongst school, community, state and national leaders in an effort to exemplify the work that is being done towards moving all schools towards becoming healthy, high performance or green schools. The significance and timeliness of this study is to provide school leaders with examples of green school practices that can move their schools from high performing to healthy and high performing. In addition, this study provided a theoretical framework for sustaining these practices in an effort for all schools to become ED-GRS award schools. Andrea Falken stated the following in the "Highlights of the 2016 honorees,"

Our honorees are not necessarily the wealthiest institutions. In fact, over the last five years, half of our honorees have educated underserved student populations. When it

comes to green schools, high-poverty schools come out on top. It is no longer a surprise to us that green school practices continue to be used as a tool to improve the built environments, health, and engagement of students of all ages that might seem to have the slimmest chances for success, and that those students are thriving as a result.

(U.S. Department of Education [H], n.d.)

Currently, these award-winning schools represent a very small percentage of schools in the United States. Yet, the trend towards implementing green school practices is growing and gaining attention from local, state, national and international public and private organizations and corporations. Some of the reasons for this movement is the need for schools to focus on the whole child which includes students attending schools that are safe, energy efficient, promote health and wellness and reflect environmental and/or sustainability embedded curriculum.

What is the Importance of the ED-GRS Award?

The ED-GRS award is focused on acknowledging schools that improve student engagement, higher academic achievement and graduation rates, and workforce preparedness, as well as energy independence and economic security (U.S. Department of Education [E], n.d.).

“Schools all over the country can look to today’s honorees as models for creating a healthier learning environment while lowering energy bills and preparing students for success in the 21st century economy,” said Acting Chair Mike Boots. “The schools and districts being honored today are taking smart, innovative steps to reduce environmental impacts and teach students the kinds of sustainable practices that they can carry with them into their homes and future careers”

(U.S. Department of Education [B], n.d.)

The U.S. Department of Education states on their website that awardees are nationally recognized as some of America’s most successful educational institutions in reducing their

environmental impact and costs; improving health and wellness; and providing effective sustainability education. Schools, districts and postsecondary institutions selected may report a renewed sense of pride and accomplishment. They may be sought out as mentors to other schools, districts, or postsecondary institutions; and/or may find greater success raising funds and recruiting students. Each year, all honorees are invited to Washington, D.C. for a ceremony to celebrate their success, share information, and be honored with a plaque and banner to commemorate their achievement (U.S. Department of Education [G], n.d.).

Key Terms and Definitions

Democratic Principles: Ten concepts that reflect democratic practices among individuals and organizations (Fenton, 2002; Kensler, 2012)

Ecological Principles: Six concepts that are foundational for sustainability that are common to all healthy systems; human and nonhuman alike (Capra 1996, 2002; Kensler, 2012)

Green School: A green school is a healthy environment conducive to learning while saving energy, resources and money. (Center for Green Schools, n.d.)

Sustainability: Sustainability is based on a simple principle: Everything that we need for our survival and well-being depends, either directly or indirectly, on our natural environment. To pursue sustainability is to create and maintain the conditions under which humans and nature can exist in productive harmony to support present and future generations. (EPA, n.d.)

U.S. Department of Education Green Ribbon Schools (ED-GRS): ED-GRS is the non-monetary award created by the U.S. Department of Education in 2011. This award is announced each year on Earth Day to recognize the schools, school districts and institutes of higher learning that reflect the three pillars of the award. Only the awards designated at ED-

GRS are recognized by the U.S. Department of Education. (U.S. Department of Education [E], n.d.)

Whole School Sustainability: A whole system approach to sustainability. (Birney & Reed, 2009; Barr, Cross & Dunbar, 2014; Kensler, 2012)

Limitations

There are limitations to using only the publicly available application packets for phase one of the study. The U.S. Department of Education provides an application framework which includes the three pillars of the ED-GRS award, however, state agencies are able to create their own application. This created difficulty in reviewing the applications as each of the states may ask for different information or artifacts. I was also limited by not being able to ask follow-up questions about the information provided in the application. The majority of the applications included a narrative; however, the information provided in the narratives were inconsistent, reflecting the lack of guidance for this aspect of the application. In addition, I was unable to assume that the ED-GRS award winners represented the full extent of green schools around the United States. Each authority is allowed to submit for consideration

... up to five PK–12 school or district nominations. If a state or comparable authority wishes to nominate more than two schools or districts, at least one must serve at least 40 percent of students from a disadvantaged background. For a private school to be nominated, at least one public school or district must be nominated. No more than one of the five nominees in this Pre-K–12 category may be a private school. A school or district may be selected as an honoree only once. (U.S. Department of Education [F], n.d.)

However, this is a large sample of schools recognized for greening their schools and they are part of a growing trend in education across the world. This study presented an initial overview of how green schools are conceptualized and practiced in the U.S.

There also were limitations to conducting an online survey for phase two of the study. One needs to make the following assumptions: participants are willing to participate and honest in completing the survey. In addition, I chose to survey teachers from the entire population of ED-GRS award winners. There were 190 schools in the United States that were awarded from 2012–2014. Locating the contact information for the principal or head of the school: 15% of the applications didn't list the principal or head of school on the application packet that was submitted and made available publicly on the U.S. Department of Education website. This limitation created a need for me to search via school websites and make several dozen phone calls to gather the name of the principal, direct phone number and email address. The turnover rate was 40% of the principals or head of schools as of the fall of 2015. In addition, schools also may have had teacher turnover since being recognized as an ED-GRS award winning school.

Organization of the Study

This study is divided into five chapters. Chapter I provides an introduction to the study, including the statement of the problem, purpose of the study, the research questions that will be answered, the significance of the study including why it matters for schools and the importance of the ED-GRS award, key terms and definitions used in the study, and the organization of the study. Chapter II provides an integrative review of the available literature on the ED-GRS award and the importance of this award for school leaders in sustaining green school practices, the theoretical frameworks surrounding whole school sustainability, and empirical literature, reports and studies that have provided insight and guidance into the green schools movement in

the United States and across the world. Chapter III is phase one of the study focused on what the ED-GRS award is, who the schools are that have received the award during the first three years, and the practices that reflect the ED-WSS framework. Chapter IV is phase two of the study focused on teacher perceptions of ecological and democratic principles in their ED-GRS award school and the relationships that exists between the ED-WSS principles perceived in the participating ED-GRS schools. Chapter V is a summary of findings, conclusions, and recommendations for further study of the ED-GRS award.

CHAPTER II: MANUSCRIPT #1

AN INTEGRATIVE LITERATURE REVIEW:

U.S. DEPARTMENT OF EDUCATION GREEN RIBBON SCHOOLS AWARD 2012–2014

President Obama believes we have a moral obligation to leave behind a cleaner, healthier, and safer planet for our children and grandchildren, that's why inspiring and preparing the next generation of leaders to tackle the tough challenges facing our planet is so important. Today's honorees have shown they are up to the task, setting an example that schools and districts across the country can follow. (Goldfuss, 2015)

The above quote by the White House Council on Environmental Quality Managing Director Christy Goldfuss on June 3, 2015 was included in a press release that was published on the United States Department of Education website in response to President Obama recognizing the 2015 honorees of the Green Ribbon School Award. 2015 was the fourth year of this national award in which 26 states, the District of Columbia, and the Department of Defense Education Authority had awardees. Throughout the five years of this award 30 states have participated on average each year. "The aim of U.S. Department of Education Green Ribbon Schools (ED-GRS) is to inspire schools, districts and Institutions of Higher Education (IHEs) to strive for 21st century excellence, by highlighting promising practices and resources that all can employ" (U.S. Department of Education [E], n.d.).

Although there were 367 ED-GRS awardees as of April 2016, and a global green school movement, scholarly research on the phenomenon of green schools or whole school sustainability is still in its early stages. The purpose of the present study is to fill the gap in research related to these schools and specifically, the ED-GRS award. In order to set the ED-GRS program in context, this literature review will describe the growing body of literature related to green schools and whole school sustainability. The literature review will also explore the theoretical frameworks of whole school sustainability as it relates to the ED-GRS. Schools and school districts in the United States have begun moving towards becoming more sustainable. According to the Center for Green Schools at U.S. Green Building Council (USGBC), 2014 Year End Report Card, “13,712,709 K–12 students are learning in schools with green building practices” (The Center for Green Schools at USGBC, 2014). The Center for Green Schools at USGBC carefully tracks the green schools movement and supports schools in their efforts through training, resources, and funding. This literature review compiles the available research in providing school leaders with relevant resources to guide their efforts in becoming a green school.

The literature review is broken into four major sections. The first section is focused on what the ED-GRS award is and the literature that directly relates to the award. The second section focuses on two theoretical frameworks of whole school sustainability. The third section provides the groundwork of green school practices and the research on the sustainability efforts outside the ED-GRS program, including, but not limited to schools in the United States, Australia, China and the United Kingdom. The fourth section is comprised of research reports that provide guidance to schools and school leaders on implementation of green school practices including benefits and challenges.

Literature Review

Schools and school districts across the United States are beginning to focus their attention on whole school sustainability. The term ‘sustainability’ or ‘sustainable development’ was first introduced in 1987 by the UN World Commission on Environment and Development (WCED) also known as The Brundtland Commission in the book, *Our Common Future*. Sustainable development was defined as ‘development that meets the needs of the present generation without compromising the ability of future generations to meet their own needs’ (WCED, 1987). Whole school sustainability is the practice of designing, managing, and leading healthy, high performance, green schools. “Sustainability is an ethic to embrace, a concept to practice, and a goal to achieve. It is about recognizing and understanding relationships within and among social, economic, and ecological systems” (Auburn University, n.d.). The move towards whole school sustainability is reflected in the ED-GRS award that schools across the United States can apply to become. The ED-GRS award is focused on three pillars: (1) reducing environmental impact and costs; (2) improving the health and wellness of schools, students and staff; and (3) providing effective environmental and sustainability education (U.S. Department of Education [E], n.d.). Schools can implement the necessary changes to reflect the three pillars with the end result of increasing efficiency, decreasing spending, and improving student academic performance. “They are demonstrating ways schools can simultaneously cut costs, improve health, and engage students with hands-on learning that prepares them with the thinking skills necessary to be successful in college and careers,” as explained by U.S. Department of Education Secretary Arne Duncan (U.S. Department of Education [A], 2013).

U.S. Department of Education – Green Ribbon Schools (ED-GRS) Award

The U.S. Department of Education began the ED-GRS recognition award program in fall 2011 and named the first cohort in April 2012. The award highlights the innovative practices of trailblazing schools across the United States that are reducing environmental impact and costs, improving health and wellness, and providing effective environmental and sustainability education. There have been 190 school and 23 district award winners in the first three years of the program. According to the U.S. Department of Education, National Center for Education Statistics ([NCES], 2015), there are approximately 98,328 public schools and 30,861 private schools. This new award has recognized less than ½ of one percent of schools. Green schools are a new phenomenon and are on the cutting edge of whole school and whole district reform.

The U.S. Department of Education created eligibility criteria for nominating schools, districts, and post-secondary institutions for the ED-GRS award. The information below was found on the U.S. Department of Education’s website under eligibility in an effort to provide guidance and clarity for state education agencies and other interested parties.

Each year, state education authorities are able to nominate as many as five Pre-K–12 school or district nominations. If a state or comparable authority wishes to nominate more than two schools or districts, at least one must serve at least 40 percent of students from a disadvantaged background. For a private school to be nominated, at least one public school or district must be nominated. No more than one of the five nominees in this Pre-K–12 category may be a private school. A school or district may be selected as an honoree only once. Authorities are encouraged to consider a school or district’s academic achievement, success in closing achievement gaps, and diversity when selecting school nominees. Free standing early learning institutions are eligible in this

category. In addition to a total of five school and district nominees, each state may nominate one Institution for Higher Education for progress in all three Pillars. For this award, State Selection Committees are encouraged to document where possible how the nominees' sustainability work has reduced college costs, increased completion rates, led to higher rates of employment, and ensured robust civic skills among graduates, and to make an appropriate effort to consider diverse types of institutions. (U.S. Department of Education [F], n.d.)

The application for the ED-GRS award provided a set of criteria for schools to follow as they document their progress toward becoming a healthy, high performance school. The U.S. Department of Education website provides detailed information including purpose, eligibility information, sample applications, contacts and past applications from ED-GRS award winners. The award structure is quite similar to the National Blue Ribbon Schools award that began in 1982. The National Blue Ribbon Schools award program recognizes public and private elementary, middle, and high schools where students perform at very high levels or where significant improvements are being made in students' academic achievement (U.S. Department of Education, [D], n.d.). The National Blue Ribbon Schools award program is focused primarily on academics. The ED-GRS recognition program is less focused on academic achievement compared to the National Blue Ribbon Schools award program, and more concerned with reducing environmental impact and costs, improving the health and wellness of students and staff, and effective environmental and sustainability education in schools (U.S. Department of Education [E], n.d.).

Table 1

ED-GRS Framework

Pillar 1	Pillar 2	Pillar 3
Reduced Environmental Impact and Costs	Improved Health and Wellness	Effective Environmental and Sustainability Education
Elements		
<p>Reduced or eliminated greenhouse gas emissions, using an energy audit or emissions inventory and reduction plan, cost-effective energy efficiency and/or purchase of green power</p>	<p>High standards of coordinated school health, including health, nutrition, and outdoor physical education; health, counseling, and psychological services for both students and staff; family community involvement</p>	<p>Interdisciplinary learning about the key relationships between dynamic environmental, energy, and human systems</p>
<p>Improved water quality, efficiency, and conservation</p>	<p>An integrated school environmental health program that considers occupant health and safety in all design, construction, renovation, operations, and maintenance of facilities and grounds</p>	<p>Use of the environment and sustainability to develop STEM content knowledge and thinking skills to prepare graduates for the 21st century technology-driven economy</p>
<p>Reduced solid and hazardous waste production through increased recycling, reduced consumption, and improved management, reduction, or elimination of hazardous waste</p> <p>Expanded use of alternative transportation, through active promotion of locally-available, energy efficient options and implementation of alternative transportation supportive projects and policies</p>		<p>Development of civic engagement knowledge and skills and students' application of such knowledge and skills to address sustainability issues in their community</p>

(U.S. Department of Education [F], n.d.)

Literature Supporting ED-GRS

The ED-GRS award program has had five years of school, district and Institutions of Higher Education (IHE) winners. However, the published literature on this newly created award is still in its infancy. As of the end of 2015, there have been three published articles focused on the ED-GRS. One of the articles assessed the ED-GRS schools' integration of sustainability education (Warner & Elser, 2014), another surveyed school leaders about their insights on the award (Sterrett, Imig & Moore, 2014) and the third article explored the three pillars of the ED-GRS (Sterrett & Imig, 2015). These three studies represent the initial body of research on the ED-GRS program, as of this writing. Beginning here sets the stage for describing the growing body of literature related to whole school sustainability.

How do sustainable schools integrate sustainability education? An assessment of certified sustainable K–12 schools in the United States. Warner and Elser published an article in 2014 about the first cohort of ED-GRS awardees from 2012 when there were 78 schools that received the recognition award. Of those, 59 schools participated in their study. They introduced “interconnectedness” as a metric to conceptualize sustainability education (Warner & Elser, 2014). This metric proposes that if schools have implemented the three pillars of the ED-GRS they are or should be implicitly making connections among the environment, society and the economy. Warner and Elser created this new metric in response to the incertitude of instruments available to evaluate sustainability education. Warner and Elser (2014) defined interconnectedness as “the facilitation of the interactions, collaborations, and integrations between diverse and relevant disciplines, ideas and educational stakeholders in order to teach students that our actions may, and often do, result in unintended consequences” (p. 2). They used the publicly available ED-GRS applications from the 2012 awardees that are accessible on

the U.S. Department of Education website. Warner and Elser began with reviewing all of the 78 schools that received the award; yet upon digging deeper they realized they needed to gather additional information from the schools. During this phase of their study, 59 of the 78 schools chose to participate by responding to Warner and Elser's request for information. In addition to the self-reported data available through the U.S. Department of Education website, they used sustainability and/or energy reports, school websites, and telephone interviews to validate the green school projects that were listed in the applications.

Warner and Elser (2014) argued that "interconnectedness" must exist among the projects for the projects to be sustained over time.

This interconnectedness of solution-oriented, K–12 sustainability education across the environment, the economy, and the community, and into schools' curriculums and campuses is a primary indicator of sustainability education. A school must be interconnected to its community to allow students to develop an understanding on complex problems. (p. 5)

One of the examples supplied by Warner and Elser in their study to explain interconnectedness was that of a school garden. A school garden where the harvest from the school garden provides fresh produce to its students and then the produce is also used for a school-wide workshop on healthy eating. This example showcased how a single initiative like growing a school garden can be directly connected to stakeholders and other initiatives in creating sustainable practices for school, community, environment and the economy.

Warner and Elser (2015) advocated that schools who received the ED-GRS are national examples of schools that exemplify whole school sustainability. Yet, in the research findings the majority of projects focused primarily on isolated environmental or campus projects. These

projects included the addition of solar panels arrays to their school building or grounds, the addition of wind power or geothermal heating or cooling systems where the main goal was a reduction in energy consumption. The authors defined these as environmental or campus projects; but not projects that would be considered “interconnected.” The authors offer that schools may have chosen to focus on isolated environmental or campus projects due to being impacted by the availability of monetary support for certain types of projects. These projects may have included solar, wind, or geothermal implementation from federal, state and/or local agencies and competitive grants.

The results indicated a large number of schools with recycling programs or recycling clubs; yet these projects also scored low on the interconnectedness metric. Many times, these recycling program are initiated through a recycling club or dedicated teacher or student-leader who spearheads the initiative.

The schools often cited recycling project as one of their biggest sustainability achievements, but personal interviews with teachers who showed these projects were often very difficult to sustain due to the lack of interconnectedness into any other part of the school. (Warner & Elser, 2015 p. 14)

The results also offered that of the 17 schools that achieved a .9 interconnected score or higher were schools designed and/or envisioned as a sustainability or environmentally focused school. The study also suggested that purposeful vision statements that included sustainability and were shared often with staff accounted for high interconnectedness.

Warner and Elser’s (2015) article has initiated a conversation about the ED-GRS award. “Interconnectedness’ of projects is a higher expression of whole school sustainability. One can deduct that the lack of “interconnectedness” in the inaugural year of ED-GRS award winning

applications being associated with the newness of the ED-GRS award and the green schools movement. Their metric of “interconnectedness” supports the idea that if democratic principles are present; ED-GRS award winning schools will sustain green school practices.

Leadership insights and implications of the ED-GRS. Sterrett, Imig and Moore published an article in 2014 focusing on leadership insights and implications of school leaders who received the ED-GRS award in 2012, 2013, and 2014. The purpose of their work was to learn more about the individuals who wrote the application and received the award which was carried out using an online survey. The research questions for their study were:

1. What are your leadership perceptions regarding the school sustainability efforts that were recognized by the ED-GRS award?
2. What benefits do you perceive regarding the ED-GRS award?

The participants in this survey were educational leaders, whom were major contributors to their school’s ED-GRS application. As of 2014, there were 213 schools and school districts that received the ED-GRS award. Of the 213 educational leaders contacted, 75 or 35% of them participated in the online survey. These 75 educational leaders represented superintendents, principals, assistant principals, lead teachers, building and grounds directors, sustainability and/or environmental directors, a community liaison, grants coordinator, school board member, and chief operating officer. The majority of the participants, at 77%, reported their position as a principal, assistant principal or head of school. Almost half of the participants stated they were from schools with less than 20% of students receiving free or reduced lunch. Eleven percent stated that 20–39% of their students qualified; 22% indicated that 40–59% qualified; 10% of the schools stated that 60–79% of their students qualified and 8% declared over 80% received free or reduced lunch. Fifty-four percent or a little more than half of the participants also represented

schools that may be considered mid-sized from 251–750 students. Also, 51% identified themselves at a suburban school and 49% at an urban or rural school (Sterrett, Imig, & Moore, 2014, p.7).

The results of the survey didn't vary significantly due to the size of the school, type of the school (suburban, rural or urban, and elementary v. middle v. high school) or if the school had 40% or more students receiving free or reduced lunch. It is important to note that the ED-GRS award criteria does account for the number of schools that must be considered "disadvantaged". Eligibility criteria was discussed earlier in the article; the criteria come into play if a state wants to nominate more than two schools or district — at least one must serve at least 40 percent of students from a disadvantaged background (U.S. Department of Education [F], n.d). Stating that there isn't a significant difference in the results if the schools were disadvantaged proposes that disadvantaged doesn't impact or defer those schools from attaining the ED-GRS award and further more implementing green school practices.

The first research question aimed attention at the leadership perceptions of the survey participants regarding the schools' sustainability efforts that were recognized by the ED-GRS award. The researchers provided the participants with a Likert-type scale of 1–4, where 1 was not involved and 4 was extremely involved. The researchers asked two survey questions in support of the first research question. The first survey question asked survey participants to indicate the involvement of each group in developing and leading the work and the second question asked about the involvement of each group in sustaining the work. The findings established that teachers, administrators, the school green team and the facilities staff had the highest perceived involvement in both developing and leading and sustaining the work according to the survey participants. Yet, in sustaining the school sustainability efforts, students and

teachers were identified as being the most imperative to the sustainability efforts. In addition, it was mentioned that the schools green team was pivotal. A green team is usually a student-run school organization that may also include other members of the school community. This team may coordinate, direct and implement activities that are focused on greening a school or community.

The second research question asked survey participants about what benefits they perceived regarding the ED-GRS award. The survey included three questions about perceived benefits in the areas of community engagement, student engagement and quality of teaching and learning. The researchers provided the survey participants with a 5-item response choice (significantly declined, declined, no change, improvement or significant improvement). Eighty-five percent of the participants stated that the quality of teaching and learning improved or significantly improved since receiving the award. The question that concentrated on student engagement displayed 90% improvement by the participants and community engagement presented that 77% indicated improvement.

Survey participants were also asked, “Has the U.S. Department of Education Green Ribbon Schools award enhanced your stature in some way by increasing your school’s or district’s visibility and/or attention you have gotten from any of the groups listed? According to the survey findings, local media, current parents, teachers and school board members were listed as the four highest percentages followed by staff, state media, and prospective parents in which all receive a percentage greater than 50% of increased visibility. This data supports the statement on the ED-GRS website.

Schools, districts and postsecondary institutions selected may report a renewed sense of pride and accomplishment. They may be sought out as mentors to others schools,

districts, or postsecondary institutions; and/or may find greater success raising funds and recruiting students. (U.S. Department of Education [G], n.d.)

Participants were also able to add comments; the comments included statements that implied the importance of saving money, improved collaboration and communication, and leaving the world a better place (Sterrett, Imig & Moore, 2014).

Schools really appreciate the validation, awareness, and visibility that the ED-GRS award brings. The passion and excitement in so many of the open-ended responses indicates how eager people are for this kind of recognition, and that green efforts have often been invisible and championed by unsung heroes. (Sterrett, Imig, & Moore, 2014, pgs. 13–14)

Sterrett, Imig and Moore's research is an important contribution to the ED-GRS literature that is currently available. Through their study, they deepened the understanding of the implications of the ED-GRS award by surveying school leaders in these award winning schools from the first three years of the program. The results of this study provide interested school leaders with a roadmap as to the importance of the ED-GRS framework from those who implemented or supported the implementation of green school practices in their schools. This article also opened the door for the need to expand the understanding of the ED-GRS award through the eyes of the teachers in these schools. My study looked at teacher perceptions of ecological and democratic principles in ED-GRS award winning schools and examined the relationships between ecological and democratic principles.

Learning green: Perspectives from ED-GRS school educators. In November of 2015, Sterrett and Imig published an article which expanded their previous study of 75 ED-GRS schools in an attempt to dig deeper into the leadership characteristics, challenges and successes of 12 specific school/districts. The purpose of this study was to provide useful examples of

school sustainability practices through the lens of the three pillars of the ED-GRS. The interview questions were focused on the unique features and practices that each of the 12 schools/districts implemented in connection with the three pillars of the ED-GRS.

Sterrett and Imig (2015) purposefully selected 12 schools/districts for this study as they are all recipients of the ED-GRS award. They conducted 13 interviews on-site, by telephone or online. The roles of the interviewees ranged from superintendents, teachers, sustainability coordinators, principals or heads of school and district compliance managers. The schools or districts were representative of one awardee from 2012, eight awardees from 2013 and three awardees from 2014. Five of the schools were private, six were public schools of which three were charter schools and one public school district. “Responses were organized to fit the three ED-GRS pillars and their related elements” (Sterrett & Imig, 2015 p. 3).

The findings of Sterrett and Imig’s study proposed a variety of practices related to the three pillars of the ED-GRS award. This study also provided school leaders with examples of successful implementation practices and the benefits of those practices. Sterrett and Imig (2015) created a list of eight strategies for school leaders to consider when implementing green school practices. These eight strategies include organizing a green team, implementation of energy saving practices, implementation of waste reduction practices, creation of an outdoor learning garden, building nature trails and outdoor classrooms, establishing student and faculty health initiatives, aligning green school practices within the daily curriculum, and sharing the message with all stakeholders.

In addition to the 13 interviews of the ED-GRS leaders, Sterrett and Imig asked Deborah Moore, Executive Director of the Green Schools Initiative in Berkeley, CA and a co-author of

their 2014 study, about how to start the process of greening a school. Deborah Moore focused on the following key areas:

- 1) Forming a green team that is representative of all stakeholders.
- 2) Take into consideration of “place and passion”; she stated the importance of understanding the needs of the stakeholders in the school community.
- 3) Fostering curriculum integration.
- 4) Consider students and staffs’ overall health.
- 5) Start small.

Lastly, Sterrett and Imig discussed the importance of assessing progress. They stated, “The application process challenges school personnel to reflect on and document the curricular, environmental, and health benefits by going green” (p. 12).

Sterrett and Imig expanded on their first study of ED-GRS principals (2014) and added to the growing body of literature on the ED-GRS award by highlighting successful practices that are reflected in the ED-GRS framework. This work supports current school leaders in their efforts to implement green school practices that can be sustained over time. This work also supports the work that I have completed in writing a descriptive analysis of the 190 ED-GRS award winning school applications from the first three years and the subsequent study that focused on teacher perceptions of ecological and democratic principles in those award winning schools. As further studies are completed and published, the purposeful work of school leaders in whole school sustainability will become more prevalent.

These recently published articles on the ED-GRS award are just the beginning of a growing interest in the ED-GRS award and they are providing school and district leaders, government officials, teachers, parents, students and the community with valuable information

about not only the award itself, but about strategies, and exemplar practices that can be implemented in any schools. In addition, the ED-GRS framework can provide a starting point for schools and school leaders looking to move towards whole school sustainability; offering students a healthy, high performance experience in PK–12. The following section is focused on two theoretical frameworks that support the implementation of green school practices and the ED-GRS.

Theoretical Frameworks for Green Schools

As mentioned previously, the national trend conveys an increasing number of schools that are recognizing the need to implement green school practices in an effort to find creative ways to save money by reducing energy consumption, improving the health and wellness of their students and staff, and including environmental and sustainability education as part of the daily core curriculum (U.S. Department of Education [E], n.d.). However, as schools are implementing green school practices, there are limited resources and tools available in supporting these practices. The ED-GRS framework is one of the available resources, in addition there are two theoretical frameworks that support green schools and whole school sustainability. These frameworks are the Whole-School Sustainability (WSS) framework originating from Barr’s Master’s thesis (2011) and the Ecological Democracy for Whole School Sustainability (ED-WSS) framework introduced by Kensler (2012). Other researchers have provided definitions of green schools. For example, Edwards (2006) suggested there are four characteristics of green schools. He followed that up with 20 critical factors, stating that a school could be considered a “green school” if the schools reflects 75% of those critical factors. His research helped to define factors of “green schools”, yet I found it to be practice versus theory. In my research, I was looking for frameworks that would provide clarity about domains or

principles of practice in whole school sustainability. For that reasoning, I chose to focus on WSS and ED-WSS. Each of the theoretical frameworks are discussed in detail in the next two sections. Each of these frameworks provide school leaders with a structure to understand whole school sustainability, in an attempt to support green school practices in their own schools or school organizations.

Whole-School Sustainability Framework (WSS)

Barr first introduced the framework of Whole-School Sustainability (WSS) in 2011 in her Master's Thesis (Barr, 2011). Barr, along with Cross and Dunbar from Colorado State University, reintroduced the WSS framework in a compilation of case study research in 2014 (Barr, Cross & Dunbar, 2014). The WSS is a framework that came out of a qualitative study of a few exemplar "green" schools. The WSS framework recommends nine principles. The three components are organizational culture, physical place, and educational program. Each of the components has three principles. The WSS framework closely reflects the three pillars of the ED-GRS criteria, with the exception of organizational culture which isn't included in the three pillars.

Organizational culture. The first component is organizational culture, which includes vision and mission alignment, interdepartmental learning and catalytic communication (p. 4). Vision and mission alignment must be present in schools to achieve goals, create a sense of purpose and engage all stakeholders in the implementation and sustainability. Interdepartmental learning can also be defined as the integration of all stakeholders in the learning process, by which feedback is encouraged to improve processes and systems. Catalytic communication is important to the framework as a means to ensure all stakeholders understand and embrace the message and that their behaviors reflect the vision.

Physical place. Engaging and active design, progressive efficiency, and healthy systems are the principles of the second component of physical place (Barr, Dunbar, & Cross, 2014). Engaging and active design speaks to both the natural and built environment of the school. The building can serve as learning resource, and provide opportunities for students to use their senses to uncover beauty, structure, and how biological systems play a role in conservation. Progressive efficiency explores the commitment of leaders to implement practices through the creation of protocols and procedures to ensure sustainability. An example of this principle is a school having a measuring and reporting tool that communicates progress to all stakeholders including the community. Developing healthy systems in schools is integral in the health and wellness of students and staff. This can be achieved through operational practices, like using environmentally-safe cleaning supplies or by removing unhealthy foods from the cafeteria or vending machines. The principle of healthy systems embodies “a system that balances environmental, social and economic concerns” (p. 11).

Connecting people, place, and purpose, a school’s educational program brings the vision and mission of a school to life. If the school’s vision for sustainability is aligned with its core education mission, then sustainability will be visible in the educational program through the leadership of staff, place-based connections, and the activities of students.

(Barr, Dunbar, & Cross, 2014, p. 12)

Educational program. The third component is educational program. Charismatic champions, connection to place, and student powered are the three principles of this component. Charismatic champions speak to the importance of having leaders who believe in the vision and are not only able to carry out the actions, but encourage others along the way through modeling. Connection to place mirrors the significance of the relationship between school and community.

In addition, environmental or sustainability curriculum needs to be integrated into the student's daily curriculum providing the utilization of resources and tools. Sustainability is at the center of Barr, Dunbar and Cross's framework which recommends that students need to be an integral part. Student powered is the final component of the framework. Student powered represents the need for students to be leaders, problem-solvers, and critical thinkers in providing peer mentorship to the school and community in creating a future generation of green school leaders.

Ecological Democracy for Whole School Sustainability (ED-WSS) Framework

Kensler (2012) reported that the "available case studies of green schools suggest the possibility that the ecological consciousness deemed necessary for a more sustainable future is also the thinking that will facilitate effective school improvement strategies" (p. 805). Kensler, in her works published in 2010 and 2012, created a theoretical framework based on ecological principles (Capra, 1996, 2000) and democratic principles (Fenton, 2002) — the Ecological Democracy for Whole School Sustainability (ED-WSS) framework. This work was based on the collection and analysis of available literature on green schools. Kensler draws a comparison of the importance of combining ecological and democratic principles into the whole school sustainability framework through the formation of four categories of schools: (1) ecological democracy or green schools, (2) green bureaucracy, (3) machine bureaucracy, and (4) democratic administration.

Ecological principles. Kensler (2012) stated that "ecological principles govern healthy and sustainable life systems, the systems in which our social systems exist and upon which they depend" (p. 798). Capra defined ecological principles in his books published in 1996 and 2002 as well as on the Center for Ecoliteracy website (<http://www.ecoliteracy.org/article/applying-ecological-principles>). Kensler adopted the six ecological principles in the ED-WSS,

synthesizing the work of Capra. The six ecological principles are: development, networks, partnerships and diversity, dynamic balance, nested systems, cycles, solar energy and flows.

The first ecological principle is development. Development is the progress or change of all living things; in living systems this change is organic and perpetual within individuals, communities, and populations. Networks, partnerships and diversity refers to all living things being interconnected and that heterogeneity promotes flexibility within our networks. Dynamic balance is defined as feedback loops that help maintain equilibrium with the influence of constant change. Nested systems represent the entrenchment of living and non-living systems; when changed affect one another individually and as a whole system or systems. “The ecological principle cycles calls for serious reductions in human-produced waste delivered to landfills” (Kensler, 2012, p. 801). Solar energy and flows advocates for the use of renewable energies, such as solar or geothermal. In addition, as energy is transferred, energy is loss; energy efficiency needs to be practiced by individuals and systems.

Democratic principles. Fenton (2002) presented an original list of ten democratic principles and Kensler extended Fenton’s study of these principles into the field of education. “Individual leadership styles, assumptions, beliefs, and practices of individuals in positions of power and throughout the system may influence the operation of democratic principles and so also influence the expression of democracy” (Kensler, 2010, p. 6). The ten democratic principles are purpose and vision, dialogue and listening, integrity, accountability, choice, individual and collective, decentralization, transparency, fairness and dignity and reflection and evaluation.

Purpose and vision provide a common purpose or goal for an entire organization or system; this must be present for all stakeholders to take action and implement change. Dialogue and listening champions direct communication that allows for clear understandings and

connections; stakeholders listen and they are also heard. Integrity is defined as “doing the right things and doing things right” (Kensler, 2010, p. 8). Integrity also exemplifies honorableness and righteousness. Accountability presents responsibility to whom and from whom with clarity. Stakeholders understand their responsibilities and the responsibilities of others.

The principle of choice reflects how stakeholders have opportunities to make decisions or choices that affect what they do and how they do it. Individual and collective refers to the equity that needs to exist between the group and the person; valuing both the individual and the common good. Decentralization promotes distributed leadership or joint decision-making; “each individual has a significant contribution to make and the capacity to do so” (Kensler, 2010, p. 10). Transparency elicits a sense of clearness and translucency in an organization; information, ideas, decisions etc. are open and accessible to stakeholders. Fairness and dignity necessitates justness and excellence of each stakeholder. The last democratic principle is reflection and evaluation. Reflection and evaluation suggests that there is appropriate time set aside to review and assess the purpose and the vision; allowing all stakeholders to be part of this process.

Kensler (2012) asserted in her framework that “democratic principles govern socially just and continuously learning social systems” (p. 798).

The school communities we work and learn in are those that we design and perpetuate; to the extent that our designs reflect the assumptions of democracy and the democratic principles in action, they will evolve toward more socially just learning spaces. (Kensler, 2010, p. 12)

Laying the Foundation of “Green Schools” in the United States and Internationally

Several environmental and sustainability leaders, educators, researchers, and consultants have published empirical literature and shared their data in support of implementation practices

of green or healthy high performance schools. The articles that are included in this section span across the United States (Schelly, Cross, Franzen, Hall & Reeve, 2012; Veronese & Kensler, 2013), United Kingdom (Edwards, 2006), Canada (Issa, Attalla, Rankin & Christian, 2013), Australia (Pepper & Wildly, 2008), China (Wenzhong, 2004), Cyprus (Zachariou & Kadji-Beltran, 2009) and Israel (Kerret, Orkibi & Ronen, 2014). The work from these authors begins to lay the groundwork for creating and sustaining green or healthy high performance schools. Several of the articles suggest the importance of school leader preparation (Kensler, 2012; Kensler & Uline, 2014; Veronese & Kensler, 2013; Shallcross, Loubser, LeRoux, O'Donoghue & Lupele, 2006), importance of role models (Chawla & Cushing, 2007; Higgs & McMillan, 2006; Schelly, Cross, Franzen, Hall & Reeve, 2012; Veronese & Kensler, 2013), a charismatic or transformative leader (Ernst, 2012; Evans, Whitehouse & Gooch, 2012; Pepper & Wildly, 2008; Schelly, Cross, Franzen, Hall & Reeve, 2011; Zachariou & Kadji-Beltran, 2009), an integrated environmental or sustainability curriculum (Davis & Cooke, 2007; Ernst, 2012; Kerret, Orkibi & Ronen, 2014; Krasny, Lundholm & Plummer, 2010; Miranda, 2015; Pepper, 2013; Shallcross, Loubser, LeRoux, O'Donoghue & Lupele, 2006; Strife, 2010; Upitis, 2007; Wenzhong, 2004), improvement of health and wellness (Chawla, Keena, Pevac & Stanley, 2014; Edwards, 2006; Selby, 2010; Veronese & Kensler, 2013), and environmental design and financial cost-savings (Edwards, 2006; Higgs & McMillan, 2006; Issa, Attalla, Rankin & Christian, 2013; Izadpanahi, Elkadi & Tucker, 2015; Schelly, Cross, Franzen, Hall & Reeve, 2011; Veronese and Kensler, 2013). In the following sections, I discuss key components of green school practices that I found to be most prevalent in the available literature: importance of school leader preparation, importance of role models, a charismatic or transformative leader, an integrated environmental or

sustainability curriculum, improvement of health and wellness and environmental design and cost-savings.

Importance of school leader preparation. “Educational leaders around the world are grappling with the challenges of learning how to design, lead, and manage schools from a more ecocentric perspective” (Kensler, 2012 p. 797). One of the findings in the literature is the importance of teacher and administrator preparation that includes green school and sustainability practices. Kensler and Uline (2014) discussed the need for leadership capacity in Sobel, Gentile and Bocko’s *National Action Plan for Educating for Sustainability*. Shallcross, Loubser, LeRoux, O’Donoghue and Lupele stated “Teacher education programmes should educate students to become educational agents in the process of influencing transformative social and ecological change (2006, p. 289). Veronese and Kensler (2013) add to the above quote, presenting the idea that school leader preparation and professional development is necessary to inform educational leaders about the advantages of implementing green school practices.

Importance of role models. Modeling is defined as providing an example or showing someone how to do something. This can be done “in schools, modeling through facilities, governance, individual behavior patterns, and cultures occurs throughout the entire day and can strongly impact students thoughts and actions (Higgs & MacMillan, 2008, p. 40). Modeling was a characteristic that presented itself in four of the articles providing direction for the implementation of green school or sustainability practices (Chawla & Cushing, 2007; Higgs & McMillan, 2006; Schelly, Cross, Franzen, Hall & Reeve, 2012; Veronese & Kensler, 2013). “School culture is an important venue through which environmentally responsible behavior can be modeled or learned” (Schelly et al., 2012). Veronese and Kensler (2013) support modeling sustainability as one of the top five advantages of leading and managing a school as a green

school. Chawla and Cushing (2007) recommend modeling as a tool to defeat challenges and create policies for success. Higgs and McMillan (2006) suggest “the first step for a school interested in modeling sustainability is to become aware of what the school is currently modeling to students” (p. 51).

Charismatic or transformative leader. Educational leaders are necessary stakeholders in implementing and sustaining change (Ernst, 2012; Zachariou & Kadji-Beltran, 2009). However, these educational leaders need to be charismatic or transformational to lead for sustainability and inspire cultural shifts in their school organizations (Pepper & Wildly, 2008; Schelly, Cross, Franzen, Hall & Reeve, 2011). Evans, Whitehouse and Gooch found in their 2012 study that even with several obstacles, education leaders whom are transformational can overcome and implement sustainable practices. Schelly et al. (2012) found in their study that charismatic leaders were identified by participants in the case study and were said to have inspired the cultural changes through leadership and communication.

An integrated environmental or sustainability curriculum. Gadotti (2010) noted, One of the great challenges of reorienting educational practices toward sustainability is to overcome the naturalistic view of the environment and to embrace a systemic view containing multiple, undetermined and interdependent causalities to conceive a learning environment of sustainable management beyond the promotion of isolated actions (reducing, reusing, recycling, etc.). (p. 206)

Environmental or sustainability curriculum must be integrated and interconnected into the daily curriculum in schools (Ernst, 2006; Krasny, Lundholm & Plummer, 2010; Strife & Wenzhong, 2004). This integrated curriculum also should include hands-on, practical activities that create meaningful connections between the school and community (Ernst, 2012; Kerret, Orkibi &

Ronen, 2014; Krasny, Lundholm & Plummer, 2010; Miranda, 2015; Pepper, 2013; Shallcross, Loubser, LeRoux, O'Donoghue & Lupele, 2006; Strife, 2010; Upitis, 2007; Wenzhong, 2004). Shallcross et al. (2006) offers that “a feature of whole school approaches to environmental education is that schools and their pupils participate in promoting locally derived solutions to concerns about sustainability that derive their authenticity from their presence in and effect on their own communities” (pgs. 284–285). Miranda (2015) advocates that “by incorporating curriculum integration, real-life experiences, ownership of knowledge and partnerships with the community – as well as other aspects of multicultural education, service learning, and sustainability education – this exemplary project seeks to create a strong school community made up of budding global citizens” (p. 221). An integrated environmental or sustainability curriculum can provide a powerful connection between green school or sustainability practices and human health and wellness (Kerret et al., 2014).

Improvement of health and wellness. The improvement of health and wellness was an area of focus in the available literature on green and healthy, high performance schools. Edwards (2006) and Selby (2010) defines physical and psychological health as a characteristic of a green school. Selby also proposes healthy lifestyles and relationships. “Natural areas motivated attention and focusing, students discovered values in the wooded areas, habitat and gardens that they were never taught by the adults who supervised them “(Chawla, Keena, Pevac & Stanley, 2014, p.11). Chawla et al. (2014) stressed the need for green schoolyards. They found in their study that green schoolyards can reduce stress for children. Veronese and Kensler (2013) in their study lists improving environmental and health conditions is one of the top five advantages of a green school.

Environmental design and cost-savings. Financial cost-savings is an area of study that is most prevalent and contested in the field of green or healthy, high performance schools. The available literature focused on financial cost-savings as a benefit for schools that implement energy reduction strategies, conservation of resources, sustainable architectural/environmental design, and building with alternative materials (Edwards, 2006; Higgs & McMillan, 2006; Issa, Attalla, Rankin & Christian, 2013; Izadpanahi, Elkadi & Tucker, 2015; Schelly, Cross, Franzen, Hall & Reeve, 2011; Veronese & Kensler, 2013). “School have made significant efforts to decrease the negative environmental impacts and increase the positive social impacts of their institutions through the construction, maintenance, and operation of their facilities” (Higgs & McMillan, 2006, p. 44).

Edwards (2006) included resource efficient as one of the four characteristics of a green school. Edwards (2006) in his study concluded that “energy efficiency leads to quasi-natural environments in schools that are valued by teachers and pupils” (p. 18). Veronese and Kensler (2013) stated that saving money and conserving resources were two of their top five advantages of leading and managing a school as a green school. Energy consumption can be controlled and reduced in schools. Schelly, Cross, Franzen, Hall and Reeve (2011) focused on cost savings by reducing energy consumption. Issa, Attalla, Rankin and Christian (2013) concentrated on comparing the long-term costs and potential savings of conventional, retro-fitted buildings, and green buildings.

Issa et al. (2013) and Schelly et al. (2011) used quantitative data to analysis the use of energy in conventional, retro-fitted and green schools buildings. Issa et al. (2013) found that there is a cost savings in the operating and maintenance of green schools; they stated that the savings can be immediate, yet their research concluded that it will take over 25 years of savings

in rehabilitation costs and over a dozen years in operating, and maintenance cost to recover the construction costs of building a healthy, high performance school. Schelly et al. (2011) concluded that energy consumption reduction is possible in conventional buildings when there is a charismatic leader present. They also stated the importance of educating students and teachers about the importance of reducing energy consumption. Both Schelly et al. (2011) and Issa et al. (2013) collected data from schools that were designed as green schools as well as conventional and retro-fitted; both articles concluded that schools can reduce their energy consumption.

Schelly et al. (2011) also suggested that creating green schools or a healthy, high performance school is important, but that there are other factors like leadership and school culture that are needed in order for the green schools to significantly reduce their energy consumption. Issa et al. (2013) echoed this conclusion in their data that the green schools were costing less to operate and maintain; but not significantly enough to outweigh the construction costs. The limitations of Issa et al. (2013) and Schelly et al. (2011) is the small number of schools that were used in their studies; yet both articles suggested a need for further research to support the idea that green schools cost less to operate and maintain over time versus the potential cost of green school construction.

Izadpanahi, Elkadi and Tucker (2015) suggested that “sustainable school design informs meaningful understanding in children of the symbiotic relationship between the built environment and the wider ecological context” (p.14). Edwards (2006) builds on the above quote, stating that one can change how stakeholders see their school and raise academic achievement through sustainable architectural design. Schelly, Cross, Franzen, Hall and Reeve (2011) suggested in their study that construction of a health, high performance schools that are

LEED certified are more energy efficient as there are certain enhancements that are built into the new construction.

What are Available Research Reports Saying About “Green Schools”?

Green schools are high performance facilities that have been designed, built, renovated, operated or reused in an ecological and resource efficient manner. Components such as environmental education, leadership development, green behavior development, green facility operations and a focus on efficient resource management encourages students and staff to begin to foster sustainable environmental attitudes and behaviors that carry over into their daily lives. (Johnston, 2009, p. 1)

In the past ten years, several research reports focused on “green schools” have been made available for school leaders. This section is comprised of research reports that provide guidance to schools and school leaders on the implementation of green school practices. The Center for Green Schools at USGBC has been the frontrunner in publishing such reports (Barr, Cross & Dunbar, 2014; Crosby & Metzger, 2013; Gutierrez & Metzger, 2015; Ruedig & Metzger, 2013; Sobel, Gentile & Bocko, 2014). Other organizations have also published reports: The Institute for the Built Environment – Colorado State University (Barr, Leigh & Dunbar, 2011), National College for Leadership Schools and Children’s Services (Birney & Reed, 2009), and the New Jersey School Boards Association (Henry, Angotti & Leone, 2015). In this section, I also reviewed two reports written by professionals in the architectural field (Kats, 2006; Langdon, 2007), as well as various trade magazine articles (Bobadilla, 2010; Chapman, 2014; Gutter & Knupp, 2010; Sanders, 2010). In addition, I reviewed the Center for Green Schools at USGBC “State of the Schools” report published in March of 2013 and 2014.

Benefits of “Green Schools”

“When a school places sustainability at the core of its activity, it supports adults and young people’s learning their contribution and the sustainability of our planet” (Birney & Reed, 2009, p. 3). The focus of this section is to discuss the benefits of green schools which include academic performance, economic benefits, environmental benefits and improving the health and wellness of students and staff. These benefits are included in Birney and Reed’s, findings from the leading sustainable schools research project (2009). In addition to the benefits listed above, Birney and Reed included the need for policies and initiatives and creating a purpose and vision that is understandable by all stakeholders. A recent report from the New Jersey Sustainable Schools Project (Henry, Angotti & Leone, 2015) recommended actions that supported Birney and Reed’s work and also drew attention to the practices of creating a green team and using the physical school building and grounds as a daily teaching tool. All of the benefits discussed in the available research reports support the three pillars of the U.S. Department of Education’s Green Ribbon School (ED-GRS) award: reduced environmental impact and costs, improved health and wellness and effective environmental and sustainability education (U.S. Department of Education [E], n.d.)

School districts are continuously looking for creative ways to save money, spend money and bring more money into their schools, usually in receiving grant dollars and support from local businesses (Bobadilla, 2010). Unfortunately, many times school districts consider only short-term solutions instead of looking at long-term solutions (Leachman & Mai, 2013). Focusing on the long-term, how do schools stay in the black? In March of 2014, the Center for Green Schools at USGBC released the “State of the Schools” report, indicating that it will take more than 500 billion dollars over the next ten years to renovate or replace PK–12 school

facilities. According to Kats (2006), “Greening school design provides an extraordinary cost-effective way to enhance student learning, reduce health and operational costs, and ultimately, increase school quality and competitiveness” (p. 4).

Financial benefits. Analyzing and evaluating the published research reports (Kats, 2006; Langdon, 2007; Ruedig & Metzger, 2013) focused primarily on financial benefits of green schools in the short-term and long-term (Crosby & Metzger, 2013) as well as environmental benefits, impact on students and teachers’ wellness, attendance and engagement. Kats stated in his report that schools who have implemented energy performance enhancements will use an average of a third less energy than conventionally designed schools. This is supported by Bobadilla (2010), who stated that Guilford Middle School in Greensboro, NC uses on average 43% less than a similar school building of its size. Another example of a significant cost savings applied district-wide is Council Rock School District in Newtown, PA who saved over 7.1 million dollars over four years by decreasing their energy consumption by 46% (Gutter & Knupp, 2010). Sanders (2010) recommended that any plan should include decreasing the use of resources, such as energy. This is a simple way to immediately see a cost savings (Bobadilla, 2010; Crosby & Metzger, 2013; Gutter & Knupp, 2010; Sanders, 2010). However, Crosby and Metzger (2013) proposed “implementing a behavior change initiative” (p. 3). A quote by Henry Kelly, President, Federation of American Scientists (as cited in Kats, 2006) stated:

This carefully documented study conclusively demonstrates the financial, environmental, and other benefits of using green technologies in schools. In fact, failure to invest in green technologies is not financially responsible for school systems; the study uses conservative accounting practices to show that investments in green technologies significantly reduce the life-cycle cost of operating school buildings. And the public

benefits of green schools are even larger than those that work directly to the financial advantage of schools. These include reductions in water pollution, improved environmental quality and increased productivity of learning in an improved school environment. (p. 3)

Energy enhancements. Kats (2006) stated in his report that schools can choose different energy performance enhancements in building their healthy, high performance school. Some of the enhancements discussed were efficient lighting, more efficient daylighting and sensors, more efficient heating and cooling systems and better insulated walls and roofs. Guilford Middle School was built to include natural daylighting, which accounts for two-thirds of the lighting source each day (Bobadilla, 2010). Kats explained that there is a direct and indirect benefit for schools. He suggested that the direct benefit is the decrease in monthly utility bills, and indirect, supply and demand of the energy. The less energy buildings use, the more the supply causing a decrease in cost.

Morris, one of the contributing authors on the report published by Langdon (2007) challenged the method in which Kats determines cost savings of green schools versus conventional schools. The concern is that Kats uses a theoretical approach by forecasting costs not findings on actual empirical cost data. Morris (2007) confirmed that this is one of the methods in determining costs, and also the most subjective as the findings relay on the originally created budget and then comparing that the final costs after including energy enhancements. The report also stated that it is most effective for an organization to create goals and identify the features to be included in the building of a healthy, high performance school, and then build the budget around the goals and features. In addition, The Center for Green Schools at USGBC provided five key commendations including collecting school level data on building age,

building size and site size and mandating a Government Accountability Office (GAO) facility condition survey take place every 10 years, with the next one beginning immediately.

Sustainability professionals. Ruedig and Metzger (2013) published, “Managing Organizational Sustainability: Demonstrating the Business Case for Sustainability Professionals in the Workplace.” The purpose of this white paper was to determine if there is a need for sustainability professionals and to what extent are their roles established, and if the positions exist in an organization. Secondly, the authors looked at ways to measure sustainability staff’s impact in organizations. Ruedig and Metzger found that the roles were created by a top leader in the organization in an effort to initiate, intensify or consolidate sustainability programs. The results showed that sustainability professionals have a financial impact for organizations; yet roles look very different across organizations. “It is clear that organizations are increasingly reaching a tipping point at which they decide to incorporate sustainability into their structures. However, this tipping point looks different for each organization, depending on their unique strategies and existing structures” (Ruedig & Metzger, 2013, p. 3).

As a follow-up to the report published by Ruedig and Metzger in 2013, in 2015, Gutierrez and Metzger published, “Managing Sustainability in School Districts: A Profile of Sustainability Staff in the K–12 Sector.” The goals of this study were to develop an outline of whom a K–12 sustainability professional is, compare their roles to job-alike positions in fields outside education, understand the reasons school leader are creating these positions, and looking at expectations and performance of such individuals. The results of the study offered that the K–12 sector is in its infancy in understanding what the role of sustainability professionals should look like, how this position should be evaluated, and reasons as to why this position should be created. However, the results supported the importance of cost savings; this was the most

important metric to the sustainability professionals' supervisors (p. 14). Gutierrez and Metzger (2015) conclude that "In the case of school districts, the sustainability professional can save money, increase managerial efficiency, improve communication and provide new and exciting learning opportunities for students" (p. 15).

Summary

The limited research that has been published since 2004 suggested that schools can save thousands of dollars by building and/or implementing initiatives that support the creation of green or healthy, high performance schools. Schools are saving money by simply turning of lights, computers, controlling heating and cooling systems, and eliminating printing costs (Henry, Angotti, & Leone, 2015; Sanders, 2010). However, there is a need for additional data to build the case that there are significant long-term financial benefits to green schools or health, high performance schools without costing districts additional dollars initially. In addition, there is also emerging research that there are other benefits than financial that are becoming evident, for example, environmental (Birney & Reed, 2009), teacher retention (Kats, 2006), an increase in student engagement through the integration of content and curriculum (Barr, Leigh & Dunbar, 2011; Birney & Reed, 2009; Henry, Angotti & Leone, 2015; Sobel, Gentile & Bocko, 2014), and creation of health and wellness programs directed at students and school staff.

Conclusion

The purpose of this literature review was to fill in the gap in research related to green schools and whole school sustainability and introduce the research surrounding the ED-GRS award program. In addition, this work explored the ED-GRS framework along with two theoretical frameworks (WSS and ED-WSS) that provide guidance and support for school leaders in implementing green school practices. The emerging literature suggested that the

benefits outweigh the challenges in moving towards becoming a “green school” or being recognized as an ED-GRS award winning school. All students deserve a world-class education in a school that is both high performing and healthy. The ED-GRS should be a standard for all schools and school organization in an effort to move toward whole school sustainability.

CHAPTER III: MANUSCRIPT #2

U. S. DEPARTMENT OF EDUCATION GREEN RIBBON SCHOOLS AWARD: ANALYSIS OF THE FIRST THREE YEARS

Imagine your loved one sitting in classrooms for six hours a day without windows, eating a school lunch that contains high amounts of saturated fats and carbohydrates, and/or not being able to play outside, as there are no safe spaces for unstructured play. Unhealthy conditions like these limit the learning opportunities for young people. Quality education is a fundamental civil and human right (UNESCO, n.d.) In addition to having highly qualified teachers and effective school administrators, students deserve to be educated in healthy, high performance schools that focus not only on students' academic achievement, but also on occupant health and well-being, environmental responsibility, and economic prosperity. Schools are increasingly using education for sustainability (EfS) as a framework for whole school reform (Sobel, Gentile, & Bocko, 2014). EfS is "a transformative learning process that equips students, teachers, and school systems with the new knowledge and ways of thinking we need to achieve economic prosperity and responsible citizenship while restoring the health of the living systems upon which our lives depend" (Cloud Institute as quoted in Sobel et al., 2014, p. 6).

Are school leaders taking into consideration the need to create healthy, high performance schools that exceed expectations and create a meaningful learning environment for students and teachers? Money is a primary concern for school district leaders. These leaders are continuously looking for creative ways to save money, spend money and bring more money into their schools.

Resources often include grant dollars and local businesses support (Bobadilla, 2010). Unfortunately, many times short-term financial solutions take precedence over investing in long-term solutions (Leachman & Mai, 2013). Focusing on the long-term, how do schools stay in the black? In March of 2014, the Center for Green Schools at USGBC released the “State of the Schools” report, indicating that it will take more than 500 billion dollars over the next ten years to renovate or replace PK–12 school facilities (2013). A follow-up to the report in 2014, the 2016 State of Our Schools: America’s K–12 Facilities, published jointly between 21st Century Fund, the USGBC, and the National Council on Facilities reinforced the importance of spending additional dollars on schools as the report stated that currently schools need an additional 46 billion to provide adequate and equitable facilities for all public school students (Filardo, 2016). According to Kats (2006), “Greening school design provides an extraordinary cost-effective way to enhance student learning, reduce health and operational costs, and ultimately, increase school quality and competitiveness” (p. 4). The U.S. Department of Education Green Ribbon School (ED-GRS) award, initiated in 2011, seeks to promote greening school design, management, and practice.

The first three years of the ED-GRS award recognized 190 K–12 schools. This paper presents the findings of a descriptive analysis of the award winning schools’ applications. I provide a thorough descriptive overview of the winning schools as well as compare their practice to a theoretical conception of green school practice. Following an introduction to the ED-GRS award program, I present a review of empirical literature related to the ED-GRS.

What is the ED-GRS Award Program?

The ED-GRS award is a non-monetary recognition created by the U.S. Department of Education. This award mirrors the National Blue Ribbon Schools program that began in 1982.

The National Blue Ribbon Schools award program recognizes public and private elementary, middle, and high schools where students perform at very high levels or where significant improvements are being made in students' academic achievement (U.S. Department of Education, [D], n.d.). "The aim of U.S. Department of Education Green Ribbon Schools (ED-GRS) is to inspire schools, districts and Institutions of Higher Education (IHEs) to strive for 21st century excellence, by highlighting promising practices and resources that all can employ" (U.S. Department of Education [E], n.d.). The ED-GRS award focuses on three pillars: (1) reducing environmental impact and costs; (2) improving the health and wellness of schools, students and staff; and (3) providing effective environmental and sustainability education (U.S. Department of Education [E], n.d.).

The three pillars of the ED-GRS award application afford schools an opportunity to conduct an in-depth assessment of their organization. In pillar 1, reducing the environmental impact and costs, school districts must document their efforts toward reducing energy use, water use, and waste production. Some districts are finding it cost effective to hire a sustainability director to lead these efforts (Gutierrez & Metzger, 2015; Ruedig & Metzger, 2013). The money saved from energy cost reductions often pays for this newly created position. Student organizations, such as green teams or student councils, can also help in leading this effort.

Pillar 2 centers on the health and wellness of students and staff. Health and wellness efforts include the basic needs related to quality food, clean water, and indoor air quality as well as other aspects of infrastructure and programming. Pillar 2 specifically speaks to students having increased physical education time or non-structured outdoor time because of their documented association with improved wellbeing and health (Louv, 2008). Incorporating school gardens into the school's curriculum; teaching students the importance of eating fruits and

vegetables, as well as learning how to grow their own vegetables promotes health and wellness (Williams & Brown, 2011; Williams & Dixon, 2013). Staff leading health and wellness activities for students and staff includes examples such as walk to school days, bike to school days or offering an after-school Zumba or yoga class. The school leader plays a significant role in empowering students and staff to meet their needs by making significant changes to their routines and to challenge them to create opportunities that reflect health and wellness.

Addressing sustainability means deeply considering the integrated aspects of human needs, environmental needs, and economic needs. Pillar 3 promotes implementation of effective environmental and sustainability education, incorporating STEM (science, technology, engineering and math) or STEAM (science, technology, engineering, arts, and math), civic skills, and green career pathways. Schools can provide learning or training opportunities for students to develop civic engagement knowledge and skills. Students can use these skills to lead and empower others in creating change initiatives that address sustainability and environmental issues in their community. Schools can look to a variety of available programs and curriculum that support pillar 3 and the needs of 21st century students in creating healthy, high performance schools. A short list of the many programs includes Project Learning Tree, National Wildlife Eco-Schools, and Project WILD. Pillar 3 charges schools to teach students about the environment and sustainability to prepare them for citizenship and employment in the 21st century. It is important for schools to meet the needs of the students through meaningful learning that can transfer into action (Chawla, 2008). Staff will also need to be provided with professional development or training around the program or curriculum that may be implemented (Nolet, 2009, 2015). School leaders and staff need to build strong, professional relationships

with one another in order to facilitate change; they also need to engage and empower students to become an active participant in change initiatives.

Preparing students for success in the 21st century economy begins in our schools. The schools and districts being honored today are modeling the best practices in reducing environmental impact and cutting costs, creating a healthier learning environment, and providing students with an education geared toward the jobs of the future. (U.S. Department of Education [A], 2013)

Literature Review

The ED-GRS award program has had five years of school, district and Institutions of Higher Education winners. However, the published literature on this newly created award is still in its infancy. As of the end of 2015, there have been three published articles focused on the ED-GRS. One of the articles assessed the ED-GRS schools' integration of sustainability education (Warner & Elser, 2014), another surveyed school leaders about their insights on the award (Sterrett, Imig & Moore, 2014) and the third article explored the three pillars of the ED-GRS (Sterrett & Imig, 2015). These three studies represent the initial body of research on the ED-GRS program, as of this writing. Beginning here sets the stage for describing the growing body of literature related to whole school sustainability.

Warner and Elser (2014) reviewed the 2012 ED-GRS applications. Through their analysis they created a new metric, "interconnectedness". Warner and Elser argued that "interconnectedness" must exist among the projects for the projects to be sustained over time. They offered in their research that "a school must be interconnected to its community to allow students to develop an understanding on complex problems "(Warner & Elser, 2014, p. 5). This idea of connecting to the community to sustain green school practices is also suggested in

Sterrett, Imig and Moore's article (2014) and Sterrett and Imig's article (2015). These studies complement my work in digging deep into three years of the ED-GRS applications and analyzing to what extent these applications reflect ecological and democratic principles (Kensler, 2012).

Sterrett, Imig and Moore (2014) surveyed ED-GRS award winning school leaders from 2012–2014. They concluded that being labeled a “disadvantage school” wasn't a barrier to implementing green school practices or winning the ED-GRS award. Sterrett et al. also addressed the importance of the organization of a green team that included both students and staff; this was further supported in their follow-up study from 2015 (Sterrett and Imig). Green teams were listed as one of Sterrett and Imig's eight strategies for school leaders to consider when implementing green school practices. They also concluded that students and teachers were identified as being the most imperative to the sustainability efforts. Eighty-five percent of the participants stated that the quality of teaching and learning improved or significantly improved since receiving the award. Lastly the reported that student engagement displayed 90% improvement by the participants and community engagement presented that 77% indicated improvement.

Sterrett and Imig followed up with 12 of the schools from their 2014 study. The purpose of their study was to provide useful examples of school sustainability practices through the lens of the three pillars of the ED-GRS. Three of the key findings in their study suggested: aligning green school practices within the daily curriculum, sharing the message with all stakeholders, and the creation of outdoor learning gardens. These key findings also support Warner and Elser's (2014) research on “interconnectedness” and its importance in sustaining green school practices.

All three of these ED-GRS articles are pivotal in creating support for the ED-GRS award and whole school sustainability. They have set the groundwork for other researchers, practitioners, and school leaders to begin or continue implementing green school practices in moving their schools to becoming healthy, high performance schools. The following section is focused on two theoretical frameworks that support the implementation of green school practices and the ED-GRS.

Theoretical Frameworks for Green Schools

Although the empirical literature presents an emerging case for green schools being beneficial for occupant wellbeing and student learning, there is not yet a single definition or set of criteria for what exactly defines a green or sustainable school (Dautremont-Smith, 2012). Currently there are two theoretical frameworks that appear in the literature related to green schools, the Whole-School Sustainability (WSS) framework (Barr, Cross, & Dunbar, 2014) and the Ecological Democracy for Whole School Sustainability (ED-WSS) framework (Kensler, 2012). Barr, Cross, and Dunbar's (2014) WSS model is presented in a report published by the U.S. Green Building Council. An earlier version was first reported in Barr's master's thesis (2011). The WSS framework emerged from the qualitative study of exemplar green schools and identified three primary aspects of schools in which sustainability is and/or may be integrated into the core practice: (1) educational program, (2) organizational culture, and (3) physical place. They argued that a whole school or system approach is critical to the successful transformation to a more sustainable school organization. They identified three critical areas of practice within each of the three domains. In the educational program these three areas were charismatic champions, connection to place, and student leadership. Vision and mission alignment, interdepartmental learning, and catalytic communication were integral to developing an

organizational culture reflective of sustainability. Finally, a sustainable physical space involved an engaging and active design, progressive efficiency, and healthy systems.

The ED-WSS framework (Kensler, 2012) emerged from her review of empirical literature describing green school practices from around the world. Consistent across the international literature was that the social conditions for learning and change within the schools were as critical as the environmental practices in green schools. Schools did not immediately transform into green schools, they had to learn their way into more environmentally responsible, economically efficient, and socially just practices. Kensler, Caskie, Barber, and White (2009) showed a strong correlation between teachers' perceived practices of democratic principles (democratic community) and their report of their own continuous learning. In other words, teachers reported higher levels of continuous learning in more democratic schools. These findings are consistent with other research that has shown the value of more distributed, shared, and engaging leadership for facilitating change and improvement (Glickman, 2003; Marsick & Watkins, 1999; Silins & Mulford, 2004).

Two primary assumptions grounded Kensler's ED-WSS. The first was that ecological principles govern healthy ecological systems. She relied on Capra's (1996, 2002) list of ecological principles that he has argued to be consistently active across all healthy ecological systems. The second assumption was that democratic principles govern healthy social systems. Fenton (2002) presented an original list of ten democratic principles and Kensler extended Fenton's study of these principles into the field of education. Kensler (2012) argued that green schools are places where both ecological and social health matters. The intentional practice of ecological and democratic principles facilitates whole school sustainability. She details this

argument and fully explains each of the ecological and democratic principles in her 2012 paper. For space reasons, I will not repeat that discussion here.

I considered both the WSS and the ED-WSS frameworks as appropriate analysis tools for this study. However, I found that the ED-GRS program's three pillars mirrored the WSS framework too closely; the defining aspects of the application and the framework were essentially the same. The ED-WSS framework is comprised of underlying principles that may drive practice in diverse ways. The structure of the ED-GRS application did not directly reflect the practice of these principles. Therefore, using this framework as an analysis tool would allow me to both test and possibly extend the ED-WSS framework as well as gain a deeper understanding of how educators across the U.S. are presenting their practice of green schools.

This research study investigated two primary questions: (1) What characterizes ED-GRS award winners? and (2) To what extent do the ED-GRS award winning applications provide evidence that these schools fit a theoretical model of whole school sustainability (ED-WSS)? For the purpose of the paper, the term ED-GRS refers to schools that have received the recognition award from the U.S. Department of Education and these are the focus of our study.

Methods

This section reports the actions taken and describes the research design, the sample, instrumentation, data collection, data analysis and limitations in this study. As outlined in the introduction, this mixed-methods study was designed to investigate the characteristics of ED-GRS award winners. In addition, analyzing the award winning applications to evaluate to what extent these applications provide evidence of ecological and democratic principles.

Research Design

This study was a mixed-method, descriptive analysis. Formal grounded theory provided a process in which researchers use a set of *a priori* codes from a concept, model or theory to develop theoretical ideas in the data (Salkind, 2012). I used an extensive set of *a priori* codes derived from the ED-WSS framework (Kensler, 2012). This priori code included the six ecological principles and the ten democratic principles of the ED-WSS. Formal grounded theory allowed me to verify and extend this framework (Glaser, 2006). Descriptive statistics were used to summarize the quantifiable trends in the data. These descriptive statistics included the award winners by state each year, the type of school, how the schools are funded, how the schools are structured, and the number of schools receiving energy star certification.

Research Questions

This study was designed to address the following questions regarding characteristics of ED-GRS award winners from 2012, 2013, and 2014. As well, the study was designed to dig deeper into the applications of award winners to uncover evidence of ecological and democratic principles.

1. What characterizes ED-GRS award winners?
2. To what extent do the ED-GRS award winning applications provide evidence that these schools fit a theoretical model of whole school sustainability (ED-WSS)?

Sample

The data sources for this study were publicly available documents – the application packets for each winner of the ED-GRS award. These applications are available through the U.S. Department of Education website (U.S. Department [I], n.d.). There were 78 schools from 30 states who received the award in 2012. In 2013, 64 schools from 30 states received the award. In

2014, the U.S. Department of Education recognized 48 schools from 27 states. I analyzed 190 school application packets. My process followed formal grounded theory and involved reviewing all the available application packets for the first three years (2012, 2013 and 2014) of the ED-GRS award.

Analysis

I began with reading each of the application packets and created an evidence chart that reflected the three pillars of the ED-GRS program: environmental impact and reduction, health and wellness, and environmental and sustainability education. I also looked for partnerships with businesses and universities, energy star certification, as well as demographic information including type of school, location of school, and free/reduced lunch status.

I then used the 16 principles of the ED-WSS framework (six ecological and ten democratic principles) (Kensler, 2012) to analyze each of the applications in an attempt to understand the degree to which the ED-WSS framework is representative of green school practice in the United States. In addition, I was able to examine the data for attributes that did not necessarily fit the framework and thus, may inform framework revisions. I charted the data of the 16 principles for each of the school applications. I also created a spreadsheet of examples of artifacts that exemplified the 16 principles. This was an attempt to share how schools included ecological and democratic principles in their schools. Lastly, I quantified the trends in the data and report those patterns in the results section.

Limitations

There are limitations to using only the publicly available application packets for the study. The U.S. Department of Education provided an application framework which included the three pillars of the green ribbon school award; however, state agencies are able to create their own

application. This created difficulty in reviewing the applications as each of the states may ask for different information or artifacts. The researcher is also limited by not being able to ask follow-up questions about the information provided in the application. The majority of the applications included a narrative; however, the information provided in the narratives were inconsistent, reflecting the lack of guidance for this aspect of the application.

I was unable to assume that the ED-GRS award winners represent the full extent of green schools around the United States. Each authority is allowed to submit for consideration

... up to five PK-12 school or district nominations. If a state or comparable authority wishes to nominate more than two schools or districts, at least one must serve at least 40 percent of students from a disadvantaged background. For a private school to be nominated, at least one public school or district must be nominated. No more than one of the five nominees in this Pre-K–12 category may be a private school. A school or district may be selected as an honoree only once” (U.S. Department of Education [F], n.d.)

However, this is a large sample of schools recognized for greening their schools and they are part of a growing trend in education across the world. This study presents an initial overview of how green schools are conceptualized and practiced in the U.S.

Results

This section will answer our two research questions: (1) What characterizes ED-GRS award winners? and (2) To what extent do the ED-GRS award winning applications provide evidence that these schools fit a theoretical model of whole school sustainability (ED-WSS)? To answer the first question, I provide a descriptive overview of the 190 ED-GRS award winners from 2012, 2013, and 2014. I then present an analysis of the ED-GRS applications using the ED-WSS framework for both testing and extending the theoretical framework.

Table 2 represents the ED-GRS award winners disaggregated by state from 2012, 2013 and 2014. The table also includes if the state is considered a red or blue state according to the 2014 Cook Partisan Voter Index presented by <http://www.politico.com> . The award winners represent 38 states and the District of Columbia. There are 12 states (AK, ID, LA, ME, MT, NV, OK, SC, SD, TX, UT, WY) that haven't participated in any of the three years of the program. Of the 12 states not participating; ten of those states are considered red states. Arizona, Arkansas, Missouri, and North Dakota had ED-GRS award winners in 2012, but didn't receive an award in 2013 or 2014. Delaware, Iowa, Mississippi, New Hampshire and Tennessee had ED-GRS award winners in 2013 only. New Mexico was the only state of the 38 who received an award in 2014 that didn't in 2012 and 2013. California and Wisconsin have received 11 ED-GRS awards over the three years and the state of Washington received 10. There are 15 (AL, CA, CO, GA, KY, MD, MN, NE, NJ, NY, OH, RI, WA, WV and WI) of the 38 states who have received awards in 2012, 2013, and 2014. Nine of fifteen states that received the ED-GRS in 2012, 2013, and 2014 are considered to be blue states.

Table 2

ED-GRS Winners by State, 2012–2014

State	2012	2013	2014	Total
AL ^R	2	3	3	8
AZ ^R	2	0	0	2
AR ^R	1	0	0	1
CA ^B	4	4	3	11
CO ^B	3	1	3	6
CT ^B	0	3	2	5
DE ^B	0	1	0	1
DC ^B	2	3	0	5
FL ^R	3	2	0	5
GA ^R	3	1	2	6
HI ^B	2	0	0	2
IL ^B	3	0	1	4
IN ^R	0	1	2	3
IA ^B	0	1	0	1
KS ^R	3	1	0	4
KY ^R	3	3	1	7
MD ^B	4	2	2	8
MA ^B	0	3	1	4
MI ^B	2	0	2	4
MN ^B	3	3	2	8

State	2012	2013	2014	Total
MS ^R	0	1	0	1
MO ^R	2	0	0	2
NE ^R	2	1	1	4
NH ^B	0	1	0	1
NJ ^B	4	2	2	8
NM ^B	0	0	1	1
NY ^B	3	3	1	7
NC ^R	2	0	1	3
ND ^R	1	0	0	1
OH ^R	2	1	3	6
OR ^B	4	0	2	6
PA ^B	4	3	0	7
RI ^B	2	2	2	6
TN ^R	0	2	0	2
VT ^B	0	3	3	6
VA ^B	2	2	0	4
WA ^B	4	4	2	10
WV ^R	2	2	2	6
WI ^B	3	4	4	11

^R – Red State

^B – Blue State

(2014 Cook Partisan Voter Index, 2014)

ED-GRS applicants were asked to indicate the type of school (rural, suburban, and urban) as well as to provide the percentage of free and reduced lunch students, a proxy for socioeconomic status (SES). In table 3, the data shows that over the three-year period of the award; 29% of the school applications indicated they were urban, 22% as rural, and 49% as suburban. Percentages have varied over the three years, 29% and 36% of urban schools received the award in 2012 and 2013 with a decrease to only 19% in 2014. Rural schools were recognized 26% in 2012, a slight drop in 2013 to 16% and an increase to 25% in 2014. However, the majority of the schools consistently indicated they are suburban, with 45% in 2012, 48% in 2013, and 56% in 2014. On average 43% of the schools receiving the award over the three years reported over 40% of their students received free and/or reduced lunch, meeting the U.S. Department of Education standard for classification as high poverty.

Table 3

ED-GRS Award Winners, 2012–2014 — Type of School

Type of School	2012 – %	2013 – %	2014 – %	Total – %
Rural School	26%	16%	25%	22%
Suburban School	45%	48%	56%	49%
Urban School	29%	36%	19%	29%
High Poverty	45%	50%	29%	43%

Schools are funded with public and/or private dollars. ED-GRS applicants were asked to indicate if they are considered a public school, charter school, private/independent school or

tribal school. Table 4 shows that the majority of the schools reported being public schools, with an average over the three-year period of 72%. Charter schools, which are also considered public but are separate for purposes explained later in the discussion, comprised approximately 11% of the winning schools over the three-year period. Fifteen percent of the winners were private schools in 2012, 16% in 2013 and a slight increase to 19% in 2014. States were allowed to submit an application for only one private school for their state each year strongly limiting the number of private schools eligible for the award. Only one tribal school submitted by Bureau of Indian Education in North Dakota has received the award.

Table 4

ED-GRS Award Winners, 2012–2014 — Type of Funding

Type of Funding	2012 – %	2013 – %	2014 – %	Total – %
Public*	72%	70%	75%	72%
Charter	12%	14%	6%	11%
Private/Independent	15%	16%	19%	16%
Tribal	1%	0%	0%	.5%

*Percentage doesn't include charter

Table 5 highlights the grade configurations of the ED-GRS award winning schools. Elementary schools received the award most often with 37% in 2012, 36% in 2013, and 45% in 2014. High schools followed the elementary schools with 24% in 2012, 22% in 2013, and 25% in 2014. On average 14% of the schools over the three years were middle schools and 15% were K–8 schools. Nine percent of schools indicated they were K–12 or 5th/6th grade–12th grade.

Table 5

ED-GRS Award Winners, 2012–2014 — Grade Configurations

Grade Level(s)	2012 – %	2013 – %	2014 – %	Total – %
Elementary	37%	36%	45%	38%
Middle	17%	13%	10%	14%
High	24%	22%	25%	24%
K–8	13%	22%	10%	15%
5/6–12	3%	1%	2%	2%
K–12	6%	6%	8%	7%

Another interesting trend in the data is the number of schools reporting Energy Star certification prior to receiving ED-GRS award. According to the information in the applications, 31% of the applicants indicated Energy Star certification in 2012, 25% in 2013 and 38% in 2014. However, each state’s application is slightly different than the application template provided by the U.S. Department of Education. The U.S. Department of Education template for the ED-GRS asked if the school participated in a local, state or national program, such as EPA Energy Star portfolio manager, etc. A majority of states revised this in their application asking the school if they are Energy Star certified, including the date of certification.

I have presented the demographic data about the ED-GRS award using the ED-GRS framework. Now I turn to my analysis of the ED-GRS applications using the Ecological Democracy for Whole School Sustainability (ED-WSS) framework. A fundamental assumption of the ED-WSS is that green schools attend to both ecological and social conditions. My

purpose in this section, was to explore the degree to which ED-GRS award winning schools' application packets provided evidence of both ecological and democratic principles in practice.

Overview of the Ecological Democracy for Whole School Sustainability (ED-WSS) Data

The ED-WSS framework includes 6 ecological and 10 democratic principles. Because of how the standard application was organized, with a primary focus on environmental or ecological practices, the narrative section of the ED-GRS applications provided the richest source of data for analysis with the ED-WSS framework. The narrative section asked the schools to provide an overview of their school, and describe their schools' efforts in reducing environmental impact and costs, improving the health and wellness of students and staff, and providing effective environmental and sustainability education.

Table 6 suggests that 54% of the 190 schools included practices that reflected five or six of the six ecological principles in their application. Yet, none of the schools that scored a five or six on the ecological principles scored a 9 or 10 out of 10 on the democratic principles. Four schools or 6% scored an 8 out of 10. Only 23% of the schools received a 6 or 7 out of 10 on the democratic principles, leaving the majority of schools, or 77%, scoring a 5 or less out of 10 on the democratic principles.

Table 6

Overview of the ED-WSS Principles

Indicator	2012 – %	2013 – %	2014 –%	Overall %
6/6 on the Ecological Principles	10	28	44	25
5/6 on the Ecological Principles	24	36	27	29
10/10 on the Democratic Principles	0	0	0	0
9/10 on the Democratic Principles	0	0	0	0
8/10 on the Democratic Principles	0	6	0	0
7/10 on the Democratic Principles	9	3	10	7
6/10 on the Democratic Principles	15	14	21	16

Ecological Principles Data

Each of the six ecological principles were evident in at least 64% of the schools. Table 7 suggests that networks, partnerships and diversity were evident in all but eight of the schools or 96%. This ecological principle focused on schools engaging in several, quality partnerships with businesses, industries, colleges and universities, parents, and community organizations in supporting the three pillars of the ED-GRS award. The application did ask several times throughout the application to discuss partnerships that have been forged with the surrounding community. The importance of this principle is that it provides a connectedness directly or indirectly between the school and the partnership; creating a sense of resiliency. In addition, 64% of the schools had school vegetable gardens that provided produce for the cafeteria, classrooms or families in the need. School gardens reflect dynamic balance when the produce in used in the cafeteria or provided to students or families in need; feedback loops help maintain a

relatively steady state with continuous fluctuations between upper and lower boundaries (Kensler, 2012).

Table 7

Ecological Principles

Ecological Principle	# of Schools	%	Examples of Evidence from ED-GRS Award Applications
Development	158/190	= 83%	Outdoor classrooms, sustainable school gardens, fruit orchards, Environment in Context (EiC) curriculum, Education for Sustainability (EfS), GLOBE, Education and the Environment Initiative (EEI), Seed to Soup Curriculum
Networks, Partnerships, and Diversity	182/190	= 96%	WVU Extension Services Youth Nutrition Outreach, U.S. Forest Service Adopt-a-School, Arkansas Game & Fish Commission, Georgia Pacific, Chevron, Lockheed Martin, Alliance for Climate Education, The Nature Conservancy
Dynamic Balance	122/190	= 64%	School vegetable gardens that provide produce for classrooms, lunches and families in need, FEED program
Nested System	122/190	= 64%	Student-led teams in a school, School and District Green Teams, Diffusion from school initiative to district or city initiative, Participation in the U.S. Healthier Schools Challenge, Changes in the school lunch program affecting students, staff and the community, Community-Supported Agriculture (COOP), ReLeaf for Egg Harbor Township. Kinard C.A.R.E.S
Cycles	150/190	= 79%	Composting, Recycling, Rain barrel catchment, Xeriscaping
Solar Energy and Flows	138/190	= 73%	Geothermal energy, Solar panels, Daylighting, Solar tubes, Wind Generator – Wind to Schools

An ecological principle, solar energy and flows is expressed through the following examples in the applications: geothermal energy, solar panels, daylighting, solar tubes, and wind generator. This principle was evident in 73% of the schools. Composting, recycling, rain barrel

catchment and xeriscaping were found in 150 of the 190 schools. These examples represent cycles, the definition of this ecological principle is matter cycles through all living systems without producing a steady stream of unused waste; one's waste is another's food.

The ecological principle that was found in 83% ED-GRS award applications was development. The definition of development that the researchers used in collecting the data was how individuals and communities change and continuously improve. Examples of this principle from the applications are outdoor classrooms, sustainable school gardens, fruit orchards, Environment in Context (EiC) curriculum, Education for Sustainability (EfS), and Education and the Environment Initiative (EEI). Nested systems are every living system is itself an integrated whole and the same time part of a larger system; how change at one level affects the other levels. 64% of the schools provided examples of this in their application; some of the schools included the following: student-led teams in a school, school and district green teams, and diffusion from school initiative to district or city initiative.

Democratic Principles Data

There are ten democratic principles in the ED-WSS framework. The democratic principles are listed in Table 8, along with the # of schools where the principle was evident and specific examples from the ED-GRS award applications. The results show a broad range of scores. The percentages range from as little as 4% in the area of transparency to 97% in choice.

Table 8

Democratic Principles

Democratic Principle	# of Schools = %	Examples of Evidence from ED-GRS Award Applications
Fairness and Dignity	27/190 = 14%	Anti-Bullying Programs, Sylacauga Alliance for Family Enhancement (SAFE), Employee and Student Recognition Programs, Student Health & Wellness Programs (ex: IMPACT, Miller Park)
Purpose & Vision	157/190 = 83%	Vision Statements, Leaders who construct processes for co-creation of a shared vision, FOX Code
Integrity	46/190 = 24%	Goals, Expectations promoting integrity (Ex: IB Learner Profile), Policies, PBIS – Positive Behavior Intervention Strategies
Reflection and Evaluation	61/190 = 32%	Evaluation plan (ex: G & H school program – seven earth-friendly pathways, Environmental education frameworks that include reflection and evaluation, Energy Improvement Plan (Loveland, OH), Changed internal policies (ex: Miller Park, Omaha, NE)
Accountability	117/190 = 62%	EPA IAQ, Tools for Schools Student-led initiatives or events that impact a larger community, Energy Star Rating – EPA Portfolio Manager, Utility Manager, PowerEd - McKinstry, SEE (Schools for Energy Efficiency), National Energy Education Program (NEED)
Individual & Collective	148/190 = 78%	Several Participants involved in application process, HiP (I can make a Healthy Planet) HEROS (Helpful Energy Resource Officers (Flagstone – Douglas Cty), Service Learning Projects, “Theme Immersion,” daily instruction uses the physical design and interactive exhibits to convey environmental elements. (Munford), Valuing student interest and inquiry
Dialogue & Listening	116/190 = 61%	Community Planning or engagement that impact decision-making (ex: Chicago Conservation Corp), Safe Routes to Schools, Working with partners in creating curriculum and student experiences (e.g. Hawaii Prep Academy)
Decentralization	21/190 = 11%	Shared Leadership, Student-led initiatives (e.g. Aquaculture research facilities, Recycling Program Farmer’s Market)
Transparency	8/190 = 4%	Goals are shared and easily identifiable to all stakeholders, QHS Professional Learning Communities (Quincy), Natural Step – Systems-Thinking
Choice	185/190 = 97%	Student, staff, parent, teacher choice, After-school exercise opportunities for students and staff, Healthy snacks, salad bar, Farm to School Problem-based Learning/Project-based Learning, Outdoor classrooms

Three of the democratic principles were evident less than 15% in the ED-GRS award applications. These principles are transparency, decentralization, and fairness and dignity. Transparency is defined in the framework as when ideas flow freely and information is openly and responsibly shared. Examples from the applications include the QHS Professional Learning Communities, Natural Step – systems-thinking and when goals are shared and easily identifiable to all stakeholders. Transparency was only evident in eight schools or 4%. Decentralization is when power is appropriately shared among people at all levels of the organization. This democratic principle was apparent in 21 schools or 11%. Shared leadership and student-led initiatives were two examples of this principle most commonly found in the 21 schools. Fairness and dignity is explained as when each person is treated justly and regarded partially; anti-bullying programs, Sylacauga Alliance for Family Enhancement (SAFE) and employee and student recognition programs are a few examples that were documented in the ED-GRS award applications.

Integrity, reflection and evaluation, dialogue and listening, and accountability were four of the democratic principles that were identified in the ED-GRS award applications. Accountability, defined as when each person and the organization as a whole is responsible to each other and their community for their actions. Student-led initiatives or events that impact a larger community, Schools for Energy Efficiency (SEE), National Energy Education Development (NEED) and district conservation plans are examples found in the GRS award applications. Accountability was identified in 62% of the school applications. Dialogue and listening, when we listen and engage in conversation in a way that brings out new levels of meaning and connection, was apparent in 61% of the school applications. Examples of this

principle are: community planning or engagement that impacts decision-making, and working with partners in creating curriculum and student experiences. Reflection and evaluation is defined as when there is careful and thorough consideration and feedback regarding previous actions, events or decisions. Examples of this principle from the award applications are environmental education plans that include reflection and evaluation, energy improvement plans, and changed internal policies. Reflection and evaluation were present in 32% of the award applications. Integrity was evident in only 24% of the award application. This democratic principle was defined as when each person steadfastly adheres to high moral principles. Examples of integrity are expectations that promote integrity: International Baccalaureate (IB) Learner Profile attributes, Positive Behavior Intervention Strategies (PBIS), and Seven Habits of a Highly Effective Teen.

There were three democratic principles that were present in at least 78% of the award applications; individual and collective, purpose and vision, and choice. Choice was present in all but five schools. Choice was defined as when each person is encouraged to exercise their right to choose between a diversity of possibilities. After-school exercise opportunities for students and staff, healthy snacks, outdoor classrooms and Project-Based Learning (PBL) are examples of choice from the award applications. Purpose and vision surfaced in 83% of the schools. This democratic principle is defined as when an organization and the individual know their reason for existing and have a sense of intentional direction. Examples of this principle are clear mission and vision statements and leaders who construct processes for co-creation of a shared vision. Individuals understand the unique contribution they make toward achieving collection goals is the definition of individual and collection. This principle was evident in 78% of the award applications. Examples from the award applications include: several participants being involved

in the application process, service learning projects, valuing student interest and inquiry, and individualization of curriculum/learning opportunities.

Summary

The results suggest that schools that received the ED-GRS represent a diverse group of schools that span the United States. I found three application packets that reflected a high level of ecological and democratic principle practice. Common Ground High School in New Haven, CT, Quincy High School in Quincy, MA, and Berkshire School in Sheffield, MA are the “greenest” of the green ribbon school award recipients based on my analysis using the ED-WSS framework. Each of these high schools’ applications reflected all six of the ecological principles and eight of the ten democratic principles. These three recipients were recognized by the U.S. Department of Education in 2013. A brief summary of each of the schools is discussed below.

Common Ground High School is an urban, charter school in New Haven, CT. This school reflected all six ecological principles and eight of the 10 democratic principles. The democratic principles that were evident in their ED-GRS application are: purpose and vision, integrity, accountability, individual and collective, decentralization, transparency and choice. The school had a free/reduced lunch percentage over 50%. The school composted 100 percent of its organic waste on its own campus, and participated fully in the city of New Haven’s single-stream recycling program. Common Ground had established partnerships with the University of New Haven, Yale University, The Nature Conservancy, Solar Youth, CitySeed, and Elm Shakespeare Company. Students must defend an electronic portfolio that demonstrated mastery of environmental leadership standards in order to graduate from Common Ground High School. Students cooked and ate from the school’s urban farm, which produced more than 35,000 servings of fresh, local food. The school committed to putting at least half of this harvest to use

in their school cafeteria, while sharing the rest through local farmer's markets, educational programs, and donations to local emergency food providers. A solar array on the roof demonstrated alternative energy options and provided data for classroom manipulation. Common Ground High School is an example of an urban school that is making a significant difference for students, staff and their community.

Quincy High School is an urban, public school in Quincy, MA. This high school reflected all six ecological principles and eight of the 10 democratic principles. The democratic principles that were evident in their ED-GRS application were: purpose and vision, integrity, reflection and evaluation, accountability, individual and collective, decentralization, transparency and choice. The school had a free/reduced lunch percentage of 47%. Quincy High School had a unique organizational structure that provided an unprecedented level of teacher leadership, professional development and collaboration. In addition, the rotating block schedule allowed for interdisciplinary planning. The school incorporated a modernized approach to learning, which demonstrated that subject matter is connected to the real world. An example of this was an interdisciplinary unit between social studies and earth science where students learned the economic and civic responsibilities of establishing single stream recycling, assessed current usage of waste, identified gaps in waste management, and performed pre and post assessment evaluations. Quincy High School had a greenhouse that was part of the STEM wing, where students were actively involved in growing their own food. The school also had a student-run café that was part of the culinary program, where students prepares food in a professional kitchen. Students also took part in yoga, cardio dance and weight training as a daily part of their physical education classes. Quincy High School is setting the precedent for "green" urban high

schools where being labeled as disadvantaged doesn't impede the progress of their students, staff and the community.

Berkshire School is a rural, private boarding school located in Sheffield, MA. This private high school reflected all six ecological principles and eight of the 10 democratic principles. The democratic principles that were evident in their ED-GRS application were: fairness and dignity, purpose and vision, integrity, reflection and evaluation, accountability, individual and collective, decentralization, and choice. They had a two-megawatt, eight-acre solar field, which is the largest in the state of Massachusetts. This project was part of their energy master plan developed by sustainability students. Berkshire adheres to the sustainability benchmarking program from the Association of the Advancement of Sustainability in Higher Education (AASHE). Every student at Berkshire must play a sport each season, two of which must be competitive. The school's interscholastic program embodies the schools' mission "Not just for school but for life". The school has a Director of Sustainability and a sustainability task force that established sustainability principles and practices with the goal of positively transforming the campus. Student-led programs have included unsubscribing to unwanted magazine subscriptions, promoting sustainable events, encouraging zero waste meals, and eliminating bottled water. Berkshire is leading the way by engaging students in creating change that will be sustainable.

Discussion

The designers of the ED-GRS award application framework reflected a greater concentration of the ecological principles. It would be difficult to score that you had included democratic principles unless those who completed the application philosophically believed in the importance of democratic principles or tend to be more democratic leaders. Many of those who

completed the ED-GRS award application included evidence, samples, and narratives that distinctly reflected democratic principles. This may suggest that those who completed the application understand the need to include both ecological and democratic principles in order to ascertain a level of sustainability in their school.

I found that the ED-GRS award application was focused on recognizing schools that have successfully implemented ecological principles in the areas of development, networks, partnerships and diversity, dynamic balance, nested systems, cycles and solar energy and flows. The application designers didn't explicitly ask for examples of ecological principles; yet it is evident that ecological principles were embedded in the questions. The democratic principles that lead to sustaining change were less evident in the application framework as well as the documentation provided by the school leader. However, a majority of the schools included examples of three of the ten democratic principles: accountability, individual and collective, and choice. The absence of the democratic principles suggested that ED-GRS award winners may not be able to sustain the changes that were implemented before and during the ED-GRS award application process.

CHAPTER IV: MANUSCRIPT #3

U.S. DEPARTMENT OF EDUCATION GREEN RIBBON SCHOOLS FROM 2012, 2013, AND 2014: TEACHER PERCEPTIONS OF ECOLOGICAL AND DEMOCRATIC PRINCIPLES

All students deserve a world-class education. I stand by this statement as it drives the work that I have been doing in public schools for the nearly twenty years. I believe that schools can always be better; we haven't arrived at a time when all schools are healthy, high performance schools, "green schools" or schools that embrace whole school sustainability. One of the most quoted definitions of sustainability is from the UN Brundtland Commission:

Sustainable development is the development that meets the needs of the present without compromising the ability of future generations to meet their own needs. It contains within it two key concepts: the concept of 'needs', in particular the essential needs of the world's poor, to which overriding priority should be given; and the idea of limitations imposed by the state of technology and social organization on the environment's ability to meet present and future needs. (United Nations, 1987)

Birney and Reed (2009), in their leading sustainable schools report, stated that sustainability "is about engaging, learning and teaching to create a positive, empowering future for our children and their children" (p. 3). Schools and school facilities need to be sustainable. In March of this year (2016), 21st Century Schools Funds, Inc., USGBC and the National Council on School Facilities published, "2016 State of Our Schools: America's K-12 Facilities."

This report exposed the need for federal and state assistance in allocating the appropriate funds to meet the current needs of school facilities. The report stated that 99 billion dollars are currently being spent each year on facilities, but 46 billion more is needed to ensure that all children are learning in adequate and equitable school facilities (p. 6).

There is a trend that schools are moving in the direction of becoming more sustainable or green. The U.S. Department of Education is showcasing these schools, school districts and post-secondary institutions with the Green Ribbon School (ED-GRS) award in April of each year. Since 2012, 367 schools, school districts and post-secondary institutions have received this prestigious non-monetary recognition. However, the percentage of schools that are receiving this award is less than 1/2 of one percent of schools in the United States. This is according to the U.S. Department of Education, National Center for Education Statistics, which states that there are approximately 98,271 public schools and 33,619 private schools (NCES, 2016).

The purpose of this study was to further my recent study which examined the 190 school applications that received the ED-GRS from 2012, 2013, and 2014 (McKey & Kensler, 2016). The first study was a mixed-methods study in which I reviewed the award-winning school applications; wrote a deep descriptive analysis and then applied formal grounded theory through the use of a theoretical framework, the Ecological Democracy for Whole School Sustainability (ED-WSS) framework (Kensler, 2012). The results of the first study revealed a need to extend my research of ED-GRS focusing on teachers in these ED-GRS schools; examining evidence of sustaining beyond the ED-GRS award. The present study is different than the three other ED-GRS studies currently published (Sterrett & Imig, 2015; Sterrett, Imig & Moore, 2014; Warner & Elser, 2014). My study is focused on teacher perceptions of ecological and democratic principles within their ED-GRS award winning school and exploring to what extent a

relationship exists between teacher's perceptions of practicing ecological and democratic principles. This data was collected through an anonymous online survey which asked teachers to reflect on organizations, processes and systems in their school that were aligned to the three pillars of the ED-GRS: (1) reducing environmental impact and costs, (2) improving the health and wellness of schools, students and staff, and (3) providing effective environmental and sustainability education (U.S. Department of Education [E], n.d.).

The first three years of the ED-GRS award recognized 190 K-12 schools. This paper presents the findings of a quantitative study focused on teacher perceptions of ED-WSS in their ED-GRS award winning schools. Following a brief introduction to the ED-GRS award program, I describe the theoretical framework of ED-WSS (Kensler, 2012) and an overview of the empirical literature published on the ED-GRS.

ED-GRS Award Program

The U.S. Department of Education began recognizing schools for their sustainability efforts in the spring of 2012. The following year, the U.S. Department of Education added school districts, and in 2015, they added recognizing post-secondary institutions. Andrea Suarez Falken, Director of this award stated in the 2015 ED-GRS highlights document that:

We are pleased to see that the award has prompted instructors, parents, students, and administrators nationwide to acknowledge the critical need for students to learn in a manner – and a place – that will sustain both them and the planet. These green schools, districts, and postsecondary institutions have taught us that it's not just *what* students are learning; the *where* matters too. (U.S. Department of Education [C], n.d.)

Schools, school districts, and post-secondary institutions use the ED-GRS framework of the three pillars (1) reducing environmental impact and costs; (2) improving the health and

wellness of schools, students and staff; and (3) providing effective environmental and sustainability education (U.S. Department of Education [E], n.d.) to benchmark their progress in each of these areas. The applications are submitted to their state education agency, which then reviews, scores and submits the state's honorees to the U.S. Department of Education. The ED-GRS award winners are announced in April of each year. The honorees are invited to an awards presentation in Washington, D.C. each June. The benefits of being recognized as an ED-GRS school are: (1) cost savings (2) improved student and staff productivity (3) increased student engagement (4) enhanced critical thinking, civic skills (5) preparation for green jobs of the future and (6) reduced behavioral problems (U.S. Department of Education [G], n.d.).

Ecological Democracy for Whole School Sustainability (ED-WSS) Framework

Ecological Democracy for Whole School Sustainability (ED-WSS) framework (Kensler, 2012) emerged from her review of empirical literature describing green school practices from around the world. The ED-WSS consists of six ecological principles and ten democratic principles. The ecological principles were derived from the work of Capra (1996, 2002), and the democratic principles from the work of Fenton (2002) in which Kensler extended the initial definitions into the field of education. I used ED-WSS as the theoretical framework for my previous study which focused on the ED-GRS applications; focused on the question, "To what extent do the ED-GRS award winning applications provide evidence that these schools fit a theoretical model of whole school sustainability (ED-WSS)?"

Table 9 lists the ecological principles, definition of the principle, and examples of the evidence from the ED-GRS applications (McKey & Kensler, 2016).

Table 9

Evidence of Ecological Principles in ED-GRS Award Winners, 2012–2014

Ecological Principle	Definition	Examples of evidence from ED-GRS award applications
Networks, Partnerships, and Diversity	All living things are connected directly and/or indirectly; dense, diverse networks and partnerships provide resilience.	WVU Extension Services Youth Nutrition Outreach, U.S. Forest Service Adopt-a-School, Arkansas Game & Fish Commission, Georgia Pacific, Chevron, Lockheed Martin, Alliance for Climate Education, The Nature Conservancy
Development	All life changes and evolves over time; change in living systems is natural and continuous within individuals, communities, and populations	Outdoor classrooms, sustainable school gardens, fruit orchards, Environment in Context (EiC) curriculum, Education for Sustainability (EfS), GLOBE, Education and the Environment Initiative (EEI), Seed to Soup Curriculum
Cycles	Matter cycles through all living systems (e.g. water, geochemical) without producing a steady stream of unused waste; one’s waste is another’s food; local cycles interact with regional and global cycles.	Composting, Recycling, Rain barrel catchment, Xeriscaping
Solar Energy and Flows	The sun fuels most ecological systems on earth; every transfer of energy results in some energy loss, thus energy needs are ongoing.	Geothermal energy, Solar panels, Daylighting, Solar tubes, Wind Generator - Wind to Schools
Dynamic Balance	Feedback loops help maintain a relatively steady state with continuous fluctuations between upper and lower boundaries	School vegetable gardens that provide produce for classrooms, lunches and families in need, FEED program
Nested Systems	Every living system is itself an integrated whole and at the same time part of a larger system; change at one level affects the other levels.	Student-led teams in a school, School and District Green Teams, Diffusion from school initiative to district or city initiative, Participation in the U.S. Healthier Schools Challenge, Changes in the school lunch program affecting students, staff and the community

Table 10 lists the democratic principles, definition of the principle, and examples of the evidence from the ED-GRS applications (McKey & Kensler, 2016).

Table 10

Evidence of Democratic Principles in ED-GRS Award Winners, 2012–2014

Democratic Principle	Definition	Examples of evidence from ED-GRS award applications
Choice	When each person is encouraged to exercise their right to choose between a diversity of possibilities	Student, staff, parent, teacher choice, After-school exercise opportunities for students and staff, Healthy snacks, salad bar, Farm to School Problem-based Learning/Project-based Learning, Outdoor classrooms
Purpose & Vision	When an organization and the individual know their reason for existing and have a sense of intentional direction	Vision Statements, Leaders who construct processes for co-creation of a shared vision, FOX Code
Individual & Collective	When individuals understand the unique contribution they make toward achieving collective goals	Several Participants involved in application process, HiP (I can make a Healthy Planet) HEROS (Helpful Energy Resource Officers (Flagstone – Douglas Cty), Service Learning Projects, “Theme Immersion,” daily instruction uses the physical design and interactive exhibits to convey environmental elements. (Munford), Valuing student interest and inquiry
Accountability	When each person and the organization as a whole is responsible to each other and their community for their actions	EPA IAQ, Tools for Schools Student-led initiatives or events that impact a larger community, Energy Star Rating – EPA Portfolio Manager, Utility Manager, PowerEd - McKinstry, SEE (Schools for Energy Efficiency), National Energy Education Program (NEED)
Dialogue & Listening	When we listen and engage in conversation in a way that brings out new levels of meaning and connection	Community Planning or engagement that impact decision-making (ex: Chicago Conservation Corp), Safe Routes to Schools, Working with partners in creating curriculum and student experiences (e.g. Hawaii Prep Academy)
Reflection and Evaluation	When there is careful and thorough consideration and feedback regarding previous actions, events, or decision	Evaluation plan (ex: G & H school program – seven earth-friendly pathways, Environmental education frameworks that include reflection and evaluation, Energy Improvement Plan (Loveland, OH), Changed internal policies (ex: Miller Park, Omaha, NE)
Integrity	When each person steadfastly adheres to high moral principles	Goals, Expectations promoting integrity (Ex: IB Learner Profile), Policies, PBIS – Positive Behavior Intervention Strategies
Fairness and Dignity	When each person is treated justly and regarded impartially	Anti-Bullying Programs, Sylacauga Alliance for Family Enhancement (SAFE), Employee and Student Recognition Programs, Student Health & Wellness Programs (ex: IMPACT, Miller Park)

Democratic Principle	Definition	Examples of evidence from ED-GRS award applications
Decentralization	When power is appropriately shared among people at all levels of the organization	Shared Leadership, Student-led initiatives (e.g. Aquaculture research facilities, Recycling Program Farmer's Market)
Transparency	When ideas flow freely and information is openly and responsibly shared	Goals are shared and easily identifiable to all stakeholders, QHS Professional Learning Communities (Quincy), Natural Step – Systems-Thinking

The ED-WSS framework is comprised of underlying principles that may drive practice in diverse ways. Kensler, Caskie, Barber, & White (2009) showed a strong correlation between teachers' perceived practices of democratic principles (democratic community) and their report of their own continuous learning. This study utilized the ED-WSS in creating a survey to measure teacher perceptions of the practice of ecological and democratic principles in their ED-GRS schools and to find out if there is a relationship between ecological and democratic principles in these schools according to the evidence reported by teachers. The structure of the ED-GRS application did not directly reflect the practice of these principles. Therefore, using this framework as an analysis tool allowed me to both test and possibly extend the ED-WSS framework as well as gain a deeper understanding of how educators across the U.S. are presenting their practice of green schools.

Literature Review

The ED-GRS award program has had four years of schools, school districts and post-secondary winners. However, the published literature on this newly created award is still in its infancy. As of the end of 2015, there have been three published articles focused on the ED-GRS. One of the articles assessed the ED-GRS schools' integration of sustainability education (Warner & Elser, 2014), another surveyed school leaders about their insights on the award (Sterrett, Imig & Moore, 2014), and the third article explored the three pillars of the ED-GRS (Sterrett & Imig,

2015). These three studies represent the initial body of research on the ED-GRS program, as of this writing. Beginning here sets the stage for describing the growing body of literature related to whole school sustainability.

Warner and Elser (2014) reviewed the 2012 ED-GRS applications. Through their analysis they created a new metric, “interconnectedness”. Warner and Elser argued that “interconnectedness” must exist among the projects for the projects to be sustained over time. They offered in their research that “a school must be interconnected to its community to allow students to develop an understanding on complex problems “(Warner & Elser, 2014, p. 5). This idea of connecting to the community to sustain green school practices is also suggested in Sterrett, Imig and Moore’s (2014) article, and Sterrett and Imig’s (2015) article. These studies complement my work in digging deep into three years of the ED-GRS applications and analyzing to what extent these applications reflect ecological and democratic principles (Kensler, 2012).

Sterrett, Imig and Moore (2014) surveyed ED-GRS award winning school leaders from 2012–2014. They concluded that being labeled a “disadvantage school” wasn’t a barrier to implementing green school practices or winning the ED-GRS award. Sterrett et al. also addressed the importance of the organization of a green team that included both students and staff; this was further supported in their follow-up study from 2015 (Sterrett & Imig). Green teams were listed as one of Sterrett and Imig’s eight strategies for school leaders to consider when implementing green school practices. They also concluded that students and teachers were identified as being the most imperative to the sustainability efforts. Eighty-five percent of the participants stated that the quality of teaching and learning improved or significantly improved since receiving the award. Lastly they reported that student engagement displayed 90%

improvement by the participants and community engagement presented that 77% indicated improvement.

Sterrett and Imig followed up with 12 of the schools from their 2014 study. The purpose of their study was to provide useful examples of school sustainability practices through the lens of the three pillars of the ED-GRS. Three of the key findings in their study suggested: aligning green school practices within the daily curriculum, sharing the message with all stakeholders, and the creation of outdoor learning gardens. These key findings also support Warner and Elser's (2014) research on "interconnectedness" and its importance in sustaining green school practices.

All three of these ED-GRS articles are pivotal in creating support for the ED-GRS award and whole school sustainability. They have set the groundwork for other researchers, practitioners, and school leaders to begin or continue implementing green school practices in moving their schools to becoming healthy, high performance schools. This quantitative study is focused on teacher perceptions of ED-WSS in their ED-GRS award winning school as well as examining the data to understand how these principles are related to one another. This expansion of the published research includes survey data from teachers and how this data of ED-WSS principles correlate to one another in suggesting that both ecological and democratic principles need to be present simultaneously to sustain the practices of the ED-GRS framework.

For the purpose of the paper, the term 'ED-GRS' refers to schools that have received the recognition award from the U.S. Department of Education and these are the focus of our study. In addition, the term 'ED-WSS' refers to the Ecological Democracy for Whole School Sustainability framework as this is the theoretical framework used for this study. This study will

move beyond these ED-GRS articles and focus on the teachers in these schools and their perceptions of ED-WSS.

Methods

This section documents the actions taken and describes the research design, the sample, instrumentation, data collection, data analysis and limitations in this study. As outlined in the introduction, this quantitative study was designed to investigate teacher perceptions of the practice of ecological and democratic principles (ED-WSS) in ED-GRS award winning schools. This study further examines ED-GRS winning schools in an effort to understand if schools are sustaining the implemented practices. This study focused on the perceptions of teachers in these schools; previous studies (Sterrett & Imig, 2015; Sterrett, Imig & Moore, 2014) were focused on educational leaders. In addition, this study digs deeper into the ED-WSS framework allowing me to examine relationships between the ED-GRS framework and the ecological and democratic principles. This research will provide school and district leaders not only with examples of practices related to the ED-GRS three pillars, but support the need to implement democratic principles in an attempt to sustain green school practices.

Research Design

This was a descriptive and correlational quantitative study (Johnson, 2001). Descriptive statistics were used to inform the audience of the ecological and democratic principles perceived by the ED-GRS teachers in the study. In addition, I used a correlational research design as this study is non-experimental research where I have only one group and two or more variables. “Correlational research involves collecting data in order to determine whether and to what degree, a relationship exists between two or more quantifiable variables” (Gay & Airasian, 2000,

p. 321). An online survey was created and used to gather teacher perceptions about the practice of the ED-WSS framework in their school.

The use of Qualtrics was appropriate for collecting the survey data from the ED-GRS teachers because it is user-friendly, ease of availability, and teachers could take at their convenience. I developed two research questions that outlined the framework for analyzing ED-GRS teacher perceptions of ecological and democratic principles in their schools.

Research Questions

This study was designed to address the following question regarding ecological and democratic principles in schools that received the ED-GRS award during the first three years of the award.

1. To what extent do teachers from ED-GRS 2012, 2013, and 2014 report evidence of the practice of ecological and democratic principles?
2. To what extent is there a relationship between teacher perceptions of ecological principles and democratic principles in ED-GRS 2012, 2013, and 2014 schools?

Sample

Due to the infancy of the ED-GRS award program, it was necessary to survey all 190 schools that received the award in 2012, 2013, and 2014. Each of the ED-GRS principals received a phone call requesting that his/her teachers participate in the survey. I followed up the phone call with an email to the principal with directions to forward to his/her teachers. The email asked the participants to complete a brief anonymous survey to report their perceptions of organizational processes and systems in their school. Participants represented the 190 ED-GRS schools awarded in 2012, 2013 and 2014.

Sampling Method

Phone numbers and email addresses for the ED-GRS Principals was made available on the publicly accessible ED-GRS applications located on the U.S. Department of Education website for those schools receiving the award in 2012, 2013, and 2014. Of the 190 applications, 10% of the applications didn't list the principal or head of school on the application packet. In addition, 40% of the principals or head of schools had turned over as of the fall of 2015. I had to research via the web and call several schools to find the name of the principal. My goal was to contact all 190 ED-GRS principals to obtain their permission for their teachers to participate; I was able to get in contact with 178 via phone and/or email. I struggled to get directly in contact with the principals. I had to leave voice messages and messages with front desk personnel or the office manager. Even though I followed up every message with an email, I only received confirmation to participate from 34% of the 190 principals whereas 31% didn't respond at all. Thirty of the principals that stated they would participate didn't have any teachers complete the survey. My data set consists of 34 schools and 359 teacher surveys. Using an online survey via email may have initially saved time and money; there were issues that may have presented obstacles including emails lost or caught in spam or junk folders.

Instrument and Data Collection Method

The survey included 55 questions across two sections. The questions focused on the practice of ecological and democratic principles. There were fixed answer questions, open-ended questions and Likert-type questions. The following six-point scale was used for the Likert-type questions: Never (1), Very Rarely (2), Rarely (3), Occasionally (4), Frequently (5), Very Frequently (6).

Section 1 of the survey tool was created from the ED-GRS framework and the ecological principles (Capra 1996, 2002) to measure teacher perceptions of the practices of ecological principles in their school. I created this survey tool for this study as there wasn't any survey tool already created focusing on ecological principles. An expert panel was convened to help with the creation of this survey tool, including initial feedback on survey questions, design, and distribution. The panel included Auburn University professors with expertise in the ED-GRS framework, LEED (Leadership in Energy and Environmental Design), survey design, and an understanding of sustainability. In addition, a pilot study was conducted which included surveying 30 educational leaders, teachers, and professors. Participants answered questions that reflected the three pillars of the ED-GRS framework and related to the practices of each of the six ecological principles in their school. The six ecological principles are development, network, partnerships and diversity, dynamic balance, nested systems, cycles, and solar energy and flows. The three pillars of the ED-GRS framework focus on reducing environmental impact and costs, improving the health and wellness of students and staff, and providing effective environmental and sustainability education.

Table 11

Sample Survey Questions – Section 1: Ecological Principles

Pillar	Sample Survey Questions Organized by Ecological Principle	
1 2 3		
Development		
*	*	*
		Teachers have the opportunity to participate substantially in designing new change initiatives at my school.
*		*
		Our school building’s form and function is explicitly visible and taught to occupants.
Networks, Partnerships, & Diversity		
*		*
		Our school involves local businesses and/or community organizations in the building design, renovation and/or management.
	*	*
		Our students learn about food webs through studying the species that live on and near our school property.
Dynamic Balance		
*	*	*
		Our students learn through interdisciplinary lessons, problems, and/or projects about the dynamic relationships among nature, the built environment, and human well-being through studying our school community (landscape, building and occupants).
Nested Systems		
	*	
		Our students learn how to evaluate complex situations (grade-level appropriate) from different perspectives.
*	*	
		The following features of our building clearly integrate it into the surrounding landscapes: Mark all that apply Abundant natural light in the building, constructed wetlands, garden(s), green roof, native plants, rainwater management, solar panels, other, and don’t know
Cycles/Energy and Flows		
	*	
		Our school promotes health and wellness through one or more of the following at my school: Mark all that apply Banned sales of high sugar drinks, daily physical activity, fresh fruit and vegetable options at lunch, healthy snacks, high quality indoor air quality, natural lighting, outside play or unstructured time, other and don’t know
*		*
		Students at my school use our building to learn about one or more of the following: Mark all that apply Daylighting, energy use, geothermal power, green roofs, indoor air quality, natural building materials, solar panels, water management, other and don’t know

The second section of the survey tool was the WorldBlu School Survey. Previous work by Kensler (2009) supported the reliability of this survey tool in Pennsylvania public schools.

Kensler used the survey to measure teacher perceptions of democratic principles in action at the individual, positional leader, and organizational levels (Kensler, Caskie, Barber & White, 2009). Participants answered 37 questions that related to the practices of the 10 democratic principles in their Green Ribbon School; approximately three to five questions per principle. The ten democratic principles are fairness and dignity, purpose and vision, integrity, reflection and evaluation, accountability, individual and collective, dialogue and listening, decentralization, transparency and choice.

Table 12

Sample Survey Questions – Section 2: Democratic Principles

Sample Survey Questions Organized by Democratic Principle
<p>Fairness and Dignity I am encouraged to be respectful of others views and opinions, even if they differ from mine.</p>
<p>Purpose and Vision My school’s administrators set strategic priorities in order to live our school’s values, achieve its vision, and fulfill its purpose.</p>
<p>Integrity Systems and processes are in place that provide ethical checks and balances for my school and protect it from fraud.</p>
<p>Reflection and Evaluation I am encouraged to develop myself through training, coaching and/or mentoring.</p>
<p>Accountability Systems and processes are in place that bring a balanced approach to my school’s accountability, not just a singular focus on test scores.</p>
<p>Individual and Collective My school’s administrators encourage me to express my individuality while still being responsible to the purpose and values of the school.</p>
<p>Dialogue and Listening Systems and processes are in place that allow everyone to take the appropriate amount of time to dialogue and listen to ideas and suggestions.</p>
<p>Decentralization I am encouraged to take risks regardless of my title or rank.</p>
<p>Transparency Systems and processes are in place to keep me informed about my school’s overall performance</p>
<p>Choice My school’s administrators appropriately encourage me to make choices.</p>

Data Analysis

The survey data was downloaded from Qualtrics to IBM Statistical Package for the Social Sciences (SPSS) for Windows version 23.0 (IBM SPSS Inc. 2015), then the data was aggregated by school providing an overall mean score for each of the questions per school not per teacher that took the survey as the number of surveys per school were inconsistent. This was to create usable mean scores that would most accurately reflect each of the ED-GRS schools that participated in the survey. The questions were then organized by the principles of the ED-WSS. This organization of questions is explained in Tables 11 and 12 above. The final data set included overall mean scores of the ED-WSS for each of the 34 schools, an overall mean score for ecological principles, and an overall mean score for democratic principles. Pearson correlations determined if there were relationships between the overall ecological mean and the overall democratic mean as well as relationships between the individual principles of the ED-WSS.

Limitations

There are limitations to conducting an online survey. One needs to make the following assumptions: participants are willing to participate and honest in completing the survey. In addition, I chose to survey teachers from the entire population of ED-GRS award winners. There were 190 schools in the United States that were awarded from 2012–2014. More than 40% of the principals or head of schools had turned over as of the fall of 2015. Principal turnover is limitation of the survey as it was difficult to know who to contact as well as the buy-in for a new principal to participate in a survey that they were unaware of the ED-GRS award and the application process. In addition, schools also may have had teacher turnover since being awarded.

Results

This section will answer the two research questions: (1) To what extent do teachers from ED-GRS 2012, 2013, and 2014 report evidence of the practice of ecological and democratic principles? and (2) To what extent is there a relationship between teacher perceptions of ecological principles and democratic principles in ED-GRS 2012, 2013, and 2014 schools? To answer the first question, I provide a descriptive overview of the teacher perceptions of ecological and democratic principles reported in the online survey that was conducted. I then present an analysis of the correlations between ecological and democratic principles of the ED-WSS framework.

Table 13 represents the mean scores for each of the principles of the ED-WSS. Teachers were asked three to five questions that directly related to each of the principles. The questions that pertained to cycles, solar energy and flows were multiple answer questions; teachers were able to mark all that applied. They received a score up to 6; based on the number of practices that they marked. The other questions were answered with a Likert-Type scale with 1 representing never and 6 representing very frequently. According to Table 13, under ecological principles cycles, solar energy and flows had the highest score of 5.09; indicating that teachers perceived this principle most frequently in their ED-GRS school. Nested systems score a 4.76 and networks, partnerships, and diversity scored a 4.51; both scores reflect that teachers report evidence of these principles frequently. Development and dynamic balance scored 4.30 and 4.29 respectively; indicating that teachers perceived these principles occasionally at their ED-GRS school.

Table 13

Phase 2 – Teacher Perceptions of ED-WSS in ED-GRS Award Winners, 2012–2014

Ecological Principle	Mean Score	Democratic Principle	Mean Score
	out of 6		out of 6
Cycles, solar energy and flows	5.09	Integrity	5.35
Nested systems	4.76	Accountability	5.34
Networks, partnerships and diversity	4.51	Fairness and dignity	5.25
Development	4.30	Purpose and vision	4.92
Dynamic balance	4.29	Choice	4.90
		Transparency	4.85
		Dialogue and listening	4.82
		Reflection and evaluation	4.80
		Individual and collective	4.77
		Decentralization	4.60

According to the data, looking at democratic principles, integrity scored a 5.35, accountability scored a 5.34, and fairness and dignity scored a 5.25 which indicated that teachers perceived these principles most frequently in their ED-GRS school. Purpose and vision, choice, transparency, dialogue and listening, and reflection and evaluation, scored between 4.80 and 4.92; teachers perceived these principles more often than individual and collective and decentralization, but less often than integrity, accountability, and fairness and dignity.

The mean scores for the ecological and democratic principles were averaged to create an overall mean score for each set of principles. The democratic mean score was higher at 4.95 or very closely related to frequently; ecological principles had an overall mean score of 4.59 or

half-way between occasionally and frequently on the Likert-type scale. The standard deviations were .55 and .43 respectively for ecological and democratic principles. I ran a Pearson correlation to determine if there was a relationship between the ecological and democratic principles overall. The Pearson correlation revealed a .36 correlation. This statistic is used to measure the strength and direction of the linear relationship, or correlation between two factors. The value of r can range from -1.0 to +1.0. This correlation is a positive value which indicates that the values of two factors changed in the same direction. As the values of one factor increases, values of the second factor also increase; as the values of one factor decrease, values of the second factor also decrease. The closer the r value is to +1 the stronger the correlation, a score of .36 represents a correlation; a medium or moderate correlation (Green & Salkind, 2011).

Ecological and democratic principles were shown to have a medium positive correlation. I then executed correlations for the individual principles to find out if relationships existed between them. Table 14 represents the correlations between the principles of the ED-WSS. For this study, cycles were combined with solar energy and flows thus the sixteen principles are grouped into fifteen principles. The results of the correlational analyses presented in Table 14 show that 63 out of the 105 correlations were statistically significant and were greater than or equal to .34. Purpose and vision was correlated to all of the principles except for networks, partnerships and diversity, and nested systems; they were statistically significant and were greater than or equal to .34. Choice was also correlated to twelve of the principles except for nested systems and cycles, solar energy and flows; they were statistically significant and were greater than or equal to .40. The correlations of nested systems, networks, partnerships and diversity, and cycles, solar energy and flows with the other principles tended to be lower and not significant. Nested systems showed a relationship with cycles, solar energy and flows at .54;

which is statistically significant at the .01 level. However, nested systems didn't correlate as statistically significant with any other ecological principles or democratic principles.

Focused only on the democratic principles, the results suggest that 45 of the 45 correlations were statistically significant at the .01 level and were greater than or equal to .45. The most highly correlated democratic principles were accountability and integrity at .91, reflection and evaluation and individual and collective at .86, dialogue and listening and choice at .82, and choice and decentralization at .80. The most highly correlated ecological principles were development and dynamic balance at .70, development and networks, partnerships, and diversity at .70, development and choice at .65, and development and purpose and vision at .62. All of the most highly correlated principles listed above were statistically significant at .01. They were also greater than or equal to .62 which represents a large correlation.

Table 14

Correlations of the Ecological and Democratic Principles

E & D Principles	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1. Development	1	.70**	.70**	.15	.32	.62**	.34	.36*	.65**	.38*	.48**	.57**	.43*	.42*	.34
2. Dynamic balance		1	.54**	.19	.54**	.42*	.24	.24	.49**	.18	.36*	.45**	.25	.28	.19
3. Networks, partnerships			1	-.01	.11	.30	.05	.16	.40*	.15	.21	.26	.12	.13	.20
4. Nested systems				1	.54**	.05	-.23	-.20	-.01	-.12	.03	.01	-.14	.08	-.16
5. Cycles, solar energy and flows					1	.34*	-.03	-.02	.14	-.05	.27	.28	.15	.18	.00
6. Purpose and vision						1	.58**	.56**	.69**	.56**	.70**	.75**	.69**	.60**	.50**
7. Integrity							1	.91**	.45**	.61**	.45**	.56**	.68**	.60**	.48**
8. Accountability								1	.55**	.72**	.55**	.62**	.63**	.66**	.61**
9. Choice									1	.79**	.80**	.82**	.56**	.71**	.65**
10. Individual and collective										1	.69**	.76**	.68**	.66**	.86**
11. Decentralization											1	.73**	.58**	.75**	.61**
12. Dialogue and listening												1	.70**	.69**	.67**
13. Transparency													1	.53**	.68**
14. Fairness and dignity														1	.48**
15. Reflection and evaluation															1
Mean	4.30	4.29	4.51	4.76	5.09	4.92	5.35	5.34	4.90	4.77	4.60	4.82	4.85	5.25	4.80
SD	.67	.86	.61	.45	1.11	.50	.40	.38	.59	.59	.50	.63	.51	.44	.61
Skewness (SE= .40)	-.87	-.54	-.21	.04	-.75	-.82	-1.25	-.56	.57	-.13	.17	-1.11	-.55	-.25	-.50
Kurtosis (SE=.79)	.57	-.82	-.96	.53	-.95	2.83	3.2	1.07	.33	-.23	-.97	1.06	.087	-.48	-.23

*p <.05 **p < .0

Discussion

Teachers from 34 of the 190 ED-GRS award winning schools from 2012, 2013, and 2014 participated in the study and reported evidence of ecological and democratic principles. Teachers reported mean scores of 4.6–5.35 on a scale of 6.0 on the democratic principles. Kensler et al. (2009) reported similar mean scores in their study of 79 middle schools surveying teachers on the ten democratic principles in schools that were not designated at ED-GRS schools. Evidence of democratic principles in schools have been shown in previous studies to support and sustain change initiatives (Birney & Reed, 2009; Higgs & MacMillan, 2006; Kensler, 2012; Schelly et al., 2012). The democratic principles of integrity and accountability had the highest mean score as they were perceived most frequently by the teachers. Teachers reported mean scores of 4.29 – 5.09 on a scale of 6.0 on the ecological principles. Cycles, solar energy and flows had the highest mean score of 5.09 which indicated that teachers perceived this ecological principle most frequently. Teachers in ED-GRS award winning schools perceived both ecological and democratic principles in their schools at a level that was reflected from occasionally – very frequently.

The survey responses indicated strong relationships existed between ecological and democratic principles; in addition, the ten democratic principles were strongly correlated with one another. The strong positive relationship between ecological and democratic principles reported by teachers in ED-GRS schools suggested that schools may sustain the implemented practices beyond the award. The findings proposed that positive relationships exist amongst and between the principles; which would offer that both need to be present to sustain ecological change in schools. This relationship between the ED-WSS provides school, community, state, and federal leaders with additional data to suggest the importance of implementing practices that

support the ED-GRS framework and ecological principles in addition for the need to focus on democratic principles.

The results of the study suggested that the ED-GRS award promoted whole school sustainability through the use of the ED-GRS framework and the resources that are made available for schools aspiring to become more green or sustainable. One of those resources is Green Strides (<http://www.greenstrides.org>) which is supported by the USGBC. This website provided schools, school districts, and post-secondary institutions with resource aligned to the three pillars of the ED-GRS framework. One may suggest that schools that are sustaining beyond the ED-GRS award exhibit both ecological and democratic principles in their schools. The ED-GRS application is primarily focused on ecological principles which can be aligned with the three pillars. Yet, evidence of democratic principles in ED-GRS schools suggested that these schools may be able to sustain change over time including turnover of teachers and administration.

This study invited teachers who worked in ED-GRS schools to participate through approval and distribution of the survey from the principal or head of the school. It was difficult to get in contact with the principals and have the opportunity to explain the study's importance, which may have contributed to the number of schools that participated in the survey. Principals that chose to participate in the study may have a deeper level of support and interest for this work than those who did not. For this reason, the sample of schools that participated may represent some of the greenest of the green schools in the United States. Yet, without data from non-participating schools, this is simply conjecture.

Currently the ED-GRS award doesn't allow schools to receive recognition more than once or offers an award for sustaining beyond the award. If the goal is to promote schools

becoming healthy, high performance or green schools, additional recognition for sustaining these practices may need to be put into place in the future. Also, including evidence of democratic principles in the ED-GRS award application would promote the importance of democratic community in our schools. School leader preparation programs also play a pivotal role in educating or training our future leaders in becoming democratic leaders that promote ecological practices in their schools. There is a need for graduate-level leadership programs to include coursework and field experiences on whole school sustainability (Kensler & Uline, 2014, as cited in Sobel, Gentile & Bocko, 2014).

There is a need to continue to study ED-GRS award winning schools as these schools are examples of healthy, high performance schools that are providing a world-class education for students. This is a non-monetary award, and schools are only able to be recognized once. However, it is important that all students have the opportunity to engage in schools that are safe and energy efficient, focus on student's and staff's health and wellness, and promote environmental and sustainability education. School leaders play a decisive role in implementing and sustaining change; yet, democratic principles need to be present in addition to ecological principles.

CHAPTER V: FINDINGS, CONCLUSIONS, AND RECOMMENDATIONS

This chapter summarizes the findings and the major conclusions from Chapters III and IV. In addition, this chapter will propose recommendations for school leaders that reflect the findings of the studies. Recommendations for future areas of study will also be proposed.

Purpose of the Study and Research Questions

This mixed-method, descriptive analysis and quantitative correlational study focused on the U.S. Department of Education Green Ribbon School (ED-GRS) award and the Ecological Democracy for Whole School Sustainability (ED-WSS) framework. The first phase of the study was designed to understand what the U.S. Department of Education Green Ribbon School (ED-GRS) award is, define the characteristics of these schools who received the award, and to describe exemplar schools that could be identified as the “greenest of the green schools” through evidence of ED-WSS. The second phase of the study focused on to what extent teachers report evidence of ecological and democratic principles in their ED-GRS award winning school and to determine if there was a relationship between teachers’ perceptions of practicing ecological and democratic principles in their schools.

The ED-GRS award was established in 2011, with the first winners being announced in April 2012. The award reflects the three pillars of the ED-GRS framework: (1) reducing environmental impact and costs; (2) improving the health and wellness of schools, students and staff; and (3) providing effective environmental and sustainability education (U.S. Department of

Education [E], n.d.). Schools, school districts and post-secondary institutions can utilize this framework to benchmark their progress in these areas as well as to apply for the award.

ED-WSS (Kensler, 2012) is a theoretical framework that emerged from her review of empirical literature describing green school practices from around the world. The ED-WSS consists of six ecological principles and ten democratic principles. The ecological principles were derived from the work of Capra (1996, 2002), and the democratic principles from the work of Fenton (2002) in which Kensler extended the initial definitions into the field of education. The ED-WSS was used for both phases of the ED-GRS study.

Phase one of the study was designed to address the following questions regarding characteristics of ED-GRS award winners from 2012, 2013, and 2014 as well as to dig deeper into the applications of award winners to uncover evidence of ecological and democratic principles.

- (1) What characterizes ED-GRS award winners?
- (2) To what extent do the ED-GRS award winning applications provide evidence that these schools fit a theoretical model of whole school sustainability (ED-WSS)?

Phase two of the study was designed to address the following questions regarding ecological and democratic principles (ED-WSS) in schools that received the ED-GRS award during the first three years of the award.

- (3) To what extent do teachers from Green Ribbon Schools (2012, 2013, and 2014) report evidence of ED-WSS?
- (4) To what extent is there a relationship between teachers' perceptions of practicing ecological and democratic principles in ED-GRS 2012, 2013 and 2014 schools?

Summary of Findings and Conclusions

This study was designed to bring attention to the ED-GRS award as well as to dig into how and what these schools have implemented and if these schools reflect both ecological and democratic principles in their submitted applications and as perceived by teachers in these schools. The findings indicated that the ED-GRS award recognized schools, school districts, and post-secondary institutions that reflected ecological principles as evidenced by Phase 1 of the study. Phase 2 of the study provided additional guidance that these award-winning schools emulated democratic principles, suggesting that schools that implemented green school practices reflective of the three pillars of the ED-GRS framework also may have exemplified democratic principles through their school, teacher or community leadership. Also, the second phase of the study advocated for both ecological and democratic principles as reflected in the results of the correlational study. Previous studies and published literature speaks to the importance of democratic community or leadership in implementing and sustaining change (Birney & Reed, 2009; Higgs & MacMillan, 2006; Kensler, 2012; Schelly et al., 2012).

Phase 1 of the Study

Conclusions from Phase 1 of the study supported that schools which are considered “disadvantaged” are able to successfully implement ecological and democratic principles and become ED-GRS award winning schools. Forty-three percent (43%) of the schools who received the ED-GRS recognition during the first three years of the award report themselves as high poverty or schools with 40% or more of their students receiving free and/or reduced lunch. This finding challenged other research that lack of funding is a barrier to implementing green school practices (Attalla, Rankin & Christian, 2013; Crosby & Metzger, 2013; Evans, Whitehouse & Gooch, 2012; Veronese & Kensler, 2013).

The findings also concluded that ED-GRS schools support a focus on sustainability vs. environmentalism. Environmentalism has been linked to solely an ecological approach to implementing green school practices. The definition of environmentalism as stated on the Merriam-Webster online dictionary is the advocacy of the preservation, restoration, or improvement of the natural environment (Merriam-Webster, n.d.). Sustainability is defined as creating and maintaining the conditions under which humans and nature can exist in productive harmony to support present and future generations (EPA, n.d.). The findings from the analysis of the ED-GRS applications proposed that schools have implemented ecological practices that move beyond the environment, an example of this is the embedding of sustainability standards and curriculum that reflect the EPA's definition in core subject areas outside of the sciences in a variety of K–12 classrooms.

The study concluded that democratic principles were less evident than ecological principles in the submitted award-winning applications. All of the ecological principles were evident in 25% of the ED-GRS school applications as compared to the democratic principles whereas none of the 190 school applications reflected all of the democratic principles. In addition, individual ecological principles ranged from 64%–96% as evidenced in their application. Individual democratic principles ranged from as little as 4% to 97% in the school applications.

The democratic principles of choice, purpose and vision, individual and collective, accountability and dialogue and listening were evident in the majority of the ED-GRS applications. The percentage of school applications that reflected these democratic principles ranged from 61%–97%. The democratic principles that were evident in less than 15% of the ED-GRS applications were transparency, decentralization, and fairness and dignity. The analysis of the ED-GRS application reflected a primary focus on ecological principles as the framework of the

three pillars did not explicitly include any questions referring to practices consistent with democratic principles.

Phase 2 of the Study

Teachers in ED-GRS award winning schools reported evidence of ecological and democratic principles through an online survey created to reflect the three pillars of the ED-GRS framework (U.S. Department of Education [E], n.d.), the work of Capra (1996, 2002) with ecological principles, and Fenton (2002) and Kensler (2009) with democratic principles. These teachers represented 34 schools out of 190 schools that received the award in the first three years of the award. All 190 ED-GRS schools were invited to participate in this study. One could ascertain that the principals or head of schools that agreed to participate were the school leaders who were most supportive or involved in the implementation process.

The democratic principles were perceived by the teachers overall with mean scores ranging from 4.6–5.35 on a scale of 6.0, which suggests these practices are frequently evident in these ED-GRS schools. The democratic principles with mean scores over 5.0 were integrity, accountability, and fairness and dignity; these were the principles with the highest score and report most frequently. Fairness and dignity reported a mean score of 5.25; this is a significant difference from Phase 1 of the study where fairness and dignity was only evident in 14% of the ED-GRS applications. This could be attributed to the fact that the application didn't include any specific questions about this principle; yet is important to point out as the score is one of the highest when surveying ED-GRS teachers.

The six ecological principles were combined into five principles for the sake of the survey; solar energy and flows was combined with cycles. The mean scores for these principles ranged from 4.29–5.09 on a scale of 6.0. These means were a bit lower or possibly less evident

than the democratic principles. It also could be how the teachers interpreted the questions being asked or their knowledge and understanding about the green school practices that have been implemented in their schools. The mean scores for ecological principles as perceived by the teachers in highest to lowest order were cycles, solar energy and flows, nested systems, networks, partnerships and diversity, development and dynamic balance. In Phase 1, the following is the order of principles from highest to lowest as evidence by the submitted applications: networks, partnerships, and diversity, development, cycles, solar energy and flows, nested systems and dynamic balance. This comparison suggested that there is a small difference between the understanding of those who put together the application and the general population of teachers in the school building.

The only constant is that dynamic balance is the lowest for both phases of the study. An example of dynamic balance are school gardens that use the produce in the cafeteria or provide this resource to student or families in need. A sample question from the survey asked teachers the following, “Our students learn through interdisciplinary lessons, problems, and/or projects about the dynamic relationships among nature, the built environment, and human well-being through studying our school community (landscape, building and occupants)” (McKey & Kensler, 2016). Teachers answered using a Likert-type scale ranging from 1–6, in which 6 representing very frequently. A mean score of 4.29 aligns closely to occasionally on the scale.

Besides the descriptive results, correlations were executed for both ecological and democratic principles in Phase 2 of the study. The findings showed that 63 of the 105 possible correlations were statistically significant and were greater than or equal to .34. All of the correlations amongst the democratic principles were statistically significant at the .01 level and were greater than or equal to .45. The most highly correlated democratic principles were

accountability and integrity at .91. These two democratic principles also had the highest mean scores of 5.35 and 5.34.

The most highly correlated ecological principles were development and dynamic balance at .70; statistically significant at the .01 level. These two principles had the lowest mean scores of 4.30 and 4.29; which indicated that teachers perceived these principles occasionally at their ED-GRS school.

The data reflected positive relationships between ecological and democratic principles; this suggested that both are present in the participating schools as perceived by the teachers in these schools. In addition, correlations were run to look at relationships between the six ecological and ten democratic principles. The findings proposed that positive relationships exist amongst and between the principles; which would offer that both need to be present to sustain ecological change in schools.

Recommendations for Practice

Accessibility and Availability of Information

The current ED-GRS application is reflective of ecological principles and the ED-GRS framework. Both of these frameworks reflect whole school sustainability components which are necessary for schools to become an ED-GRS school. The U.S. Department of Education and the Center for Green Schools partnered in creating resources for schools to access as a guide for implementation. These resources are available at <http://www.greenstrides.org> . In addition, each of the participating states has a state contact that is available to schools, school districts and post-secondary institutions to provide support, guidance, and answer questions about the ED-GRS award. Their contact information is available on the ed.gov website. In addition, studies like this one and the three others mentioned earlier (Sterrett & Imig, 2015; Sterrett, Imig & Moore,

2014; Warner & Elser, 2014) are important in sharing with school, district, community, local, state and federal leaders' details benefits related to schools becoming healthy, high performance or ED-GRS award winning schools in exceeding expectations for student wellness and academic achievement.

School Leadership

School leaders played a significant role in schools applying for and being recognized as an ED-GRS award winning school. Yet, one of the barriers from the published literature is the lack of understanding school leaders have about sustainability, green school practices, and ecological and democratic principles (Crosby & Metzger, 2013; Kensler, 2012; Pepper & Wildly, 2008; Schelly, Cross, Franzen, Hall & Reeve, 2011; Veronese & Kensler, 2013).

Kensler and Uline (2014) suggested in *the National Action Plan for Educating for Sustainability* cited as section within larger work.

Educational leadership/school administrator preparation and licensure program providers must begin integrating core content related to Educating for Sustainability (EfS) and green school practices into their curricula so that the next generation of school and district administrators are able to lead with deep awareness and understanding of the powerful educational opportunities presented by EfS. (p. 20)

It is necessary to educate our future leaders not only about the ED-GRS award, but about what sustainability is and how to implement sustainability into their schools utilizing both ecological and democratic principles. Democratic principles need to be reflected in the implementation in order to sustain practices well beyond the award and/or the tenure of the school leadership team.

Sustaining Beyond the Initial Award

The ED-GRS award in its current state is awarded to schools, school districts or post-secondary institutions once. Currently, there aren't any future awards available if schools continue to sustain the implemented practices beyond the initial recognition. Of course it can be argued that this is a non-monetary award and cost-savings, health and wellness of students, and educating students to embrace and engage in whole school sustainability reflects the benefits of implementing green school practices. However, I would suggest that an award be created to recognize schools that sustain beyond the award. This award could be available for schools to apply 5 years after receiving the first award. The criteria for this award could reflect the ED-GRS three pillars framework with an additional fourth pillar to reflect democratic principles of the ED-WSS. The importance of including democratic principles provides school leaders with strategies for success in implementation and sustainability. An additional award for schools to apply for is an extra incentive that schools don't stop once receiving the first recognition, but that they continue to strive to become better. Also, this award application should include a school walk-through to ensure that the information included on the application reflects the practice of the schools. This provides credibility for the award as well as motivation for the entire school community to be a part of the change initiatives.

Future Research

The following questions provide guidance for future research into the U.S. Department of Education Green Ribbon School (ED-GRS) award and Ecological Democracy for Whole School Sustainability (ED-WSS) framework in guiding schools towards successful and sustainable implementation of healthy, high performance or green schools.

1. What drives school leaders' decisions to implement sustainable practices?
2. What are the long-term academic, social, and financial effects on schools that engage in sustainability/green school practices?
3. To what extent, does improved student health relate to academic achievement?
4. To what extent does the ED-GRS award, a non-monetary award, influence organizational change for sustainability?

Summary

The overall purpose of this study was to investigate the ED-GRS award and look for evidence of both ecological and democratic principles in these schools. The first phase of the study was to describe the ED-GRS award, define characteristics of these award-winning schools, and analyze the school applications through the ED-WSS theoretical framework. Phase 2 of the study was to survey teachers in these ED-GRS schools to see if they report evidence of ecological and democratic principles and then to examine the survey data by running a correlational study.

Presence of democratic principles in schools suggest sustained, implementation of ecological principles leading to students in schools that are healthy, high performing. Data from the surveys of ED-GRS teachers supports strong relationships between evidence of democratic principles in schools that represent some of the “greenest of the green” schools. Schools leaders who embrace democratic principles in their schools will be able to move their schools towards healthy, high performing in reflecting the three pillars of the ED-GRS framework.

A sustainable future where ecological, social, and economic systems are healthy, just, and prosperous requires that we learn quickly to see and act in new ways. From an ecocentric perspective, democratic school leaders and communities will recognize opportunities for seeing, considering, and reducing negative impacts on the local and global natural

environment and creating conditions where ecological, social, and economic systems flourish. (Kensler, 2012, p. 804)

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