Education for Sustainable Development: An Assessment of West Midlands Schools

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Submitted by:
Joseph Bosco
Kyle Foster
Trang Ha
Emma Travassos

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Submitted to:

Project Advisor:
Susan Jarvis

Sponsor:
Elena Lengthorn, Department of Education: University of Worcester

Abstract

Schools across the United Kingdom are striving to improve sustainability education to meet the demands of Target 4.7 of the UN Sustainable Development Goals. However, no tool currently exists to measure schools' progress toward this target. Working with our sponsor at the University of Worcester, our team developed an assessment tool that was piloted in five secondary schools across the West Midlands to determine the current state of participation in Education for Sustainable Development (ESD) and quantify the tool's effectiveness.

Acknowledgements

The completion of our project would not have been possible without the guidance, advice, participation, and cooperation of the following individuals, organizations, and groups.

Most importantly, we would like to thank Ms. Elena Lengthorn of the University of Worcester for sponsoring this project and providing us with ample guidance and connections to facilitate our assessment. Her generosity and hospitality was unparalleled.

We would additionally like to thank the five secondary schools and members of faculty who participated in our study, graciously allowing our team to visit their schools, observe their facilities, and conduct interviews.

For usage of campus facilities and resources, we would like to thank our UK site coordinator Katy Boom and the staff of the University of Worcester.

For continued guidance and assistance in conducting our project and writing the IQP report we would like to thank Professor Susan Jarvis. We would also like to thank our ID2050 instructor Professor Courtney Kurlanska for providing our team with the tools and resources needed to successfully complete our project.

Executive Summary

In 2015, the United Nations put forward the 2030 Agenda for Sustainable Development which introduced and defined the Sustainable Development Goals (SDGs), a set of 17 goals intended to ensure sustainability on Earth by the year 2030. Goal Four on this list calls for an improvement in education across the world and, more specifically, Target 4.7 of this goal aims to develop a worldwide curriculum to generate knowledge concerning "sustainable development and sustainable lifestyles" (UN General Assembly, 2015).

According to the United Nations, there has been growing international recognition of Education for Sustainable Development (ESD) as a key factor in realizing these goals. ESD approaches education in a holistic and transformational manner, aiming to orient the way people think and act towards environmental sustainability by transforming the curriculum and learning environment in schools. Among educational programs that support ESD, Eco-Schools is the most successful internationally recognized program, having been implemented in nearly 70 countries all over the world. England, in particular, has a registration rate of 70% across the country. However, the number of Eco-Schools applications in the West Midlands region has been declining in the past years, due in part to financial constraints in region (see below).

Worcestershire Secondary School Budgets per Year
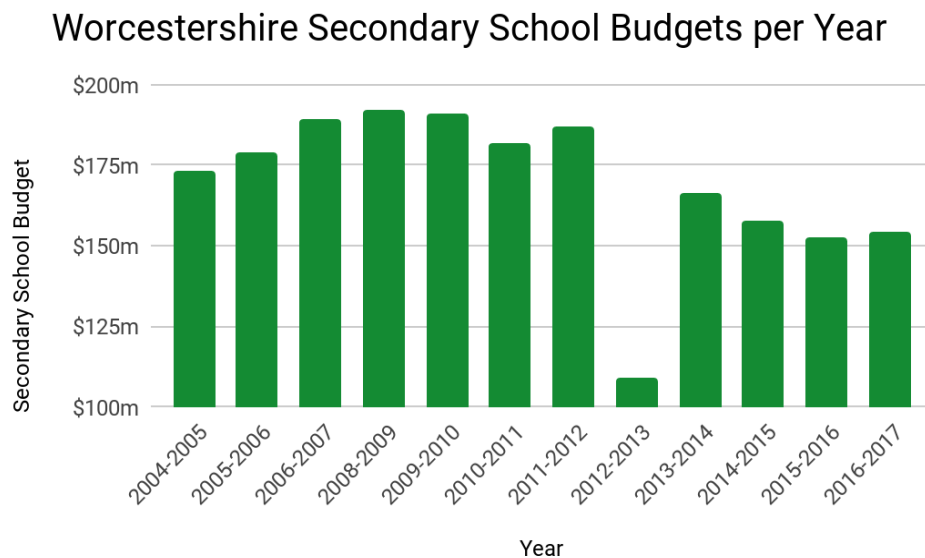
Whether this indicates an overall decline in commitment to ESD in schools, or schools are embedding ESD through a different framework than Eco-Schools, requires in-depth investigation. As such, the goal of this project was to develop a tool to be used in secondary

schools in the West Midlands to assess the current practices of ESD and sustainable actions in secondary schools.

Methods

To accomplish this goal we endeavored to develop the framework for a comprehensive tool and arrange a pilot study in secondary schools. This tool needed to accurately:

1. Understand educator attitudes concerning sustainability and its place in the classroom
2. Observe sustainability practice in action in schools
3. Characterize student understanding and participation in ESD
4. Interpret data and devise a report to convey findings and recommendations to schools.

In the first seven weeks of our project, our team developed a four-part assessment tool to achieve our goal. This tool included a multi-school focus group, where we talked to several geography educators in the region concerning ESD implementation in their schools, and a set of subsequent school visits. Each visit consisted of

1. An observational analysis to quantify the amount of visible sustainable action in each school
2. Semi-structured interviews with geography educators to discover teachers' views towards ESD, as well as gain deeper insights into the incorporation of ESD in the curriculum
3. Surveys distributed to students to attain an overview of student understanding and practice of sustainable ideals.

After each visit, data was transcribed, compiled, and scored according to our prepared scoring guidelines. These guidelines give each section of our analysis a score from 1 to 5 and the resulting sectional scores are used to generate an overall composite score for each school. The data gathered from each individual school and their resulting scores were then used by our team to compose an individual report for each school that summarized the school's sustainability implementation, curriculum integration of ESD, and student understanding of sustainability goals.
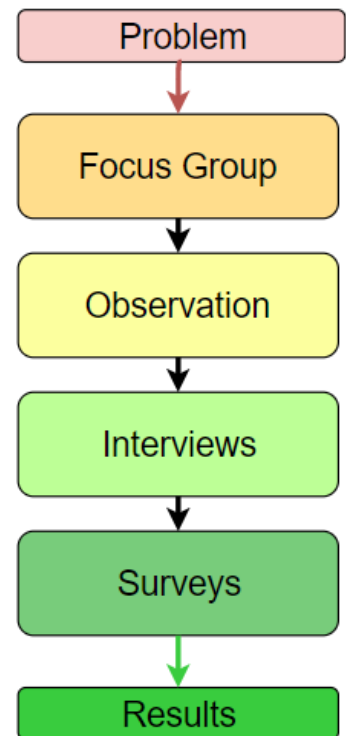
Scores are given on a scale of *5-Excellent, 4-Good, 3-Satisfactory, 2-Needs Improvement, 1-Poor*

Section	Score
Sustainability implementation	[1-5]
Curriculum integration	[1-5]
Student understanding of sustainability goals	[1-5]
Overall	[1-5]

Results

      Nine geography educators participated in the focus group our team conducted. From the discussion amongst the educators, our team found that most of the educators in the focus group were displeased with sustainability education, practice, and student understanding within their schools. When asked what they thought was causing this, most of the educators pointed toward a lack of interest from their senior management teams, a lack of sustainable focus in the mandated geography curriculum, and a lack of time given to geographers to teach outside of their curriculum. With respect to the students, most of the educators noted that their schools did not require higher level students to take geography courses, leading to a possible decrease in sustainability understanding in higher level students. They also expressed concerns about student attitudes towards sustainability, particularly when it came to the culture of consumerism.

      After analyzing the data from the focus group, our team began schools visits in which we conducted interviews with geography educators and performed observational analyses of five secondary schools in the West Midlands. The interviews reinforced the sentiments found in the focus group, as well as provided more in depth explanations to ESD obstacles in each individual school. Most of the educators, when interviewed individually, mentioned that the curriculum in most geography courses is geared primarily toward GCSE preparation. They noted that in the past year elements of the GCSE have been altered to reflect greater sustainability understanding, and therefore geography curriculum has been changing accordingly. However, most interviewed geography educators found it very difficult to find time and support to promote ESD, as they felt the responsibility for its promotion falls solely on their department.

At each school visited, our team conducted our observational analysis in conjunction with an educator-led tour of the school and its grounds. Results from these analyses varied between schools - for instance, although all five schools visited had outdoor areas for student use, not all were kept in the same condition. Through these analyses and tours, our team found trends. Most of the analyzed schools were fairly old, making it difficult to retrofit newer sustainable features, such as solar heating and better insulation. A lack of support from local authorities also made it difficult for schools to implement better practices, such as proper recycling. In 4 out of the 5 cases, our team observed issues with rubbish collection. In these cases, rubbish and recycling was not separated at the school prior to collection.

As the final portion of our analysis tool, our team asked each interviewed educator to administer 25 of our surveys to their students, in an even distribution of grade level and gender if possible. The survey incorporated questions that were intended to uncover the frequency and quality of sustainability lessons, the behaviors of students as they relate to sustainability, and uncover student attitudes towards sustainability and the environment. After compiling the results from all the schools that returned our surveys, no notable demographic trends were identified. Overall, it appears that sustainability lessons are occurring in schools, but not very frequently and that many students do not make a conscious effort to reduce their consumption, nor are they particularly interested in doing so. It is possible that many students may not be unaware of small behaviors they can do to make their school more sustainable and become engaged in more positive behaviors.

In terms of the developed tool, it should be taken into consideration that the sample size of schools and student surveys is not large enough to be summative of the entire West Midlands region or England as a whole. Rather, these five schools offer a glimpse into local difficulties and successes as it pertains to ESD that should be followed up and further analyzed with a larger sample size. The main goal of this project was to develop a tool that could be used on a larger scale to identify trends and offer insights into the current situation. Our team considers the tool a success in generating numerical results that are easily translated into a sensible score. It is important to note the possibility that those interviewed are likely to have their own biases that may present in our analysis. However, while the team's individual impressions of each visit did not factor into the analysis, the overall rankings reflect our team's general opinions of each school. Therefore, we believe our tool is competent at producing numerical data that accurately

reflects the perception of the average person. This is promising, as it indicates that this qualitative turned quantitative assessment style does not appear to shortchange or overemphasize certain elements of the analysis.

Recommendations

Recommendations from our team pertain to suggestions for West Midlands schools as well as the future of our developed tool. Recommendations for West Midlands schools were developed with a view to both facilitate an increase in ESD and aid in the development of sustainable communities. It is the desire of the team that these recommendations are feasible and cost-effective to implement. The main goal of these recommendations is to increase awareness and cooperation in schools. Our team first recommends improving communication between educators. By communicating with other departments and voicing opinions to senior management, geography educators can lessen the responsibility of being the sole provider of ESD in their school. This cross-curriculum communication allows integration of more comprehensive sustainability education throughout the school. Cooperative organizations, such as an eco-committee, are one means of facilitating this goal. Our team further recommends increasing visible features of sustainability. By installing more visible signs of sustainability, such as posters and school-wide campaigns, teachers and administrators can make students aware of ways to reduce their consumption and live more sustainably. Lastly, we recommend including an additional project or paper into the curriculum. This has the potential to benefit student comprehension of ESD by presenting students with the challenge of thinking critically about sustainability issues. These sorts of skills require a greater understanding of the material than is demanded in traditional lecture.

To improve upon the procedure outlined in the tool, we recommend extending the pilot study to many more schools in order to fine-tune the mathematical analysis, and develop a way to streamline the analysis. To improve the analysis tool itself, we recommend modifications to the observational analysis to better accommodate the main features of a sustainable community as well as to take into account the differences of each school. Regarding improvements for the surveying process, future teams can replace paper surveys with electronic surveys to reduce paper waste and make data collection more efficient. Lastly, we recommend interviewing a broader

range of staff at each school, ideally educators outside the geography department and a members of senior management.

By installing these recommendations, we hope that the developed analysis tool can be applied to a variety of schools across other regions of England, and the world. This will put school systems on a path to changing student attitudes, and creating communities dedicated to operating sustainably.

Authors

Joseph Bosco
Joseph Bosco is an aspiring Chemical Engineer with a minor in History. He has led team research projects analyzing the feasibility of developing chemical plants in other nations, as well as participating in the 2017 AIChE Eckhart Conference as the Head Chem-E Car Competition Team Coordinator.

Kyle Foster
Kyle Foster is an Aerospace Engineering major pursuing a minor in Electrical and Computer Engineering. Outside of class, he is the treasurer of the AIAA student chapter and a lab monitor in the Collablab, a student-run makerspace on campus.

Trang Ha
Trang Ha is a Computer Science major, pursuing a minor in Statistical Mathematics. She has strong communication skills and experience with working in teams for various projects. She has led a team of five to develop a computer game in 7 weeks. She is involved in a number of international organizations on campus, including International Student Council, as member, and Vietnamese Student Association, as Public Relations chair.

Emma Travassos
Emma Travassos is a chemistry major who is also pursuing a minor in Environmental and Sustainability Studies. Emma has held several leadership positions in Alpha Gamma Delta Women's Fraternity, and is currently holding the position of Vice President Academic Excellence. In her spare time she enjoys playing flute with the WPI concert band and orchestra.

Authorship

All edits were an equal group effort. Primary author(s) are listed

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DESD - Decade for Education for Sustainable Development

ESD - Education for Sustainable Development

EYFS - Early Years Foundation Stage

GCED - Global Citizen Education

GCSE - General Certificate of Secondary Education

IQP- Interactive Qualifying Project

KBT - Keep Britain Tidy

LA - Local Authority

MDGs - Millennium Development Goals

Ofsted - Office for Standards in Education, Children's Services and Skills

SDGs - Sustainable Development Goals

STEM - Science, Technology, Engineering and Mathematics

TEESNet - Teacher Education for Equity and Sustainability Network

UN - United Nations

UNCHE- United Nations Conference on the Human Environment

UNESCO - United Nations Educational, Scientific, and Cultural Organization

UoB - University of Bristol

WCC - Worcestershire County Council

WPI - Worcester Polytechnic Institute

1. Introduction

On September 25th, 2015, the 193 countries of the United Nations (UN) General Assembly adopted an agenda committing them to a pathway of worldwide sustainable development by the year 2030. This document, entitled "Transforming our World: the 2030 Agenda for Sustainable Development," contains a set of targets commonly referred to as the "Sustainable Development Goals" (SDGs). The SDGs commit underdeveloped and developed nations alike to 17 goals aimed at ending poverty, protecting the planet, and improving overall global well-being.

A key aspect within the SDGs is Goal 4: "ensure inclusive and quality education for all and promote lifelong learning." Within this goal, Target 4.7 calls for all learners to acquire "the knowledge and skills needed to promote sustainable development" (United Nations, 2015). Recognizing that areas targeted in the SDGs affect people at the local level, governments and world leaders have begun to look towards methods to localize the SDGs (Kelleher, 2017). Localization efforts towards achieving Goal 4 have already begun, based upon indicators developed by the United Nations Educational, Scientific, and Cultural Organization (UNESCO). These indicators measure the extent to which Global Citizen Education (GCED) and Education for Sustainable Development (ESD) are emphasized in curriculum, teacher education, and student assessments (UNESCO, 2017).

This project considers target 4.7, explicitly as it pertains to ESD in secondary schools throughout the West Midlands in the United Kingdom. In recent years, funding to secondary schools in the area has decreased. As a result, some educators have noticed a similar decline in the number of schools engaging in the Eco-Schools Programme. In response, our team has worked with Elena Lengthorn, a Senior Lecturer in the Institute of Education at the University of Worcester to perform a pilot study of ESD practices of schools in the West Midlands.

To gather this information, our team created a tool to guide data collection and analysis. This tool consists of interviews with educators, observational analysis of the school grounds, and surveys administered to students, as well as a means to score each section and rate each school numerically. Our team visited five schools, and executed these methods at each in order to gain an understanding of the schools' attitudes towards ESD, the extent of the implementation thereof, and whether the efforts had any measurable effect on the students. With this information, we were then able to construct individual school reports, which outline our findings for each school

we visited. These reports, which were subsequently sent to each respective school, contained recommendations for areas of improvement to consider in the future. It is our hope that this assessment process receives continued use in the West Midlands, and, with proper modification, is able to spread further across the country and the world.

2. Background

In this chapter, we will first provide an overview of the Sustainable Development Goals, and how they encourage sustainable actions throughout the world. Next, we provide a short description of the English school system and describe its efforts toward sustainable development. We will conclude with a discussion of how to develop assessments and examine previous assessments that evaluated ESD in educational institutions.

2.1 The United Nations and Sustainability

2.1.1 A Brief History

Since its inception in 1945, the United Nations has worked towards its goal of maintaining peace and security between its member nations, all in the hope of making the Earth a safer and more suitable habitat for future generations. The strategies used to achieve this goal have varied over the years, from mediating armistice to end wars, to providing support to nations in need. Around 50 years ago, however, these strategies shifted their focus towards environmentalism and sustainability. In 1972, Stockholm, Sweden held the United Nations Conference on the Human Environment to discuss potential tactics aimed at ensuring the protection of environments, as well as the local populations inhabiting them. The resulting document, named the Stockholm Declaration, marked the United Nations' first official promotion of the protection of non-renewable resources and the promotion of environmental education (UNCHE, 1972).

In the following decades, resolutions adopted by the United Nations increasingly emphasized sustainability and its importance in education. The Belgrade Charter (1975), Tbilisi Declaration (1977), and Brundtland Report (1987) all laid the groundwork for the explosion of environmental education summits that would occur in the 1990s (Beynaghi et al., 2015). These summits, including the Rio Earth Summit in 1992 and the creation of the Kyoto and Swansea Declarations, finally culminated in 2000 in the form of the Millennium Declaration. This resolution laid out eight 'millennium development goals' (MDGs), aimed to improve the sustainability of the world population as it progressed into the new century. Goals 2 and 4 focused primarily on education and sustainability. All eight goals were set to be accomplished by 2015 (UN General Assembly, 2000). The main education achievement of the MDGs was the creation of the UN Decade of Education for Sustainable Development in 2005, which increased the

prevalence of sustainability in school curriculums (UNESCO, 2012). Although these goals were not fully achieved in the following fifteen years, their structure and focus had firmly planted sustainability and its education into the objective set of the new millennium.

2.1.2 UN Sustainable Development Goals

By September of 2015, the United Nations found themselves in need of a new sustainability agenda to carry on the ideals of the MDGs. The resulting resolution, the 2030 Agenda for Sustainable Development, laid out the Sustainable Development Goals (SDGs) in an attempt to ensure sustainability on Earth by the year 2030. Goal Four on this list of seventeen calls for an improvement in education across the world, increasing inclusivity and the amount of sustainable development curriculum seen in schools. More specifically, Target 4.7 aims to develop a worldwide curriculum to generate knowledge concerning "sustainable development and sustainable lifestyles" (UN General Assembly, 2015).

Since their adoption in 2015, the SDGs have come under much criticism, with some claiming that their goals are too broad, that they do not capture the complexity of most sustainability issues, and that they do not reflect the UN's principles of human rights (Sengupta, 2016). Others claim that the usefulness of the SDGs lies in their interpretation and actions taken surrounding them. A more specific interpretation of certain portions of the SDGs came in May of 2015, as UNESCO adopted the Incheon Declaration. This document expanded on Goal Four, creating a structure for the promotion of education for sustainable development in schools across the world.

2.2 Education for Sustainable Development

2.2.1. Introduction to Education for Sustainable Development (ESD)

UNESCO defines ESD in terms of four main categories:

1. Social and economic justice
2. Cultural diversity
3. Human rights of future generations; and
4. The protection and restoration of the Earth's ecosystems (Tierney et al., 2015)

According to UNESCO, there has been growing international recognition of ESD as a key factor in realizing the Sustainable Development Goals. The history of ESD is associated with the 1992 United Nations Conference on Environment and Development, where 178 Member States agreed on a framework for action to enforce sustainable development (UN, 1992: paragraph 36). ESD is a "holistic and transformational" approach to education, aiming to orient the way people think and act towards environmental sustainability by transforming the curriculum and learning environment in schools (UNESCO, 2017). Implementation of ESD changes school curriculum by improving the schools' learning environment, adopting whole-school approaches, applying recognition and certification schemes, and strengthening school-community interactions (UN, 2014). Beginning in 2005, the UN Decade for Education for Sustainable Development (DESD) aimed to spread out the knowledge and practice of ESD worldwide. According to UN's 2014 DESD final report:

ESD has been completely integrated in primary education (49%) and in secondary education (50%). Of the more than 22,000 consultations, workshops, training and capacity building efforts and over 18,000 curriculum support materials and publications referenced by Member States and other stakeholders, the majority have been in support of primary and secondary education. (UNESCO, 2014).

2.2.2 Eco-Schools and The Green Flag Award

Among programs that reinforce ESD practice, Eco-Schools is the most widely known international educational program. Developed in 1992 as a response to needs identified at the UN Conference on Environment and Development, Eco-Schools has been implemented in 67 countries in the world and has a total participation of over 19 million students. Eco-Schools has

been deemed a highly successful program, becoming a model program for environmental education and sustainability (UNESCO, 2014). According to Keep Britain Tidy (KBT), England's national operator for Eco-Schools, the program is designed to provide guidance to schools in achieving sustainability, providing a framework to help integrate sustainability principles into the schools through impacts on students' behavior. (KBT, 2013). Eco-Schools assists schools in operating in a more environmentally efficient manner, teaching students about environmental issues, and encouraging positive environmental behavioral changes.

The highest type of recognition for this program is the Green Flag Award, which is granted to participating organizations that meet the standards for eco-management. To earn a Green Flag award, schools must first choose between one and five of the nine sustainability topics provided by Eco-Schools to become the focus of a year-long project. By following the Eco-Schools' seven-step procedure, pupil-led teams work to develop, implement and evaluate their projects. The success of the project and impact on the local community is evaluated by Eco-Schools through a school's application to the award. Based on the number of topics covered, a school will be awarded either a Bronze, Silver, or Green Flag award.

The existence of this award-level scheme has significantly encouraged schools to integrate sustainability into their curriculum. This is illustrated by a survey in KBT's 2013 report on Eco-Schools, where they asked eco-coordinators to select the one statement out of five that best described schools' engagement in sustainability actions and behaviors. The results showed that 27% of eco-coordinators from schools holding the Green Flag award chose "children are very aware of, and interested in, environmental issues," as the truest statement, while only 14% and 9% of the eco-coordinators from schools holding Silver and Bronze awards, respectively, observed the same behavior (KBT, p. 9, 2013). From this survey, KBT was able to conclude that "as schools progress through the Eco-Schools awards levels, the engagement of children in environmental and sustainability issues strengthens" (KBT, p. 8, 2013). More detailed results of this survey are displayed in Figure 2.1.
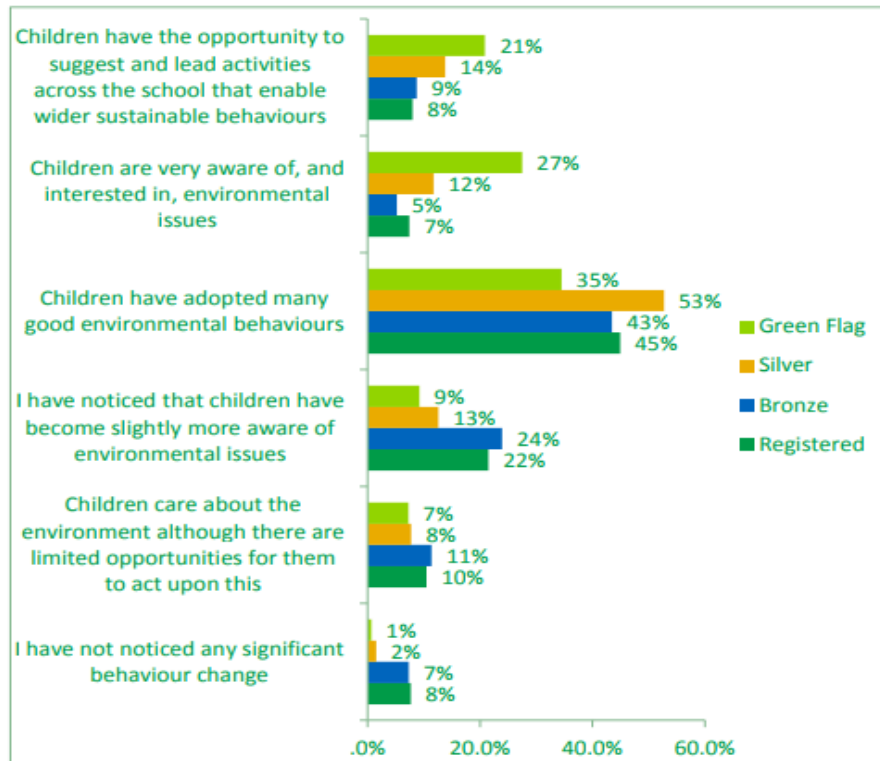
Figure 2.1: Eco-coordinators' selection of one statement that best reflects their school's situation regarding sustainability practice (KBT, 2013)

2.2.3 ESD Practice in England

England, as one of the first members of the program, has the most Eco-Schools in the world with 70% of all schools in England currently registered (Eco-Schools, 2012). In UNESCO's Policy Brief 9, it is noted that "good practice in ESD exists at all levels and in most learning contexts across the UK." This is indicated by the improved performance of students and the professional standards of the teachers, as well as an engaging, high-quality curriculum that supports the idea of sustainable development. Additionally, in one of the surveys in their 2013 report, KBT asked eco-coordinators to evaluate the Eco-Schools program's contribution to the wellbeing of children. This report revealed the influence of the program, with 98% of the surveyed eco-coordinators responding positively on the program's contribution to children's awareness of the natural environment (KBT, 2013).

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2.3 The English Education System

Essential to understanding how ESD is applied in West Midlands schools, as well as how students interact with these topics is a general understanding of how the English school system is structured.

2.3.1 National Education Structure

English schools divide their curriculum into three main sections, each corresponding to the age of students it considers. From infancy to age five, children enter the Early Years Foundation Stage (EYFS), followed by primary education until age 11. Secondary education is the final legally mandated stage of schooling, covering students until the age of 16. From 16 to 18, students continue through their choice of further education, joining an apprenticeship, or working part time while taking classes (gov.uk, n.d.).

Primary and secondary education are further subdivided into four key stages. Key stage 1 and 2, associated with primary school, outline the curriculum for young people in topics of English, math, and science, as well as other topics, including physical education, art and design, religious studies, and use of technology. Stages 3 and 4 continue these topics while adding sections covering sex, relationships, and citizenship (Department for Education, 2014).

In England, students can enroll into three main types of school. Before 2010, the most common were schools run by Local Authorities (LAs), called maintained schools. Maintained schools follow the curriculum outlined in the national framework, but are managed by local governments. Local government responsibilities include distributing funds and managing student transportation systems. Following the Academies Act of 2010, the national government encouraged maintained schools to convert to academies. The government also gained the ability to convert underperforming schools to academies as well. Academies operate with significantly more freedom than maintained schools. They operate as independent from the LA and nearby schools, receiving funding directly from the government (BBC News, 2010). Furthermore, they are not beholden to the provided national curriculum. Instead, they are required only to maintain a "balanced and broadly based curriculum" (Academies Act 2010, c.32 s1(6)(a)). Finally, so-called "free schools" are regulated almost identically as academies. The main difference, however, is that individuals or organizations can found free schools if they are dissatisfied with their current situation (BBC News, 2010).
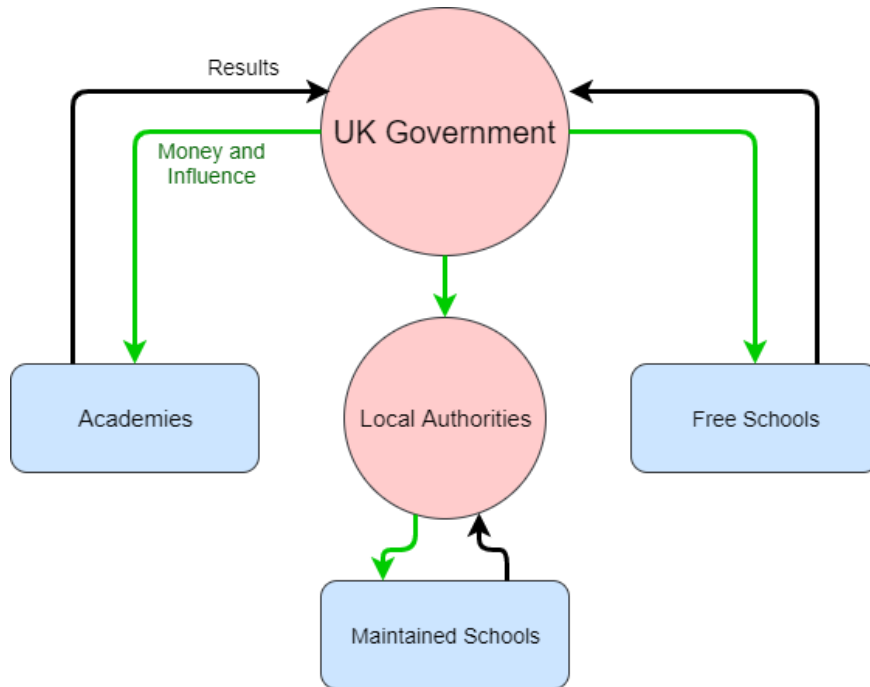
Figure 2.2: Structure of the English School System

The growth of academies has been subject to much debate. Proponents of academisation cite the greater freedom of academies to shape their curriculum. Furthermore, they claim that academies increase standards. By taking power from LAs and giving it to teachers, academies give teachers more control over school hours, curriculum, and their own pay (BBC News, 2016). Critics of the trend have attacked academies for their lack of financial transparency. The lack of oversight in these schools has led to concerns of conflicts of interest between academies and the companies that sponsor them (Williams, 2017). Many teachers believe academies actually lower academic standards. In a poll of over 8000 UK teachers, 48% believed academies will make education standards lower. Only 17% believed standards would improve (Dahlgreen, 2016). Other teachers worry about the "privatization" of the school system caused by the influence of sponsors (BBC News, 2016).

Currently, academies and free schools make up 35% of the government-funded schools in England, versus 65% maintained schools. Academies appear to be the minority in the education system. However, the distribution of academies skews heavily towards secondary education. More than 72% of secondary schools in England are academies and free schools. On the other hand, a nearly identical percentage of primary schools remain maintained by LAs (Beals & Croft, 2018).

An important feature of secondary education in England is the General Certificate for Secondary Education, known as the GCSEs. The GCSEs are a collection of exams given to year 10 and 11 students. The exams cover a multitude of subjects, and a majority of students takes at least five exams by the end of year 11 (GCSEs: compulsory and optional, 2017). The core subjects of the GCSE include English, math, science, a second language, and a humanities topic. Other certifications, however, range in material from nutrition to astronomy (GCSEs explained, 2017). The GCSEs are designed to standardize measurements of student performance, and to determine their readiness to pursue further education. In a similar way to the SATs in the United States, universities in the UK use GCSE scores to determine how well a student may perform in their studies.

Despite recent reforms, the GSCEs continue to receive much criticism. This criticism is diverse in its claims. Many institutions interpret students' GCSE scores more harshly than the program suggests. Under the old system, any grade between A and G constitutes a passing grade, many teachers and employers only consider scores above a C as successful. On the other hand, some schools claim that the GCSE program is too easy, akin to a boy scout collecting badges (GCSEs, 2011). Furthermore, in 2017, under the revised GSCE program, experts warned that a large number of students are likely to receive incorrect grades (Turner, 2017). The new system increased the grading divisions from seven letter options to a scale of 1 to 9 (CareerPilot). Though this allows for a better separation of student accomplishment, it also increases the likelihood that students fall on a border of two scores, where grader error can mark an incorrect grade.

Another major issue with the GCSE curriculum is the popularity of 'teaching to the test.' Due to the importance of student performance on these exams, often teachers must teach only the information pertinent to the test, without mention of other useful or interesting related topics. Furthermore, teaching with the intent of passing a test does not lead to a long-term understanding of the material. Immediately after the exams, students begin to forget the material they were supposed to learn, as it was only important to them to complete the test (Secret Teacher, 2018). It is possible that, given the strain already present in teachers' curriculums, topics in ESD have fallen out of the spotlight. This may account for the observed decline in sustainable efforts in recent years.

2.3.2 School Funding

While the overall trend in England has been an increase in academies over maintained schools, Worcestershire, a county in the West Midlands, has kept a high level of maintained schools. As of 2017, the LA maintains more than 60% of schools in the county ("All schools and colleges", 2017). In other words, the Worcestershire County Council (WCC) is responsible for managing funding to a majority of the region's schools. Although the net funding to Worcestershire schools has remained mostly constant, records show that since 2011 funding to secondary schools has tended to decrease when adjusted for inflation (Worcestershire County Council, 2016).
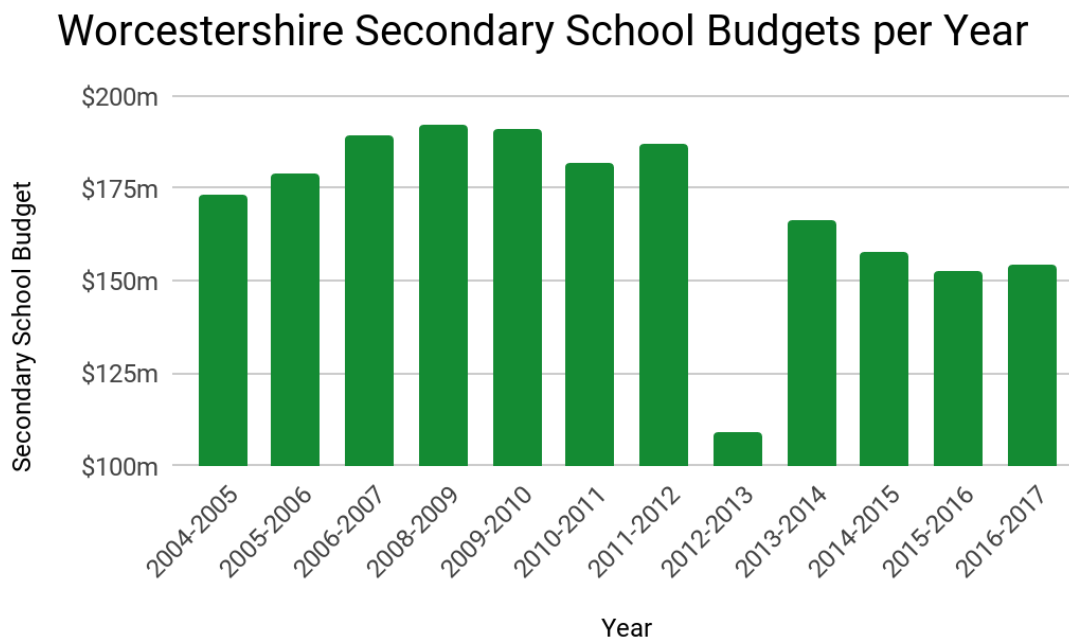
Figure 2.3: A graph showing the funding for Worcestershire secondary schools between 2004 and 2017

This decrease in funding has adversely affected teachers in Worcestershire. Many teachers have no choice but to pay for supplies out of their own pockets, while others have seen significant staff decreases. Schools are seeing technology break down as they lay off IT professionals, while some teachers' assistants have been thrust into full teaching positions (Ratcliffe, 2017).

Although the WCC is dedicated to sustainable development, these financial constraints have necessarily reduced its support for Eco-schools. In the last few years, there has been a

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serious decrease in participation in Eco-schools across Worcestershire secondary schools. Forty-four schools have maintained their Green Flag Awards, and one has achieved the honor in the 2016-2017 school year (Worcestershire County Council, 2016). However, that number represents only half of the award recipients of 2013-2014, when 88 schools earned their flag (Worcestershire County Council, 2014). It is not clear what the future holds; the constant economic troubles have created the sense that ESD has become less of a priority to many. Schools may look to pursue other avenues towards sustainable development. Each school must be assessed to determine its current ESD practice as well as to guide future action.

2.4 Performing an Assessment

2.4.1 Developing Assessment Schemes

In order to discover the level to which schools in Worcestershire are achieving ESD best practice, we must perform an assessment of contributing factors to ESD and sustainability. Educational institutions often wish to identify whether they are meeting sustainability targets. Assessments "alleviate this problem through identification of best practice" and act as a way to communicate progress within an institution (Shriberg, p. 255, 2002). However, without proper assessment design, evidence gathered cannot be properly interpreted and the goal of the study will falter.

The Australian Skills Quality Authority (ASQA) provides a guide for developing an assessment, breaking the task into three main stages. The first stage, planning, encompasses five components: elements, performance criteria, performance evidence, knowledge evidence, and assessment conditions. Elements of the assessment can be defined as "the essential actions or outcomes which are demonstrable and assessable" (ASQA, p.3, 2015). In other words, what kind of data should a given assessment protocol produce in order to demonstrate competency? Performance criteria and performance evidence, as well as knowledge evidence, break this idea down into more discrete parts. By identifying what skills and knowledge are relevant to the product or process, respectively, a team can determine a benchmark for achievement of a given element and identify knowledge gaps present that may be hindering performance.

During the planning phase, a team must additionally have a strong understanding of the various assessment methods available to them. These range from direct observation to third party evidence and can often be combined to create a flexible tool. A table detailing the different types

of assessment methods are displayed in Figure 2.3. Pertaining to the assessment of ESD in secondary schools, a combination of direct observation and questioning would be an effective style of assessment. Direct observation allows assessment engagement with sustainability and ESD practices in real time, whereas questioning allows a team to evaluate the knowledge of those the study affects. Questioning can be done in the form of direct interview questions, whether verbal or written, or through surveys and questionnaires.

Method	Description
Direct observation	• Assessed in real time in the workplace. • Assessed in a simulated off-the-job situation that reflects the workplace.
Product based methods	• Structured assessment activities such as reports, displays, work samples, role plays, and presentations.
Portfolio	• A purposeful collection of work samples of annotated and validated pieces of evidence, compiled by the learner. • Evidence could include written documents, photographs, videos or logbooks.
Questioning	• Generally more applicable to the assessment of knowledge evidence. • Assessment could be by written or oral questioning, conducting interviews and questionnaires.
Third-party evidence	• For more information on using third party evidence, refer to ASQA's *Fact Sheet—Using third-party evidence to assess competence*.

Figure 2.4: Methods of Assessment Australian Skills Quality Authority (2015).

When planning an assessment, it is essential that the systematic review avoid bias as completely as possible and that the questions asked are also free of bias. For instance, leading questions introduce the risk of bias as oftentimes the wording suggests an answer the interviewer is looking for or could prompt a respondent into answering a certain way. These sorts of responses invalidate an interview (Henning, 2013). A chosen assessment method should identify areas of risk for bias and work to minimize it as the assessment continues. Speaking particularly on assessment in educational institutions, Shriberg recommends that in the planning phase the assessment must address "contextually appropriate issues of major importance to campus environmental, social and economic efforts and effects" (Shriberg, p. 256, 2002). In other words, when creating the assessment, ensure that it can identify important and broad issues, but that those issues have specific measurement possibilities. Often educational institutions find

measuring the presence of sustainability education and efforts challenging because there is a lack of efficient ways to measure progress, priorities, and direction (Shriberg, 2002). Keeping this criteria in mind while planning an assessment will enable a design that will produce meaningful results to aid in improvement.

Once a framework is laid, the project may move into the second stage. Stage 2 details design and development to "ensure [the] assessment is conducted in a manner that is fair, flexible, valid and reliable" (ASQA, p. 6, 2015). An effective assessment system specifies both the context and conditions of the assessment. The context of the assessment should take into consideration previous assessments (if any exist) and the results of those assessments. With an understanding of context, conditions under which evidence can be collected can be established. Good context takes into consideration material requirements, relationships with team members and participants, as well as timeframes for completion amongst other elements (ASQA, 2015). Second, specifications of the assessment should be clear and thorough as to minimize variations between assessors. Finally, when developing an assessment, evidence criteria should not be open to interpretation and the method should yield one or more clear outcomes displaying competency. This is especially relevant when deciding on measurement methods. Measurement methods need to be flexible enough to account for 'organizational complexities,' yet specific enough to yield results that are calculable and comparable to a set of standards or another institution operating with best practice (Shriberg, 2002).

The third stage of developing an assessment scheme is quality checks, several of which should be done before implementation. In order to be valid, an assessment must successfully measure the desired outcome. The validity of the assessment is dependent on several sources of evidence to support the claim that it is measuring what it is intended to measure. A summative scheme for developing a successful assessment shown in Figure 2.4.
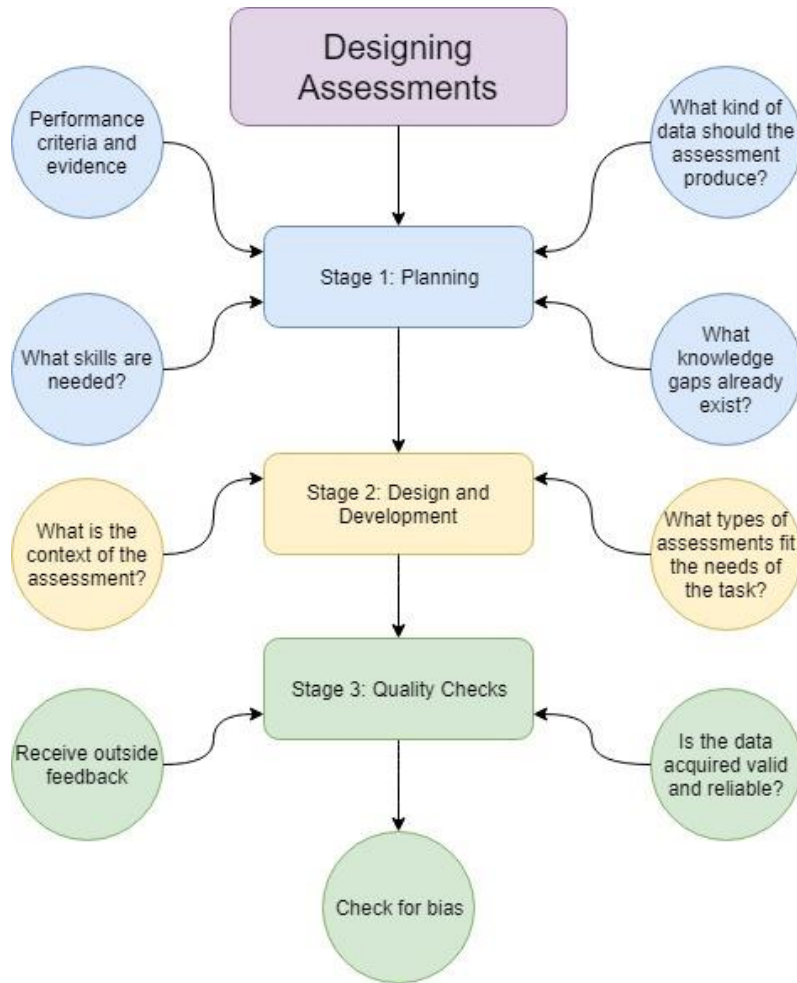
Figure 2.5: How to Design an Assessment

2.4.2 Case Studies

University of Bristol

The majority of assessments are developed in a manner similar to the one outlined by the Australian Skills Quality Authority. These assessments have been implemented or applied to measuring ESD in an academic setting. In 2015, the University of Bristol (UoB) identified the need for replicable, consistent, and more context-driven approaches for assessing ESD taught in curriculum. The vast majority of methods used to assess the presence of ESD in curriculum were text-count based methods. Seeing this as ineffective, the UoB designed a quantitative and comparative assessment for reviewing ESD using an in-house method, as it was determined that this was the most cost-effective option. The methodology combined student statements on ESD experience with a quantitative process employing the text-count based review of curriculum and

course descriptions (Tierney et al., 2015). From this review, it was found that there was a lack of communicating complete ESD information in descriptions and curriculum. The case study resulted in an initiative implemented at the UoB. This initiative is a new database system that will provide quick results to see how curriculum is doing in regards to its percentage of ESD-related units. Overall, the assessment was able to clarify where ESD is implemented and how to best manage it and focus on improvement (Tierney et al., 2015).

ESD in Latvian Schools

In 2014, as the United Nations Decade for Sustainable Development was coming to a close, researchers from the Daugavpils University assessed ESD practices in Latvian schools. To begin their assessment, the researchers administered an electronic questionnaire to the heads and deputy heads of 26 UNESCO associated schools. These questionnaires asked how ESD curriculum affected the associated schools and students: how it has improved education, curriculum development, students' values, partnerships, and school-wide innovation (Iliško, 2014).

From the 19 responses to these questionnaires, the researchers selected two schools succeeding in incorporating a sustainability agenda on a school-wide level. The department heads and curriculum leaders at these schools were more thoroughly interviewed. After compiling the results, responses indicated that there is no universal method for defining sustainability and what that means in a school. Instead, several definitions should be considered and left somewhat open to school heads. Results also found that some school heads or administrations were unclear in the definition of what ESD was, therefore, it is essential that if schools are left to interpret sustainability education in a more independent way, that behind that interpretation is a complete understanding of what ESD encompasses (Iliško, 2014). Reflecting on the two cases of successful schools, the authors assert that from these examples, tools for overcoming barriers pertaining to discipline, organization, and academic conservatism can be created.

Summary

From these two case studies it is clear that to assess ESD, a dedicated effort is needed to understand the surrounding attitudes and the personal experiences of the students and teachers. Quantitative data can be used effectively to understand the subjects and ideals taught (e.g. text-count based methodology). However, to perform an effective assessment that explicitly considers the needs of an institution, insights gained from a methodology incorporating interviews or focus groups should be more heavily considered. Additionally, as shown in the Latvian schools case study, schools must be allowed to have some degree of independence in how they present and incorporate ESD into their curriculum. The lessons learned from these two case studies show that when creating an assessment for Worcestershire schools, our team must be able to generate results that offer insights both into the frequency and subject matter in the curriculum, as well as data on the experiences of teachers and students with ESD and sustainability. With both of these aspects, our team can produce a clear report on ESD and sustainability practices in secondary schools within Worcestershire and surrounding counties.

3. Methodology

3.1 Goals and Objectives

The goal of this project was to assess the practices of ESD and sustainable actions in secondary schools in the West Midlands. To accomplish this goal we endeavored to develop the framework for a comprehensive tool and arrange a pilot study in secondary schools. This tool needed to accurately:

1. Understand educator attitudes concerning sustainability and its place in the classroom
2. Observe sustainability practice in action in schools
3. Characterize student understanding and participation in ESD
4. Interpret data and devise a report to convey findings and recommendations to schools.

Each objective represents a stage in our assessment process. To achieve these objectives, the team has conducted a focus group, performed observational analyses and interviews, and distributed student surveys. The information gained from our research, as well as the resulting report, will used by our sponsor to improve ESD practices in UK schools. We anticipate the report will also be discussed at the Teacher Education for Equity and Sustainability Network (TEESNet) Conference in September of 2018.

3.2 Methods

3.2.1 Focus Group

On March 12, 2018 a focus group, organized by our sponsor Elena Lengthorn, was held at St. Mary's RC High School in Hereford. This focus group was comprised of nine local geography educators. We designed the focus group to investigate how educators incorporate the ideals of sustainability in their classrooms, barriers to sustainability education, and the types of behaviors that they associate with a sustainable student body. The discussion was moderated by the team in groups of two, with one member asking questions and the other taking notes. The discussion was audio recorded and the notes timestamped for later reference.

The discussion was mainly focused on educator opinions of ESD and helped to provide insights that guided us while conducting observational analyses and faculty interviews in other West Midlands schools. Expecting this to be the case, we designed the focus group questions to

be largely unstructured, covering broad topics instead of asking specific questions (Berg, 2012). Our aim was to ascertain the characteristics of a general educator philosophy around sustainability and ESD.

The majority of educators in the focus group were geography teachers. Geography is the only subject area in the UK where sustainability education is compulsory. As a result, it is possible these educators may value sustainability and ESD more than the average educator in the region. At the same time, however, geography teachers are more likely to be knowledgeable in school ESD efforts as well as possible improvements that could be made. The guiding questions for the focus group can be found in Appendix A. Broad topics covered in the questions are summarized below:

- Personal opinions regarding sustainability
- Observable characteristics of sustainability in schools
- Measuring understanding of sustainability
- Barriers to ESD
- Examples of school sustainability efforts

3.2.2 Observational Analysis

After we conducted the focus group, visits to schools commenced. Schools visited were chosen both by our sponsor's connections within the network of West Midlands schools and schools the team contacted within Worcester. At each school we conducted an observational analysis, as well as interviews with faculty and administrators. The observational analysis was used to quantify visible instances of positive and negative sustainability actions. The criteria for observation was based upon a set of sustainability characteristics. This set of observable sustainability characteristics, as well as instructions for use, can be found in Appendix B. The list of characteristics was developed from the UK Department for Education's Top Tips for Sustainability in Schools, and was improved using the information gained from the March 12 focus group (UK Department for Education, 2012). In many cases, the team was shown around by a staff member of the school during the observational analysis, to ensure no areas of the school were neglected. Recorded data and notes taken by the team were primarily based on the degree of usage and level of maintenance of a given fixture, opposed to the quantity of an item. For

example, the team did not focus on the number of recycling bins in a school, rather the focus was on whether or not the bins were available, clearly marked, and being used by the students.

As seen in appendix C, the observational analysis is broken into three parts. These sections are intended to increase the ease of finding and noting sustainable features in each observed school. The first section contains individual instances of sustainability. These items, such as recycling bins or posters promoting sustainability, can be installed with relative ease. The second section, on the other hand, includes systemic features of sustainability. For example, a school may have stops for public bus systems or a large outdoor space for students to utilize. Implementation of these features requires significantly more planning and resources than those of section one. The purpose of the third section is to provide space for any noted features that do not appear in the previous section. It is impossible to predict every possible feature a school may implement to promote sustainability, so part 3 consists of a blank space where any noteworthy features can be added.

Based upon the categories on the checklist, results from Part 1 and 2 of the analysis were scored on a range of zero to four. A score of '0' meant the sustainable action was not seen within the school. '1' meant the sustainable feature was seen, but in very poor condition. '2' meant the sustainable feature was seen and in need of minor improvement. '3' meant the sustainable feature was seen and appeared adequate. '4' meant the sustainable feature was seen and appeared to be functioning very well.

The final score given to each category was agreed upon based on discussion of the four members of the team, looking at the individual sheets each team member used during the tour of each school. The results for Part 3 were scored in a similar manner: using the individual notes of each team member, one point was given for each observation that reflected positive sustainable actions, and one point was subtracted for each observance that reflected negative sustainable actions. This total was added to the scores from the first two parts of the observational analysis, creating the overall observational score for each school. The scoring sheets from each school observed can be found in Appendix I.

3.2.3 Faculty Interviews

The faculty interviews included interviewing geography educators with the goal of gaining a deeper understanding of the scope of, and faculty sentiment towards, sustainability education. This first required contacting geography heads at the selected schools, once again explaining our project and its goal, as well as our method of study. After permission was granted by the interviewees, the interview process began. These twenty-minute interviews were conducted by the whole group in a semi-structured format, with two members interviewing while the others took note of responses (Berg & Lune, 2012). All of the interviewees gave permission to our team to record audio for use in our later transcription. Due to the large number of educators in each school, only the head of the geography and one additional geography staff member were interviewed in most cases. These educators were chosen under the assumption that department heads and geography educators will have the best overall understanding of education practices in the school. The set of questions for an educator interview can be found in Appendix C.

Questions were developed with the goals of first becoming acquainted with the interviewed faculty members, understanding the ESD practices through the words of those who perpetuate them, and finally determining the faculty's own feelings towards these practices. This information was used to discover potential patterns, shared feelings, and commonly flawed practices, thereby indicating possible causes for the decline in ESD.

Interviews with teachers also aimed to identify some of the major challenges to taking initiative in sustainability, and how they may have been overcome. For example, while budget reports show that funding to schools has decreased, they do little to describe the effects that reducing funds has on the curriculum or sustainability initiatives. Faculty, on the other hand, have first-hand experience to call upon in describing the challenges of educating students in sustainability.

The transcriptions of the interviews were coded to quantify sustainability trends in each school. Instances of a positive trend, suggesting increased ESD support, counted as a single point towards the total interview score. Each instance of a negative trend, on the other hand, removed a point from the score. If, for example, the interviewee mentions their school's dedication to conserving energy, but also notes a problem with food waste, the score for the interview remains at 0, as there is one positive and one negative point. The numerical ratio of positive trends to negative trends noted will constitute the interview score for each school.

3.2.4 Student Surveys

Students are greatly involved and affected by the ESD in their schools – for example, Green Flag Awards projects are entirely student-run. For this reason, our team believes it is important to gain information from the students regarding their reception of ESD and sustainability and the impact it has on their lives. To ascertain this information, we administered surveys to the student body through the faculty (University of Wisconsin Office of Quality Improvement, 2010, p. 1-20.) At the end of the department head interview process, we asked that the department heads hand out the provided surveys to a random sample of approximately 25 pupils distributed between each grade level. Survey questions can be found in Appendix D.

While a school may display strong initiative in creating an ESD program, the effort would be fruitless if students graduated without the skills an ESD program intended to impart. We used the surveys collected from students to estimate a school's success in ensuring students are educated in sustainable practices. Furthermore, we also investigated students' attitudes towards sustainability, to determine the likelihood that students will continue practicing sustainability in the future. In other words, a successful sustainable education must sustain sustainable students.

The numerical responses to the survey questions seen in Appendix D were tallied similarly to the observational analysis. Questions reflecting negative sustainability practices (2e and 2g) were reverse scored. Responses from questions 4, 5a, 5b and 10 were recorded for the purpose of gaining more insight in to the decline of Green Flag Award applications, as well as demographic information to identify trends within groups, if any exist. These responses were not counted towards the survey score, due to the excessive specificity of determining Green Flag participation. This final tally constituted the survey score for each school. Overall, the results from the surveys are used to generate an understanding of student perception of ESD and sustainability practices in the report given to each school.

3.3 Overall Assessment Analysis

The goal of the assessment was to learn from schools that exemplify the best ESD practices. By determining how various schools interact with sustainability, we were able to share our findings with the schools in order to improve participation in sustainability education across the country. Furthermore, we provided each assessed school with a report outlining strengths and

weaknesses in their efforts toward sustainable education, which can be found in Appendices J through N.

This report was composed of the results of the assessments, describing which areas the school succeeds in implementing ESD and sustainability practices and where the school still needs improvement. The format of these reports is similar to those published by England's Office for Standards in Education, Children's Services and Skills (Ofsted) (See Appendix H for outline). These reports evaluate schools to determine if they meet national education standards. Shown in Figure 3.1, each report begins with a summary of scores for each section of the evaluation as well as a total overall score for the school. Our assessment did the same, grading schools' sustainability actions, and their results.

Inspection dates		9–10 May 2013	
Overall effectiveness	Previous inspection:	Not previously inspected	
	This inspection:	**Good**	**2**
Achievement of pupils		Good	2
Quality of teaching		Good	2
Behaviour and safety of pupils		Outstanding	1
Leadership and management		Good	2

Figure 3.1: Score overview of an Ofsted school report (Ofsted, 2013)

As with Ofsted reports, schools were given results as a range. In our case, the range is from 1 to 5, with 5 representing excellent implementation of ESD, and 1 representing poor implementation. Each section considered in our research was given an individual score assessing their achievement. Specifically, these sections include the use of ESD in the curriculum, its promotion throughout the school, and student understanding of sustainability goals. Our developed scoring chart is displayed in Figure 3.2.

Scores are given on a scale of *5-Excellent, 4-Good, 3-Satisfactory, 2-Needs Improvement, 1-Poor*

Section	Score
Sustainability implementation	[1-5]
Curriculum integration	[1-5]
Student understanding of sustainability goals	[1-5]
Overall	[1-5]

Figure 3.2 Score overview for Individual School Report

Below the score chart, each section included a detailed description of which factors contributed to the provided score. Whereas the preliminary score is given as a single number, these sections go into detail describing the logic behind giving the schools a certain score.

The analysis of results was an ongoing process, beginning with the focus group first described in Section 3.2.1 and continuing as data was collected. Though the results of the focus group did not contribute to the final report, analysis of the discussion allowed us to gain a better understanding of factors that influenced later results. This group served as a guide for our research, providing insight into how schools, in general, incorporate sustainable education practices into their curriculum. As well as writing notes during the focus group discussion, we recorded the focus group to transcribe points that we found particularly noteworthy. Points of interest included any major disagreements in the group, as well as any unanimous agreements and strong opinions held by group members. While individual moments of the focus group did not stand out as much as the overall message, it was useful to record the session for playback and review later.

The group also provided us with concepts to look for while observing schools during on-site investigations. It is these observations that composed the majority of our assessment, and served as the basis for our results and the individual school reports we developed.

Observations of West Midlands schools provided data regarding current ESD and sustainability practices across the county. As mentioned, the team looked for visual signs that sustainability is both implemented and encouraged. With this in mind, it was important to note both sustainable systems, such as water-saving appliances and energy efficient lighting, as well as signs showing that the schools promote sustainability. These signs included posters promoting sustainability, reminders to turn off lights when not in use, or recycling bins in multiple places throughout the school. The complete checklist can be found in Appendix B.

Faculty interviews were conducted in each of the schools we visited. These interviews lasted approximately fifteen minutes, with the longest lasting twenty minutes. As with the focus group, we took care to ensure that the teachers' messages were properly communicated, keeping in mind instances of sarcasm, hesitation, or uncertainty. Written notes were also taken, both to compliment the transcriptions as well as to act as a backup in the case that our recording system had failed.

Once a score was given for each subsection for each school, we tabulated an overall composite score for each school. To generate these scores for the overall assessment:

1) The results from each section (observations, surveys, and interviews) were averaged individually across the schools studied. This average constituted a score of a "3" for each subsection. Raw sectional scores were then scaled using this average to generate scaled sectional scores, and rounded to the nearest whole number.

The scaled sectional score was created by first using the equation $Score = (3 * Raw\ Score) \div Average$. This result placed a school with a score equal to the average at a 3. However, for schools significantly above or below the average, it was possible for this method to create scores beyond the defined range of 1 to 5. As such, any scores above or below this range were corrected by setting the maximum and minimum possible values respectively to 1 and 5.

2) Sectional scores were then averaged for each individual school and similarly rounded to the nearest whole number. This average became the school's overall sustainability score.

These sectional scores were calculated using the sectional scores before they were compressed to a 1 to 5 scale. For example, a school was determined to have received a 6.97 in one category. For its scaled sectional score, it received a 5. However, this two-point reduction in this score similarly reduced the final score of the school. As such, it was necessary to average the uncompressed scaled sectional scores before compressing them to a 1 to 5 scale. Please see Appendix O for a guide to using the tool, which outlines all scoring procedures.

The assessment strategy outlined above is based on a comparison of the initially selected West Midlands schools. As more schools are potentially analyzed in the future, the average score for each section will become more standardized, leading to a more accurate representation of individual schools' ESD practices.

4. Results and Findings

In this chapter, we discuss the findings of the study. Data gathered from each stage of research: the focus groups, observational analyses, interviews, and surveys, are discussed in four respective sections below. Finally, we explain our overarching analysis, summarizing the current state of ESD of the secondary schools we analyzed in the West Midlands.

4.1 Focus Group

The team conducted a focus group on March 12th, 2018 at St. Mary's R.C. High School with the participation of nine educators from Worcestershire and Herefordshire. The educators were split into two groups, each led by two team members. This was done to facilitate more total discussion in the limited time allocated for the focus group. The full session lasted 20 minutes.

From the focus group, we were able to get an overview of the current general state of ESD practice in West Midlands secondary schools. Overall, most of the geography educators present were displeased with sustainability education, practices, and understanding as it currently stands in their schools. Sustainability is not at the forefront of secondary school education, as it tends to be provided solely by the geography department. However, geography courses are not compulsory in higher levels of secondary education. Instead, in the higher levels, the curriculum of secondary schools is geared more towards preparation for the GCSEs. This poses a problem for geography teachers in integrating sustainability in the curriculum, as there is a great deal of knowledge and material that they are required to cover, leaving little room for sustainability education.

Additionally, the majority of the geography educators at the focus group felt their greatest obstacle to spreading sustainability practices and education is lack of interest from senior management (the UK equivalent of school administration), as well as constraints in the schools' budget. As previously shown in Figure 2.3, many school budgets in the UK have been reduced over the past several years, and many educational areas have lost their funding. Therefore, a number of sustainability services and features such as trash collection systems or recycling materials separation have been cut down. A few educators mentioned that their schools had previously employed better sustainability practices, thus attracting more students to get involved in activities that promote sustainability. Recently, however, they have noted a backwards trend

in the efforts to spread sustainability awareness. They claim that as a result of this trend, secondary school students currently tend to understand very little concerning sustainability, especially the dangers of excessive consumerism and the impact an individual can make.

4.2 Observational Analysis

Observational analyses were conducted in a total of five schools in the West Midlands. Overall, these schools are seen to be making an effort towards creating a sustainable environment, providing services and fixtures such as recycling bins and bus services, as well as outdoor areas for students to utilize. Nevertheless, the degree to which these features are implemented and their quality differ from school to school. In almost every school there is room for improvement. For example, motion sensor lights are mostly implemented in newly-built schools, whereas in old schools the traditional light switches are dominant. In general, it is harder for older schools to implement a new lighting system within the existing infrastructure.

Regarding recycling programs, some schools have a more effective system than others. Overall, the studied schools are lacking a fully realized recycling program. Most observed schools recycle paper, but recycle neither plastic nor cans. In School D, we found that there was a complete lack of recycling altogether; trash was not separated and all went to general waste. Schools in Herefordshire have their trash collected by the Herefordshire County Council, and it is the school's duty to separate it into recyclable/non-recyclable categories. However, as it was seen at School A, this process is not always carried out properly. The central waste collection system at School A contained a mix of recyclable content, as well as waste materials such as Styrofoam and food waste. Furthermore, in most schools visited there was trash visible on the ground, which indicated a level of student disregard for keeping the grounds clean and free of litter.

Figure 4.1: Photographs of central waste collection area and bicycle rack at School A, taken by our team

The most popular means of transportation for students in each school is also varied. Several of the observed schools have bus stops nearby and are accessible through public transportation, encouraging students to make use of it instead of riding in a car. Local bus services make special runs exclusively for the students to transport them to and from school. These bus services were seen at School A and School C. Bike racks are also present at many schools; however, many are poorly maintained and underused (see Figure 4.1). In some schools visited, the bike racks were rusty, rundown, and not centrally located. This does not encourage students to consider riding a bike to school as opposed to bus or parent drop off. It should be noted, however, that it is easier for students at local and city schools to cycle or walk to school since they are within a comfortable distance. For schools located in rural areas, on the other hand, students travel a great distance to get to school every day and riding a bike or walking is not a logical or safe option for them.

Figure 4.2: Photographs of School C's Eco-Classroom and outdoor areas

Throughout the schools visited, few demonstrated an explicit effort to promote sustainability within the schools. Many of the schools lacked posters or campaigns to encourage sustainable behaviors or show students alternative solutions to wasteful behavior (i.e. encourage the use of a reusable water bottle or be diligent about turning off lights and electronics). It should be noted that School C and School E both demonstrated great efforts to promote sustainability. School C showcased their "Eco-Classroom," wildlife areas, and garden spaces, while School E incorporated sustainability throughout the school with extensive recycling efforts, visible posters and bulletins describing environmental efforts, and a dedicated movement to reduce waste throughout the school. The only school where any sustainability posters were present was School E.

Every school that we visited had an outdoor area for students to use. However, some of these areas were superior to others. For example, School D has several courtyards and outside areas with tables, gardens, and large fields. There were also ping-pong tables for students to play

games, which well maintained. School E was similar, with large fields for sports, courts for basketball and tennis, and tables for sitting or eating.

Figure 4.3: School D's outdoor area for student use

As previously mentioned, School C makes great use of their outdoor space, creating a landscape for the students to interact and learn in. School B allows students to spend their break and lunchtime outside and there are numerous picnic tables and rubbish bins, though they lack in landscaping and services for the outside area to be more than just a place for students to socialize and eat. School A falls somewhere in the middle of these schools, having ample land with gardening space, but not much in the way of places for students to eat and socialize.

Following the visit, each school was given an observational analysis score based on our developed scoring and scaling procedure outlined in Section 3.3. School E scored the highest with a raw score of 32 which corresponds to a scaled score of '5'. School C and D earned a raw score of 21 and 23, respectively, with scaled scores of '3'. School A and B, with a raw score of 14 and 13 respectively, received a scaled score of '2' (See Figure 4.4 for a summary of observational analysis scores.) This score will then contribute to the overall school score which will be discussed later in this chapter.

School	Preliminary Score	Scaled Score
School A	14	2
School B	13	2
School C	21	3
School D	23	3
School E	32	5

Figure 4.4: Observational Analysis Scores

4.3 Interviews

From the interviews conducted at the secondary schools, much insight was gained into the obstacles geography educators in the area face when attempting to integrate sustainability ideals into their school and curriculum. Across all interviews, many of the same obstacles were mentioned by the interviewees, including a lack of funding, time, and support given by the school and its senior management team. Most of the geography educators explained that responsibility for sustainability education falls solely on the geography department, which already has a school-mandated curriculum it must cover. At School C, ESD was seen incorporated into the science department, but at most of the other schools visited, interviews revealed that sustainability education was seldom seen across departments. A number of educators expressed a wish for there to be more collaboration across departments and believed it to be possible, but it would take a dedicated effort. At School D, sustainability topics are covered in a number of other disciplines like science and product design, but from the interview, we learned that they work independently without a joint effort to do any collaborative work. This, according to the interviewed educator, is due to the lack of time from teachers in every department.

Many of the geography educators interviewed also noted that while attempting to cover their set curriculum, it becomes difficult to fit in comprehensive sustainability education. The new form of the GCSEs incorporates certain sustainability ideals which have, to an extent, been reflected in newer curriculum. Additionally, a majority of the schools visited described a low retention rate in geography from the lower levels to the upper levels. The interviewee at School A approximated this number to be one third, though each school seemed to have a slightly different estimate. One educator suggested that a possible cause for this decline is the fact that most geography classes become voluntary after a certain level. Some of the educators also

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believed that the lack of interest in sustainability education in higher levels stems from the older students 'growing out of it.' As one geography teacher put it,

I feel that secondary students don't respond as well. It's very much a primary thing. A lot of them have come from Eco-School primary schools. And they think that coming here they've sort of grown out of that (quoted from interview with educator at School C).

Other interviewed educators stated that the senior management team at most schools were not the only groups unwilling to support sustainable education. A geography educator at School A claimed the local community was unwelcoming to change, saying

You could have private companies coming in, giving talks, installing equipment, getting students aware of that, and then demanding more of that in their own lifestyle. It's not something that's done. There's a bit of a stubbornness, I think, sometimes in Herefordshire, not to ask for help, not to ask for guidelines, and [it's] every man in his castle (from interview with educator at School A).

Finally, a number of interviewed educators attributed the apathy of students towards sustainability to the fact that it does not have a direct and visible effect on their lives. Many students do not have the full perspective of environmental issues and the consequences of using resources in an unsustainable fashion, as it is difficult to convey to them the importance of something that does not visibly affect their lives. This case is specifically accurate in more rural schools where students live with natural surroundings, and thus cannot see the issues facing other parts of the world. As an educator in School D has put it,

As much as you can engage them in a lesson about sea level rise in the Maldives, there's a difficulty for them to comprehend how they are affecting that and how that's affecting them and there's kind of a bit of a disconnect between them and others essentially. (from interview with educator at School D)

Overall, nearly all of the geography educators interviewed expressed a keen desire to further sustainability in their schools. Many had taken time to lead extracurricular groups, and

requested more budgetary attention from their senior management teams. Some educators, at schools such as School C, have succeeded in some of their endeavors, by creating outdoor areas to teach sustainable concepts, or even fully sustainable 'eco-classrooms.'

A major factor relevant through many of the interviews was the importance of motivating the entire community to participate in sustainability. School E appears to have been quite successful in this effort. Teachers from School E described many of its efforts to excite students about sustainability. This was done through their recycled materials fashion show, the inclusion of hands-on activities such as the use of LifeStraws to teach about water filtration, assigning the role of 'Eco-Spies' to students to monitor energy usage, and much more. Furthermore, multiple interviews noted the importance of having a driven leader in sustainability to organize a school's efforts. The interviewees at School E remarked on the past success of a particularly driven leader, stating

> *But you know, when it is Green Flag assessment week, I suppose, certainly when it was [the previous Eco-Coordinator], students were made aware, staff were made aware, everybody played their part...to make sure the site was as clean as it could be* (from interview with educators at School E)

The interviewee at School C agreed with this, stating the importance of having a few dedicated people to be a role model in ESD. In fact, the interviewee at School C stressed that leaders in sustainability should be students, as they can more readily influence their contemporaries than teachers.

Following the interviews, each school was given an interview score based on our developed scoring and scaling procedure outlined in Section 3.3. In general, we interviewed two geography educators at each school, with exceptions of School C and School D, where we interviewed one. School E scored the highest with a scaled score of '5'. School C earned a scaled score of '3' while School A, B and D each received a scaled score of '2.' (See Figure 4.5 for a summary of interview scores).

School	Positive (P)	Negative (N)	Preliminary Score (P/N)	Scaled Score
School A	8.00	10.50	0.79	2
School B	6.00	8.50	0.70	2
School C	28.00	23.00	1.22	3
School D	11.00	12.00	0.92	2
School E	22.00	7.00	3.14	5

Figure 4.5: Interview Scores

4.4 Surveys

Our team concluded each interview by providing the interviewed educators with a packet of blank surveys, which we requested they distribute to as broad a range of the student body as possible. Each packet contained 25 surveys, though the educators were welcome to create copies to survey more students. Overall, we received 115 surveys from 4 schools.

Survey results have shown that between schools the level of student participation and understanding of ESD practices is rather consistent. School A's students had an average raw score of 33.08, School C had an average raw score of 29.64, School D had an average raw score of 22.53 and School E had an average raw score of 33.5. Each of these average raw scores corresponded to an scaled score of 3, with the exception of School D, indicating that student understanding of ESD goals remains mostly consistent across the schools. The raw scores of each school, as well as their corresponding scaled score, can be seen in Figure 4.6 below.

School	Preliminary Score	Scaled Score
School A	33.08	3
School B	n/a	n/a
School C	29.64	3
School D	22.53	2
School E	33.50	3

Figure 4.6: Overall Survey Results

As part of our survey, we collected demographic information (gender, age, and class year) to analyze whether any trends existed between class years or males and females. Our data indicates no conclusive trends in these areas. Class year data from School A could indicate a trend that younger students connect more with sustainability education than older students, but the amount of data collected is not sufficient to make this claim with any degree of certainty. Additionally, no trends were found that indicate any correlation between gender and participation in sustainability.

Figure 4.7a: Graphs of Demographic Results
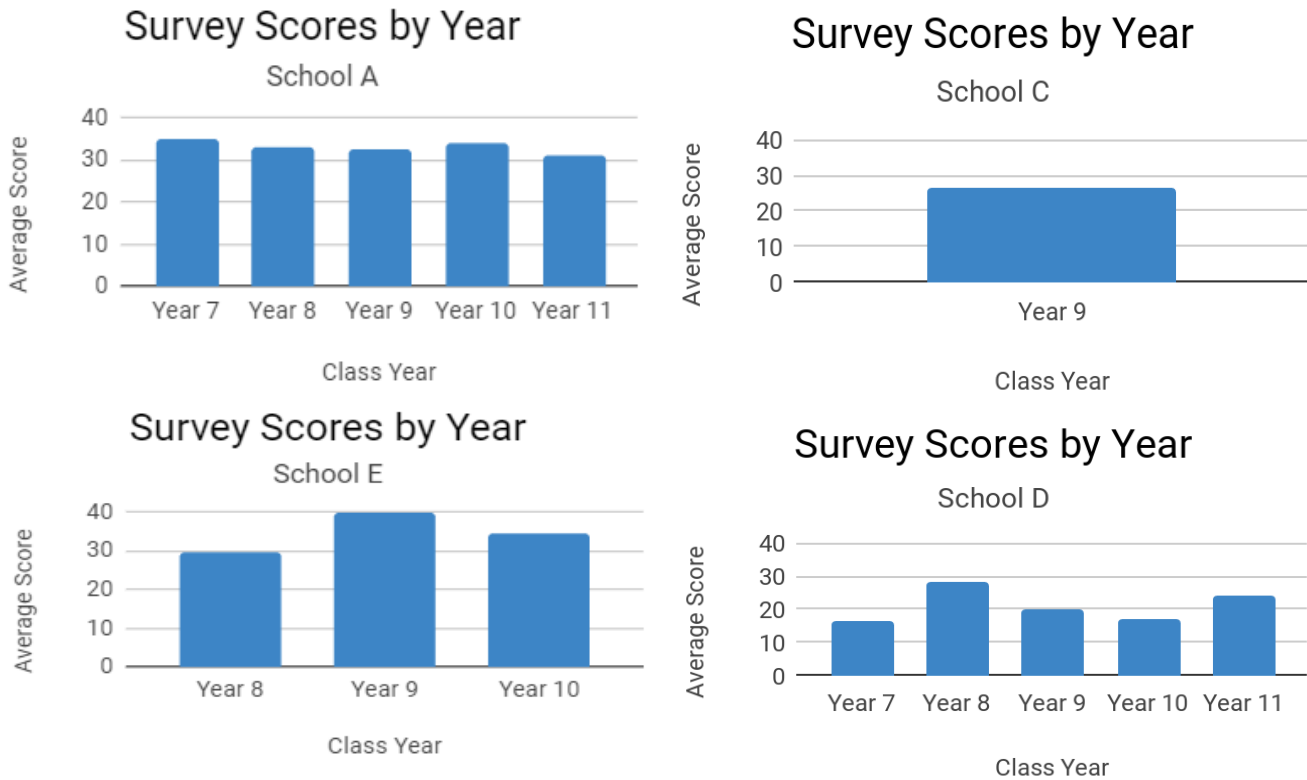
Figure 4.7b: Graphs of Demographic Results

Our team focused in on a few questions within the survey to analyze how sustainability is being received in the classroom and what sorts of behaviors students are partaking in. Question 1 of the survey asked students to estimate how often sustainability was mentioned in their classrooms (Never, Unsure, Once per month, Once per week, More than once per week, Everyday). Their responses were given numerical scores ranging from -1 to 4, respectively, making a response of 'unsure' neutral (0). Students from School A scored a 0.67 on this question, indicating that many students are unsure of how often sustainability is mentioned or only observe it being mentioned approximately once per month. Students from School C scored a 1.44 on this question, meaning students are remembering sustainability being mentioned at least once a month or as frequently as once per week. Students from School D scored 0.11, indicating many students are unsure of how often sustainability is mentioned, if at all. Finally, students from School E scored a 1.46 indicating, again, that students are remembering sustainability being mentioned at least once a month or as frequently as once per week.

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Question 9 asked students to rate how well their teachers explain topics relating to sustainability and the environment. Students from School A generated an average score of 4.16 and School C a score of 4.36 indicating that in both these schools students feel as though their teachers are explaining concepts well in the subject area. School D students responded with an average score of 2.63, indicating a slight dissatisfaction with the quality of teaching. School E students scored this question as a 3.92, which is on par with School A and C, but does score slightly lower. Overall, the majority of students at all four schools are satisfied with the quality of teaching when it comes to sustainability and the environment (See Figure 4.8).

Question 9: Quality of Teaching Sustainability
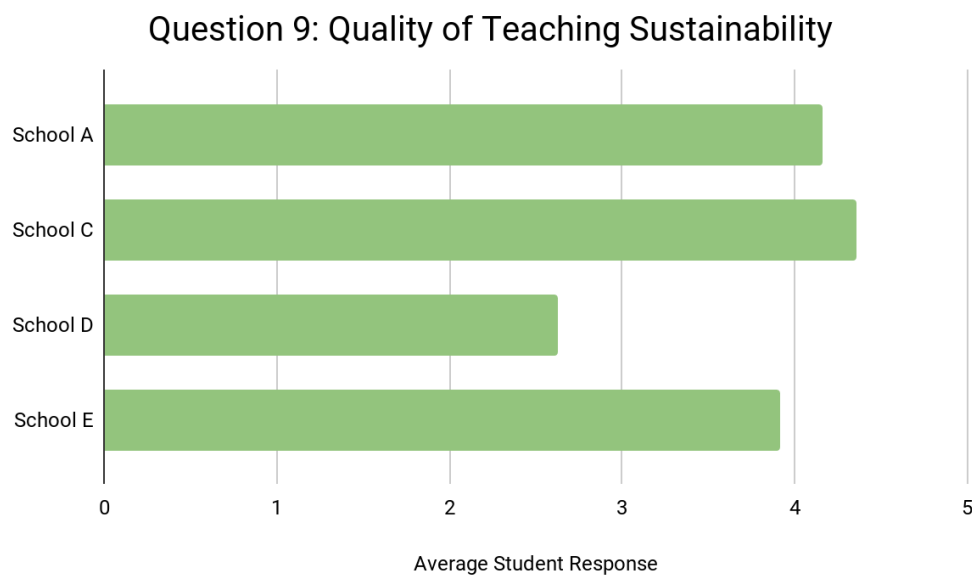
Figure 4.8: Question 9: Quality of Teaching

Question 2 asked students to gauge how often they participated in daily activities that relate to living a more "eco-friendly" lifestyle (Asked to score 1 to 5, 1=Never, 5=Everyday). This question was comprised of 8 sub-questions and the averages for each question were combined to produce an overall average for question 2. Students at School A scored a 2.55 indicating that many students are not consciously participating in activities to conserve energy and reduce litter and pollution. Students from School A had the highest average amongst the questions when asked if they turn lights off when not in use (4.24) and the lowest when asked whether they commonly ride their bike instead of being transported in a car (1.64). Students from School C had a total average of 2.14, indicating, again, that many students are not consciously

participating in activities to conserve energy and reduce litter and pollution. The highest individual average for School C was 3.84 which asked how often students spent time outside and the lowest was whether they commonly ride their bike instead of being transported in a car (1.32). Students from School D averaged 1.78 on question 2, which was somewhat lower than the other three schools. Scores were highest when students were asked how often they spent time outside (3.89) and lowest when asked how frequently they used public transportation (1.74). Students from School E had a total average of 2.50, and like the other schools, this indicates a lack of a conscious effort to live a more sustainable life. Students scored highest when asked how often they spend time outside (4.46) and lowest when asked how often they use public transportation (2.38). Overall, question 2 reveals that, in general, student participation in daily sustainable activities is consistent across all three of these schools and that this participation lies on the lower end of the spectrum (See Figure 4.9).

Question 2: Individual Student Sustainability Participation
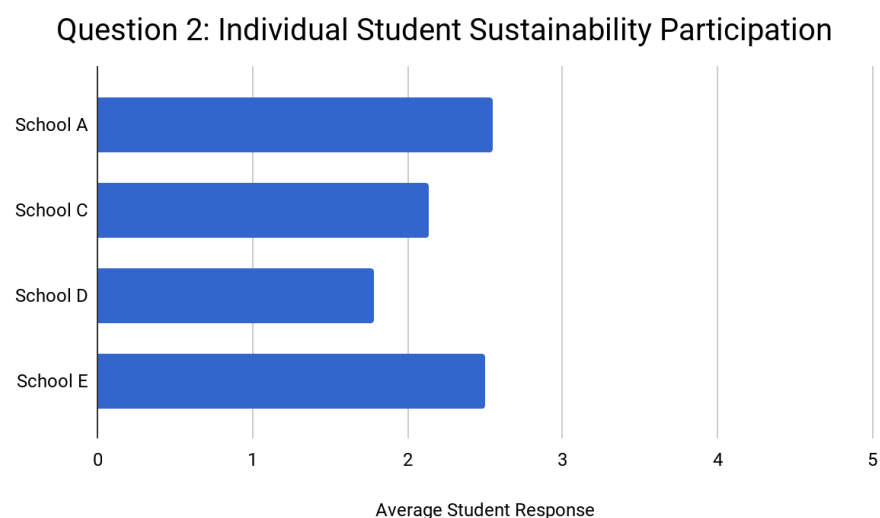
Figure 4.9: Question 2: Individual Student Sustainability Participation

Questions 6, 7, and 8 also related to students' participation and attitude towards sustainability and the environment. Question 6 asked students to rate their interest in participating in efforts outside of school such as composting, reducing energy usage, and recycling. School A's students scored this question as 2.88 indicating no strong feelings either way, School C scored this question as 2.20 which leans towards a general attitude of disinterest, School D scored this question as 2.16 which likewise indicates a general attitude of disinterest, and School E students scored a 2.83, indicating no strong feelings either way. Question 7 asked students about

their perceptions of their peers' engagement with sustainability efforts. The four schools scored 2.64, 2.68, 2.32 and 3.04 respectively, indicating that students in School A and C are seeing the same level of participation amongst their peers. The participation of School D was somewhat lower than at School A and C, whereas at School E this participation is perceived to be a bit higher. Lastly, question 8 asked students about their enjoyment in learning about sustainability and environmental issues. Students from School A scored this question as 3.72, indicating mostly positive enjoyment, School C as 2.96, indicating a neutral attitude toward learning about the environment, School D as 2.32, indicating more negative enjoyment, and School E scored a 3.38 also indicating a slight positive enjoyment (See Figure 4.10).
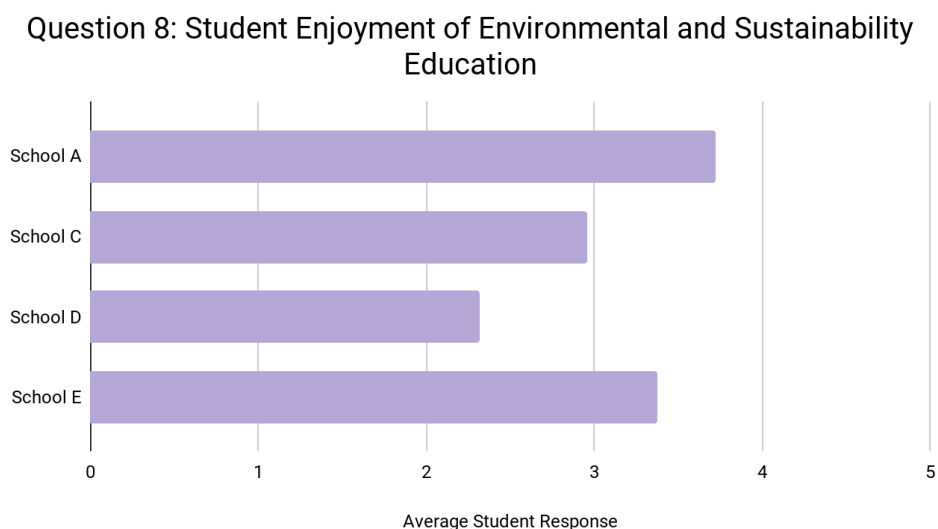
Figure 4.10: Question 8: Student enjoyment of environmental and sustainability education

4.5 Overall Results

The scores from the schools analyzed have been compared against one another using the scaling analysis outlined in Section 3.3. This was done in such a way that the school with the most sustainable features received the highest scaled score amongst all the schools, '5', while an average score of '3' indicates the most common state of ESD practices in West Midlands schools. As mentioned in Section 3.3, we have provided each school with an individual report on how well they are incorporating ESD into their curriculum and schools. These reports can be found in Appendices J, K, L, M, and N. At the end of the analysis, the schools received the following scores:

School	Interview Score	Observational Score	Survey Score	Final Score
School A	1.742	2.039	3.343	2
School B	1.555	1.893	n/a	2
School C	2.700	3.058	2.995	3
School D	2.033	3.350	2.276	3
School E	6.970	4.660	3.385	5

Figure 4.11: Sectional scores and scaled overall scores for each school

The goal of the project was to use the tool to collect information about sustainability in schools. The tool was designed to be consistent across any school we chose to analyze, as well as able to be implemented quickly, taking only a few hours to gather multiple interviews and a complete observational analysis. Furthermore, we wanted our analysis to triangulate accurate results as effectively as possible. As discussed in our methodology, the analysis of a school consists of 3 sections: interviews, observational analysis, and student surveys. Each section assesses a different perspective of sustainable education, with the interviews reviewing the curriculum, observational analyses assessing the physical systems in place at the schools, and student surveys determining if these efforts have affected the students.

This project has served as a pilot study for our tool. Data collected was done so with the mindset of testing and improving the collection tool. As a result, we believe the final product we developed is an effective start to the analysis of sustainability education in English schools. At each school we visited, the team discussed our own opinions regarding how well each school embodied the goals of ESD. In general, the tool effectively reflected our feelings toward each school numerically. In a school we determined to be less effective at promoting ESD, the tool similarly gave that school a lower score. This has been true of every school we were able to analyze.

We designed the tool in such a way that it can be utilized by any group performing ESD assessments. With this in mind, we wanted to ensure an entire assessment can be performed by anyone provided with the proper procedure. This procedure can be found in Appendix O. Using

this guide and the materials provided in Appendices B through H, researchers should be able to complete a school visit, analysis, and scoring for any number of secondary schools.

The tool has not, however, been fully vetted. Though early indications show that it matches observer opinions, the sample size of our collected data is much too small to draw any confident numerical conclusions. In addition, the scoring system is designed for large amounts of data, on the order of tens or hundreds of schools analyzed. This is because the scores given to each school are scaled relative to the overall average score. When there is data from a small number of schools, each new score can change the average score significantly. Thus, assigning a score to each of the five schools we visited must be done with the knowledge that the results are likely to have a significant error. With the addition of more added schools, at least 10, the results will become much more consistent.

5. Conclusions & Recommendations

This section outlines the major findings of our study in terms of results gathered about the current state of ESD practice in the five West Midlands schools studied as well as the successes and drawbacks of our developed tool. We then provide recommendations for West Midlands schools as a whole as well as recommendations for future improvement of the developed tool.

5.1 Conclusion

5.1.1 ESD in the West Midlands

A decline in Green Flag Award applications in Worcestershire in recent years prompted an investigation into the possible decline of ESD practices in general. In response, the goal of this project was to assess the current state of sustainable education in West Midlands secondary schools, as well as to develop a preliminary assessment system for use in other parts of the UK and across the world.

To evaluate the current state of ESD in schools, our assessment was broken into 4 parts: a focus group, observational analysis, interviews, and surveys. These assessments gathered broad results for a portion of the regional school system, as well as data specific to selected schools. Initially, a focus group consisting of local educators was conducted with the purpose of understanding educator sentiments towards current ESD practices. From analyzing their answers to the questions we had developed beforehand, our team found that the educators from nine separate schools in the West Midlands were displeased with sustainability education, practice and student understanding within their schools. When asked what they thought was causing this, most of the educators pointed towards a lack of interest from their senior management teams, budgetary constraints to implement sustainable systems such as trash collection, and a lack of time given to geographers to teach about sustainability outside of their curriculum. With respect to the students, most of the educators noted that their schools did not require higher level students to take geography courses, which causes a drop in understanding and involvement in sustainability.

After analyzing the data from the focus group, our team performed geographer interviews and observational sustainability analyses of five secondary schools in the West Midlands. The interviews reinforced the sentiments found in the focus group, as well as provided

more in depth explanations to ESD obstacles. Most of the educators, when interviewed individually, mentioned that the curriculum in geography courses is geared primarily toward GCSE preparation. They noted that in the past year, elements of the GCSE have been altered to reflect greater sustainability understanding, and therefore geography curriculum has been changing accordingly. However, most interviewed educators found it very difficult to find time and support to promote ESD, as the responsibility for its promotion falls solely on the geography department.

At each school visited, our team conducted our observational analysis in conjunction with an educator-led tour of the school and its grounds. Results from these analyses varied between schools - for instance, although all 5 schools visited had outdoor areas for student use, not all were kept in the same condition. Through these analyses and tours, our team discovered a few trends. Most of the analyzed schools are fairly old, making it difficult to retrofit newer sustainable features, such as solar heating and better insulation. A lack of support from local authorities also makes it difficult for schools to implement better practices, such as proper recycling. In 4 out of the 5 cases, our team observed issues with rubbish collection. In these cases, rubbish and recycling was not separated at the school prior to collection.

As the final portion of our analysis tool, our team asked each interviewed educator to administer 25 of our surveys to their students, in an even distribution of grade level and gender if possible. The survey incorporated questions that were intended to uncover the frequency and quality of sustainability lessons, the behaviors of students as they relate to sustainability, and uncover student attitudes towards sustainability and the environment. After compiling the results from all the schools that returned our surveys, no notable demographic trends were identified. Overall, it appears that sustainability lessons are occurring in schools, but not very frequently. Furthermore, many students do not make a conscious effort to reduce their consumption, nor are they particularly interested in doing so. It is possible that students may not be unaware of small behaviors they can do to make their school more sustainable and become engaged in more positive behaviors.

5.1.2 Effectiveness of the Tool

It should be taken into consideration that the sample size of schools and student surveys is not large enough to be summative of the entire West Midlands region or England as a whole. Rather, these five schools offer a glimpse into local difficulties and successes as it pertains to ESD that should be followed up and further analyzed with a larger sample size. The main goal of this project was to develop a tool that could be used on a larger scale to identify trends and offer insights into the current situation. We believe the tool succeeds in offering this.

The tool is designed to minimize assessor bias as much as possible. A majority of the scoring of the observational analysis and student surveys is objective, though scoring of the interviews does introduce a degree of subjectivity. However, by having multiple persons come to a consensus on interview statements it corrects for erroneous categorization or the potential for individual bias towards a certain interviewee or sentiment. In this way, our team considers the tool a success in generating numerical results that are easily translated into a sensible score. Furthermore, while the team's individual impressions of each visit did not factor into the analysis, the overall rankings of the school reflect our team's general opinions of each school. Therefore, we believe our tool is competent at producing numerical data that accurately reflects the perception of the average person. This is promising, as it indicates that this qualitative turned quantitative assessment style does not appear to shortchange or overemphasize certain elements of the analysis.

5.2 Recommendations

5.2.1 Recommendations to West Midlands Secondary Schools

Through the use of our assessment tool, our team determined that there are many barriers impeding the integration of ESD into a student's knowledge and everyday practices, including a lack of time, money, and support from senior management and local authorities. Although these obstacles are quite large, there are actions our team believes could be done to help. At School C, geographer educators told us how the science department was able to use a portion of their Science, Technology, Engineering and Mathematics (STEM) government funding to promote sustainability ideals. Additionally, educators in the science department at this school are willing

to use some of their teaching time to incorporate ESD. If implemented in other schools, this cross-departmental cooperation would lessen the ESD responsibility that has been placed almost entirely on the educators within geography departments, as well as increase the amount of monetary resources allocated to sustainability education.

Another sizable barrier to promoting sustainable practice is a lack of support from both the schools' senior management teams and local authorities. After speaking with educators and analyzing the results of the observational analysis, our team recommends that actions be taken first at the local level. The "every man in his castle" (educator, School A) attitude that is seemingly prevalent in many West Midlands communities is something our team, as well as most interviewed educators, found to be the main difficulty facing the implementation of sustainable practices in schools, and even the community as a whole. It is our team's belief that an attitude of sustainability must be cultivated throughout the community in order to provide a lasting impact on students. When sustainability is a subject in school, it can be easily forgotten. If sustainable practices become the default for a community, however, they are much more difficult to ignore. Of course, such a change in support would be a challenging task, and perhaps future researchers should investigate methods to accomplish this goal.

Our team also recommends the inclusion of at least one major project per year in the geography curriculum that is focused around sustainable development. While interviewing faculty at School B, our team was informed of their 'sustainable cities' project, which asked students to design a city that maximizes features associated with sustainable development. Educators expressed that this project increased student understanding and challenged students to think more creatively about how to live and design for the future. Encouraging students to interact with sustainability in a format that encourages individual thinking and expression, opposed to classroom lecturing, can increase overall understanding and comprehension as the students are interacting with the material firsthand (Blumenfeld et al, 1991). We recommend that School B assigns this project yearly and that the geography educators at the other schools work together to develop a sustainability project that incorporates these critical thinking skills.

In 4 out of the 5 schools visited, there was a complete lack of posters or school wide events/campaigns to publicize living sustainably. School E was the only school that did have these sorts of posters visible in the hallways of their school and had events that incorporated sustainability. However, sustainability was not the main focus of these events. Our team

recommends implementing these posters or campaigns around the school for students to see. These posters, which can promote sustainable actions as well as upcoming sustainability events, should be placed in areas highly visible to students, such as in hallways and restrooms.

A major issue observed in the observational analysis was improper recycling and from the focus group it was revealed that it is expensive to recycle in general. As such, we believe reducing paper waste is a feasible campaign in each school visited. Some schools, such as School A and School D, mentioned this desire, but nothing concrete has been produced from these ideas. Schools could dedicate a day to being completely 'paper free.' Schools can refer to the Nottinghamshire County Council guide to a 'Paper-Free Challenge Day' when looking for guidelines in developing the event (Nottingham County Council, n.d.). Small campaigns such as this can expose students to new ways to use technology in their learning and help them to understand the importance of conservation. Schools could similarly hold a 'lights off day,' where no classroom lights are turned on for an entire school day. Interviews at School A had mentioned their recent success in hosting a 'lights off day,' involving students in lessons promoting energy conservation. This is a popular campaign to "raise awareness about school-wide energy consumption and the educate communities about where...energy comes from" (Sierra Club, 2012).

Lastly, our team recommends that each school install a committee or single leader to take responsibility for sustainability efforts within their school. School E scored the highest of all 5 schools analyzed and it was revealed in the interviews that much of the positive progress they have made as well as their awards, such as the Green Flag Award became a reality due to the commitment of one driven staff member. This staff member organized the sustainability programs in the school and worked with senior management to push issues relating to sustainability to the forefront of the school's image. In the other schools we recommend the installment of something similar. This could work effectively as an eco-committee of a few educators or members of staff and ideally someone on this committee would work outside of geography to encourage cross-curricular education.

5.2.2 Recommendations to Future Research Groups

With regards to future use of our assessment tool, our team recommends a greater set of schools be analyzed using the tool, in order to fine tune the scoring guidelines. As the next team

will not have to spend time developing the tool from the ground up, more data can be gathered on schools in the West Midlands and other regions in the UK. This data, while adding to the understanding of ESD practice, can also be used to improve the structure of the tool itself. For instance, as it stands currently, the responses to student surveys are tallied manually into a spreadsheet. This scoring system works well for analyzing a small number of schools. However, this method may prove to be prohibitively time-consuming when used for a larger and more varied sample. The data from a large sample size can be used to improve both the scoring system and the type of questions asked by the surveys and interviews in a way that yields more precise and useful analyses. We recommend that future groups take a close look at the Guide to Using the Tool (Appendix O) that our team has provided to understand not only how it works but also our methodology in developing the tool, so that they can make appropriate modifications and improvements as necessary.

Regarding the observational analysis, modifications could be done to improve the checklist. After conducting observational analyses at some schools, we realized some items were not a good indicator of sustainability practices; for example, hand dryers versus paper towels, since which is better for sustainable development is open to questions. More efforts could be made to find good indicators of sustainable development to be included in the checklist before getting to the project site. Furthermore, future teams can come up with a scaling scheme for each item in the list, as opposed to treating every feature as equal. They should also devise a plan to account for unique and creative sustainability features (such as Eco-classroom). Doing so would help evaluate schools' sustainability practices in a fairer manner but, again, would require extensive research in advance.

Additionally, our group recommends interviewing educators outside of the geography department, as well as interviewing school administrators and members of the senior management teams. Each educator is subject to their own personal biases, which were not fully accounted for in the interview scoring. Increasing the range of interviewees would provide a broader and more balanced scope of opinions regarding ESD. Furthermore, these interviewees could provide more potentials barriers hindering ESD, and perhaps a broader set of potential solutions. For instance, from our faculty interviews, our team found that most budgetary decisions were made by senior management. By interviewing individuals on the management teams, their attitudes towards ESD and justification of their monetary decisions can be better

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understood. Of course, this broadening of the scope of interviewees would require the development of more specific interview and focus group questions, but our team believes these different questions will still fit within the overall structure of our assessment tool as we have it now. For example, a separate administrator focus group could be held, and responses to administrator interview questions could be scored the same manner as, but separate from, educator interview questions.

Finally, one thing that can be improved for the student survey process is using electronic forms instead of physical paper copies. This would alleviate the need for teams to print out surveys before each school visit and wait for surveys to be mailed back after they are completed. This is a sustainable practice, and will help save a considerable amount of both time and money for the team in carrying out the project.

5.3 Summary

The recommendations made in Section 5.2.1 were developed with the intention of both facilitating an increase in ESD and aiding in the development of sustainable communities in West Midlands schools. It is the desire of the team that these recommendations are feasible and cost-effective to implement. The main goal of these recommendations is to increase awareness and cooperation in schools. Our team first recommends better communication between educators. By communicating with other departments and voicing opinions to senior management, geography educators can lessen the responsibility of being the sole provider of ESD in their school. This cross-curriculum communication allows integration of more comprehensive sustainability education throughout the school. Organizations, such as an eco-committee, are one means of facilitating this cooperation. Our team further recommends increasing visible features of sustainability. By installing more visible signs of sustainability, such as posters and school-wide campaigns, educators and administrators can educate students on ways to reduce their consumption and live more sustainably. Lastly, we recommend including an additional project or paper into the curriculum. This has the potential to benefit student comprehension of ESD by presenting students with the challenge of thinking critically and individually about sustainability issues. These sorts of skills require a greater understanding of the material than is demanded in traditional lecture.

The recommendations made in Section 5.2.2 are intended to identify areas within our developed tool and study that would benefit from future improvements. To improve upon the tool, we first recommend extending the pilot study to many more schools to fine-tune the mathematical analysis and develop a way to streamline the analysis procedure. To improve the analysis procedure, we recommend modifications to the observational analysis to accommodate better for the main features of a sustainable community, as well as the uniqueness of each school. Regarding improvements for the surveying process, future teams can replace paper surveys with electronic surveys to reduce paper waste and make data collection more efficient. Lastly, we recommend interviewing a broader range of staff at each school, ideally one educator outside the geography department and a member of senior management.

By installing these recommendations, we hope that the developed analysis tool can be applied to a variety of schools across other regions of England, and the world. This will put school systems on a path to changing student attitudes, and creating communities dedicated to operating sustainably.

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Appendices

Appendix A: Guiding Questions for the Focus Group

Thank you for participating in this study. We are a team from Massachusetts, US conducting research regarding education about sustainability and current sustainability practices in West Midlands schools. This interview will help us gain a broad insight into the overall opinions of and feelings towards Education for Sustainable Development from secondary school educators. To improve the accuracy of our research, this discussion will be recorded. No names or personal identification will be used in our published report, and any personal information will be deleted on completion of this project. If you have objections to being recorded, please tell us immediately.

1. What does sustainability mean to you?
   a. Do you think sustainability is important?
2. Describe what a sustainable school looks like
   a. What is the overall structure of the school? How much of the school ground is open area?
   b. What does it look like inside academic buildings? Inside each classroom?
3. What actions or qualities demonstrate an understanding of the importance of sustainability?
4. Why might educators find it difficult to incorporate or promote sustainability?
5. What, if anything, has your school done to support sustainability?

Appendix B: Observational Analysis Checklist

      Use this document as a checklist during school observations. Record as much detail as possible, including things potentially mentioned by your tour guide. Score results using the observational analysis scoring method described in section 3.2.2 of this report.

Name of School: _____

Type of School: _____

Number of Students: _____

Part 1: Please check each box if the following things are seen or mentioned as being in the school:

1) **Recycling Bins** ☐
-    Seen in hallways ☐
-    Seen in classrooms ☐
-    Additional Notes: _____

2) **"Turn Off Lights" Signs over light switches** ☐
-    Location(s): _____
-    Additional Notes: _____

3) **Bike Racks** ☐
-    Location(s): _____
-    Additional Notes: _____

4) **Posters/bulletins concerning sustainability efforts** ☐
-    Location(s): _____
-    Additional Notes: _____

5) **Motion Sensor Lights** ☐
-    Location(s): _____
-    Additional Notes: _____

6) **Un-recycled items** ☐
-    Location(s): _____
-    Additional Notes: _____

7) **Unused electronics seen on** ☐
-    Location(s): _____
-    Additional Notes: _____

Appendix B: Observational Analysis Checklist (continued)
Part 2: Please answer the following questions. Include additional information if necessary.

1) Does the school have a nearby **public bus stop**? Y / N

Additional Information:_____

2) Is it an **enclosed bus stop**? Y / N

Additional Information:_____

3) Does the school have an **outdoor area for student use**? Y / N

Additional Information:_____

4) Is there a visual trash **collection system** seen here? Y / N

Additional Information:_____

Part 3: Please use this space below to make note of any further sustainability features mentioned during tour, or seen within the school.

Appendix C: Educator Interview Questions

Thank you for participating in this study. We are a team from Worcester, Massachusetts, conducting research regarding education about sustainability and sustainability practices in West Midlands schools. This interview will help us gain an insight into the current practice of Education for Sustainable Development in classrooms. To improve the accuracy of our research, this discussion will be recorded. No names or personal identification will be used in our published report, and any personal information will be deleted on completion of this project. If you have objections to being recorded, please tell us immediately.

1. How long have you been an educator?
2. Overall, would you say sustainability education is something the school supports?
   a. Why or why not?
3. What do you think the impact of ESD is on the school and its pupils?
4. Is ESD an important topic in your department?
5. Are you or anyone in your department involved with extracurricular activities?
   a. Do these activities incorporate ESD?
6. Have you ever participated on a Green Flag Award project team?
7. Do factors exist that are potentially preventing you from increasing ESD participation?
8. Do you believe ESD should be included in the curriculum?
9. Do you have any other thoughts regarding ESD practices at your school?
10. If you had all the time, money, resources, and support in the world, what would you do with your school in terms of sustainability?

Appendix D: Student Survey

  Thank you for participating in this study. We are a team from Worcester, Massachusetts, conducting research regarding education about sustainability and sustainability practices in West Midlands schools. No names or personal identifiers will be collected in this survey, and you will not be able to be identified in our final report.

1. How often is sustainability mentioned during an average school day?

Never Once per month Once per week More than once per week Every Day Unsure

2. How frequently do you take part in the following activities:

	Never	1	2	3	4	5	Every Day
a. Turn off lights when not in use	_	_	_	_	_		
b. Riding a bike instead of in a car	_	_	_	_	_		
c. Separate rubbish and recycling	_	_	_	_	_		
d. Ride public transportation	_	_	_	_	_		
e. Use electric hand dryers	_	_	_	_	_		
f. Spend time outside	_	_	_	_	_		
g. Leave the water on while brushing teeth	_	_	_	_	_		
h. Pick up litter	_	_	_	_	_		

3. I am aware of ways to participate in sustainability at my school

     Disagree 1 2 3 4 5 Agree

4. Have you ever helped your school to apply for a Green Flag Award? Yes No

5. If so:
  a. Was the application completed?   Yes No n/a
  b. Do you feel you had enough guidance to accomplish your goal? Yes No n/a

6. I am interested in participating in sustainability efforts outside of school (composting, trash collection, reducing energy usage, etc.).

     Disagree 1 2 3 4 5 Agree

7. I think my classmates engage in sustainability efforts.

     Disagree 1 2 3 4 5 Agree

8. I enjoy learning about environmental issues.

     Disagree 1 2 3 4 5 Agree

9. My teachers do a good job explaining environmental topics.

     Disagree 1 2 3 4 5 Agree

10. Demographic Questions:
  Please indicate your:
     Age: _____
     Class year: _____
     Gender: _____

Appendix E: Interview Informed Consent Form

Informed Consent for Participation in the Research Study

Investigator: Worcester Polytechnic Institute Research Team

Contact: D18-SDG@wpi.edu

Type of Research Study: Interview

Sponsor: Elena Lengthorn

You are being asked to participate in a research study. Before you agree, you must be fully informed about the purpose of the study, the procedures to be followed, and any benefits, risks, or discomfort that you may experience as a result of your participation. This form presents information about the study so that you may make a fully informed decision regarding your participation.

The purpose of this study is to determine how schools in Worcestershire and surrounding areas in the West Midlands take part in sustainable education. We are looking for current practices to teach sustainability to students as well as possible challenges inhibiting full implementation of a sustainability curriculum.

This interview will consist of a short set of questions that we ask you answer to the best of your abilities. We anticipate this interview lasting no longer than 20 minutes. There are no foreseeable risks to this research beyond those risks already present in daily life. If you experience any discomfort, please notify the interviewer and they will work to resolve the issue. You are free to end the interview at any time for any reason, should you choose to do so.

Your responses will be used in our assessment of your school's implementation of sustainability education. We do not foresee any personal benefit to your participation. In the unlikely event that any personal injury occurs, the research team will not be held liable for compensation. You do not give up any of your legal rights by signing this statement.

With your permission, responses to interview questions will be digitally recorded, for the purpose of transcribing portions later. Following the completion of our research, the recording will be destroyed. If, for any reason, you do not consent to audio recording, let the interviewer know and audio responses will not be digitally recorded. Instead, responses will be recorded by hand in written notes. Records of your participation in this study will be held confidential so far as permitted by law. However, the study investigators, the sponsor or its designee and, under certain circumstances, the Worcester Polytechnic Institute Institutional Review Board (WPI IRB)

will be able to inspect and have access to confidential data that identify you by name. Any publication or presentation of the data will not identify you.

By signing below, you acknowledge that you have been informed about and consent to be a participant in the study described above. Make sure that your questions are answered to your satisfaction before signing (contact D18-SDG@wpi.edu). You are entitled to retain a copy of this consent agreement.

_____   Date: _____

Study Participant Signature

_____

Study Participant Name (Please print)

_____   Date: _____

Signature of Person who explained this study

If you have any further questions regarding the study or its results, do not hesitate to contact us at D18-SDG@wpi.edu.

Appendix F: Focus Group Informed Consent Form

Informed Consent for Participation in the Research Study

Investigator: Worcester Polytechnic Institute Research Team

Contact: D18-SDG@wpi.edu

Type of Research Study: Focus Group

Sponsor: Elena Lengthorn

You are being asked to participate in a research study. Before you agree, you must be fully informed about the purpose of the study, the procedures to be followed, and any benefits, risks, or discomfort that you may experience as a result of your participation. This form presents information about the study so that you may make a fully informed decision regarding your participation.

The purpose of this study is to determine how schools in Worcestershire and surrounding areas in the West Midlands take part in sustainable education. We are looking for current practices to teach sustainability to students as well as possible challenges inhibiting full implementation of a sustainability curriculum.

This focus group will consist of a short set of questions that we ask you answer to the best of your abilities. We anticipate this discussion to last no longer than 90 minutes. There are no foreseeable risks to this research beyond those risks already present in daily life. If you experience any discomfort, please notify the moderator and they will work to resolve the issue. You are free to leave the group at any time for any reason, should you choose to do so.

Your responses will be used in our assessment of your school's implementation of sustainability education. We do not foresee any personal benefit to your participation. In the unlikely event that any personal injury occurs, the research team will not be held liable for compensation. You do not give up any of your legal rights by signing this statement.

The conversation will be digitally recorded, for the purpose of transcribing portions later. Following the completion of our research, the recording will be destroyed. If, for any reason, you do not consent to audio recording, let the moderator know and audio responses will not be digitally recorded. Instead, responses will be recorded by hand in written notes. Records of your participation in this study will be held confidential so far as permitted by law. However, the

study investigators, the sponsor or its designee and, under certain circumstances, the Worcester Polytechnic Institute Institutional Review Board (WPI IRB) will be able to inspect and have access to confidential data that identify you by name. Any publication or presentation of the data will not identify you.

By signing below, you acknowledge that you have been informed about and consent to be a participant in the study described above. Make sure that your questions are answered to your satisfaction before signing (contact D18-SDG@wpi.edu). You are entitled to retain a copy of this consent agreement.

_____ Date: _____

Study Participant Signature

_____

Study Participant Name (Please print)

_____ Date: _____

Signature of Person who explained this study

If you have any further questions regarding the study or its results, do not hesitate to contact us at D18-SDG@wpi.edu.

Appendix G: Survey Informed Consent Form

Informed Consent for Participation in the Research Study

Investigator: Worcester Polytechnic Institute Research Team

Contact: D18-SDG@wpi.edu

Type of Research Study: Survey

Sponsor: Elena Lengthorn

You are being asked to participate in a research study. Before you agree, you must be fully informed about the purpose of the study, the procedures to be followed, and any benefits, risks, or discomfort that you may experience as a result of your participation. This form presents information about the study so that you may make a fully informed decision regarding your participation.

The purpose of this study is to determine how schools in Worcestershire and surrounding areas in the West Midlands take part in sustainable education. We are looking for current practices to teach sustainability to students as well as possible challenges inhibiting full implementation of a sustainability curriculum.

The survey will consist of a short set of questions that we ask you answer to the best of your abilities. We anticipate this interview lasting no longer than 20 minutes. There are no foreseeable risks to this research beyond those risks already present in daily life. If you experience any discomfort, please notify the administrator of the survey and they will work to resolve the issue. You are free to end the interview at any time for any reason, should you choose to do so.

Your responses will be used in our assessment of your school's implementation of sustainability education. We do not foresee any personal benefit to your participation. In the unlikely event that any personal injury occurs, the research team will not be held liable for compensation. You do not give up any of your legal rights by signing this statement.

Responses to this survey will be tabulated with other results to determine averages and trends. No information collected will be used to identify you in any way. Records of your participation in this study will be held confidential so far as permitted by law. However, the study investigators, the sponsor or its designee and, under certain circumstances, the Worcester

Polytechnic Institute Institutional Review Board (WPI IRB) will be able to inspect and have access to confidential data that identify you by name. Any publication or presentation of the data will not identify you.

By signing below, you acknowledge that you have been informed about and consent to be a participant in the study described above. Make sure that your questions are answered to your satisfaction before signing (contact D18-SDG@wpi.edu). You are entitled to retain a copy of this consent agreement.

_____		Date: _____

Study Participant Signature

_____

Study Participant Name (Please print)

_____		Date: _____

Signature of Person who explained this study

If you have any further questions regarding the study or its results, do not hesitate to contact us at D18-SDG@wpi.edu.

Appendix H: Structure of school inspection report.

Inspection Date: [Date]

Scores are given on a scale of *5-Excellent, 4-Good, 3-Satisfactory, 2-Needs Improvement, 1-Poor*

Section	Score
Sustainability implementation	[1-5]
Curriculum integration	[1-5]
Student understanding of sustainability goals	[1-5]
Overall	[1-5]

Sustainability Implementation:

[This section describes how sustainability has been implemented in observable ways in the school, including through promotion of sustainable actions, access to recycling bins or alternative transportation, and preventing wasted water, fuel, or electricity.]

Curriculum Integration:

[This section describes how the school has worked to implement sustainability into the educational curriculum. This integration requires that teachers directly address sustainability topics in the classroom The score factors in challenges faced by educators attempting this effort.]

Student Understanding of Sustainability Goals:

[This section describes students' understanding and belief in sustainability goals. A successful sustainable education will provide the students with an understanding of the importance of sustainable lifestyles, and teach them methods to promote and participate in sustainable topics.]

Appendix I: Scoring Sheets for Observational Analysis

School A

Feature	Present?	Description	Score (4 pts)
Recycling Bins	Yes	Only for paper in the classrooms. Paper does not remain separated when brought outside for collection.	1
"Turn Off Lights" Signs	No	N/A	0
Bike Racks	Yes	Rusty, somewhat hidden. Difficult for students to commute by bicycle, due to distance and location.	2
Sustainability Posters	No	N/A	0
Motion Sensor Lights	Yes	Only in common areas and bathrooms	2
All Items Properly Disposed of	No	Refuse not properly separated, no bottles observed on ground	2
All Unused Electronics Off	No	Lights and a computer seen on in empty classroom	0
Accessible Bus Stop	Yes	Enclosed and used, exclusive busses just for the students in the morning and the end of the day	4
Outdoor Area for Students	Yes	Large, Well-kept areas	4
Trash Collection System	Yes	Seemed to be used	3
Extra Features (+1 pt. for sustainable observations, -1 pt. for unsustainable observations)	Yes	Single flush toilets, individual printers despite a central system, poor insulation, 'temporary' bathrooms	-4
		Score	14

School B

Feature	Present?	Description	Score (4 pts)
Recycling Bins	Yes	Paper recycling only, trash bins in hallways but no recycling bins visible	1
"Turn Off Lights" Signs	No	N/A	0
Bike Racks	Yes	Bike rack located at main entrance. Lightly utilized	2
Sustainability Posters	No	N/A	0
Motion Sensor Lights	Yes	In common areas (i.e. hallway, teacher's lounge, and canteen, but not in classrooms	2
All Items Properly Disposed of	No	Bottles next to trash cans on ground in the hallways, no trash separation	1
All Unused Electronics Off	No	Computers on in empty computer lab	0
Accessible Bus Stop	Yes	Closest bus stop ~0.6 miles. A majority of students are driven by car	1
Outdoor Area for Students	Yes	Well maintained, students allowed to use it for lunch and free time, but pavement not grass	3
Trash Collection System	Yes	Bins in outside area	3
Extra Features (+1 pt. for sustainable observations, -1 pt. for unsustainable observations)	No	N/A	0
		Score	13

School C

Feature	Present?	Description	Score (4 pts)
Recycling Bins	Yes	Paper bins only, some classrooms did not have a bin	1
"Turn Off Lights" Signs	Yes	Small sticker, hard to read	2
Bike Racks	Yes	Did not see, but were told some students and faculty	1
Sustainability Posters	Yes	Information about "Eco-Classroom" on outside of building, but no posters observed in hallways	1
Motion Sensor Lights	No	N/A	0
All Items Properly Disposed of	No	Litter seen in outside areas, trash not separated	0
All Unused Electronics Off	Yes	N/A	4
Accessible Bus Stop	Yes	Not enclosed, but bus service available for students at beginning and end of day	3
Outdoor Area for Students	Yes	Courtyard with tables and garden and large fields	4
Trash Collection System	Yes	Bins present, but recycling (which was marked distinctively) not done properly, trash on ground	2
Extra Features (+1 pt. for sustainable observations, -1 pt. for unsustainable observations)	Yes	Eco-classroom, solar water heating, wildlife area, greenhouse, temporary classrooms, community center attached to school, outdoor areas do need some upkeep	3
		Score	21

School D

Feature	Present?	Description	Score (4 pts)
Recycling Bins	No	Only general rubbish	0
"Turn Off Lights" Signs	No	N/A	0
Bike Racks	Yes	Located in well maintained outside area, bike rack in very good condition, well utilized	4
Sustainability Posters	No		0
Motion Sensor Lights	Yes	Located in all the classrooms and the common spaces	4
All Items Properly Disposed of	No	Did not observe large amounts of litter, however, no items are recycled	2
All Unused Electronics Off	No	Computers left on, projector left on	1
Accessible Bus Stop	Yes	Enclosed on one side, not too far from school, not serviced specifically for the school	2
Outdoor Area for Students	Yes	Several courtyards and outside areas with tables and garden and large fields, ping pong tables for students to play games, very well maintained and new	4
Trash Collection System	Yes	Bins present in outside areas and in the halls, incinerator on site	2
Extra Features (+1 pt. for sustainable observations, -1 pt. for unsustainable observations)	Yes	Great landscape, greenhouses, pond, photocopy and printing stations, no recycling, lots of natural lighting, faculty effort to get kids outside	4
		Score	23

School E

Feature	Present?	Description	Score (4 pts)
Recycling Bins	Yes	Recycling present in every classroom, some halls, and outdoor areas	4
"Turn Off Lights" Signs	No	No sign, turning off lights is promoted through teachings and "Eco-Spies"	2
Bike Racks	Yes	Large number, covered racks, well used	4
Sustainability Posters	Yes	Posters for Eco-Schools and Duke of Edinburgh Award outdoor projects	3
Motion Sensor Lights	No	Timed lights in the hallways. Switches in the classrooms	2
All Items Properly Disposed of	Yes	No litter seen, field was closed because of excessive littering, littering is seen as a serious offense	4
All Unused Electronics Off	Yes	'Eco-spies' catch people who leave things on	3
Accessible Bus Stop	Yes	Public stop, somewhat near the school, not directly designed for student use	2
Outdoor Area for Students	Yes	Well maintained, used and promoted	3
Trash Collection System	Yes	Many bins located all around the school. Litter prevention important to the system	4
Extra Features (+1 pt. for sustainable observations, -1 pt. for unsustainable observations)	Yes	Working to improve building insulation, some portions of the building were older and not yet retro-fitted, push valve taps	1
		Score	32

Overall Observational Analysis Scores for Schools A through E

School	Preliminary Score	Scaled Score
School A	14.00	2
School B	13.00	2
School C	21.00	3
School D	23.00	3
School E	32.00	5

Appendix J: School A Report

School: A, Herefordshire

Conducted by: SDGs in Schools (Joseph Bosco, Kyle Foster, Trang Ha, Emma Travassos) of Worcester Polytechnic Institute, Worcester MA

Date of Visit: 15 March 2018

Introduction

Thank you for participating in the pilot study of our recently developed assessment tool. Before reviewing the numerical results, please keep in mind that these are comparative results; the numerical scores below were generated by weighing your school's results against the other schools analyzed by our team, and not an accurate representation of your school as it compares to the entirety of the educational community of the West Midlands. Numerical scores may seem higher or lower than expected, due to the relatively small initial sample size of five schools analyzed. The written sections, found below, were developed specifically for your school, and are a better reflection of your school's sustainability education and practice.

Our total report, including our background research, methodology, and anonymous overall results, was submitted to the faculty of Worcester Polytechnic Institute, and can be viewed by all on the school's website. If you have any questions about this report or our overall results, please feel free to email us at D18-SDG@wpi.edu.

Findings

Scores are given on a scale of *5-Excellent, 4-Good, 3-Satisfactory, 2-Needs Improvement, 1-Poor*

Section	*Score*
Sustainability implementation	2
Curriculum integration	2
Student understanding of sustainability goals	3
Overall	2

Sustainability Implementation

[This section describes how sustainability has been implemented in observable ways in the school, including through promotion of sustainable actions, access to recycling bins or alternative transportation, and preventing wasted water, fuel, or electricity.]

From the observational analysis completed during the tour of your school, as well as the interviews conducted with faculty members, the sustainability implementation of your school was found to be a '2', when compared *only* to the other schools analyzed in our study. School A is making positive strides in and moving towards excellence in the following areas:

- **Access of bus services to students**
- **Outdoor space for student use**

Many students take advantage of the bus service provided by DRM buses. The student bus stop is secured behind a gate at the entrance of the school and is equipped with an overhead awning as well as benches for students to sit. This bus services reduces the number of students being individually driven to school by their guardians and promotes a culture of using public transportation.

The outdoor space gives students the opportunity to socialize during breaks and after school in a natural area. The space is well maintained and mostly litter free. Large bins are centrally located in this outside area and the member of staff facilitating the tour informed us that students use these bins for their rubbish. The addition of a garden gives students the opportunity to grow plants and flowers to beautify the grounds and learn gardening skills. The garden is a great opportunity to run student driven projects and educate them about growing food and gardening and sourcing food sustainably.

However, the school displayed a need for improvement in the following areas:

- **Recycling**
- **Energy conservation**
- **Promotion of sustainability ideals**

Paper recycling was seen throughout the school as evidenced by bins in the classrooms, but trash is not separated. Therefore, the school is generating a significant amount of plastic and bottle waste. We were informed that trash is supposed to be separated, but this is not the case, and we observed instances of improper separation in the central bins.

In terms of energy conservation, our team observed several unused electronics not properly switched off as well as lights left on in empty classrooms. Additionally, there were no signs encouraging students to switch off the lights if they are the last to leave the classroom. The school is equipped with central printing stations, yet many classrooms have smaller individual printers that are regularly being used. The building as a whole has poor insulation and there is no way to regulate the building's heating. Windows were opened while the heat was running.

Lastly, our team did not observe many efforts to promote sustainability visibly in the school. There were no posters displayed on hallway bulletin boards, nor were there any major clubs with an environmental focus. We were informed that there is a gardening club, and on the day of our visit we observed a school wide campaign to empower women and support gender equality. This campaign aligns nicely with goals of supporting education for gender equality supported by the UN, but concrete efforts to promote an environmentally sustainable lifestyle were not seen. Maintenance of the bike rack was rather poor as well. It was not conveniently located and appeared rusted, worn down and mostly unused. The school could do more to encourage students to bike to school if it is possible for them to do so, though we acknowledge some students may live too far away for this to be a reality.

Curriculum Integration

[This section describes how the school has worked to implement sustainability into the educational curriculum. This integration requires that teachers directly address sustainability topics in the classroom The score factors in challenges faced by educators attempting this effort.]

Sustainability education is only implemented through geography and is not a priority at the school overall. Geography teachers do an excellent job conveying sustainability in class and maintain a uniformity in sustainability education across the classrooms, but they do not necessarily raise interest in students. Currently, the number of students selecting geography for Year 11 has dropped, meaning there is less opportunity for them to spread sustainability education and practices. We were informed that the geography department is administering a survey to students to gather data on why interest in geography is dropping and these results will be used to hopefully improve retention rates.

Student Understanding of Sustainability Goals

[This section describes students' understanding and belief in sustainability goals. A successful sustainable education will provide the students with an understanding of the importance of sustainable lifestyles, and teach them methods to promote and participate in sustainable topics.]

The results from the surveys, administered to 25 students of varying grade level in your school, showed that student understanding of sustainability goals was 'satisfactory' when compared only to the other three schools that returned our survey. Between grade levels and gender groups at School A, no greatly significant difference in sustainability education was seen. However, it should be noted that students surveyed from Year 7 scored the highest amongst the grade levels, while students surveyed from Year 11 scored the lowest. This trend may stem from the lack of geography courses required for older students.

Conclusion and Recommendations

Geography educators interviewed at School A displayed a passion for sustainable education, and a desire to implement it to a greater degree in their department, as well as their entire school. Unfortunately, large barriers such as a lack of time given outside of mandated curriculum and a lack of budgetary support from the school's senior management team hinder the school's ability to improve sustainable education and practice. Perhaps educators could generate interest into the creation of student-run clubs, centering around sustainable ideals. By keeping these clubs student-run, geographers may avoid the issue of time commitment.

Although resolving the school's more major issues of sustainable practice, such as the poorly insulated windows and energy inefficient lighting, would require costly overhauls, there are smaller things a school can do to improve sustainability. These things could include adding small written reminders to turn off lights above switches, or appointing certain students to check that unused electronics remain turned off. These methods were found to be effective in other, more sustainable schools.

Appendix K: School B Report

School: B, Dudley

Conducted by: SDGs in Schools (Joseph Bosco, Kyle Foster, Trang Ha, Emma Travassos) of Worcester Polytechnic Institute, Worcester MA, USA

Date of Visit: 20 March 2018

Introduction

Thank you for participating in the pilot study of our recently developed assessment tool. Before reviewing the numerical results, please keep in mind that these are comparative results; the numerical scores below were generated by weighing your school's results against the other schools analyzed by our team, and not an accurate representation of your school as it compares to the entirety of the educational community of the West Midlands. Numerical scores may seem higher or lower than expected, due to the relatively small initial sample size of five schools analyzed. The written sections, found below, were developed specifically for your school, and are a better reflection of your school's sustainability education and practice.

Our total report, including our background research, methodology, and anonymous overall results, was submitted to the faculty of Worcester Polytechnic Institute, and can be viewed by all on the school's website. If you have any questions about this report or our overall results, please feel free to email us at D18-SDG@wpi.edu.

Findings

Scores are given on a scale of *5-Excellent, 4-Good, 3-Satisfactory, 2-Needs Improvement, 1-Poor*

Section	*Score*
Sustainability implementation	2
Curriculum integration	2
Student understanding of sustainability goals	*N/A*
Overall	2

Sustainability Implementation

[This section describes how sustainability has been implemented in observable ways in the school, including through promotion of sustainable actions, access to recycling bins or alternative transportation, and preventing wasted water, fuel, or electricity.]

From the observational analysis completed during the tour of your school, as well as the interviews conducted with faculty members, the sustainability implementation of your school was found to be '2', when compared *only* to the other schools analyzed in our study. School B is making positive strides in and moving towards excellence various facets of sustainability:

- **Well maintained/used outdoor areas**
- **Motion Sensor lights in hallways**
- **Available Bike Racks**

School B had several outdoor areas, all of which had visual trash collection systems. Additionally, time was allotted in the student schedule to use these areas. In the hallways, an effort to conserve electricity was seen in the usage of motion sensor lights. Although they were not used everywhere, School B was one of the few schools our team analyzed that made use of motion sensor lights at all, which was impressive. Your school also seemed to have a sufficient number of bike racks, which promote the use of alternate, more sustainable transportation methods.

Conversely, the school displayed a need for improvement in the following areas:

- **Recycling issues**
- **Distant public bus stop**
- **Litter seen in halls**
- **Unused electronics seen on**
- **No promotion for sustainable activities seen**

Although many classrooms were seen to have recycling bins, only paper recycling was observed, while some classrooms were seen without bins at all. In the hallways, much un-collected litter was seen, reflecting either a poor outdoor rubbish collection system, or a lack of student willingness to dispose of their rubbish properly.

In some areas of the school, such as the computer lab, several seemingly unused electronics and light fixtures were seen to be on. However, nowhere was promotional material for sustainable action seen. Although this is mostly out of the school's control, the nearest

public bus stop was a bit far for students to use. This may be reflected in the large number of students that are driven to school.

Curriculum Integration

[This section describes how the school has worked to implement sustainability into the educational curriculum. This integration requires that teachers directly address sustainability topics in the classroom The score factors in challenges faced by educators attempting this effort.]

Geography educators interviewed at School B showed a large interest in implementing more sustainable ideals into their curriculum. Some of this is being done - for example, a project is done in Year Seven where students develop a fictional settlement, taking into account these sustainable ideals. However, interviewed educators cited a lack of time allotted in the mandated curriculum as a large barrier to including sustainable education into day to day learning, as well as a lack of funding from senior management to support sustainable learning tools.

Student Understanding of Sustainability Goals

[This section describes students' understanding and belief in sustainability goals. A successful sustainable education will provide the students with an understanding of the importance of sustainable lifestyles, and teach them methods to promote and participate in sustainable topics.]

Unfortunately, our team was not able to collect student surveys from School B in time for analysis. As such, not much can be known about differences in sustainability understanding between grade level and gender in your school. However, from faculty interviews, it was revealed to our team that most students are not observed actively participating in sustainable practices, such as turning off lights or recycling.

Conclusion & Recommendations

Compared to the other schools in our small sample size, with regard to sustainability practice and education, School B 'needs improvement'. Although educators in the geography department display a sizable passion for sustainable education, large barriers such as a lack of time given outside of mandated curriculum and a lack of budgetary support from the school's senior management team hinder them. To combat this, there are a few small things other schools have done that our team believes may be helpful. This may include appointing certain students, on a rotating schedule, to be responsible for ensuring that unused electronics and lighting remain off is an effective way to reduce electricity usage. Some geography departments found additional funding by partnering with their school's science department, sharing their greater STEM (Science, Technology and Engineering) budget. To better engage students in sustainable action, perhaps educators could generate interest into the creation of student-run clubs, centering around sustainable ideals. By keeping these clubs student-run, geographers may avoid the issue of time commitment.

Appendix L: School C Report

School: C, Herefordshire

Conducted by: SDGs in Schools (Joseph Bosco, Kyle Foster, Trang Ha, Emma Travassos) of Worcester Polytechnic Institute, Worcester MA, USA

Date of Visit: 22 March 2018

Introduction

Thank you for participating in the pilot study of our recently developed assessment tool. Before reviewing the numerical results, please keep in mind that these are comparative results; the numerical scores below were generated by weighing your school's results against the other schools analyzed by our team, and not an accurate representation of your school as it compares to the entirety of the educational community of the West Midlands. Numerical scores may seem higher or lower than expected, due to the relatively small initial sample size of five schools analyzed. The written sections, found below, were developed specifically for your school, and are a better reflection of your school's sustainability education and practice.

Our total report, including our background research, methodology, and anonymous overall results, was submitted to the faculty of Worcester Polytechnic Institute, and can be viewed by all on the school's website. If you have any questions about this report or our overall results, please feel free to email us at D18-SDG@wpi.edu.

Findings

Scores are given on a scale of *5-Excellent, 4-Good, 3-Satisfactory, 2-Needs Improvement, 1-Poor*

Section	*Score*
Sustainability implementation	3
Curriculum integration	3
Student understanding of sustainability goals	3
Overall	3

Sustainability Implementation

[This section describes how sustainability has been implemented in observable ways in the school, including through promotion of sustainable actions, access to recycling bins or alternative transportation, and preventing wasted water, fuel, or electricity.]

From the observational analysis completed during the tour of your school, as well as the interviews conducted with faculty members, the sustainability implementation of your school was found to be '3', when compared *only* to the other schools analyzed in our study. School C is making positive strides in and moving towards excellence various facets of sustainability:

- **Access to public transportation**
- **Outdoor spaces for student use**
- **Eco-classroom**
- **Renewable Energy**
- **Community center attached to school**

The local bus service stops right at the school, providing greater student access to more sustainable forms of transportation. The multitude of usable outdoor spaces provides students an opportunity to socialize during breaks in a natural area. The inclusion of a garden gives students the opportunity to grow plants and flowers to beautify the grounds and learn gardening skills, as well as corresponding sustainability ideals. As mentioned by the faculty member giving the tour, many additional gardens are being planned in other outdoor areas around the school. The wildlife area adds to this sustainability education, giving students an opportunity to explore their natural surroundings.

The creation and use of the Eco-classroom is a fantastic example of how School C promotes sustainability ideals in an active way. All of its features, from the orientation of the roof to the materials used to build it support most aspects of sustainability. Similar features seen elsewhere in the school, such as green roofs and the solar water heating used in the kitchen areas, also actively support these aspects.

Conversely, the school displayed a need for improvement in the following areas:

- **Recycling issues**
- **Litter in outdoor areas**
- **Prolonged usage of temporary classrooms**

Although many classrooms were seen to have recycling bins, only paper recycling was observed, while some classrooms were seen without bins at all. In the outdoor areas, much un-collected litter was seen, reflecting either a poor outdoor rubbish collection system, or a lack of student willingness to dispose of their rubbish properly. Additionally, several temporary classrooms were seen on the school ground - our team was told by a faculty member that these facilities, although 'temporary', had been in use for several years, and were not built/maintained with sustainable materials.

Within the Eco-classroom, a few posters concerning its purpose and design were seen. However, our team did not observe any efforts to promote sustainability visibly within the other parts of the school. Although 'turn-off lights' signs were seen in some places, they were small and hard to notice. Additionally, School C made no use of motion sensor lights, a feature becoming more common in other schools in the region.

Curriculum Integration

[This section describes how the school has worked to implement sustainability into the educational curriculum. This integration requires that teachers directly address sustainability topics in the classroom The score factors in challenges faced by educators attempting this effort.]

At School C, it was apparent that the geography department works hard to integrate sustainability ideals into their curriculum. Across departments, the science department also helps, using STEM funding to improve sustainable areas such as the wildlife area. This was impressive to learn, as many schools in the region find it difficult to fund budgetary support for sustainable curriculum integration, as well as being able to spread these ideas between subject departments. However, geography educators plan to improve cross-curriculum mapping as time goes on. Lastly, the recent change in the GCSE material has caused a shift in GCSE preparation curriculum that interviewed faculty members believe is favorable towards sustainability.

Student Understanding of Sustainability Goals

[This section describes students' understanding and belief in sustainability goals. A successful sustainable education will provide the students with an understanding of the importance of sustainable lifestyles, and teach them methods to promote and participate in sustainable topics.]

The results from the surveys, administered to 46 students of Level 9 in your school, showed that student understanding of sustainability goals was 'satisfactory', when compared *only* to the other schools analyzed in our study. Between male and female students, no significant difference was seen in survey results. Because surveys were only administered to one grade level, trends between grade levels at School C could not be analyzed. From faculty interviews, it was revealed to our team that as students progress in grade level, uptake in geography was said to be between 20 and 50 percent. The interviewed geography educator characterized this as 'good' - this percentage was higher than the other schools observed, so our team agrees with this characterization, and believes this reflects a positive student understanding of sustainability ideals at School C.

Conclusion & Recommendations

Although School C may have only received and overall numerical score of '3', our team found your school to very impressively incorporate sustainability into both education and practice. Of the five schools analyzed, School C had the second-highest overall score. The development, design, and effective use of the Eco-Classroom was fantastic, as well as the other energy-efficient features seen throughout your school were excellent and a model for other schools. The enthusiasm of educators in both the geography and science departments is definitely the cause of School C's high geography retention rate.

Although it is understood that a lack of time given outside of mandated curriculum and a lack of budgetary support from the school's senior management team are the main barriers impeding sustainability in education and practice, there are a few things other schools have done that may help yours. For example, appointing certain students, on a rotating schedule, to be responsible for ensuring that unused electronics and lighting remain off is an effective way to reduce electricity usage. Also, to combat excessive littering in outdoors areas, some schools have had success with restricting student usage of these areas if abused with litter.

Overall, sustainability at School C is doing very well, and our team hopes it continues to grow and improve as time goes on.

Appendix M: School D Report

School: D, Worcestershire

Conducted by: SDGs in Schools (Joseph Bosco, Kyle Foster, Trang Ha, Emma Travassos) of Worcester Polytechnic Institute, Worcester MA, USA

Date of Visit: 19 April 2018

Introduction

Thank you for participating in the pilot study of our recently developed assessment tool. Before reviewing the numerical results, please keep in mind that these are comparative results; the numerical scores below were generated by weighing your school's results against the other schools analyzed by our team, and not an accurate representation of your school as it compares to the entirety of the educational community of the West Midlands. Numerical scores may seem higher or lower than expected, due to the relatively small initial sample size of five schools analyzed. The written sections, found below, were developed specifically for your school, and are a better reflection of your school's sustainability education and practice.

Our total report, including our background research, methodology, and anonymous overall results, was submitted to the faculty of Worcester Polytechnic Institute, and can be viewed by all on the school's website. If you have any questions about this report or our overall results, please feel free to email us at D18-SDG@wpi.edu.

Findings

Scores are given on a scale of *5-Excellent, 4-Good, 3-Satisfactory, 2-Needs Improvement, 1-Poor*

Section	*Score*
Sustainability implementation	3
Curriculum integration	2
Student understanding of sustainability goals	*N/A*
Overall	3

Sustainability Implementation

[This section describes how sustainability has been implemented in observable ways in the school, including through promotion of sustainable actions, access to recycling bins or alternative transportation, and preventing wasted water, fuel, or electricity.]

From the observational analysis completed during the tour of your school, as well as the interviews conducted with faculty members, the sustainability implementation of your school was found to be '3'. when compared *only* to the other schools analyzed in our study. School D is making positive strides in and moving towards excellence various facets of sustainability:

- **Outdoor spaces for student use**
- **Motion sensor lights**
- **Bike racks**

The outdoor area is very spacious and well-maintained, encouraging students to spend more time outside. There are several courtyards with tables, as well as a garden and large green fields, which create a beautiful landscape. Recreations such as ping pong tables are also provided in the outdoor area. This provides students with opportunities to socialize and have activities outside such as sporting events or camping in a natural surroundings.

Buildings are recently rebuilt, giving the school the chance to implement sustainable systems such as motion sensor lights and automatic water taps. Bike racks are also new and conveniently located within the school, encouraging students to cycle.

Conversely, the school displayed a need for improvement in the following areas:

- **Recycling litter**
- **Litter in outdoor areas**
- **Promotion of sustainability ideals**

Currently there is no recycling practice at School D. Rubbish is not separated and all goes to general waste. Therefore, the school is generating a significant amount of paper plastic and bottle waste. Additionally, bins are labeled recycling but takes any kind of rubbish, which might be confusing and misleading to students. In the outdoor areas, much un-collected litter was seen, reflecting either a poor outdoor rubbish collection system, or a lack of student willingness to dispose of their rubbish properly.

Our team did not observe many efforts to promote sustainability visibly across the school. There were no posters concerning sustainability displayed on hallway bulletin boards, including geography classroom, nor were there any major clubs with an environmental focus.

Curriculum Integration

[This section describes how the school has worked to implement sustainability into the educational curriculum. This integration requires that teachers directly address sustainability topics in the classroom The score factors in challenges faced by educators attempting this effort.]

At School D, sustainability education is not a priority at the school overall. However, it was apparent that the geography department works hard to integrate sustainability ideals into their curriculum. Across departments, the science and product design disciplines also helps incorporating sustainability ideas into their curriculum. This was impressive to learn, as in many schools in the region geography is the sole subject in charge of covering sustainable development. Geography educators also mention the possibility of improving collaborative work cross-departments in the future.

Student Understanding of Sustainability Goals

[This section describes students' understanding and belief in sustainability goals. A successful sustainable education will provide the students with an understanding of the importance of sustainable lifestyles, and teach them methods to promote and participate in sustainable topics.]

Unfortunately, our team did not receive surveys from School D in time to analyze. Therefore, student understanding of sustainability goals cannot be assessed across gender and student year.

Conclusion & Recommendations

Geography educator interviewed at School D displayed a great interest in integrating sustainable education, as well as expanding the role of the geography department in making a model of a more sustainable community. Unfortunately, large barriers such as a lack of time given to educators and a lack of budgetary support from the school's senior management team hinder the school's ability to improve sustainable education and practice. This school is lacking

in one of the most notable features in sustainable development, a rubbish recycling system, but to fix this situation would require senior management's consensus and costly overhauls.

However, there are things that can perhaps be done at a school-wide level with educators' joint efforts. Educators could generate interest into the creation of student-run clubs, centering around sustainable ideals. By keeping these clubs student-run, geographers may avoid the issue of time commitment. Furthermore, little and easy to implement things to remind students of the importance of sustainability such as posters on the bulletins or inside classroom might also help increase the understanding of sustainability practices in students. More efforts could also be made to promote sustainability practices by taking advantage of the green outdoor area, such as organizing events that focuses on spreading awareness of current environmental issues stemming from unsustainability. Teachers could also have students contribute to improving the natural landscape around the school, such as building a little pond or planting flowers and make a garden. This would not only increase the visual appeal of this area, but also improve students' engagement in sustainability practices.

Appendix N: School E Report

School: E, Worcestershire

Conducted by: SDGs in Schools (Joseph Bosco, Kyle Foster, Trang Ha, Emma Travassos) of Worcester Polytechnic Institute, Worcester MA, USA

Date of Visit: 20 April 2018

Introduction

Thank you for participating in the pilot study of our recently developed assessment tool. Before reviewing the numerical results, please keep in mind that these are comparative results; the numerical scores below were generated by weighing your school's results against the other schools analyzed by our team, and not an accurate representation of your school as it compares to the entirety of the educational community of the West Midlands. Numerical scores may seem higher or lower than expected, due to the relatively small initial sample size of five schools analyzed. The written sections, found below, were developed specifically for your school, and are a better reflection of your school's sustainability education and practice.

Our total report, including our background research, methodology, and anonymous overall results, was submitted to the faculty of Worcester Polytechnic Institute, and can be viewed by all on the school's website. If you have any questions about this report or our overall results, please feel free to email us at D18-SDG@wpi.edu.

Findings

Scores are given on a scale of *5-Excellent, 4-Good, 3-Satisfactory, 2-Needs Improvement, 1-Poor*

Section	Score
Sustainability implementation	5
Curriculum integration	5
Student understanding of sustainability goals	3
Overall	5

Sustainability Implementation

[This section describes how sustainability has been implemented in observable ways in the school, including through promotion of sustainable actions, access to recycling bins or alternative transportation, and preventing wasted water, fuel, or electricity.]

From the observational analysis completed during the tour of your school, as well as the interviews conducted with faculty members, the sustainability implementation of your school was found to be '5', when compared *only* to the other schools analyzed in our study. School E is making positive strides in and moving towards excellence various facets of sustainability:

- **Recycling bins throughout school**
- **Access to public transportation**
- **Well-kept outdoor spaces for student use**
- **Superb bike storage facilities**
- **Push-valve taps**
- **Timed lighting, natural lighting**
- **Working to improve insulation**
- **Posters promoting sustainability clubs, such as Eco-Schools**

As discussed in the interview portion, School E is run out of an older building, in the face of an ever growing student body. From our interviews and observational analysis, it is evident to our team that sustainability is something kept at the forefront of your school's expansion. Your school's many attempts to 'retro-fit' certain sustainable features, such as the push-valve taps and more energy conscious forms of lighting, were successful and showed a commitment to sustainable practices.

School E also appeared to have a commitment to providing students time in their day to go outside, as well as several very well-kept outdoor areas for student usage. The inclusion of trash collection systems in these areas, as the removal of student access to certain areas when misused was very impressive to see. With regard to transportation, your school had a nearby public bus stop, as well as an excellent covered bike rack area.

Within the school, it was also impressive to see a commitment to recycling. Your school was, of the five schools our team visited, the only to have recycling bins seen in all classrooms and hallways, and the only to participate in more than just paper recycling (such as battery recycling). Additionally, your school was the only one in our sample to have an Eco-Club, a

Green Flag Award, and an observable promotion of the clubs and activities related to sustainability.

Conversely, the school displayed a need for a little improvement in the following areas:

- **Insulation and lighting**

As mentioned above, School E seems to be committed to incorporating sustainability practices into their expansion. However, due to the age of the school, certain features have not yet been added, such as better insulated windows and motion lighting. It is understood that these are costly additions, however it is something our team hopes you keep in mind for the future.

Curriculum Integration

[This section describes how the school has worked to implement sustainability into the educational curriculum. This integration requires that teachers directly address sustainability topics in the classroom The score factors in challenges faced by educators attempting this effort.]

The geography educators at School E indicated that school-wide inclusion of sustainability into education was "very good". From our interview with these educators, our team would agree. The geography department appears to take every opportunity to integrate sustainability into the curriculum, such as the recyclable fashion show, "Switch It Off" Week, "eco-spies", the use of interesting topics such as international sustainable efforts, and, most impressively, sustainability topics that relate to Worcester. These positive curricular features are reflected by your school's above-average retention rate in higher-level geography courses, relative to the four other schools analyzed by our team.

Student Understanding of Sustainability Goals

[This section describes students' understanding and belief in sustainability goals. A successful sustainable education will provide the students with an understanding of the importance of sustainable lifestyles, and teach them methods to promote and participate in sustainable topics.]

The results from the surveys, administered to 25 students in your school, showed that student understanding of sustainability goals was 'satisfactory', when compared to only the other schools analyzed. Between male and female student respondents, no significant

difference was seen in survey results. Similarly, no significant difference in results was seen between student respondents of Years 8, 9 and 10. It should be noted that in the other schools analyzed (only two others returned the survey), a slight decline in understanding was seen as students progressed in year level. Your school's lack of a decline shows is most likely a reflection of your school's high geography retention rate, which in turn is a reflection of your geography department's sustainable curriculum integration.

Conclusion & Recommendations

School E had the highest overall score of all five schools analyzed. Although the sample size was small, the sustainable practices and education seen in School E was impressive. The geographers at your school appear to be passionate and determined to instill a sense of sustainability into their pupils. It is our team's hope that this passion is carried into your school's Eco-Club. Through interviews it was disclosed that under new management in recent years, your school's Eco-Club has become less proactive. This Eco-Club, in conjunction with the other sustainability-centered activities, is an important part of encouraging sustainable action in your school, and would be good to maintain the enthusiasm left behind by the club's previous manager. If, by some fortunate turn of events, the geography department finds greater funding, our team would recommend purchasing more geography "props". These learning tools, such as the LifeStraw, really seem to generate student interest in geography and sustainable education.

Appendix O: Guide to Using the Tool

Guide to Using the Tool

This tool was developed by our team for use in secondary schools in the West Midlands region of the United Kingdom. What follows is the composition and scoring guidelines of the assessment tool. This tool can be applied to a variety of school systems and is subject to future revisions.

Section A: Observational Analysis

Introduction
The observational analysis is used to quantify visible instances of positive and negative sustainability actions. A school should be explored thoroughly, either guided by a member of staff or conducted independently if granted permission. Using the provided checklist in Appendix B, features of the school should be recorded based on their presence and degree of usage in the school as well as the quality of maintenance. We caution against a purely numerical assessment, as schools can differ dramatically in terms of size and student population.

Structure
The observational analysis is broken into three parts. These sections are intended to increase the ease of finding and noting sustainable features in each observed school. The first section contains individual instances of sustainability. These items, such as recycling bins or posters promoting sustainability, can be installed with relative ease. The second section, on the other hand, includes systemic features of sustainability. For example, a school may have stops for public bus systems or a large outdoor space for students to utilize. Implementation of these features requires significantly more planning and resources than those of section one. The purpose of the third section is to provide space for any noted features that do not appear in the previous section. It is impossible to predict every possible feature a school may implement to promote sustainability, so part 3 consists of a blank space where any noteworthy features can be added.

Scoring

Results from sections 1 and 2 of the observational analysis are scored on a range of 0-4.

- '0' indicates that the sustainability feature was not present at the school.
- '1' indicates the feature was seen but was poorly maintained or underused
- '2' indicates the feature was seen but the condition and usage was slightly below average
- '3' indicates the feature was seen in acceptable(or average) condition and utilization
- '4' indicates the feature was seen in good condition and was being properly utilized

Section 3 is more freeform than the previous two sections. This section allows the observers to note positive and negative features that fall outside of the predefined criteria. One point was given for each observation that reflected positive sustainable actions, and one point was subtracted for each observance that reflected negative sustainable actions. This total was added to the scores from the first two parts of the observational analysis, creating the overall observational score for each school.

Section B: Faculty Interviews

Introduction

Faculty interviews are conducted with the goal of gaining a deeper understanding of the scope of, and faculty sentiment towards, sustainability education as well as an understanding of topics in the curriculum. It is recommended that at least two faculty members are interviewed and that one of them is the department head of the department that is likely to best incorporate sustainability education. In our case, this was the geography department.

Structure

Faculty interviews should be conducted in a semi-structured format and recorded for later transcription. Questions were developed with the goals of first becoming acquainted with the interviewed faculty members, understanding the ESD practices through the words of those who perpetuate them, and finally determining the faculty's own feelings towards these practices. With this information, potential patterns, shared feelings, and commonly flawed practices may be discovered, thereby indicating possible causes for the decline in ESD. Suggested questions for a faculty interview are supplied in Appendix C.

Scoring

The transcription of the interview should be coded to quantify sustainability trends in each school (i.e. positive, negative, neutral). Instances of a positive trend, suggesting increased ESD support, counts as a single point towards the total interview score. Each instance of a negative trend, on the other hand, removes a point from the score. Neutral does not contribute. Each member of the team should complete this process individually and then compare scores. The team should then go through each identified point and come to a consensus on how it should be scored. For a statement to count as either positive or negative a majority opinion must be had.

Section C: Student Surveys

Introduction

Surveys are used to gain information from students regarding their reception of ESD and sustainability and the impact it has on their lives. This survey is comprised of questions that address three major areas:

- Student reception to sustainability education
- Student participation in 'everyday' sustainable actions (i.e. recycling waste, conserving energy, etc.) and
- Student participation and attitudes towards sustainability and the environment.

The survey administered to students can be found in Appendix D.

Structure

The survey consists mainly of questions asked on a 5 point Likert Scale, asking students their level of agreement with certain statements or asking them to determine how frequently they participate in a stated activity. This was done to exclude the presence of anecdotal evidence and keep all data purely numerical. Demographic information was also collected (age, grade level, and gender). Each school was given 25 surveys, but were free to make additional copies. Ideally, surveys should be administered to an even representation of grade levels and genders.

Scoring

Returned surveys are given a numerical identifier and each numerical response for all questions should be recorded in a spreadsheet. (Note: question 1 asks students to circle a word response. These were later translated to a numerical range (0-4)). All responses are then summed to give a given survey a total score. These total scores are then averaged to give the average survey total for the school. Each question is also given an overall average based on all the surveys and an average by grade level (if applicable). The mode of each response was also recorded.

Section D: Overall Scoring

To generate these scores for the overall assessment:

1) The results from each section (observations, surveys, and interviews) were averaged individually across the schools studied. This average constituted a score of a "3" for each subsection. Raw sectional scores were then scaled using this average to generate sectional scores, and rounded to the nearest whole number to create the scaled sectional scores, which is used in the report.

2) Sectional scores were then averaged for each individual school and similarly rounded to the nearest whole number. This average became the school's overall sustainability score.

How to generate the scores:

$$Sectional\ Score\ = (3 * Raw\ Score) \div Average$$

$$Overall\ Score\ = \frac{Sectional\ Score\ 1 + Sectional\ Score\ 2 + Sectional\ Score\ 3}{3}$$

Scaled Score, for both the sectional and overall scores:

if (score < 1);
     Scaled Score = 1;
else if (score > 5);
     Scaled Score = 5;
else if (1 < score < 5);
     Scaled Score = round(score);