Hey Teacher! We Need More Education: A Study of the Experiences of Irish Young People of Education for Sustainable Development (ESD)

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Hey Teacher! We Need More Education: A Study of the Experiences of Irish Young People of Education for Sustainable Development (ESD)

Carolina Angarita-Cala

A Thesis in the Field of Sustainability
for the Degree of a Master of Liberal Arts in Extension Studies

Harvard University
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Abstract

Education for Sustainable Development (ESD) is an emerging tool that governments around the world are increasingly implementing in their education systems to address the changes that are required for society to transition towards a more sustainable, equitable future. But how effective is the actual implementation of ESD strategies and policies in post-primary schools in leading to knowledge, attitudes, and behaviors supportive of Sustainable Development (SD)? Focusing on Ireland, this study analyzed SD awareness in 18 to 21-year-old young adults. Using a survey as the data collection tool, it categorized demographic variables such as gender, current activity, type of school, school ethos, and age group. Response variables collected measured participants’ level of knowledge, attitudes, and behaviors (KAB) towards SD. Scores in the three KAB areas were standardized to create three corresponding KAB indexes.

The findings in this study agreed with previous research in which self-identified females outperformed those self-identifying as male in all three KAB areas. A multiple regression of knowledge and attitudes on the behavior variable showed that knowledge explained up to 20% of variance of favorable behaviors of SD, with attitudes showing no influence as a predictor of behaviors of SD in the presence of knowledge.

Other findings in this study showed that (i) students who thought that the subject Civic, Social and Political Education (CSPE) and the Green Schools program taught them about SD in school displayed more sustainable behaviors, (ii) young people in university displayed more sustainable behaviors than those in school, and (iii) the behaviors of
young people in the study were influenced by feelings of respect. The latter finding
agreed with previous studies of the KAB of SD in students.

The ultimate goal of this research is to increase the understanding of young
people’s attitudes, knowledge, and behaviors on SD in Ireland to assist government
departments and agencies in the development of future ESD policy so that specific areas
of weakness can be targeted and improved.
Acknowledgements

I would like to dedicate this thesis to my father Jose Antonio and especially to my mother, Maria Dolores, who always believed in me and supported my decision to leave my home country of Colombia almost 14 years ago; to my partner, Jarlath, for his emotional support and for tolerating my incessant questions about English grammar.

I would like to thank my thesis director, Dr. Melody Brown Burkins for her invaluable guidance and words of support, which motivated me throughout the project. I am also greatful to Dr. Mark Leighton whose lectures inspired me to undertake a project involving statistical analysis and for his assistance in the proposal phase.

I owe my deepest thanks to each and everyone who supported me in this endeavor, you know who you are.
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Chapter I
Introduction

A common definition of Sustainable Development (SD) is the ability to meet our present needs without compromising the ability of future generations to meet their own (Brundtland, 1987). Given the importance of education in driving social change (Burns, 2002), a focus on sustainability education programs is key to achieving this goal. This approach is known today as Education for Sustainable Development (ESD): a set of strategies created to reorient education towards the development of the key knowledge, attitudes, and behaviors (KAB) needed for sustainable development (UNESCO, 2013).

In Europe, efforts to introduce ESD into school curricula and learning processes have been widely documented (UNECE, 2015b). However, significant barriers to the implementation and adaptation of ESD strategies remain and, as of today, high-level education and policy commitments to ESD in Europe have yet to materialize. In part, this failure of ESD to take root in the curriculum is probably due to the absence of convincing, evidence-based research that assesses the KAB outcomes of ESD programming and clearly identifies factors for KAB outcome success (Jucker & Mathar, 2015).

Against this background, the development and implementation of well-designed ESD program indicators and monitoring processes, used to measure and assess the progress of ESD programs, will be critical to the future of ESD policy implementation and success (UNECE, 2015b).
Research Significance and Objectives

Implementing Education for Sustainable Development (ESD) programs is an important tool for policymakers to address the changes to KAB required for society to transition towards a more sustainable, equitable future. Efforts to introduce these programs in Europe and the world are well-documented (Jucker & Mathar, 2015; Rieckmann, 2017). However, we do not yet have the data needed to assess whether current ESD programs are actually assisting students to make more sustainable decisions. In the case of Europe, is the knowledge of sustainability and sustainable development learned in ESD programs translating into favorable behaviors advancing SD? In many schools, there is no clear answer to this question given the lack of meaningful assessment data available to support successes claimed for particular ESD programs and strategies. It was the aim of this study to provide insights into the implementation and assessment of ESD strategies in truly changing the knowledge, attitudes, and behavior (KAB) of students regarding sustainable development.

To understand better the positive KAB impact of ESD programs, this study focused on ESD programs in Ireland and developed a survey to collect and analyze data regarding specific sustainable development knowledge, attitudes, and behaviors (KAB) among young people aged 18 to 21 years old. Developed by the study author and distributed to participants by Qualtrics, the survey organized questions into the same “sustainability themes” (e.g., climate change, cultural diversity, consumption) described in the Irish ESD National Implementation Report (UNECE, 2015a) and also requested that respondents self-identify as a preferred gender in case this variable might also be a factor.
The research goal was first and foremost to create a baseline understanding of current ESD programs in Ireland and then to use survey tools to try to understand better the effectiveness of Irish ESD programs in promoting a positive trend in student KAB regarding sustainable development. The following objectives guided the study design:

- To further the understanding of Ireland’s ESD strategy, implementation and results
- To introduce the first baseline measurement of ESD strategy in young people in Ireland
- To provide guidance for Irish policymakers in the development of ESD policy and practice, and in this vein, to add to the body of research on ESD currently being developed in Europe and the world

**Background**

Environmental education (EE) has underpinned the basic understanding of sustainability in the education process since the publication of Wilbur Jackman’s Nature Study for the Common Schools in 1891 (Stevenson, 2007). Over time, this concept has evolved to include aspects of environmental, social, and economic responsibility, which are critical for the achievement of sustainable development (SD). Education for Sustainable Development is considered a key outcome of the Rio Earth Summit held in 1992 (UNESCO, 2015). Over the subsequent years, ESD has continued to evolve, with much research being conducted on the subject (Jucker & Mathar, 2015).

In 2005, the United Nations Educational, Scientific and Cultural Organization (UNESCO) launched the UN Decade for Education for Sustainable Development
(DESD), an all-encompassing initiative to promote and encourage the principles of sustainability in all aspects of education. The UN DESD helped to coordinate efforts around the world for the introduction of policies and strategies to establish and encourage learning processes that support sustainable development. Many governments, companies and UN agencies are increasingly emphasizing the importance of learning and of building capacity to search for solutions to the sustainability challenges of our time, including climate change, disaster risk management, biodiversity loss, and sustainable production and consumption (Wals, 2012). In September 2015, world leaders adopted the 17 United Nations Sustainable Development Goals (United Nations, 2015). The SDGs constitute an ambitious agenda to be achieved by 2030 to address climate change and environmental protection, and also to deal with social inequalities, a vital component in the achievement of sustainable development. ESD plays a crucial role in the achievement of these goals.

Education for Sustainable Development in Europe

Over the past decade, European nations have attempted to introduce policies, strategies and changes in curricula in order to integrate and address aspects of Education for Sustainable Development (ESD). Compelling examples can be drawn from Germany, France, Norway, and the UK, where ESD has made good progress (Jucker & Mathar, 2015). A strong emphasis is placed on the power of collaborative research models, cross-stakeholder solutions, and support and rewards systems for ESD. In fact, there is a strong correlation between pupils’ learning outcomes and the level of collaboration with outside stakeholders (Jucker & Mathar, 2015). In these cases, a strong national strategy on ESD, coupled with sound programs for training, a national ESD website, and ESD evaluations
in schools have emerged as a winning formula for ESD implementation. In some cases, good ESD implementation in schools has been shown to increase the overall quality of education.

ESD implementation in Europe has also encountered obstacles; the pressure to focus on literacy, numeracy, and information and communications technology (ICT) diverts resources needed for ESD projects, while many ESD projects struggle to break out of specific boxes, such as natural sciences (Jucker & Mathar, 2015). A perceived lack of understanding of ESD by teachers and head teachers has also emerged as a challenge to be addressed in schools at a local level. In general, there is a strong indication that a key obstacle to good ESD implementation lies in the lack of vertical integration or feedback loops from ESD experiences at a local level into national educational policymaking (Jucker & Mathar, 2015).

Overall, the experience of other European nations with ESD shows that even though there are national policies supporting ESD frameworks, these policies do not always translate into meaningful ESD performance in individual schools, particularly if the national guidance is not customized to local school needs (or “localized”) and supported by an enforced system of ESD performance reporting and evaluation.

UNECE (United Nations Economic Commission for Europe) Strategy for ESD

The main purpose of the UNECE Strategy for ESD is to ensure that policies and regulatory and operational frameworks are developed by European countries and Canada to support ESD. In turn, the UNECE monitors the progress of the implementation of ESD strategies, thereby providing data for other countries to emulate and helping them to
move forward (UNECE, 2015a). Monitoring the implementation of ESD strategies by the UNECE has undergone three phases, with the first phase having member countries begin to report their ESD progress in 2007. A second phase of ESD progress reporting occurred in 2010 and the most recent phase of reporting occurred in 2015. However, Ireland only submitted its first formal report of national progress on the implementation of its ESD strategy in 2015 after publishing its National Strategy on Education for Sustainable Development in 2014. As such, Ireland’s implementation of ESD strategies is still at a relatively early stage, almost seven years behind other European nations (UNECE, 2015a).

Education for Sustainable Development in Ireland

At present, ESD is addressed in Irish post primary schools through curriculum subjects such as Environmental and Social Studies (ESS), Politics and Society, Social, Personal and Health Education (SPHE) and Civic Social and Political Education (CSPE). CSPE is examined at Common Level, the most basic assessment level, and it is part of the Junior Certificate, which is the State examination taken at the end of the third year of post-primary education. CSPE aims to develop analytical and communication skills in children regarding aspects of citizenship at the individual, community, and State level (National Council for Curriculum and Assessment, 2018a). Politics and Society was introduced into the curriculum in 2016 as a continuation of CSPE in the senior cycle, which is the last two years of post-primary school. It addresses directly issues related to KAB for SD, such as active citizenship, human rights, and the power of decision making (National Council for Curriculum and Assessment, 2018b). This is the most evident
change in the curriculum to address ESD and it was made available to 41 schools in Ireland as a State Examination subject, with the first students taking the exam in June 2018 (State Examinations Commission, 2018). These schools will be in a position to provide a baseline measurement of ESD progress in Ireland in the future.

ESD is also supported in secondary schools through co-curricular activities, which support understanding of SD, and government-supported initiatives such as Green Schools Ireland (UNECE, 2015a). Voluntary initiatives, such as Green Schools Ireland (An Taisce, 2018) complement the curriculum by promoting the conservation and preservation of the environment among students.

In 2014, Ireland’s first National Strategy on Education for Sustainable Development was published. This most compelling commitment of the Irish government to ESD to date was prepared by the Department of Education and Skills in consultation with stakeholders. It is strongly influenced by the UN Decade for Education for Sustainable Development and the national strategy on sustainable development, Our Sustainable Future – A Framework for Sustainable Development in Ireland (Department of Communications, Climate Action & Environment, 2012). The latter is the Irish government’s overarching framework on sustainable development for the Irish economy. A key area of concern highlighted in the ESD strategy was the need for data collection and baseline measurement, which can enable the setting of targets or measures of progress (Department of Education and Skills, 2014). This study can assist the Department of Education and Skills in the assessment of students’ knowledge, attitudes, and behaviors (KAB) after taking ESD courses and participating in related initiatives to better assess ESD effectiveness.
Ireland’s Report on the Implementation of the UNECE Strategy for ESD

In 2015, Ireland reported for the first time on the progress made in implementing the country’s ESD strategy (UNECE, 2015a). The report implied that there has been some level of measurement of ESD through the so-called Life Skills survey, the results of which are available to the public (Department of Education and Skills, 2015). However, the survey did not report on how ESD was translating into the knowledge, attitudes, and behaviors (KAB) of SD in children. Instead, the report gave details on the extent to which ESD is being implemented in schools. For example, 76% of post primary schools in the survey said students are given the knowledge, skills, and dispositions required to make sustainable choices (Department of Education and Skills, 2015). However, whether this is actually affecting students’ behaviors cannot be ascertained. There was no list of common indicators to measure the ESD program success and/or positive implementation of sustainable development initiatives and policies after student ESD program participation. Although post-primary schools were well represented in the 2015 survey with a response rate of 30% (with a margin of error of 5%), this was nonetheless considerably lower than that the 52% registered in 2012 (Department of Education and Skills, 2015). This was the first time the Life Skills survey had included ESD topics in the questionnaire, and the disengagement by post-primary schools in the 2015 survey emerges as an impediment to the monitoring and evaluation of ESD efforts. How post-primary schools engage in the next Life Skills survey should be monitored and addressed as an indicator of ESD implementation.

Ireland’s first report on the UNECE Strategy for ESD did, however, explicitly
highlight the teaching of sustainability across themes, including climate change, corporate social responsibility, production and/or consumption patterns, and environmental protection. This same thematic framework was adopted for the survey of student ESD knowledge in this study.

Measuring Knowledge of, Attitudes, and Behaviors (KAB) towards SD

An extensive body of research suggests governments and agencies around the world are developing strategies and programs for the integration of ESD in the educational system. However, whether ESD is having the desired effect on youth remains inconclusive and has been the subject of a number of studies aimed at developing tools to measure favorable attitudes and behaviors towards SD in students. Different theoretical backgrounds have informed these studies. The New Environmental Paradigm (NEP) encompasses what are probably the most widely used measures of environmental beliefs. It includes 12 items measured on a Likert scale, a rating scale whose items are typically summed or averaged to produce a more reliable measure than could be obtained by use of a single item (Lavrakas, 2008). The NEP 12-item Likert scale focused on three crucial aspects: (1) the existence of ecological limits to growth, (2) the importance of maintaining the balance of nature, and (3) the rejection of the anthropocentric notion that nature exists primarily for human use (Dunlap & Liere, 1978). Since its introduction in 1978, the NEP scale has continued to evolve to broaden the scale’s content beyond just the environment and, in 1990, both the scale and NEP acronym were rebranded as the New Ecological Paradigm (Dunlap, Liere, Mertig, & Jones, 2000).
The NEP scale remains at the core of many other theoretical frameworks concerned with measuring environmental attitudes. The Value-Belief-Norm (VBN) theory evaluates the relationship between environmental concern and behavior, whereby normative factors and personal values and beliefs – which include those described in the NEP scale, can influence behavior (Stern, Dietz, Abel, Guagnano, & Kalof, 1999). A recent study of the VBN theory model for predicting sustainable behaviors among college students argued that education can alter attitudes, but not always change behaviors. A key driver of this discrepancy relates to how knowledge is imparted to students (Whitley, Takahashi, Zwickle, Besley, & Lertpratchya, 2017).

While both NEP and VBN theory have been widely applied in many studies to examine critical environmental behaviors, other key aspects of SD such as equality, poverty, democracy, and quality of life (UNESCO, 2005) are not directly measured by the NEP and VBN theory approaches. To better address and assess these issues, which are core to SD, Michalos et al. (2015) developed a scale to measure tenth grade students’ knowledge, attitudes, and behaviors (KAB) concerning sustainable development using the formal UNESCO SD concepts. This scale was developed after research was undertaken to survey a cohort of tenth grade students in Manitoba, Canada, specifically to test the hypothesis that knowledge and favorable attitudes towards SD lead to favorable behaviors (Michalos et al., 2015). To this end, the study developed three separate indexes for the three parts of KAB – one to assess student knowledge, one for favorable attitudes, and one for behaviors. On their questionnaires, students were asked to indicate their level of agreement or disagreement with each question on a Likert scale ranging from strongly agree (1), agree (2), neutral (3), disagree (4) to strongly disagree (5). Answers ranking
between 1 and 2 were considered as indicative of a respondent’s knowledge being consistent with themes regarded as necessary and or favorable for SD (Michalos et al., 2015). Students were also given the option to respond “don’t know”, which also gave a good indication of students’ knowledge of SD. The results indicated that students showed a better knowledge of environmental and social issues than of aspects of SD such as economic equity. Moreover, knowledge of SD and favorable attitudes did not seem to translate into sustainable behaviors, with only 25% of the variation of the favorable behavior index scores being accounted for by the knowledge and attitudes indexes (Michalos et al., 2015).

The challenge of assessing young people’s response to ESD as it leads to positive KAB includes recognizing that there may be other variables that influence the KAB response of young people. For example, a study based on the assessment by Michalos et al. (2015) found that students identifying as female in Swedish post-primary schools seemed to perform better on the KAB aspects of SD than their self-identified male counterparts (Olsson & Gericke, 2017). The same study found that this gender gap widened in post-primary schools offering ESD. However, an earlier study by Olsson et al. found students from post-primary schools offering ESD seeming to score lower on KAB aspects of SD than students from schools not offering ESD (Olsson, Gericke, & Rundgren, 2016). While the reasons for this anomaly are not apparent in the study, Olsson et al. (2016) suggested the underperformance of schools offering ESD may have been due to ESD being taught using a normative approach (e.g., based only on scientific knowledge), rather than a transformative one, which calls for critical thinking,
participatory decision-making, value-based learning, and social learning (Pauw, Gericke, Olsson, & Berglund, 2015).

Research Questions, Hypotheses and Specific Aims

The most recent National Implementation Report submitted by Ireland on the UNECE Strategy for Education for Sustainable Development confirms that a broad range of SD topics are currently being addressed in children’s education (UNECE, 2015a). With this in mind, my research asked the following questions: Is education for sustainable development in Ireland leading to sustainable attitudes and behaviors in young people? Are there influential factors, such as demographic factors, influencing knowledge, attitudes, and SD behaviors in Irish young people?

Consequently, the hypotheses that this study examined are:

- Self-identified female young people have better knowledge of SD and display more favorable attitudes and behaviors towards SD than their male counterparts.
- Knowledge of SD leads to sustainable attitudes and behaviors in Irish young people.

The specific aims of this research were to (i) create a survey instrument with questions about knowledge, attitudes, and behaviors (KAB) towards SD, based on the previous work by Michalos et al. (2015), and to (ii) analyze relationships between independent categorical variables (gender, type of school, etc.) and dependent continuous variables (indexes of young people’s KAB of SD) in order to ascertain what can influence KAB of SD in Irish young people.
Chapter II
Methods

An online survey was chosen as the preferred method to collect the demographic and KAB factors of SD in young people between the ages of 18 to 21 years in Ireland. Extensive research determined that this is the first time that data of this kind was collected in the Irish educational system.

Survey Design

Recognizing the value of using a peer-reviewed, validated survey design for new research (Robson, 2002), the survey instrument for this study was based to a great extent on the work by Michalos et al. (2015) in which knowledge, attitudes, and behaviors (KAB) of ESD were measured in tenth grade students in Manitoba, Canada. For over ten years, Michalos et al. continued to develop their survey instrument in order to increase its reliability in ascertaining the extent to which knowledge of ESD leads to favorable behaviors. Manitoba is seen as a successful story of integrating ESD into schools curricula (Rieckmann, 2017), and the methodology by Michalos et al. (2015) provided the Government of Manitoba with the groundwork for this success. By deploying the methodology of Michalos et al. (2015), this research intended to provide further validation or otherwise of this approach.

Following the survey design and methods of Michalos et al (2015), this study was distributed to participants using the Qualtrics platform, a commercial, online survey tool,
with digital survey design facilitated by Harvard University Information Technology (HUIT). The first section of the survey was designed to collect a number of demographic variables for participants such as gender, identity, age, occupation, and also information about their post-primary school, such as the ethos and whether it was a fee-paying or non-fee-paying school. There were also specific questions regarding respondents’ experience of subjects and activities that currently address SD in Irish post-primary schools. The questions in the survey followed sustainability themes that Ireland’s first report to the UNECE Strategy for ESD explicitly highlighted as being taught in Irish schools (UNECE, 2015a, p. 35).

The predictor variables used in this study were:

- Gender: Respondents were given the option to select between male, female, and gender non-conforming. Only 10 respondents selected gender non-conforming and these were not included in the analysis.
- Age: options ranged between the ages of 18 and 21.
- Graduation year: respondents were asked whether they graduated in 2017 or would graduate in 2018, in order to identify the youngest cohort with a more recent experience of SD in post-primary school.
- Occupation: options ranged between college student, secondary school student, and not attending college or school.
- Post-primary school ethos: Options given were: Catholic, Church of Ireland (Protestant), inter-denominational, multi-denominational, Quaker, Jewish, and Methodist. This variable was further grouped into Catholic and non-Catholic
schools for the analysis of the influence of the Catholic ethos on ESD, as Ireland is a predominately Catholic country.

- Type of school: respondents were asked to select between fee-paying and non-fee-paying schools. Those who answered “don’t know” were not included in the analysis.

- Green Schools in ESD: respondents were asked whether they thought the Green School Program in school taught them about sustainable development. As this is an extra-curricular activity, respondents were given the choice to respond that they did not know about the Green Schools program.

- CSPE in ESD: respondents were asked whether they thought CSPE was relevant to ESD. CSPE is the subject in the curriculum of all Irish schools that addresses sustainable development.

- Time dedicated to CSPE: respondents were asked whether time allocated for CSPE should be increased, reduced, or stay the same. This extended the assessment of the respondents’ engagement with CSPE.

The second section of the survey was grouped into three questionnaires, each with a set of Likert-type questions to evaluate more specifically a participant’s score for KAB, breaking out scores for knowledge, attitudes, and behaviors towards issues of SD. These questions asked respondents to confirm to what degree they agreed with a statement: 1 for strongly agree, 2 for agree, 3 for neither agree nor disagree, 4 for disagree, and 5 for strongly disagree. In the knowledge questionnaire, respondents were also given the option to select “don’t know”. While scale responses from 1 to 5 give an indication of a respondent’s level of agreement or otherwise, answering “don’t know” to a question
indicates that the participant did not know how to respond to the question and was thus given a zero score (Michalos et al., 2015). Both the attitudes and behaviors questionnaires followed much the same wording as in the methodology used by Michalos et al. (2015) with only minor changes such as adapting words to an Irish context. The knowledge questionnaire was also slightly amended, shortening the Michalos et al. version in order to make the length similar to that of the attitudes and behaviors questionnaires. More specifically, three questions were removed from the original knowledge questionnaire in Michalos et al. (2015): one regarding the environment, one regarding society, and one regarding the economy. The removal was not expected to change the outcome significantly or affect the ability to compare the data to those of Michalos et al., as the assessment of the alpha coefficient in each index will indicate later in this study.

In total, the knowledge, attitudes, and behaviors (KAB) questionnaires contained 18, 15, and 16 questions respectively. In addition, an open question at the end of the survey asked respondents to give feedback about their experience of ESD. Full details of the survey are listed in Appendix 1.

Ethical Conduct of Human Research

Prior to launching this survey of human research subjects, the survey design and research protocols for this study were subject to full review by the Harvard Committee on the Use of Human Subjects (CUHS), the University’s Institutional Review Board (IRB). The study submission met the criteria for Exempt Review on the basis that the respondents recruited in this study were aged 18 or older, voluntary consent was always
sought, the study did not collect any personal data, and the study posed no more than a minimal risk to participants.

Sample Size

Table 1 shows the total population in the age group 18–21 in Ireland according to the most recent Census in 2016. Using the Survey Monkey online tool for sample size calculation (Survey Monkey, 2018), with a population total of 229,600, a confidence level of 95% and a margin of error of 5%, the online tool determined a sample size of 384, which is below the actual sample size in this study (N = 461).

Table 1. Population in Ireland by gender in 2016 (Central Statistics Office, 2016).

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<tr>
<th>State Both genders</th>
<th>2016</th>
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<tbody>
<tr>
<td>18 years</td>
<td>61,294</td>
</tr>
<tr>
<td>19 years</td>
<td>57,572</td>
</tr>
<tr>
<td>20 years</td>
<td>56,337</td>
</tr>
<tr>
<td>21 years</td>
<td>54,397</td>
</tr>
<tr>
<td>Total</td>
<td>229,600</td>
</tr>
</tbody>
</table>

Distribution and Barriers to Completing the Survey

This study encountered a series of difficulties during data collection. This section outlines these complications, so they can be avoided in future research in this field in Ireland. For the recruitment of participants, a 5-minute video using Apple’s iMovie, was created to give participants a short introduction to the survey, to indicate what would be expected from their participation, and to state why their collaboration was so important in
this study. The video and a link to the survey were available through a Facebook page created for this study, called “Sustainable Development Ireland” (Facebook, 2018). Subsequent advertisements on Facebook targeted at youth in Ireland between the ages of 18 and 21 were produced. Although the page received almost 500 visits, it was not successful in recruiting respondents for the survey.

Further, I engaged with all the universities and institutes of technology in Ireland, 28 in total, and provided a letter signed by the Department of Education supporting this research (see Appendix I for details). I sought to persuade the universities to participate in the study by emphasizing the importance of collaboration in education and research. All the universities either declined to participate or failed to respond. Of those that did respond, there was an inherent preference for circulation of their own surveys and research material. To connect with the students directly, I contacted the student unions through their Facebook pages. The few student unions that responded to this contact advised that a financial incentive should be offered for survey participation.

Ultimately, a decision was made that the best way forward would be to incur the expense of assigning the data collection to a specialist firm and a request was made for this service to the online survey provider, Qualtrics. This provider has been used for several other social science research surveys for Harvard Extension and has met requirements for transparency and quality. Once their services were procured, Qualtrics made sure respondents took enough time to respond to the survey by determining the median length of time the survey took to complete (10 minutes), removing responses that took considerably less time than the median and that were not expected to alter results significantly (see further explanation under Avoiding Response Bias in Survey Response).
I funded the cost of the data collection and carried it out in two stages. The first data collection began on March 26, 2018, and the second on April 16, 2018. Data collection ended on May 1, 2018. All respondents were only eligible to take the survey if they had finished or been in the process of finishing post-primary school in Ireland and had to be 18 or older to complete the survey. Respondents received a monetary incentive for their participation.

Avoiding Response Bias in Survey Response

A common response bias during survey sampling is the respondent’s intentional or unintentional propensity to present a desirable image of the self to others, resulting in the underreporting of unfavorable attitudes or behaviors (Paulhus, 1991). In particular, this has been found to be more prominent in younger respondents who, for example, may want to please the researcher (Tellis & Chandrasekaran, 2010). To reduce this form of bias, all contact between the lead researcher and respondents was avoided throughout the study. Moreover, participants were given the freedom to answer the survey from a location of their choice, as opposed to a controlled environment such as a classroom.

A further method to control for response bias was to include questions that were negatively worded. This helps to create the conditions for respondents to use more cognitive processes, whereby they would take more time to think about their answers, as opposed to automatic processes, where answers might not be thought through (Podsakoff, MacKenzie, Lee, & Podsakoff, 2003). In these cases, the usual Likert scale for both the attitude and behavior questionnaires were reverse-coded so that higher values would
indicate a more favorable attitude/behavior towards SD. The knowledge questionnaire did not have reverse-coded questions.

Lastly, as it is difficult to distinguish whether an extreme rating in the Likert scale indicates a strong opinion or a tendency to use the extremities of the scale (Paulhus, 1991), the last question in the survey asked respondents for comments that could help support their responses. For example, in cases where a respondent had a tendency towards strongly agreeing in the scale, such a person also felt inclined to leave a strong message supporting SD.

Statistical Analysis

Respondents’ data collected in this study were analyzed using IBM’s SPSS Statistics GradPack version 25, with each individual KAB questionnaire analyzed using descriptive statistics. To follow the approach of Michalos et al. (2015), the mean values in each of the questions were assessed as a summary measure of favorable and unfavorable responses.

The next step was to create three indexes for the KAB questionnaires to generate three unified measures of knowledge of, favorable attitudes and behaviors towards SD. These three response variables were calculated by summing the scores of each respondent for each of the three questionnaires. To assess the reliability of each index, a well-known statistical “reliability coefficient” (Cronbach’s alpha coefficient) was calculated using the following equation:

$$\frac{k}{k - 1} \left( 1 - \frac{\sum_i s_i^2}{s_t^2} \right)$$
where k is the number of items (or survey questions), $s_i^2$ is the variance of scores on item i and $s_t^2$ is the variance of total test scores (Lavrakas, 2008). The alpha coefficient ranges between 0 and 1, with coefficients above 0.70 regarded as satisfactory, and those above 0.80 as relatively high (Michalos et al., 2015). In this study, the higher the alpha coefficient, the more likely each survey question is to measure knowledge of, and attitudes and behaviors towards SD. Correlations were also calculated across all three indexes in this study to see how well each item in each indexed questionnaire correlated to the corresponding index.

To test the null hypotheses for this type of statistical data, a t-test is generally used. T-tests assume the normality of the data; however, when the normality assumption is not satisfied, parametric statistical methods might provide misleading results (Lavrakas, 2008). Therefore, I ran a test to determine whether the data in the study followed a normal distribution. The normality test was done specifically for the gender variable and was checked using the Shapiro-Wilk W test, which is based on the correlation between the data and the corresponding normal scores, and is the preferred choice of researchers for testing for normality (Ghasemi & Zahediasl, 2012). The Shapiro-Wilk W test indicated that the data in the study deviates from a normal distribution, with the p-value less than 0.05 (see table 8 in Chapter III). This study also used nonparametric statistics to confirm the statistical significance of the findings. Although parametric tests are considered to have more statistical power, nonparametric tests can perform well with non-normal continuous data if the sample is sufficiently large (Lavrakas, 2008).
Two nonparametric tests, the Mann Whitney U test and the Kruskal-Wallis H test, were conducted to determine whether there were any significant differences between 2 or more group medians (Lavrakas, 2008). In this study, these nonparametric tests met the following assumptions that: (i) the data does not follow a normal distribution, (ii) the response variables of knowledge, attitudes and behaviors (KAB) are measured at the continuous level, (iii) demographic predictor variables are made up of categorical, independent groups, and (iv) observations within each group are independent and do not participate in more than one group (Beatty, 2018).

After confirming that the data met these four assumptions, I ran a Mann Whitney U test for the KAB indexes on the demographic variables of gender, age group, school ethos, school type, year of graduation, and CSPE in ESD. For predictor variables with three or more independent groups, such as time dedicated to CSPE, Green Schools in ESD, occupation and age group, the Kruskal-Wallis H test was run.

Finally, quantifying the strength of the association between the KAB indexes was achieved through calculation of Spearman’s correlation coefficient (Lavrakas, 2008). This calculation was followed by a regression analysis to test the hypothesis that knowledge of SD and favorable attitudes towards SD lead to favorable behaviors of SD, based on the regression equation

\[ Y = a + b_1X_1 + b_2X_2 + \ldots \]

where \( Y \), the dependent variable, is favorable behaviors of SD, \( a \) is the intercept (or the value of \( Y \) when \( X = 0 \)), \( X_1 \) and \( X_2 \) are knowledge of and favorable attitudes of SD (independent variables), and \( b_1 \) and \( b_2 \) are the coefficients describing the effect that the independent variables have on the dependent variable \( Y \).
Testing Mediation with Regression Analysis

Mediation analysis is used to clarify the different ways in which conceptual variables may account for differences in people’s behaviors (Baron & Kenny, 1986). This study considered how the variable of knowledge (K) affects a second variable – attitudes (A), which, in turn, affects a third variable – behaviors (B). The intervening variable, knowledge, is the mediator. It “mediates” the relationship between predictor attitudes and response behaviors. The mediational effect, in which attitudes lead to behaviors through knowledge, is called the indirect effect. The indirect effect represents the portion of the relationship between attitudes and behaviors that is mediated by knowledge.

Figure 1. Mediation model based on Baron and Kenny (1986) method.

Baron and Kenny (1986) proposed a four-step approach in which several regression analyses are conducted, and the significance of the coefficients is examined at each step:

1. Conduct a simple regression analysis with attitudes (A) predicting behaviors (B).
2. Conduct a simple regression analysis with attitudes (A) predicting knowledge (K).
3. Conduct a simple regression analysis with knowledge (K) predicting behaviors (B).

4. Conduct a multiple regression analysis with K and A predicting B.

The first three steps will establish that relationships among the variables exist. If one or more of these relationships are non-significant, mediation is unlikely. However, if there are significant relationships identified in the first three models, step 4 should be performed, where some form of mediation is assumed and K remains significant. If A is no longer significant, the finding supports full mediation. If both A and K significantly predict B, the finding supports partial mediation.

Additional Analysis

A qualitative analysis of the feedback question in the survey was conducted in order to find patterns and repetitions that could add a further layer of understanding to this study.
Chapter III

Results

This section will present the statistical output generated on SPSS for this study. Both descriptive and inferential statistics are presented, as well as a qualitative analysis of the data. In total, 461 completed surveys were received for this study (N = 461). A survey was considered to be completed only if respondents reached the end of the survey and filled in responses to questions in the final questionnaire (the Behaviors Questionnaire). However, though N for completed surveys is 461, the sample size varies between the three KAB questionnaires. The sample size was slightly larger for the Knowledge Questionnaire (N = 479) and the Attitudes Questionnaire (N = 469) than when the Behaviors Questionnaire was included. The number of valid entries for the Knowledge Questionnaire also varies, as it was the only questionnaire where respondents actually skipped some questions.

Descriptive Statistics for the Three KAB Questionnaires

Respondents’ answers to the KAB questionnaires are split into three tables – Tables 2, 4, and 5 below – showing the mean values respondents replied to specific questions on a scale from 1 to 5, with mean values closer to 1 suggesting greater alignment with knowledge, attitudes, and/or behaviors supportive of SD. Each table groups the “strongly agree” and “agree” answers into one category, and “strongly disagree” and “disagree” into another category. “Neither disagree nor agree” is listed
separately and considered a middle point where respondents did not take a position on the matter. In order to compare the three KAB questionnaires consistently, the option “don’t know”, which was only available in the Knowledge Questionnaire, was reviewed separately in Table 3 and was given zero points on the Knowledge Questionnaire.

Results of Knowledge Questionnaire

The results of the Knowledge Questionnaire are shown in Table 2, below, with the lowest mean score (i.e., most favorable response for SD) recorded in relation to the statements “human actions are contributing to changes in our atmosphere and climate systems” and “improving people’s opportunities for long and healthy lives contributes to SD”.

In contrast, the statement “aspects of SD were taught in my school”, recorded the highest mean (i.e., the least favorable response for SD), with a relatively high proportion of respondents (14.3%) disagreeing, or strongly disagreeing with this statement. The second highest mean was recorded for the statement “gender equality is important to SD” with 23% not taking a stand on the matter. The range of the means in the Knowledge Questionnaire was 0.65, meaning that there was a relatively narrow variation in the responses from the Knowledge Questionnaire when compared to the Attitudes (1.54) and Behaviors (1.50) Questionnaires.
Table 2. List of survey questions and summary of responses on Knowledge (K) Questionnaire ordered by mean score.

<table>
<thead>
<tr>
<th>Survey Question</th>
<th>Mean</th>
<th>% Strongly Agree or Agree</th>
<th>% Strongly Disagree or Disagree</th>
<th>% Neither Agree nor Disagree</th>
<th>N Valid Entries</th>
</tr>
</thead>
<tbody>
<tr>
<td>Human actions are contributing to changes in our atmosphere and climate systems</td>
<td>1.61</td>
<td>84.5</td>
<td>5.3</td>
<td>10.2</td>
<td>471</td>
</tr>
<tr>
<td>Improving people's opportunities for long and healthy lives contributes to SD</td>
<td>1.63</td>
<td>89.1</td>
<td>2.6</td>
<td>8.3</td>
<td>458</td>
</tr>
<tr>
<td>Protecting the environment is necessary for SD</td>
<td>1.68</td>
<td>85.0</td>
<td>5.4</td>
<td>9.6</td>
<td>460</td>
</tr>
<tr>
<td>SD requires access to good quality education for everyone</td>
<td>1.86</td>
<td>78.6</td>
<td>7.9</td>
<td>13.6</td>
<td>471</td>
</tr>
<tr>
<td>Conservation of water is necessary for SD</td>
<td>1.87</td>
<td>77.2</td>
<td>9.7</td>
<td>13.1</td>
<td>464</td>
</tr>
<tr>
<td>SD requires shifting to the use of renewable resources as much as possible</td>
<td>1.88</td>
<td>76.8</td>
<td>9.0</td>
<td>14.2</td>
<td>457</td>
</tr>
<tr>
<td>SD requires acknowledgment of human rights issues and concerns</td>
<td>1.89</td>
<td>79.3</td>
<td>8.5</td>
<td>12.2</td>
<td>460</td>
</tr>
<tr>
<td>SD requires individuals to reduce all kinds of waste</td>
<td>1.91</td>
<td>78.0</td>
<td>8.8</td>
<td>13.1</td>
<td>464</td>
</tr>
<tr>
<td>SD requires businesses to behave responsibly to their employees, customers and suppliers</td>
<td>1.96</td>
<td>74.8</td>
<td>8.0</td>
<td>17.2</td>
<td>465</td>
</tr>
<tr>
<td>Economic development is necessary for SD</td>
<td>1.98</td>
<td>77.1</td>
<td>9.4</td>
<td>13.5</td>
<td>459</td>
</tr>
<tr>
<td>A culture of peace where people settle conflicts by discussion is necessary for SD</td>
<td>1.98</td>
<td>74.5</td>
<td>9.8</td>
<td>15.7</td>
<td>459</td>
</tr>
<tr>
<td>Good citizenship is necessary for SD</td>
<td>2.00</td>
<td>74.8</td>
<td>11.2</td>
<td>14.0</td>
<td>464</td>
</tr>
<tr>
<td>SD requires achieving the United Nations’ Sustainable Development Goals (SDGs)</td>
<td>2.02</td>
<td>73.3</td>
<td>10.6</td>
<td>16.1</td>
<td>442</td>
</tr>
<tr>
<td>SD requires people to reflect on what it means to improve quality of life in general</td>
<td>2.05</td>
<td>70.9</td>
<td>9.9</td>
<td>19.3</td>
<td>467</td>
</tr>
<tr>
<td>Respect for cultural diversity (variety of cultures) is necessary for SD</td>
<td>2.05</td>
<td>71.7</td>
<td>13.3</td>
<td>15.0</td>
<td>460</td>
</tr>
<tr>
<td>The elimination of poverty is necessary for SD</td>
<td>2.06</td>
<td>73.8</td>
<td>10.1</td>
<td>16.1</td>
<td>465</td>
</tr>
<tr>
<td>Gender equality is important to SD</td>
<td>2.10</td>
<td>65.5</td>
<td>11.8</td>
<td>22.7</td>
<td>458</td>
</tr>
<tr>
<td>Aspects of Sustainable Development (SD) were taught in my school</td>
<td>2.26</td>
<td>69.7</td>
<td>14.3</td>
<td>16.0</td>
<td>456</td>
</tr>
</tbody>
</table>

Scale of 1-5, with lower scores suggesting most favorable responses for SD. Format adapted from Michalos et al. (2015).

As mentioned previously, data from “don’t know” answers were removed from the statistical analyses of the mean values of the Knowledge Questionnaire, but the data
was preserved and shown in Table 3 below. It is interesting to note that the statement “SD requires achieving the UN’s Sustainable Development Goals (SDGs)” received the highest number of “don’t know” answers and was also skipped by the most respondents. The next highest number of “don’t know” answers was given for the statement “aspects of SD were taught in my school.” This statement also received the highest mean score (i.e., the least favorable response of SD) (Table 2).

Table 3. List of survey questions on Knowledge Questionnaire answered with “don’t know” and removed from statistical analysis.

<table>
<thead>
<tr>
<th>Survey Question</th>
<th>% Don't Know</th>
<th>N Valid Entries</th>
</tr>
</thead>
<tbody>
<tr>
<td>SD requires achieving the United Nations’ Sustainable Development Goals (SDGs)</td>
<td>7.2</td>
<td>442</td>
</tr>
<tr>
<td>Aspects of Sustainable Development (SD) were taught in my school</td>
<td>4.7</td>
<td>456</td>
</tr>
<tr>
<td>SD requires shifting to the use of renewable resources as much as possible</td>
<td>4.5</td>
<td>457</td>
</tr>
<tr>
<td>Improving people's opportunities for long and healthy lives contributes to SD</td>
<td>4.4</td>
<td>458</td>
</tr>
<tr>
<td>Gender equality is important to SD</td>
<td>4.4</td>
<td>458</td>
</tr>
<tr>
<td>Economic development is necessary for SD</td>
<td>4.2</td>
<td>459</td>
</tr>
<tr>
<td>A culture of peace where people settle conflicts by discussion is necessary for SD</td>
<td>4.2</td>
<td>459</td>
</tr>
<tr>
<td>Protecting the environment is necessary for SD</td>
<td>4.0</td>
<td>460</td>
</tr>
<tr>
<td>Respect for cultural diversity (variety of cultures) is necessary for SD</td>
<td>4.0</td>
<td>460</td>
</tr>
<tr>
<td>SD requires acknowledgment of human rights issues and concerns</td>
<td>4.0</td>
<td>460</td>
</tr>
<tr>
<td>SD requires individuals to reduce all kinds of waste</td>
<td>3.3</td>
<td>464</td>
</tr>
<tr>
<td>Good citizenship is necessary for SD</td>
<td>3.3</td>
<td>464</td>
</tr>
<tr>
<td>Conservation of water is necessary for SD</td>
<td>3.3</td>
<td>464</td>
</tr>
<tr>
<td>The elimination of poverty is necessary for SD</td>
<td>3.1</td>
<td>465</td>
</tr>
<tr>
<td>SD requires businesses to behave responsibly to their employees, customers and suppliers</td>
<td>3.1</td>
<td>465</td>
</tr>
<tr>
<td>SD requires people to reflect on what it means to improve quality of life in general</td>
<td>2.8</td>
<td>467</td>
</tr>
<tr>
<td>Human actions are contributing to changes in our atmosphere and climate systems</td>
<td>2.1</td>
<td>471</td>
</tr>
<tr>
<td>SD requires access to good quality education for everyone</td>
<td>2.1</td>
<td>471</td>
</tr>
</tbody>
</table>

Table format adapted from Michalos et al. (2015).
Results of Attitudes Questionnaire

Interestingly, the topic of ESD seemed a conspicuous theme in the Attitudes Questionnaire (Table 4), with a strong majority of respondents agreeing or strongly agreeing that “every person should receive education that teaches the knowledge, values and skills necessary for sustainable living in a community”. This question also recorded the lowest mean score in the survey (1.40), showing strong positive agreement with the statements about positive attitudes towards sustainability. Similar findings were observed for another statement associated with ESD: “males, females and other gender identities should have equal access to all kinds of education and employment” which recorded a mean score of 1.60. The results also showed that the statement “the present generation should make sure that the next generation can live in communities that are at least as healthy as those that exist today” was among the lowest mean scores (1.54). The range of the means in the Attitudes Questionnaire (1.54) was considerably wider compared to that of the Knowledge Questionnaire, suggesting a more pronounced variation between the answers that were more supportive of SD and those that were not (Table 4).

Results showed that the highest mean scores in the Attitudes Questionnaire were given to statements that were reverse-coded, meaning the respondents disagreed, or strongly disagreed, with a statement. The highest mean score on a reverse-coded statement was for the statement “it is all right to use as much water as we want as long as it is free of charge”, with a significant proportion of respondents (21%) neither agreeing nor disagreeing with it. This was followed by the statement “as long as resources are available, using more than we need now doesn’t threaten the health and welfare of future generations”, with a mean score of 2.87.
Table 4. List of survey questions and summary of responses on Attitudes (A) Questionnaire ordered by mean score.

<table>
<thead>
<tr>
<th>Survey Question</th>
<th>Mean</th>
<th>% Strongly Agree or Agree</th>
<th>% Strongly Disagree or Disagree</th>
<th>% Neither Agree nor Disagree</th>
<th>N Valid Entries</th>
</tr>
</thead>
<tbody>
<tr>
<td>Every person should receive education that teaches the knowledge, values and skills necessary for sustainable living in a community</td>
<td>1.40</td>
<td>93.2</td>
<td>1.9</td>
<td>4.9</td>
<td>469</td>
</tr>
<tr>
<td>The present generation should make sure that the next generation can live in communities that are at least as healthy as those that exist today</td>
<td>1.54</td>
<td>89.8</td>
<td>2.8</td>
<td>7.5</td>
<td>469</td>
</tr>
<tr>
<td>Males, females and other gender identities should have equal access to all kinds of education and employment</td>
<td>1.60</td>
<td>84.2</td>
<td>7.5</td>
<td>8.3</td>
<td>469</td>
</tr>
<tr>
<td>Citizens should be well-informed and actively participate in democratic processes like voting</td>
<td>1.72</td>
<td>82.9</td>
<td>4.9</td>
<td>12.2</td>
<td>469</td>
</tr>
<tr>
<td>It is important to find ways to reduce poverty</td>
<td>1.76</td>
<td>81.4</td>
<td>8.1</td>
<td>10.4</td>
<td>469</td>
</tr>
<tr>
<td>Households tasks should be equally shared among members of the household regardless of gender</td>
<td>1.80</td>
<td>79.7</td>
<td>8.5</td>
<td>11.7</td>
<td>469</td>
</tr>
<tr>
<td>Manufacturers should discourage the use of disposables</td>
<td>1.90</td>
<td>76.3</td>
<td>7.0</td>
<td>16.6</td>
<td>469</td>
</tr>
<tr>
<td>People who pollute our land, air or water should pay for damage to communities and the environment</td>
<td>1.93</td>
<td>76.1</td>
<td>9.6</td>
<td>14.3</td>
<td>469</td>
</tr>
<tr>
<td>Governments should adopt Sustainable Development as a national priority</td>
<td>1.94</td>
<td>76.1</td>
<td>9.0</td>
<td>14.9</td>
<td>469</td>
</tr>
<tr>
<td>Sustainable Development will not be possible until wealthier nations stop exploiting workers in poorer nations</td>
<td>1.98</td>
<td>73.8</td>
<td>9.2</td>
<td>17.1</td>
<td>469</td>
</tr>
<tr>
<td>Use of fuel-efficient vehicles should be encouraged by governments</td>
<td>2.04</td>
<td>71.6</td>
<td>12.8</td>
<td>15.6</td>
<td>469</td>
</tr>
<tr>
<td>Understanding and addressing the problem of climate change is not important - reverse-coded</td>
<td>2.67</td>
<td>37.7</td>
<td>51.8</td>
<td>10.4</td>
<td>469</td>
</tr>
<tr>
<td>We don't need stricter laws and regulations to protect the environment - reverse-coded</td>
<td>2.78</td>
<td>33.9</td>
<td>49.9</td>
<td>16.2</td>
<td>469</td>
</tr>
<tr>
<td>As long as resources are available, using more than we need now doesn't threaten the health and welfare of future generations - reverse-coded</td>
<td>2.87</td>
<td>37.7</td>
<td>45.8</td>
<td>16.4</td>
<td>469</td>
</tr>
<tr>
<td>It is alright to use as much water as we want as long as it is free of charge - reverse-coded</td>
<td>2.94</td>
<td>37.3</td>
<td>42.2</td>
<td>20.5</td>
<td>469</td>
</tr>
</tbody>
</table>

Scale of 1-5, with lower scores suggesting most favorable responses for SD. Format adapted from Michalos et al. (2015).
Results of Behaviors Questionnaire

The Behaviors Questionnaire was characterized by higher means relative to the other two questionnaires – Knowledge and Attitudes – in the survey, which indicates that respondents displayed less favorable behaviors of SD than favorable attitudes and knowledge of SD.

Table 5. List of survey questions and summary of responses on Behaviors (B) Questionnaire ordered by mean score.

<table>
<thead>
<tr>
<th>Survey Question</th>
<th>Mean</th>
<th>% Strongly Agree or Agree</th>
<th>% Strongly Disagree or Disagree</th>
<th>% Neither Agree nor Disagree</th>
<th>N Valid entries</th>
</tr>
</thead>
<tbody>
<tr>
<td>I give the same level of respect to people regardless of their gender identity or age</td>
<td>1.75</td>
<td>80.3</td>
<td>6.9</td>
<td>12.8</td>
<td>461</td>
</tr>
<tr>
<td>When I use the computer or phone for social networking or gaming I always treat everyone as respectfully as I would in person</td>
<td>1.99</td>
<td>75.9</td>
<td>13.2</td>
<td>10.8</td>
<td>461</td>
</tr>
<tr>
<td>At home I recycle as much as I can</td>
<td>2.02</td>
<td>75.7</td>
<td>12.1</td>
<td>12.1</td>
<td>461</td>
</tr>
<tr>
<td>I usually examine problems from many points of view</td>
<td>2.09</td>
<td>72.0</td>
<td>10.8</td>
<td>17.1</td>
<td>461</td>
</tr>
<tr>
<td>I choose to walk or cycle to places instead of using a motor vehicle</td>
<td>2.12</td>
<td>68.3</td>
<td>15.0</td>
<td>16.7</td>
<td>461</td>
</tr>
<tr>
<td>I have thought quite a bit about how to live sustainably</td>
<td>2.22</td>
<td>63.8</td>
<td>12.6</td>
<td>23.6</td>
<td>461</td>
</tr>
<tr>
<td>I try to do things that will help people living in poverty</td>
<td>2.34</td>
<td>58.8</td>
<td>13.7</td>
<td>27.5</td>
<td>461</td>
</tr>
<tr>
<td>I participated in democratic activities related to student life at school</td>
<td>2.45</td>
<td>57.5</td>
<td>20.0</td>
<td>22.6</td>
<td>461</td>
</tr>
<tr>
<td>I try to avoid buying goods from companies with poor track records on caring for their workers or the environment</td>
<td>2.47</td>
<td>54.0</td>
<td>21.0</td>
<td>24.9</td>
<td>461</td>
</tr>
<tr>
<td>I have changed my personal lifestyle to reduce waste</td>
<td>2.57</td>
<td>51.0</td>
<td>23.6</td>
<td>25.4</td>
<td>461</td>
</tr>
<tr>
<td>I always make lifestyle choices that are good for my health</td>
<td>2.60</td>
<td>49.7</td>
<td>26.9</td>
<td>23.4</td>
<td>461</td>
</tr>
<tr>
<td>I pick up litter when I see it in a park or natural area</td>
<td>2.64</td>
<td>46.2</td>
<td>24.9</td>
<td>28.9</td>
<td>461</td>
</tr>
<tr>
<td>I never waste water</td>
<td>2.71</td>
<td>46.0</td>
<td>28.4</td>
<td>25.6</td>
<td>461</td>
</tr>
<tr>
<td>I volunteer to work with local charities or environmental groups</td>
<td>2.76</td>
<td>46.0</td>
<td>33.0</td>
<td>21.0</td>
<td>461</td>
</tr>
<tr>
<td>I do not think about how I might be damaging the natural environment -reverse-coded</td>
<td>2.91</td>
<td>37.1</td>
<td>43.6</td>
<td>19.3</td>
<td>461</td>
</tr>
<tr>
<td>Even when I have the option, I do not always compost -reverse-coded</td>
<td>3.26</td>
<td>49.0</td>
<td>28.6</td>
<td>22.3</td>
<td>461</td>
</tr>
</tbody>
</table>

Scale of 1-5, with lower scores suggesting most favorable responses for SD. Format adapted from Michalos et al. (2015).
As shown in Table 5, above, the lowest mean score (i.e., most favorable of SD) was recorded for the statement “I give the same level of respect to people regardless of their gender identity or age” with 80% of respondents agreeing or strongly agreeing with it. This was followed by the statements “at home I recycle as much as I can,” and “when I use the computer or phone for social networking or gaming I always treat everyone as respectfully as I would in person.”

The highest mean score (i.e., least favorable response of SD) was recorded for the reverse-coded questions, namely, “Even when I have the option I do not always compost” and “I do not think about how I might be damaging the natural environment”. The statements about volunteering for local charities or environmental groups, as well as the correct use of water also recorded high mean scores. The range of the means in the Behavior Questionnaire was 1.50, suggesting a more pronounced variation between the answers that were more supportive of SD and those that were not when compared to the Knowledge Questionnaire, and only a slightly narrower variation when compared to the Attitudes Questionnaire.

Standardized Measures of Knowledge, Attitudes, and Behaviors

Table 6 shows the indexes of KAB for sustainable development, specifically the knowledge of, favorable attitudes towards, and favorable behaviors for SD. The number of samples used in each index, as well as the mean, standard deviation, item total correlations and Cronbach alpha coefficients for correlation reliability are also listed.
Table 6. Indexes of knowledge, attitudes, and behaviors (KAB) and corresponding calculation of Cronbach alpha coefficients, means, standard deviations, and inter-item correlations.

<table>
<thead>
<tr>
<th>Knowledge</th>
<th>Item-total correlation</th>
<th>Attitudes</th>
<th>Item-total correlation</th>
<th>Behaviors</th>
<th>Item-total correlation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Q 1</td>
<td>0.328</td>
<td>0.441</td>
<td>0.295</td>
<td>0.466</td>
<td>0.463</td>
</tr>
<tr>
<td>Q 2</td>
<td>0.549</td>
<td>0.489</td>
<td>0.340</td>
<td>0.434</td>
<td>0.432</td>
</tr>
<tr>
<td>Q 3</td>
<td>0.492</td>
<td>0.371</td>
<td>0.537</td>
<td>0.334</td>
<td>0.416</td>
</tr>
<tr>
<td>Q 4</td>
<td>0.570</td>
<td>0.305</td>
<td>0.451</td>
<td>0.451</td>
<td>0.527</td>
</tr>
<tr>
<td>Q 5</td>
<td>0.487</td>
<td>0.411</td>
<td>0.295</td>
<td>0.347</td>
<td>0.596</td>
</tr>
<tr>
<td>Q 6</td>
<td>0.527</td>
<td>0.537</td>
<td>0.466</td>
<td>0.579</td>
<td>0.527</td>
</tr>
<tr>
<td>Q 7</td>
<td>0.511</td>
<td>0.438</td>
<td>0.466</td>
<td>0.596</td>
<td>0.347</td>
</tr>
<tr>
<td>Q 8</td>
<td>0.480</td>
<td>0.411</td>
<td>0.295</td>
<td>0.347</td>
<td>0.527</td>
</tr>
<tr>
<td>Q 9</td>
<td>0.515</td>
<td>0.295</td>
<td>0.466</td>
<td>0.579</td>
<td>0.347</td>
</tr>
<tr>
<td>Q 10</td>
<td>0.542</td>
<td>0.466</td>
<td>0.563</td>
<td>0.596</td>
<td>0.347</td>
</tr>
<tr>
<td>Q 11</td>
<td>0.532</td>
<td>0.434</td>
<td>0.434</td>
<td>0.579</td>
<td>0.347</td>
</tr>
<tr>
<td>Q 12</td>
<td>0.511</td>
<td>0.434</td>
<td>0.573</td>
<td>0.579</td>
<td>0.347</td>
</tr>
<tr>
<td>Q 13</td>
<td>0.590</td>
<td>0.434</td>
<td>0.334</td>
<td>0.596</td>
<td>0.347</td>
</tr>
<tr>
<td>Q 14</td>
<td>0.522</td>
<td>0.434</td>
<td>0.334</td>
<td>0.596</td>
<td>0.347</td>
</tr>
<tr>
<td>Q 15</td>
<td>0.526</td>
<td>0.434</td>
<td>0.334</td>
<td>0.596</td>
<td>0.347</td>
</tr>
<tr>
<td>Q 16</td>
<td>0.579</td>
<td>0.434</td>
<td>0.334</td>
<td>0.596</td>
<td>0.347</td>
</tr>
<tr>
<td>Q 17</td>
<td>0.596</td>
<td>0.434</td>
<td>0.334</td>
<td>0.596</td>
<td>0.347</td>
</tr>
</tbody>
</table>

Table format adapted from Michalos et al. (2015)

Note that Cronbach alphas for all three KAB indexes showed strong reliability, with the reliability index highest for knowledge (0.884). The Knowledge Index also recorded a scale mean of 1.8, meaning that a significant proportion of respondents gave answers that showed good knowledge of sustainable development. Note that one question was removed from the knowledge index, namely “aspects of sustainable development were taught in my school” as this question was not considered directly related to the respondents’ knowledge of SD, but rather how they had acquired that knowledge. The average item-total correlation was within a range of r = 0.328 to r = 0.596. The greater
the value, the stronger each item was correlated to the index. For the Attitudes Index, the alpha coefficient was 0.801 which is considered relatively high. Here the range of item correlation is wider than that found in the Knowledge Index scale, ranging from $r = 0.295$ to $r = 0.573$. The lower values in the item-total correlations suggest they contributed less to the reliability of the Attitudes Index. In the Behaviors Index, the alpha coefficient of 0.803 was again relatively high, however the range of item correlation as compared to the Knowledge Index and Attitudes Index is quite wide, ranging from $r = -0.005$ to $r = 0.581$.

In this case the lowest correlation in the range was recorded by a reverse-coded statement, suggesting a possible problem with the negative wording of the survey question rather than a result related to KAB outcomes.

Nonparametric Statistical Analysis

Two normality tests were run, namely the Kolmogorov-Smirnov test and the Shapiro-Wilk W test, which led to the conclusion that the data in the study deviates from a normal distribution. Table 7 shows a normality test of the KAB indexes on the demographic variable of self-identified gender.

<table>
<thead>
<tr>
<th>With what gender do you identify?</th>
<th>Kolmogorov-Smirnov a</th>
<th>Shapiro-Wilk</th>
</tr>
</thead>
<tbody>
<tr>
<td>Knowledge</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>0.101</td>
<td>0.000</td>
</tr>
<tr>
<td>Female</td>
<td>0.094</td>
<td>0.000</td>
</tr>
<tr>
<td>Attitudes</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>0.066</td>
<td>0.018</td>
</tr>
<tr>
<td>Female</td>
<td>0.069</td>
<td>0.013</td>
</tr>
<tr>
<td>Behaviors</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>0.059</td>
<td>0.047</td>
</tr>
<tr>
<td>Female</td>
<td>0.085</td>
<td>0.001</td>
</tr>
</tbody>
</table>

a. Lilliefors Significance Correction
This study focused on the Shapiro-Wilk W test as it provides better power than the Kolmogorov-Smirnov test at the significance level (Ghasemi & Zahediasl, 2012). As shown in Table 7, the significance value of the Shapiro-Wilk W test in the knowledge and attitudes indexes were less than 0.05 for both self-identified genders in this study (male and female), and thus the data deviates from a normal distribution.

A number of nonparametric tests were conducted between the predictor variables for this study and the three KAB Indexes. The first test used was a Mann-Whitney U test for self-identified gender. As was expected and shown in the literature reviewed for this study, respondents identifying as female showed more knowledge of SD and more favorable attitudes and behaviors of SD throughout the KAB Indexes relative to those who self-identified as male (p < 0.05). The null hypothesis that there are no gender biases in KAB related to SD is thus rejected. Table 8 and Table 9 show a summary of the Mann-Whitney U and Kruskal-Wallis H tests run for the predictor variables on the KAB indexes. Statistically significant values of p < 0.05 are highlighted in blue in the tables and provide enough evidence to reject the null hypothesis that there is no difference between the groups in the demographic variables with regards to the scores in the KAB indexes. Thus, the demographic variables that produced p > 0.05 were not highlighted in Tables 8 and 9, and were dropped from further analysis in the study. For all the Kruskal-Wallis H tests, the scores in the KAB indexes were significantly different between the different groups compared. Therefore, a pairwise comparison is shown.
Table 8. Mann-Whitney W test for predictor variables on KAB favorable of SD, with statistically significant results (p < 0.05) highlighted in blue.

<table>
<thead>
<tr>
<th>Variable</th>
<th>Knowledge P-values</th>
<th>Attitudes P-values</th>
<th>Behaviors P-values</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gender (female/male)</td>
<td>0.000</td>
<td>0.000</td>
<td>0.000</td>
</tr>
<tr>
<td>CSPE in ESD (yes/no)</td>
<td>0.847</td>
<td>0.650</td>
<td>0.000</td>
</tr>
<tr>
<td>2017/2018 school graduation (yes/no)</td>
<td>0.268</td>
<td>0.298</td>
<td>0.015</td>
</tr>
<tr>
<td>Catholic/Non-Catholic school</td>
<td>0.412</td>
<td>0.806</td>
<td>0.882</td>
</tr>
<tr>
<td>School type (fee/non-fee)</td>
<td>0.530</td>
<td>0.237</td>
<td>0.360</td>
</tr>
</tbody>
</table>

Table 9. Kruskal-Wallis H test for predictor variables on KAB favorable of SD, with statistically significant results (p < 0.05) highlighted in blue.

<table>
<thead>
<tr>
<th>Variable</th>
<th>Knowledge P-values</th>
<th>Attitudes P-values</th>
<th>Behaviors P-values</th>
</tr>
</thead>
<tbody>
<tr>
<td>Green schools in ESD (yes/no/don't know)</td>
<td>0.140</td>
<td>0.097</td>
<td>0.000</td>
</tr>
<tr>
<td>Time dedicated to CSPE (increase/reduce/same)</td>
<td>0.001</td>
<td>0.002</td>
<td>0.009</td>
</tr>
<tr>
<td>Occupation (university/school/neither)</td>
<td>0.683</td>
<td>0.239</td>
<td>0.006</td>
</tr>
<tr>
<td>Age group (18/19//20/21-years old)</td>
<td>0.149</td>
<td>0.516</td>
<td>0.009</td>
</tr>
</tbody>
</table>

Asymptotic significances are displayed.

The variables in this study that reflect the current approach to ESD in schools were subsequently analyzed. Respondents who said they learned about SD from the Green Schools program (Figure 2) and the subject CSPE in school (Figure 3), as well as those who considered that the time dedicated to CSPE in school should be increased (Figure 4), showed more favorable behaviors of SD (p < 0.05).
Figure 2. Kruskal-Wallis H test for learning from Green Schools activities on the Behavior Index – pairwise comparison of mean ranks. Yellow lines reflect statistical significance between the different groups.

Figure 3. Mann-Whitney U test for CSPE in ESD on the Behavior Index – Mean ranks comparison showing more sustainable behaviors in respondents who said they learned about SD through the CSPE subject.
Knowledge, attitudes, and behaviors were statistically significant for respondents who said the time dedicated to CSPE should be increased. Respondents who said they learned from CSPE and the Green Schools Program displayed behaviors of SD (see Figures 2 and 3). Knowledge and attitudes did not show statistical significance between the groups.

A Kruskal-Wallis Test was performed for the age groups 18, 19, 20, and 21 years old (N = 461). As Figure 5 shows, the 19-year-old cohort displayed more sustainable
behaviors than any other age group and the data for this cohort were statistically significant relative to the 18-year-old cohort, which is the largest age cohort in the study.

Figure 5. Kruskal-Wallis H test for age group on the Behaviors Index – Pairwise comparison of mean ranks. Yellow lines reflect statistical significance between the different groups while black lines reflect no statistical significance.

To examine the age variable further, a Mann-Whitney U test was run on the KAB indexes (N = 461) for respondents who graduated from secondary school in 2017 or would do so in 2018, and those who graduated any time before 2017 (Figure 6). The younger cohort, namely those who recently graduated or would graduate in 2018, displayed more favorable behaviors SD (p < 0.05).
Figure 6. Mann-Whitney U test for graduation year on the Behaviors Index – Mean ranks comparison showing more sustainable behaviors in respondents who have more recently had an experience of ESD in school.

A Kruskal-Wallis H test was performed for respondents’ occupation – namely in secondary school or university, neither in secondary school nor university – on the KAB Indexes. The cohort of respondents who were currently in university displayed more favorable behaviors of SD than any other group and its data was statistically significant compared to those who were in secondary school (p < 0.05). A pairwise comparison in Figure 7 helps illustrate the results of this test.

Two demographic variables that did not statistically predict knowledge of SD, or favorable attitudes and behaviors of SD, were school ethos, that is whether respondents were educated in Catholic or non-Catholic schools, and the type of school, whether they were educated in a fee-paying or in a non-fee-paying school. These variables were therefore excluded from further analysis.
Figure 7. Kruskal-Wallis H test for occupation on the Behaviors Index – Pairwise comparison of mean ranks. Yellow lines reflect statistical significance between the different groups while black lines reflect no statistical significance.

Correlation and Regression Analysis

Knowledge and attitudes showed a relatively higher association (Spearman’s rho, \( r = 0.507 \)) compared to knowledge and behaviors (\( r = 0.412 \)) and attitudes and behaviors (\( r = 0.257 \)) indexes (Table 10). These correlations were significant at the \( p < 0.01 \) level.

Table 10. Correlation among KAB Indexes towards SD.

<table>
<thead>
<tr>
<th></th>
<th>Knowledge</th>
<th>Attitudes</th>
<th>Behaviors</th>
</tr>
</thead>
<tbody>
<tr>
<td>Spearman's rho Knowledge</td>
<td>Correlation Coefficient</td>
<td>1</td>
<td>.507**</td>
</tr>
<tr>
<td>Sig. (2-tailed)</td>
<td></td>
<td>.000</td>
<td>0.000</td>
</tr>
<tr>
<td>N</td>
<td>479</td>
<td>466</td>
<td>458</td>
</tr>
<tr>
<td>Attitudes</td>
<td>Correlation Coefficient</td>
<td>.507**</td>
<td>1</td>
</tr>
<tr>
<td>Sig. (2-tailed)</td>
<td></td>
<td>.000</td>
<td>.000</td>
</tr>
<tr>
<td>N</td>
<td>466</td>
<td>469</td>
<td>461</td>
</tr>
<tr>
<td>Behaviors</td>
<td>Correlation Coefficient</td>
<td>.412**</td>
<td>.257**</td>
</tr>
<tr>
<td>Sig. (2-tailed)</td>
<td></td>
<td>.000</td>
<td>.000</td>
</tr>
<tr>
<td>N</td>
<td>458</td>
<td>461</td>
<td>461</td>
</tr>
</tbody>
</table>

** Correlation is significant at the 0.01 level (2-tailed).
Drawing on the assumption by Michalos et al. (2015) that knowledge and favorable attitudes should be our main tools of transformation in turning sustainable behaviors into daily habits, a mediation analysis was conducted. The results of the four steps taken to test the mediation are shown in the tables below. First a simple regression analysis is conducted to determine whether attitudes can predict behaviors (Table 11), whether attitudes can predict knowledge (Table 12), and whether knowledge can predict behaviors (Table 13). The beta coefficients in each model help us establish the extent to which the predictor variable, knowledge and attitudes, in each model has an effect on the dependent variable of behaviors (Lavrakas, 2008). Next to the beta coefficient is the standard error. The smaller the standard error, the more precise the beta coefficient is in each model. Lastly, the coefficient of determination (R Square in regression models below) shows the proportion of the variation in dependent variable that can be attributed to variation in the predictor variable through a simple linear regression (Gotelli, 2013).

Table 11. Regression coefficients of predictor variable Attitudes and dependent variable Behaviors.

<table>
<thead>
<tr>
<th>Unstandardized Coefficients</th>
<th>P-Values</th>
</tr>
</thead>
<tbody>
<tr>
<td>Beta</td>
<td>Std. Error</td>
</tr>
<tr>
<td>(Constant)</td>
<td>29.265</td>
</tr>
<tr>
<td>Attitudes</td>
<td>0.313</td>
</tr>
</tbody>
</table>

N = 461

R Square = 0.089

Dependent variable: Behaviors
Table 12. Regression coefficients of predictor variable Attitudes and dependent variable Knowledge.

<table>
<thead>
<tr>
<th>Unstandardized Coefficients</th>
<th>P-Values</th>
</tr>
</thead>
<tbody>
<tr>
<td>Beta</td>
<td>Std. Error</td>
</tr>
<tr>
<td>(Constant)</td>
<td>12.122</td>
</tr>
<tr>
<td>Attitudes</td>
<td>0.627</td>
</tr>
</tbody>
</table>

N = 465
R Square = 0.268
Dependent variable: Knowledge

Table 13. Regression coefficients of predictor variable Knowledge and dependent variable Behaviors.

<table>
<thead>
<tr>
<th>Unstandardized Coefficients</th>
<th>P-Values</th>
</tr>
</thead>
<tbody>
<tr>
<td>Beta</td>
<td>Std. Error</td>
</tr>
<tr>
<td>(Constant)</td>
<td>26.369</td>
</tr>
<tr>
<td>Knowledge</td>
<td>0.396</td>
</tr>
</tbody>
</table>

N = 458
R Square = 0.200
Dependent variable: Behaviors

As there were significant relationships in the three regression models presented in Tables 11, 12, and 13 (shown by p < 0.001 in all three), a multiple regression analysis with knowledge and attitudes predicting behaviors was performed. Although attitudes showed statistical significance in predicting behaviors (p < 0.001) in Table 11, this was not the case when the below multiple regression analysis (Table 14) was performed, with p = 0.275.
Thus, the influence of knowledge as the mediator between attitudes and behaviors is stronger than the direct influence that attitudes had on behaviors. The findings, therefore, support full mediation between knowledge and behaviors. They do not support the study hypothesis that knowledge of SD leads to more sustainable attitudes and behaviors, with attitudes showing no influence as a predictor of behaviors in the presence of knowledge.

Table 14 shows the results of the linear regression of favorable behaviors on the Knowledge Index. The R Square suggests that 20% of the respondents’ Behaviors response variable could be explained by the independent variable of knowledge. This result left a significant percentage of variation in the Behaviors Index, or 80%, unexplained. The beta coefficients in the regression equation also suggest that for every increase in one unit of knowledge of SD, a 0.396 unit increase in favorable behaviors of SD is predicted (b = 0.396). The regression equation is thus:

\[
\text{predicted favorable behaviors of SD} = 26.369 + 0.396 \text{ knowledge of SD.}
\]
Figure 8 shows a visual examination of the fitted line plot which helps estimate the strength of the relationship between Knowledge (X) and Behaviors (Y).

Categoric demographic variables such as gender, age group and occupation were recoded into dummy variables to allow for a regression analysis. These did not show statistical significance and were thus excluded from further analysis as predictor variables in regression analysis.

Qualitative Analysis

Survey respondents were allowed the option to provide comments regarding their experience of ESD in school. Two thirds (315) of respondents left a comment. Those who wrote words like “good” “average” “wasn’t good”, “terrible”, etc. and those who commented on the survey itself, were excluded from the analysis. The reason for the
exclusion of such short comments is the ambiguity as to whether the comment referred to the survey or to their experience of ESD. Thus, of 315 responses, a subset of only 188 comments was used for qualitative analysis. A review was undertaken to find themes and recurring words matching themes in the study and previous SD research. This resulted in the organization of the 188 qualitative responses into the following five groups:

- **SD General**: Responses include keywords describing respondents' perceptions of SD, whether in school or in general (Table 15).
- **Environment**: Responses include keywords related to environmental matters (Table 16).
- **CSPE**: Responses include keywords about respondents’ experience with SD through the subject of CSPE in school (Table 17).
- **Social Issues**: Responses include keywords linking SD directly to social issues (Table 18).
- **Green Schools**: Responses include keywords about respondents’ experience with SD through the Green Schools program (Table 19).
Table 15. Respondents’ feedback regarding SD, ordered by occurrence.

<table>
<thead>
<tr>
<th>Keywords</th>
<th>Occurrences</th>
</tr>
</thead>
<tbody>
<tr>
<td>SD needs to be taught more in schools</td>
<td>31</td>
</tr>
<tr>
<td>SD is vital/important/priority/necessary/it matters</td>
<td>28</td>
</tr>
<tr>
<td>SD could’ve been covered better/not well taught at present/should be discussed in more detail</td>
<td>26</td>
</tr>
<tr>
<td>Never heard about SD/had not an experience of SD in school</td>
<td>14</td>
</tr>
<tr>
<td>SD is a small part of the curriculum/should be part of Leaving Certificate*</td>
<td>12</td>
</tr>
<tr>
<td>Had a good learning of SD in school</td>
<td>5</td>
</tr>
<tr>
<td>SD is not important</td>
<td>3</td>
</tr>
<tr>
<td>Lower taxes for low carbon footprint should be encouraged</td>
<td>2</td>
</tr>
<tr>
<td>Learning about finances/to be open minded is important</td>
<td>2</td>
</tr>
<tr>
<td>Total</td>
<td>123</td>
</tr>
</tbody>
</table>

*Leaving Certificate is the State Examination in Ireland

Table 16. Respondents’ feedback regarding the environment, ordered by occurrence.

<table>
<thead>
<tr>
<th>Keywords</th>
<th>Occurrences</th>
</tr>
</thead>
<tbody>
<tr>
<td>Recycling/waste management is important for SD</td>
<td>11</td>
</tr>
<tr>
<td>Need to care for the planet</td>
<td>9</td>
</tr>
<tr>
<td>Protect animals and the ocean</td>
<td>2</td>
</tr>
<tr>
<td>Need to stop single plastic use/need for more renewable energy</td>
<td>2</td>
</tr>
<tr>
<td>Eco UNESCO activities were worthwhile</td>
<td>1</td>
</tr>
<tr>
<td>Total</td>
<td>25</td>
</tr>
</tbody>
</table>

*Eco UNESCO trains teachers and students about the environment in Ireland

Table 17. Respondents’ feedback regarding CSPE, ordered by occurrence.

<table>
<thead>
<tr>
<th>Keywords</th>
<th>Occurrences</th>
</tr>
</thead>
<tbody>
<tr>
<td>CSPE was not good in school</td>
<td>9</td>
</tr>
<tr>
<td>CSPE covered SD</td>
<td>4</td>
</tr>
<tr>
<td>CSPE is not taught enough</td>
<td>4</td>
</tr>
<tr>
<td>Total</td>
<td>17</td>
</tr>
</tbody>
</table>
Table 18. Respondents’ feedback regarding social issues, ordered by occurrence.

<table>
<thead>
<tr>
<th>Keywords</th>
<th>Occurrences</th>
</tr>
</thead>
<tbody>
<tr>
<td>SD is respect for people</td>
<td>5</td>
</tr>
<tr>
<td>We need gender equality/less discrimination</td>
<td>4</td>
</tr>
<tr>
<td>Gender equality has nothing to do with SD</td>
<td>2</td>
</tr>
<tr>
<td>Gender equality is not taught enough</td>
<td>2</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>13</strong></td>
</tr>
</tbody>
</table>

Table 19. Respondents’ feedback regarding Green Schools Program.

<table>
<thead>
<tr>
<th>Keywords</th>
<th>Occurrences</th>
</tr>
</thead>
<tbody>
<tr>
<td>Green Schools taught about SD</td>
<td>4</td>
</tr>
<tr>
<td>Green Schools didn't teach about SD</td>
<td>2</td>
</tr>
<tr>
<td>I participated in Green Schools</td>
<td>2</td>
</tr>
<tr>
<td>Green Schools should be promoted more</td>
<td>2</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>10</strong></td>
</tr>
</tbody>
</table>
Chapter IV

Discussion

The primary focus of this study was to investigate the impact that education for sustainable development (ESD) is having on young people in Ireland. To understand this concept better, the study reviewed knowledge of SD and attitudes and behaviors towards SD in young people using assigned categorical variables chosen to understand and test the hypothesis, including gender, age, school type and experience with subjects involving SD in school. To examine the role of ESD in Ireland, this study analyzed whether the knowledge imparted in schools is helping to shape the attitudes of young people towards issues of SD, ultimately leading to behaviors that are supportive of SD. Lastly, a qualitative analysis of the survey respondents’ feedback gave further insight into their experiences with ESD.

KAB Questionnaires

A statistical and qualitative review of responses recorded in the three KAB questionnaires gives insight into the issues of SD that matter the most to the young participants in this study.

Knowledge Questionnaire

The Knowledge Questionnaire recorded the most favorable results of SD of the three KAB questionnaires and indicated that the knowledge of young people was more
supportive of SD than their attitudes and behaviors indicated. However, given the data collected, it was difficult to discern in this study whether the SD knowledge of young people was fundamentally based on ESD in their schools, or if this knowledge was influenced by other factors such as family, television, and/or the internet.

The statement inviting the opinions of students about anthropogenic climate change, that is that human actions are contributing to changes in our atmosphere and climate systems, recorded the lowest mean (1.61), and was the statement with which respondents most agreed. The same statement also received the lowest percentage of “don’t know” responses (2.1%) in the questionnaire. Moreover, it was the statement that got the joint highest number of responses in the three questionnaires (N = 471). This suggests that young people have a good understanding of climate change, which does not appear to have been influenced by political views that dismiss climate change as a liberal conspiracy, for example, the withdrawal of the US from the Paris Agreement (UNFCCC, 2017). This is a reassuring message from the survey and a strong position from which meaningful knowledge of climate change can be imparted to students.

There was only one more entry in the Knowledge Questionnaire that also received 471 responses, namely “SD requires access to good quality education for everyone”, which reinforced respondents’ keen interest in their education. The theme of education is further reviewed in the next paragraph. For all other items in the Knowledge Questionnaire, the number of valid entries was as low as 442 (N = 442), namely, “SD requires achieving the United Nations’ Sustainable Development Goals (SDGs)”. This item has among the top five highest means (i.e., least favorable of SD) and also received the highest “don’t know” answers (7.2%) in the questionnaire, suggesting respondents’
limited knowledge of the SDGs. Whether respondents knew about the SDGs, or felt inclined to browse the term on the internet during completion of the survey, is not apparent in this research. However, considering the SDGs are currently the most agreed upon framework describing the aim of sustainable development in the world, including Ireland’s voluntary reporting on the implementation of the SDGs (Government of Ireland, 2018), perhaps more emphasis should be given to this topic in school education to help with the understanding of SD.

When assessing the role of ESD in the Knowledge Questionnaire, it became apparent that respondents disagreed the most with the statement “aspects of SD were taught in my school.” This may indicate that, despite key issues for SD such as knowledge about the environment almost surely being taught in schools, the connection between the word “environment” and the words “sustainable development” may not have been explicitly made, hence the disconnect and disagreement. This suggests there is a knowledge gap in pupils’ education, which the proper integration of ESD into the curriculum can help to bridge.

Attitudes Questionnaire

Education as a theme also figured prominently in the Attitudes Questionnaire. The only two statements about education in the Attitudes Questionnaire, “every person should receive education that teaches the knowledge, values and skills necessary for sustainable living in a community” and “males, females and other gender identities should have equal access to all kinds of education and employment” recorded the lowest mean scores (on a scale of 1 to 5) of all three KAB questionnaires, 1.40 and 1.60 respectively. This means
that respondents agreed the most with these statements. In the case of the statement “every person should receive education that teaches the knowledge, values and skills necessary for sustainable living in a community”, an overwhelming 93% of respondents agreed. This is a strong message in which young people showed their collective concern about their education and the role SD plays in their future.

The qualitative analysis provided more insight to help us to understand more fully the respondents’ stance on ESD. Many of the comments considered issues of SD important and favored more integration of SD into the curriculum, as they felt it was not covered sufficiently in school. There was also a level of discontent regarding the subject CSPE, which covers issues related to SD, most comments saying either that more time should be dedicated to CSPE, or that the subject was not good at all. In contrast, respondents’ comments were more supportive of the Green Schools Program. This may be because the Green Schools program is an extra-curricular activity that tends to be voluntary, more participatory, more collaborative than prescriptive, and not subject to formal classroom assessments.

Behaviors Questionnaire

The Behaviors Questionnaire in this study indicates that respondents agreed most with the theme of respect as a key value of SD. The lowest mean scores (i.e., the most favorable of SD) were recorded for statements such as “I give the same level of respect to people regardless of their gender identity or age” and “when I use the computer or phone for social networking or gaming I always treat everyone as respectfully as I would in person” with mean scores of 1.75 and 1.99 respectively. This concurs with the results in
Michalos et al. (2015), which suggests that it would be worthwhile to teach about issues of SD, such as the environment, in the concepts and language of respect. The results in this study would also agree with such an approach and encourage further research in this area.

It is also interesting to compare the mean scores of two contrasting forms of waste management in the Behaviors Questionnaire. The statement “at home I always recycle when I can” recorded the third lowest mean score, while “even when I have the option, I do not always compost” was at the bottom of the table with the highest mean score. This suggests that schools should encourage more awareness of composting. Indeed, other statements regarding waste reduction recorded relatively high means in the questionnaire. The items “I have changed my personal lifestyle to reduce waste” and “I pick up litter when I see it in a park or natural area” received responses from at least 50% of respondents either disagreeing with the statement or not taking a stance on it (neither agreeing or disagreeing). While recycling is a practice strongly encouraged in Irish society; for example recycling is practically free of charge, while general waste has a cost per kilo attached to it (Citizens Information, 2017), this study suggests that the actual reduction of waste is an important issue of SD to be reinforced among young people.

Demographic Variables as Predictors of KAB of SD

A number of demographic variables that were considered relevant in the context of the Irish education system were analyzed, in order to understand better their role in leading to good scores in the KAB indexes.
School Ethos/Type and the KAB Indexes

There were two fundamental reasons behind the selection of these two variables, to establish: (i) whether the values of environmental stewardship and social justice often associated with religious education could result in more sustainable attitudes and behaviors in young people, and (ii) whether the superior academic achievement associated with fee-paying schools could be influential in children’s response to sustainability issues. Of all the demographic variables considered in this study, school ethos and school type did not show statistical significance, with p-values higher than 0.05 in all three KAB indexes. This study therefore concludes that the ethos or type of institutions of education where respondents had their experience with ESD had no influence on their knowledge, attitudes and behaviors of SD. Rather, more subjective aspects such as gender, age, occupation and whether respondents had learned about SD through CSPE and the Green Schools program showed statistical significance and are reviewed below.

Occupation and the KAB Indexes

A Kruskal-Wallis H test performed on the occupation data showed statistical significance (p-value = 0.006) between respondents who were in school and those in university, with the latter group displaying more favorable behaviors of SD (Figure 7). Of the three groups analyzed in this variable, school, university, neither school nor university, respondents in school recorded the highest mean rank and thus displayed fewer favorable behaviors of SD. This indicates that respondents who chose to continue with their education after school displayed more favorable behaviors of SD. This
supports the role of education in creating favorable behaviors of SD. Previous studies in which university students showed more knowledge and favorable attitudes and behaviors of SD compared to post-primary students (Zsóka, Szerényi, Széchy, & Kocsis, 2013) support these findings. Respondents in school form the youngest cohort in this study. The effect of age on behaviors is assessed next.

Age Group and the KAB Indexes

Although the sample size was good for the population in this study, there were limitations in the age variable due to the small size of the 20 and 21-year old cohorts. These cohorts represented 17.6% and 13.7% of the sample respectively. The two largest cohorts were the 18-year-old cohort (44.4%) and the 19-year-old cohort (24.4%).

A Kruskal-Wallis H test showed that there were statistically significant differences in favorable behaviors of SD between the age cohorts in this study. The cohort of 19-year-olds displayed more sustainable behaviors than the 18-year-old cohort and was statistically significant (p-value = 0.009). This would concur with other studies that found ethical behavior to be more likely in older age groups (Ruegger & King, 1992). It is true that the age cohorts considered in this study are very close to each other and therefore conclusions based on age groups may not be definitive. However, a deeper analysis of the data collected shows that 82% of 19-year-olds in this study were in university at the time of data collection. This gives further support to the view in the previous section that respondents in university (largely 19-year-olds) displayed more favorable behaviors of SD in the sample.
School Experience of ESD and the KAB Indexes.

The predictor variables describing respondents’ experience of ESD, for example, learning about SD from CSPE and the Green Schools program, and time dedicated to CSPE, are examined in this section. Respondents who said that time dedicated to the subject CSPE in school should be increased showed more knowledge and favorable attitudes and behaviors of SD than those who thought time for CSPE should be reduced.

Respondents who said that CSPE and the Green Schools program taught them about SD displayed more favorable behaviors of SD, both with $p < 0.001$. Although the effect of these variables on knowledge and attitudes was not statistically significant, the results are congruent with the findings in Michalos et al. (2015) that students who recognized the term SD in their education were more likely to adopt sustainability-related behaviors.

When reviewing the CSPE syllabus, a search for the words “sustainability” and “sustainable development” shows no results (National Council for Curriculum and Assessment, 2018a). Although typical SD topics such as gender equality, racism, poverty, and the environment are part of the CSPE syllabus, they are not taught as being instrumental in the achievement of sustainable development. This creates a disconnect in the learning of SD. Issues such as poverty are being examined in isolation and not as part of a much bigger issue affecting the environmental, social and, economic dimensions of SD. For example, studies have found a clear connection between poverty and deforestation (Deininger & Minten, 1999). People in under-resourced countries, including those with most of the world’s rainforests, often rely on clearing the land for agriculture in order to earn a living (Kamanga, Vedeld, & Sjaastad, 2009). The social and economic
impacts of poverty are also clear. In the US, the cost of childhood poverty represents 5.4% of gross domestic product, approximately $1.0298 trillion (McLaughlin & Rank, 2018). In the world, 19.5% of the world’s children live in extreme poverty compared to just 9.2% of adults (UNICEF, 2017). The effects of childhood poverty not only impact the lives of individuals but they affect society as a whole. Studies have found that people in poverty must use most of their mental resources to tackle problems associated with basic needs, which can lead to underinvestment in their children’s upbringing (Vakis, Rigolini, & Lucchetti, 2015). This undermines their human capabilities and potential, which in adulthood, can lead to a cycle of low earnings that results in low workforce productivity, more crime, and poor health, the costs of which are ultimately covered by the taxpayer (McLaughlin & Rank, 2018).

A considerable body of research supports the notion that inequality is at the root of some of the world’s most fundamental socio-economic challenges, such as crime, morbidity, political conflict, and poor quality education (Cutler & Lleras-Muney, 2006; Fleisher, 1966; Ogrodnik & Borzutzky, 2011; Thorbecke & Charumilind, 2002). It is essential that children are taught that issues such as poverty, gender inequality, environmental challenges and economic development can only be resolved through more holistic approaches that meet multiple global challenges, such as the approach of sustainable development (Buckler & Creech, 2014). It is worth noting that the statement “gender equality is important to SD” in the knowledge questionnaire received the second highest mean and was the statement with which most people disagreed, suggesting a lack of understanding of these connections. Other respondents corroborated this view by leaving written comments stating that gender equality has nothing to do with SD. This
again indicates that the school experience of ESD needs to be reoriented to provide a broader understanding of SD.

The Role of Women in ESD

One of the initial study questions posed was whether there were gender biases in how respondents answered the KAB questionnaires. A Mann-Whitney U test determined that there were differences in the scores recorded in the three KAB Indexes between respondents identifying as male and female, with the female-identifying cohort performing better than their male-identifying counterparts in all three KAB indexes. This outcome agrees with similar studies suggesting that women displayed more sustainable and ethical behaviors, attitudes, and habits (Ruegger & King, 1992). This may also correlate with research findings regarding gender differences in work-related values, with studies suggesting that those identifying as men are more concerned with money and advancement while respondents identifying as women are more interested in nurturing relationships and helping others (Betz, O’Connell, & Shepard, 1989). If we assess the same issue at an earlier stage of professional development, for example during third level education, similar findings are observed (Haski-Leventhal, Pournader, & McKinnon, 2017). A study on the role of gender in business students found that female students place a higher value on ethical responsibilities than male students and were more positive regarding Corporate Social Responsibility related studies (Haski-Leventhal et al., 2017). Irish youth in this study seemed to show no exception to this trend, as female-identifying respondents displayed similar tendencies towards positive KAB for key aspects of SD – including knowledge, attitudes and behaviors of SD.
The positive role that gender identification may play in advancing SD with knowledge gained from ESD programs should not be ignored and could be included as a measure of progress in ESD goals. This study would suggest that females should be encouraged and supported to take roles of leadership as part of achieving goals of ESD. Furthermore, an emphasis on teaching the tools and skills necessary to catalyze changes in society could help students build the trust and confidence needed to move knowledge, attitudes, and behaviors around SD towards more successful implementation of sustainable development in the world, including the UN Sustainable Development Goals (SDGs).

The Role of Knowledge and Attitudes in Leading to Behaviors of SD

A Spearman’s rank-order correlation was undertaken to assess the relationship between knowledge of and favorable attitudes and behaviors of SD. The analysis showed that an increase in knowledge of SD was moderately associated with an increase in favorable attitudes ($r = 0.507$) and behaviors ($r = 0.412$) of SD. However, an increase in favorable attitudes of SD showed a low association with sustainable behaviors ($r = 0.257$). To better understand the relationship between knowledge of, attitudes and behaviors of SD, a regression analysis was undertaken which showed that, although the relationship between the three KAB variables were statistically significant ($p < 0.05$), knowledge was the only dominant mediator leading to sustainable behaviors. Only knowledge could explain some of the variance (20%) in the behavior variable. This is an interesting finding, which differs from the results in the study undertaken by Michalos et.al. (2015) in which both knowledge and attitudes explained 25% of the variation in the behavior variable.
However, the role of attitudes in leading to sustainable behaviors should not be discounted. While knowledge can provide understanding and influence the minds of young people regarding issues of SD, attitudes provide the emotional response necessary to accomplish sustainability (Arbuthnott, 2009). An attitude is an enduring set of beliefs about an object that predisposes people to behave in particular ways towards the object (Mainieri, Barnett, Valdero, Unipan, & Oskamp, 1997). The role of knowledge in leading to supporting attitude strength has often been measured by assessing the quantity of information output from a respondent about a specific issue (Krosnick, Boninger, Chuang, Berent, & Carnot, 1993). However, it has also been suggested that it is not the amount of knowledge, but the complexity of it that can lead to greater attitude-behavior consistency (Fabrigar, Petty, Smith, & Crites, 2006). Although the amount and complexity of knowledge are likely to be positively correlated, it is the very distinct dimensions of complexity that have greater breadth and thus more implications for attitude-behavior consistency (Fabrigar et al., 2006). The complexity of knowledge of SD and its role in leading to favorable attitudes and behaviors of SD is reviewed in the next section.

Opportunities for ESD in Schools in Ireland

This section looks into two important aspects of ESD that were observed in this study, namely, the disconnect between SD topics (e.g., inequality, poverty, the environment) and the concept of SD as understood by young people, and the missing connection of attitudes leading to sustainable behaviors in the presence of knowledge of SD.
Sustainable development is a complex issue referred to as a “wicked problem” (Pryshlakivsky & Searcy, 2013), where a specific solution is never applicable to all sides of a problem. A thought process with the ability to see a situation from many viewpoints is needed in order to unravel wicked problems. In school education, a systems-thinking approach to such issues enable the student to analyze SD situations across different domains (society, environment, economy, etc.) and different scales (local, global) in order to see cascading effects, feedback loops and other impacts that can emerge from wicked SD problems (Wiek, Withycombe, & Redman, 2011). According to the data in this study, 40% of respondents did not realize that CSPE themes such as gender equality, racism, poverty and the environment were also SD themes. Moreover, at least 30% of respondents did not agree that aspects of SD were taught in their schools. Some respondents even left a comment saying they had never heard about SD in school.

In order to enable a systems-thinking approach that can consider all aspects of SD, ESD programs in Ireland will need to highlight the connection between the aforementioned topics and SD. Interpersonal skills such as the ability to communicate, deliberate and negotiate in a pluralistic and trans-cultural mindset, in a convincing and persuasive manner, should be developed for successful collaboration between stakeholders (Wiek et al., 2011). Creating indicators to monitor and assess students’ ability to deliver in these areas, along with programs and activities designed to allow students to learn these skills should be part of measuring progress towards ESD. Such problem-based learning strategies for ESD, where specific situations and case studies help illustrate the more intangible concepts of SD, provide strong motivation for learning while developing self-directed learning skills (Barrows, 1986). Therefore, it can
encourage attitudes and behaviors in children to support their personal, social, and moral development in a democratic civil society.

Attitudes: The Missing Link between Knowledge and Behaviors of SD

This study found a weak correlation between attitudes and behaviors of SD \((r = 0.257)\), while also indicating that attitudes showed no relevance \((p > 0.05)\) in leading to behaviors of SD in the presence of knowledge of SD. This section explores the role that complexity of knowledge of SD (as opposed to just quantity of knowledge) can have in leading to favorable attitudes and behaviors of SD.

It has been shown that when a person has an attitude based on multiple distinct dimensions of knowledge, they are more willing to extrapolate and make inferences about other dimensions of attitude-relevant information of which the person has no current knowledge (Fabrigar et al., 2006). For ESD, this would involve learning about the multidisciplinary interrelationships and dilemmas that are inherent in wicked problems of SD. In consequence, limiting the knowledge of SD to the isolated definition of its parts (e.g., poverty, the environment, equality, etc.), as is the current teaching strategy in Irish schools, does not encourage a thought process that acknowledges the complexity of SD. In turn, the connections between the different dimensions of SD that are needed to extrapolate information into the attitudinal realm are absent and consequently lend less support to attitude-behavior consistency.

Adding values to knowledge of SD can increase its complexity and has shown greater impact than the cognitive process alone (Olsson et al., 2016). Research has found that students who expressed values of SD issues expressed more knowledge of SD than
those who just expressed knowledge without a value component (Olsson et al., 2016).

Values determine what we do. For instance, communication regarding climate change has been found to be more successful when it appeals to people’s values, rather than just communicating the scientific evidence (Corner, Markowitz, & Pidgeon, 2014). Looking at the results of this study, the topic with which most respondents agreed in the Behaviors Questionnaire was respect – something we all deeply value.

Similarly, the teaching of SD in schools needs to appeal to students’ values if this knowledge is to shape their attitudes and ultimately their behaviors towards sustainability. Students need to see themselves as part of the solution to SD challenges. Research has found that people who engage in pro-environmental activities tend to focus their concern beyond their immediate circle and to develop more self-transcendent, or altruistic values (Schwartz, 1994). Prioritizing self-transcendent values is associated with mental and physical health benefits, including improved subjective wellbeing and decreased depression and suicidality (Kang et al., 2017). By encouraging self-transcendent values in the manner in which we teach SD to students, we will be encouraging attitudes that not only support SD but also improve their wellbeing and quality of life.

Study Limitations and Further Research

This study tried to collect data on several variables unique to the study of education and sustainable development and, due to scope and time, it could not examine the full portfolio of demographic variables common in statistical studies of populations and behaviors. As such, this study did not consider socio-economic factors or
demographic characteristics such as identification with race, personal habits, religious beliefs, and personality traits in its analyses of factors predicting favorable KAB of SD. These factors may well have statistical significance in explaining some of the correlations and variations seen in the collected data. A significant proportion of respondents in this study were university students, and this may have also limited the findings to some extent. Further research is encouraged in younger age cohorts in Ireland, for example, before they take their first State Examination (i.e., before the age of 15) to see how their KAB of SD change over time.

Conclusions

As more and more schools invest in curriculum reform to advance ideas in sustainable development (SD), as advocated by studies of the United Nations Economic Commission for Europe (UNECE, 2015b), research into the effectiveness of Education for Sustainable Development (ESD) is critical to assess what is working – or not – to truly change behaviors in students taking ESD courses. It was in this spirit that this study, the first of its kind in Ireland, aimed to increase the understanding of ESD implementation in Ireland by examining the knowledge, attitudes, and behaviors of SD of Irish young people. One of the key findings in this study was that young people in Ireland have a keen interest in SD and want to be more involved with the topic and to have a say in how ESD is imparted to them. Educating students and future generations of adults on matters of sustainability will allow them to participate more effectively in society. Legislation currently under consideration by the European Commission recommends incorporating a strong sustainable finance component into financial education in school.
curricula, in order to enable a swifter transition to a low carbon economy (High-Level Expert Group on Sustainable Finance, 2018). However, before such a forward-looking approach can be applied, strong fundamentals of Education for Sustainable Development must be developed consistently in schools in Ireland.

This study agreed with previous findings in ESD research, including that self-identified females are more inclined to have more knowledge, attitudes, and behaviors that are favorable of SD. As a starting point in ESD research in Ireland, this study opens the door for further research to investigate when gender differentiation with regards to KAB aspects of SD starts to emerge in children in Ireland.

Although this study agreed with many of the findings of Michalos et al. (2015) such as the theme of respect that emerged from the Behaviors Questionnaire in respondents both in Manitoba, Canada and in Ireland, it did not find attitudes to be statistically significant in leading to behaviors of SD in the presence of knowledge. This study therefore questioned how durable the SD behaviors of young people are when they are not supported by the emotional response provided by attitudes. More importantly, this research raised questions about how knowledge of SD is being imparted at present in schools in Ireland. The fact that issues of SD (e.g., poverty, the environment, equality) are taught separately and not defined as issues of SD may be the missing link between students’ knowledge of SD and favorable attitudes and behaviors of SD. Considering the results of this study and the extensive body of research reviewed on the topic, this study proposes an approach to ESD in which the complexity of SD is taught while prioritizing self-transcendent values in order to increase attitude-behavior consistency of SD. Further research in this area is called for. In Ireland, in particular, the further measurement of
KAB of SD in youth can provide insights into the extent to which supportive attitudes of SD over time lead to sustainable behaviors in the presence of the knowledge of SD imparted in schools.

With this in mind, this research can serve as a self-assessment tool for schools in Ireland, particularly those with an emphasis on ESD, notably the 41 schools currently offering the subject Politics and Society at Leaving Certificate level. Whether the knowledge being imparted in Politics and Society is being translated into favorable attitudes and behaviors of SD needs to be assessed as part of a successful educational framework for SD.

If we follow a similar approach to that of Michalos et al. (2015) in which students in Manitoba were assessed through the three KAB questionnaires over a number of years, we may be able to discern whether knowledge can increasingly explain the variance in the attitudes and behaviors variables over time. Therefore, changes and adjustments in the curriculum, and indeed extra-curricular activities, oriented towards ESD would become apparent or otherwise in students’ knowledge, attitudes and behaviors of SD. It is the hope of the research author that this work of assessing ESD curricula outcomes be continued in Ireland. The author will be pleased to consider whether a summarized copy of the findings of this thesis might be made accessible to Ireland’s education policy leaders so that the author can share the knowledge gained during the study.
Appendix 1

Letter of Support from the Department of Education and Skills

Government Offices
New Quay
Clonmel
Co. Tipperary
20 September 2017

To whom it may concern,

Ms. Carolina Angarita Cala is engaged in a research project, focused on the Irish National Strategy for Education for Sustainable Development, as part of a postgraduate thesis she is working on at Harvard University in the USA.

Ms. Cala has discussed her work with me, as a representative of the Department of Education and Skills, and the Department is able to confirm that Ms. Cala’s research is of interest and relevance to the Irish education system.

While participation in this research is not in any way a Department requirement, should your school be in a position to facilitate Ms. Cala in her research work, the Department would have no difficulty with you doing so, at the school’s discretion.

Yours sincerely,

_______________________________
Kevin McCarthy
(senior inspector, Curriculum and Assessment Policy Unit)
Appendix 2

Survey Instrument

ESD in Ireland

Hello, and thank you for your interest in our survey. Before completing the survey, please review the below consent form. If you decide not to proceed, simply select No in the question at the end of this form and you will be redirected to the end of the survey. Otherwise, select Yes to begin the survey.

Participation is voluntary: It is your choice whether or not to participate in this research. If you choose to participate, you may change your mind and leave the survey at any time. Refusal to participate or stopping your participation will involve no penalty or loss of benefits to which you are otherwise entitled.

What is the purpose of this research? The purpose of this research is to examine the understanding that first-year students have of sustainable development, as they transition from post-primary school into college. Sustainable Development or SD is the ability to meet our present needs without compromising the ability of future generations to meet their own needs. Sustainable Development also means everyone having similar rights and opportunities, as well as providing for their basic needs to maintain an acceptable quality of life and is relevant to both current and future generations.

How long will I take part in this research? Your participation will take no longer than 10 minutes.

What can I expect if I take part in this research? As a participant, you will not be required to provide any personal data that could be used to identify you. You will be asked questions about some of your everyday activities as they relate to sustainability, as well as your knowledge and attitudes towards issues of sustainable development. Your answers will be used to conduct analysis for my Master’s thesis. The results of this research will be available on this Facebook page.

What are the risks and possible discomforts? If you choose to participate, we do not foresee that your participation will involve any risks or discomforts. However, should this not be the case, please contact the Researcher at the details provided below in this form.

Are there any benefits to participating in this research study? We cannot promise any benefits to you or others from your taking part in this research. However, possible benefits include a better understanding of how people your age perceive Sustainable Development, should you have an interest in this topic.

If I take part in this research, how will my privacy be protected? What happens to the information you collect? This survey will not collect any identifiable personal data such
as your name, email address, or IP address. The data we collect will be encrypted and password protected by Qualtrics Survey services. All answers collected using the software are stored in a single secure data centre; data will not “float” around in the cloud. Data transferred from the survey site will be saved on a password-protected computer. The data will be deleted by the researcher after a period no longer than 12 months. Qualtrics also participates in the EU-U.S. Privacy Shield framework, and will not allow anyone see your data other than the survey creator.

If I have any questions, concerns or complaints about this research study, who can I talk to? The researcher for this study is Carolina Angarita-Cala who can be reached at caa242@g.harvard.edu, telephone number 01-532-3539, 75 St Stephen's Green, Dublin 2 and the faculty sponsor is Dr. Melody Brown Burkins who can be reached at melody.b.burkins@dartmouth.edu (+1) 603-646-2053, 6048 Haldeman Center, Dartmouth University, USA, if you have questions, concerns, or complaints, if you would like to talk to the research team, if you think the research has harmed you, or if you wish to withdraw from the study.

This research has been reviewed by the Committee on the Use of Human Subjects in Research at Harvard University. They can be reached at 617-496-2847, 1350 Massachusetts Avenue, 9th Floor, Suite 935, Cambridge, MA 02138, or cuhs@harvard.edu for any of the following: If your questions, concerns, or complaints are not being answered by the research team, if you cannot reach the research team, if you want to talk to someone besides the research team, or if you have questions about your rights as a research participant.

Statement of Consent: By entering this survey, I am indicating that I have read the consent form, I am age 18 or older and that I voluntarily agree to participate in this research study. All my questions about the research have been answered to my satisfaction. Do you agree with the consent form?

  o Yes
  o No

Q1 What country did you attend secondary school?

▼ Ireland ...

Skip To: End of Block If Hello, and thank you for your interest in our survey. Before completing the survey, please review... = No

Skip To: End of Block If What country did you attend secondary school? != Ireland
Q2 How old are you?
   ○ 18
   ○ 19
   ○ 20
   ○ 21
   ○ 22+

Skip To: End of Block If How old are you? = 22+

Q3 With what gender do you identify?
   ○ Male
   ○ Female
   ○ Non-gender conforming

Q4 What course type are you currently pursuing in college/which school are you attending?
   ○ Arts/Literature/Languages/History
   ○ Business
   ○ Science/Engineering
   ○ Law
   ○ Education
   ○ Other (please indicate)
      __________________________________________
   ○ I'm in school (please indicate)
      __________________________________________
   ○ I'm not attending college/school

Q5 Did you graduate from secondary school in 2017, or will you graduate in 2018?
   ○ Yes
   ○ No

Q6 Did you/do you attend a fee-paying secondary school?
   ○ Yes
   ○ No
   ○ I don't know
Q7 Which third level institution are you attending? (select secondary school if graduating in 2018)

- All Hallows College ...

Q8 What was/is the ethos/religion of your secondary school?

- Catholic ...

Q9 Were/are you aware of Green Schools activities in your school?

- Yes
- No

Q10 Do you believe those activities (Green Schools) taught you habits to use outside school?

- Yes
- No
- I don't know Green Schools

Q11 Should the time dedicated to this subject (CSPE) per week be:

- Increased
- Reduced
- Stay the same

Q12 Do you consider that CSPE (Civic, Social and Political Education) taught you about Sustainable Development (SD) in the Junior Cycle?

- Yes
- No
Q13 Which subjects/activities in school do you consider taught you the most about Sustainable Development? Select up to three.

- Science
- CSPE
- Geography
- Religion
- SPHE
- Green Schools
- Other

Q14 Please indicate how strongly you agree or disagree with the following statements. You can also reply that you don't know/don't understand the question.

<table>
<thead>
<tr>
<th>Statement</th>
<th>Strongly agree</th>
<th>Agree</th>
<th>Neither agree nor disagree</th>
<th>Disagree</th>
<th>Strongly disagree</th>
<th>Don't know</th>
</tr>
</thead>
<tbody>
<tr>
<td>Improving people's opportunities for long and healthy lives contributes to Sustainable Development</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>Aspects of Sustainable Development (SD) were taught in my school</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>Protecting the environment is necessary for SD</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>Economic development is necessary for SD</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>A culture of peace where people settle conflicts by discussion is necessary for SD</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>Human actions are contributing to changes in our atmosphere and climate systems</td>
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<td></td>
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<tr>
<td>SD requires individuals to reduce all kinds of waste</td>
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<td></td>
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<td></td>
</tr>
<tr>
<td>Good citizenship is necessary for SD</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Gender equality is important to SD</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>The elimination of poverty is necessary for SD</td>
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<tr>
<td>SD requires access to good quality education for everyone</td>
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<td></td>
</tr>
<tr>
<td>SD requires businesses to behave responsibly to their employees, customers and suppliers</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Conservation of water is necessary for SD</td>
<td></td>
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</tr>
<tr>
<td>Respect for cultural diversity (variety of cultures) is necessary for SD</td>
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</tr>
<tr>
<td>SD requires shifting to the</td>
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<td></td>
<td></td>
</tr>
</tbody>
</table>
use of renewable resources as much as possible

SD requires achieving the United Nations’ Sustainable Development Goals (SDGs)

SD requires people to reflect on what it means to improve quality of life in general

SD requires acknowledgment of human rights issues and concerns

Q15 Please indicate how strongly you agree or disagree with the following statements.

<table>
<thead>
<tr>
<th>Statement</th>
<th>Strongly agree</th>
<th>Agree</th>
<th>Neither agree nor disagree</th>
<th>Disagree</th>
<th>Strongly disagree</th>
</tr>
</thead>
<tbody>
<tr>
<td>Every person should receive education that teaches the knowledge, values and skills necessary for sustainable living in a community</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>The present generation should make sure that the next</td>
<td></td>
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</tr>
</tbody>
</table>
generation can live in communities that are at least as healthy as those that exist today

Manufacturers should discourage the use of disposables

As long as resources are available, using more than we need now doesn't threaten the health and welfare of future generations

We don't need stricter laws and regulations to protect the environment

It is important to find ways to reduce poverty

Sustainable Development will not be possible until wealthier nations stop exploiting workers in poorer nations
Understanding and addressing the problem of climate change is not important.

Use of fuel-efficient vehicles should be encouraged by governments.

Governments should adopt Sustainable Development as a national priority.

Citizens should be well-informed and actively participate in democratic processes like voting.

People who pollute our land, air or water should pay for damage to communities and the environment.

Males, females and other gender identities should have equal access to all kinds of
education and employment

It is alright to use as much water as we want as long as it is free of charge

Households tasks should be equally shared among members of the household regardless of gender

Q16 Please indicate how strongly you agree or disagree with the following statements which apply to you.

<table>
<thead>
<tr>
<th>Statement</th>
<th>Strongly agree</th>
<th>Agree</th>
<th>Neither agree or disagree</th>
<th>Disagree</th>
<th>Strongly disagree</th>
</tr>
</thead>
<tbody>
<tr>
<td>I choose to walk or cycle to places instead of using a motor vehicle</td>
<td>○</td>
<td>○</td>
<td></td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>I never waste water</td>
<td>○</td>
<td>○</td>
<td></td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>At home I recycle as much as I can</td>
<td>○</td>
<td>○</td>
<td></td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>When I use the computer or phone for social networking or gaming I always treat everyone as</td>
<td>○</td>
<td>○</td>
<td></td>
<td>○</td>
<td>○</td>
</tr>
</tbody>
</table>
respectfully
as I would in
person
I always make
lifestyle
choices that
are good for
my health
I try to do
things that
will help
people living
in poverty
I pick up litter
when I see it
in a park or
natural area
I do not think
about how I
might be
damaging the
natural
environment
Even when I
have the
option, I do
not always
compost
I try to avoid
buying goods
from
companies
with poor
track records
on caring for
their workers
or the
environment
I have
changed my
personal
lifestyle to
<table>
<thead>
<tr>
<th>Activity</th>
<th>Number of Times Mentioned</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reduce waste</td>
<td></td>
</tr>
<tr>
<td>I participated in democratic activities related to student life at school</td>
<td></td>
</tr>
<tr>
<td>I volunteer to work with local charities or environmental groups</td>
<td></td>
</tr>
<tr>
<td>I usually examine problems from many points of view</td>
<td></td>
</tr>
<tr>
<td>I have thought quite a bit about how to live sustainably</td>
<td></td>
</tr>
<tr>
<td>I give the same level of respect to people regardless of their gender identity or age</td>
<td></td>
</tr>
</tbody>
</table>

Q17 Please provide any other comments regarding your experience of Sustainable Development during your secondary school education. Your feedback is very important to this study.
References


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