Inspiring young minds: Work skills readiness for decarbonisation in the Humber

Geeta Lakshmi, Redouane Sarrakh, Anthony Daniels, Joe Howe

University of Lincoln

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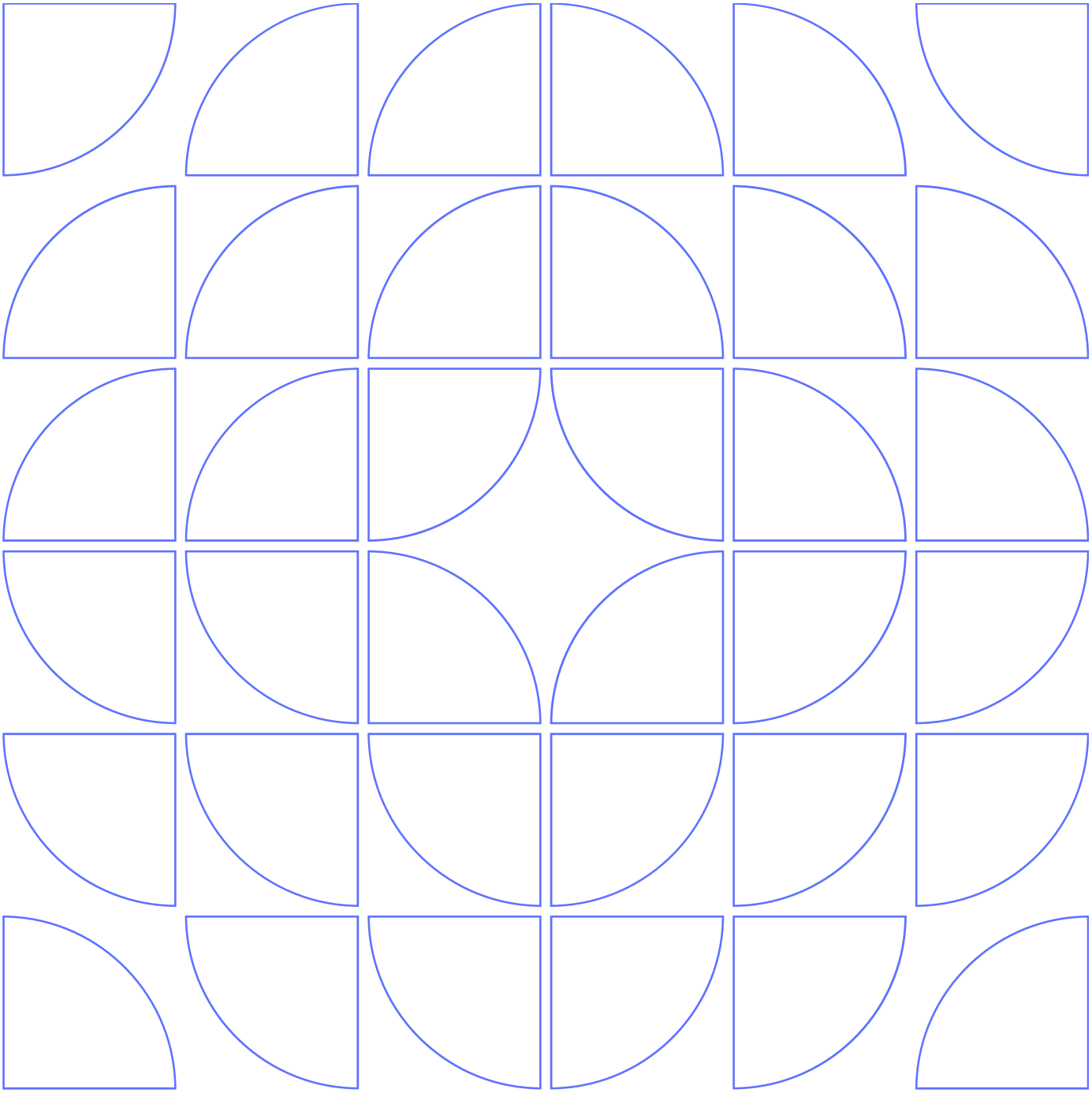

Abstract

Transitioning to a net-zero economy is crucial to reduce carbon emissions. With concentrations of energy-intensive industries, industrial clusters like the Humber must play a pivotal role in this transition. New technologies such as Carbon Capture and Storage (CCS) and blue hydrogen are being actively used, but demystifying the preparedness of the future workforce is an integral step.

The report highlights the findings of a project conducted in October 2023-Feburary 2024, exploring young pupils' perceptions of the net-zero transition across South Humber and Lincolnshire regions, including their motivations to pursue “green” careers. The aim of the project was to better understand the knowledge, attitude and aspirations towards climate change (CC) to help promote climate careers.

There is a need for education on sustainability to address the issues highlighted in this report, emphasising the importance of relevant technologies, particularly for the young. This should target young people (aged 11 to 18) who will shape the clusters’ future workforce and decision-making. The success of achieving the UK's net-zero emissions goal by 2050 therefore relies heavily on the knowledge and awareness of young people.

Impacts of this research include guiding workforce development by tailoring training programs to the needs of young people; creating closer collaboration between regional industries and schools/ communities to support decarbonisation initiatives; and providing data to support local policy decisions and incentives designed to build a workforce able to support the transition to a net-zero economy.

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Introduction

Background and Motivation

The roadmap to transitioning to a net-zero has been rapidly developed. Recent literature suggests that policy gaps still exist and risks to deliverables remain (Climate Change Committee Report to Parliament, 2022). The deployment of the roadmap includes relatively new technologies, such as decarbonisation of seven core industrialised clusters based on regions highlighted under Track 1 and Track 2, to ensure net-zero ambition translates into action across the UK (Powering up Britain, 2023). The ambition is to decarbonise while retaining growth across the UK's industrial clusters. The latter will play a significant role in this transition due to their concentration of energy-intensive industries, and their success in reducing emissions is vital.

The Humber Industrial Cluster is a thriving centre of industrial activity, generating £18 bn of the UK's economic output each year, driven largely by its deep expertise in industrial processes. A fifth of the economic value emanates from energy intensive industries and 360,000 jobs are supported by industries such as refining, petrochemicals, manufacturing, and power generation. Energy intensive industries account for around one in ten jobs in the Humber region (Humber Cluster website). The Humber is also a highest emitter of carbon in the UK -it has 2 out of UK's 6 oil refineries and 1 of two UK's integrated steelworks. Given its proximity to the North Sea, it is expecting to reach a net zero target by 2040 as it is the hub for CCUS (carbon capture storage and usage), renewable energy and hydrogen. It also houses Europe's largest biomass facility (DRAX) and has been recognised by World Economic Forum as one of two world class industrial clusters. Given that the Humber has ambitions to decarbonise and become net zero, it is seeking to train young people to deal with CCUS (carbon capture storage and usage).

Previous Literature

A previous IDRIC project (9.4) in partnership with CATCH, highlighted the need for a framework to develop skills to support decarbonisation (Maeso et al, 2023). The Green Skills Task Force (2020) highlights the key role of green skills for the future. Previous literature indicates low levels of public awareness (Alstine et al, 2022; Gough et al ,2017; Perdan et al, 2017; Lock et al, 2014), although the idea of achieving net-zero is widely recognized, there is comparatively limited knowledge regarding the deployment of decarbonisation technologies. Climate conversations around net-zero indicated key roles could be played by local authorities and local key players (Evans, 2022), providing opportunities for the university to act as an honest broker to help demystify the decarbonisation process. Education on sustainability and the importance of decarbonisation technologies is essential to ensure support and workforce recruitment for the transition to a zero-emission economy. Given the ambitions of the Humber, this research investigated the perception of young people (aged 11 – 18) regarding the ongoing transition to net-zero across the South Humber and Lincolnshire regions. Previous literature suggested that this age group has not received sufficient attention. IDRIC project 9.5 "Enabling skills for the industrial decarbonisation supply chain" (Howe and Simpson, 2022 identify skills gaps and provided valuable insights into emerging themes surrounding gender, deprivation, and career options.

Objectives

This project focuses on two main objectives and builds on previous work by widening the sample from IDRIC project 9.5. The study focused on (i) Understanding future workforce perceptions and motivations with respect to decarbonisation. (ii) Investigating the educational impact: teachers, career councillors and school staff are instrumental in shaping students' understanding of sustainability and net-zero, thus influencing future career choices.

Such insights can guide workforce development plans across the cluster and improve industry's ability to attract new and skilled employees to fill in the 25,200 high-quality direct jobs required (Vivid Economics, 2020). A key project aim is to assist training providers, specifically CATCH, to develop targeted training programs that embed the skills and knowledge required for industrial decarbonisation allowing them to identify knowledge gaps and use the findings to bolster engagement with local communities and schools, to foster support for their initiatives. Furthermore, the HEYLEP and Great Lincolnshire Local Enterprise Partnership (GLLEP) will be able to use the data collected to inform future funding support for workforce development, aligned to the needs of the Humber Industrial Cluster.

Methodology

Multiple research methods were employed to collect and analyse data. Triangulation techniques were used (particularly using multiple theoretical lens, methodological interrogation methods and, investigators) to reduce bias and increase validity of results.

As the aim of the project was to evaluate young pupils' perceptions of decarbonisation and understand their motivations to pursue green careers, mixed method approaches were deemed appropriate using both quantitative and qualitative approaches. This included survey questionnaires and interviews. Additionally, data was collected from teachers, career advisors, and school staff. Following previous literature (Mander et al, 2017), varying communication strategies for different stakeholders were employed. Accordingly, age-appropriate materials were developed and used when dealing with young school pupils and college students.

Data was collected from different schools located in South of the Humber and Lincolnshire, primarily in locations impacted by decarbonisation activities (e.g., the Viking CCS Project).
The project was conceived with the equality, diversity, and inclusion (EDI) in mind, with the collaborators mindful of Sustainable Development Goal 10 (reduced Inequalities). Equal opportunities were given to ensuring participation of young pupils from different genders, socioeconomic backgrounds, and ethnicities will be paramount. Note of the work being completed as part of IDRIC Project MIP 9.6 – "*Diversity to Decarbonise: Promoting EDI in the future workforce*" was taken.

Our approach was structured around these key activities:

Project Inception: The first stage was to have inception meetings between the academics and key stakeholders to establish timelines including Professor Joe Howe, CATCH and local contacts in the Humber.

Research Design: An in-depth review of the available literature covering different aspects of the project. This provided a baseline for the project team to design their outreach strategy, develop the survey and interview questions, and create the materials required for the interactive workshops and focus groups. The sampling strategy, data collection and analysis tools were finalised and agreed at this stage.

Initial Stakeholder Discussions: Conducted in parallel with the research design stage, understanding the project unknowns involved initial conversations with local stakeholders (teachers, industry practitioners, local government members, and academics). These were invaluable to help the project team with its research design, helping identify aspects that may not have been explored in previous studies and serving as an opportunity to review the initial research design. For example, colleagues from the University of Lincoln's School of Education helped amend the surveys to suit the reading age of children in the region. Local contacts helped establish key education specialists who helped distribute the survey.Schools contacted by email were: Caistor Yarborough Academy, The Queen Elizabeth's High School in Gainsborough, Caistor Grammar School, William Farr CofE Comprehensive School, The Gainsborough Academy, The Priory Pembroke Academy, Humberstone Academy, Oasis Academy Wintringham, Oasis Academy Immingham, Cleethorpes Academy, Havelock Academy, Beacon Academy, Ormiston Maritime Academy, John Whitgift Academy, Phoenix Park Academy, Cambridge Park Academy, Tollbar Academy, St James' School, Franklin Sixth Form College, Healing Science Academy, Learning4Life - GY, Sevenhills Academy, St Hugh's School, Outwood Academy Foxhills, Frederick Gough School, The Vale Academy, Melior Community Academy, Baysgarth School, St Bede's Catholic Academy, Sir John Nelthorpe School, The Axholme Academy, South Axholme Academy, The St Lawrence Academy, Huntcliff School, South Park Enterprise College, Engineering UTC, Outwood Academy Brumby, Winterton Community Academy, OneSchool Global UK - The Barnes Wallis Academy, Somercotes Academy, The Banovallum School, John Spendluffe Technology College, Skegness Grammar School, Queen Elizabeth's Grammar Alford - Selective Academy, King Edward VI Academy, Skegness Academy, William Lovell Church of England Academy, Louth Academy, King Edward VI Grammar School, and Queen Elizabeth's Grammar School in Horncastle. The key contacts helped the researchers also to target a snowball sample.

Data Collection and Analysis: Surveys were designed to collect quantitative data from a large sample of participants, and administered to students and school staff, either online or in paper form (depending on preference and accessibility). The questions were a mix of 5-point Likert Scale and free text. The project team tried to ensure that data collection happened at schools from four different districts (rural, coastal, large town, and small town). Qualitative semi-structured interviews were conducted with a subset of teaching staff and counsellors to gain deeper insights into students' motivations and aspirations to follow a green career, and also their teachers' awareness of decarbonisation. The quantitative data was analysed with the help of SPSS software, with a thematic analysis adopted for the qualitative data using software NVivo.

The following diagram gives a summary of the methodology.

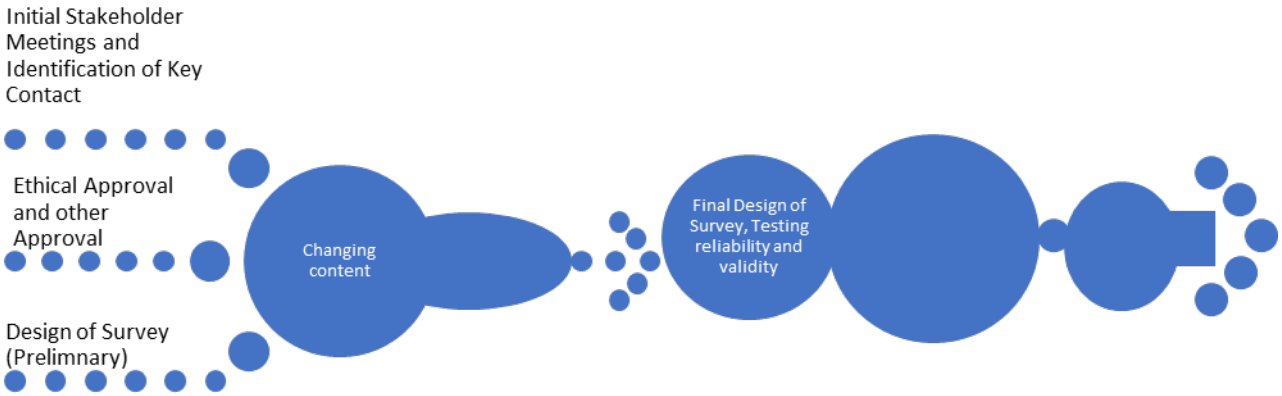

Figure 1: Methodology of the Project

Findings from Students' Surveys

Surveys were administered to students aged 11-18 and teachers. Only 18 teachers responded (reported in section 4) but there were 834 responses from students, across two types of institutions - Franklin College and 5 schools representing a younger population. The survey's questions to students were mapped into 3 areas: Knowledge, Attitude and Motivation, with their own constructs (the complete set is listed in the appendix). The analysis is divided into two distinct parts: Franklin College (with a relatively short range of ages) and those who responded from six schools (with ages ranging from 11-17).

Demographics of Students

An initial 499 responses were received from Franklin College – 9 were excluded for having no response or no serious response. The number of responses considered is 490 from Franklin College, with those from the 5 schools totalling 338. The findings for both groups are reported separately as a slightly different questionnaire was used for the latter to ensure younger pupils were not excluded. The 5 schools participating in this survey were Caistor Grammar School, Oasis Academy Wintringham, Omriston Maritime Academy, Priory Pembroke Academy and CATCH.

Female respondents from Franklin significantly outnumbered their male peers, whereas the 5 schools had an almost equal number of male and female respondents. The “others” category encompasses responses from those who did not wish to identify or regarded themselves as non-binary. The table below is a summary of the gender breakup.

	FRANKLIN COLLEGE		SCHOOLS	
	No.	**%**	**No.**	**%**
MALE	165	33.67	163	48.22
FEMALE	290	59.18	164	48.52
Others	35	7.14	11	3.25
SUM	**490**	**100**	**338**	**100**

Table 1: Gender Composition of Franklin College and Schools

The Age profile of both groups is shown in the histograms below.

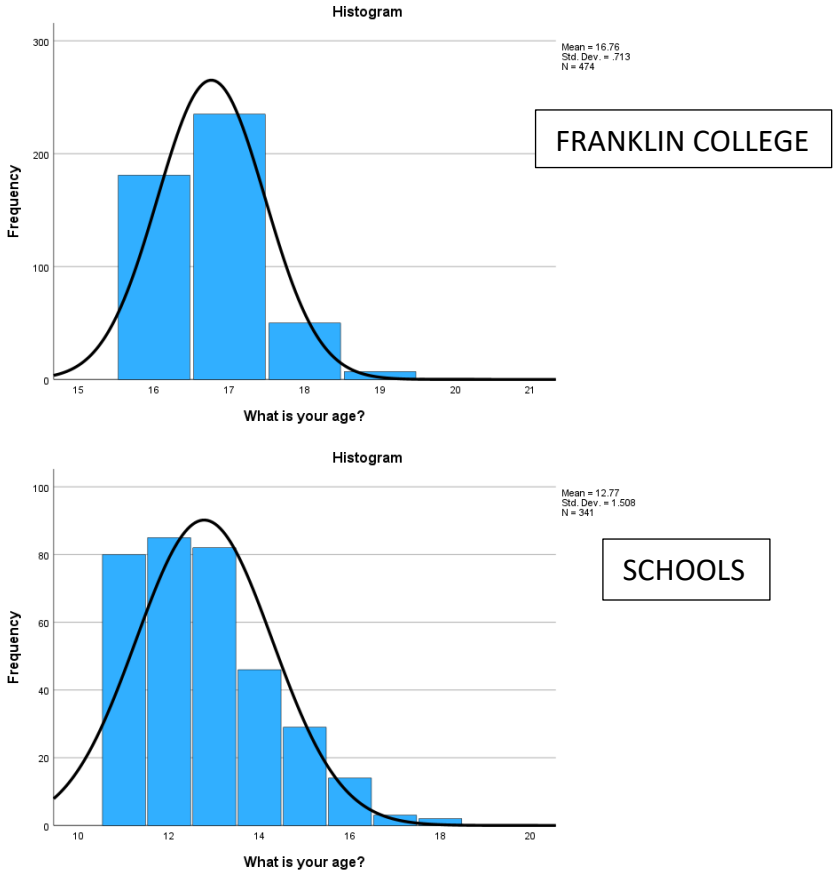

Table 1 Age Composition of Franklin College and Schools

The majority of the students from Franklin who responded are aged between 16-17 with the mean age being 16.74 years and a standard deviation of .73. Those students aged 16 years constituted 36.9% of the sample, 17 (48%), 18 (10.2%), 19 (1.4%) and 20, (.2%). For the 5 schools, most respondents (98.5%) were under 16 years with the predominant set being 11-13 years (72.4%). There were lower responses between those aged between14-16 (25.95%). The remaining 1.7% were older. The mean age is 12.77 years with a standard deviation of 1.51. Therefore, aggregating Franklin College and the 5 schools, provides data across a wide age range.

The survey questions were categorised as Knowledge of Climate Change (CC), Attitude to CC and, Career motivations. The Knowledge category explores 4 areas: the extent of **CC knowledge**, the extent of **net-zero knowledge**, the knowledge about **sources of energy** particularly in the UK and the **climate information** for learning.

The Attitude category focuses upon: **Responsibility** for CC, **Self-Belief** in Making a difference regarding CC, Efforts in **Reducing Emissions**, **Impact** of CC on Life and Family, **Discussions** with Friends and Family and Influencing People (Franklin only for the latter). The **Motivation** and **Career Choice** categories explore choices for the future envisaged by the respondents.

Knowledge

Interest in CC Knowledge

Students were questioned about their perception of their own knowledge regarding CC. A detailed analysis of climate change knowledge by gender from Franklin is shown in the table below. The percentage of respondents "somewhat interested" or "very interested" is 40.4%; the percentage disinterested ("somewhat" or "very") is nearly 25% and the neutrals are 34.7%. The percentage of interested females is higher at 41% vs 35.75% of interested from males.

			How interested are you in the topic of "Climate Change"?					
			Very uninterested	Somewhat uninterested	Neutral	Somewhat interested	Very interested	Total
What is your gender?	Male	Count	15	22	69	49	10	165
		% within What is your gender?	9.1%	13.3%	41.8%	29.7%	6.1%	100.0%
		% of Total	3.1%	4.5%	14.1%	10.0%	2.0%	33.7%
	Female	Count	33	42	95	91	29	290
		% within What is your gender?	11.4%	14.5%	32.8%	31.4%	10.0%	100.0%
		% of Total	6.7%	8.6%	19.4%	18.6%	5.9%	59.2%
	Non-binary	Count	0	3	1	6	0	10
		% within What is your gender?	0.0%	30.0%	10.0%	60.0%	0.0%	100.0%
		% of Total	0.0%	0.6%	0.2%	1.2%	0.0%	2.0%
	Prefer not to say	Count	1	5	4	9	2	21
		% within What is your gender?	4.8%	23.8%	19.0%	42.9%	9.5%	100.0%
		% of Total	0.2%	1.0%	0.8%	1.8%	0.4%	4.3%
	Other	Count	0	1	1	2	0	4
		% within What is your gender?	0.0%	25.0%	25.0%	50.0%	0.0%	100.0%
		% of Total	0.0%	0.2%	0.2%	0.4%	0.0%	0.8%
Total		Count	49	73	170	157	41	490
		% within What is your gender?	10.0%	14.9%	34.7%	32.0%	8.4%	100.0%
		% of Total	10.0%	14.9%	34.7%	32.0%	8.4%	100.0%

Table 3: Climate Change Knowledge of Respondents from Franklin college

School students were asked a similar question (wording changed to make comprehension easier for younger participants). The results are shown in Table 3b. Overall, 33.3% of the respondents indicated that they were "not interested in CC", 31.6% highlighted that they are "interested", while 34.9% "don't know". There is an almost equal distribution of the respondents who were not interested, interested, or unsure (don't know). The inclusion of the "Don't know" option was deliberate to include (especially when collecting data from children in online context) reflections on their own opinions more precisely, rather than just skip the question or give a wrong answer. The percentage of girls interested was 33% vs 35% for boys.

			Are you interested in "Climate Change"?			
			Not interested	Interested	Don't know	Total
What is your gender?	Male	Count	61	42	56	159
		% within What is your gender?	38.4%	26.4%	35.2%	100.0%
		% of Total	18.4%	12.7%	16.9%	47.9%
	Female	Count	49	59	54	162
		% within What is your gender?	30.2%	36.4%	33.3%	100.0%
		% of Total	14.8%	17.8%	16.3%	48.8%
	Non-binary	Count	0	0	2	2
		% within What is your gender?	0.0%	0.0%	100.0%	100.0%
		% of Total	0.0%	0.0%	0.6%	0.6%
	Prefer not to say	Count	1	3	3	7
		% within What is your gender?	14.3%	42.9%	42.9%	100.0%
		% of Total	0.3%	0.9%	0.9%	2.1%
	Other	Count	0	1	1	2
		% within What is your gender?	0.0%	50.0%	50.0%	100.0%
		% of Total	0.0%	0.3%	0.3%	0.6%
Total		Count	111	105	116	332
		% within What is your gender?	33.4%	31.6%	34.9%	100.0%
		% of Total	33.4%	31.6%	34.9%	100.0%

Table 3b: Climate Change Knowledge of Respondents from schools

Net Zero Comprehension

The next question focused on knowledge of net zero and net zero goals and responses are shown below in Tables 4 and 4b. Over 43% of Franklin College students have never heard of net-zero. Overall, 83% of the school's participants have never heard of the term "Net-Zero" – with 79% of male participants and 86% of female stating they had not. Out of the 17% (57 participants) that indicated that they heard of the "Net-zero" term, only 6% (21 participants) were able to give a definition of the term. Some of the definitions such as: "cutting greenhouse gas emissions to as close to zero as possible", "Put simply, net zero refers to the balance between the amount of greenhouse gas (GHG) that's produced and the amount that's removed from the atmosphere. It can be achieved through a combination of emission reduction and emission removal" were taken directly from the internet. Unsurprisingly compared to their older counterparts from college, a much higher percentage are unaware.

			Have you heard about the terms "net-zero" before?		
			Yes	No	Total
What is your gender?	Male	Count	112	52	164
		% within Have you heard about the terms "net-zero" before?	40.6%	24.9%	33.8%
		% of Total	23.1%	10.7%	33.8%
	Female	Count	144	142	286
		% within Have you heard about the terms "net-zero" before?	52.2%	67.9%	59.0%
		% of Total	29.7%	29.3%	59.0%
	Non-binary	Count	4	6	10
		% within Have you heard about the terms "net-zero" before?	1.4%	2.9%	2.1%
		% of Total	0.8%	1.2%	2.1%
	Prefer not to say	Count	12	9	21
		% within Have you heard about the terms "net-zero" before?	4.3%	4.3%	4.3%
		% of Total	2.5%	1.9%	4.3%
	Other	Count	4	0	4
		% within Have you heard about the terms "net-zero" before?	1.4%	0.0%	0.8%
		% of Total	0.8%	0.0%	0.8%
Total		Count	276	209	485
		% within Have you heard about the terms "net-zero" before?	100.0%	100.0%	100.0%
		% of Total	56.9%	43.1%	100.0%

Table 4: Knowledge of Net-Zero by Respondents from Franklin college

			Have you heard or read the phrase "net-zero" before?		
			Yes	No	Total
What is your gender?	Male	Count	33	127	160
		% within What is your gender?	20.6%	79.4%	100.0%
		% of Total	10.0%	38.5%	48.5%
	Female	Count	22	137	159
		% within What is your gender?	13.8%	86.2%	100.0%
		% of Total	6.7%	41.5%	48.2%
	Non-binary	Count	0	2	2
		% within What is your gender?	0.0%	100.0%	100.0%
		% of Total	0.0%	0.6%	0.6%
	Prefer not to say	Count	1	6	7
		% within What is your gender?	14.3%	85.7%	100.0%
		% of Total	0.3%	1.8%	2.1%
	Other	Count	1	1	2
		% within What is your gender?	50.0%	50.0%	100.0%
		% of Total	0.3%	0.3%	0.6%
Total		Count	57	273	330
		% within What is your gender?	17.3%	82.7%	100.0%
		% of Total	17.3%	82.7%	100.0%

Table 4b: Knowledge of Net-Zero by Respondents from schools

The UK goal is to hit a net-zero target by 2050. When asked if Franklin students had awareness of when UK goals of Net Zero were to be achieved, more than **half the participants (55.7%) have heard about the UK's net-zero goals**. In contrast, only 18% of School respondents had heard of the UK's Net-zero emissions by 2050 (The full table is not displayed here for brevity of reporting).

Sources of Energy Awareness

Students were asked about the source of environmentally friendly (renewable) technology across a **number of sources**. Table 5 and 5b**.** show that Franklin students are conversant with leading role of wind energy in the renewable sector. Several participants chose renewable energy as the most sustainable form of energy – with "Wind energy" and "Solar energy" the two leading forms. Water energy is not the second highest source of renewable energy in the UK as the number of hydro power stations have remained stagnant, whereas solar installations have increased. "Coal", "Oil" and "Nuclear energy" were listed as the least sustainable in the UK. School participants also have a widespread acknowledgment of the sustainability of renewable energy sources, less so of the polluting energy sources as biomass is considered part of renewables considering its role in natural carbon cycle.

Three hundred and forty-seven participants from Franklin (70.6%) were able to list one or more things that can help them and their families **to reduce carbon emissions** – with "use of public transport" [133 responses], "recycling" [123 responses], "walking" [98 responses] and "less cars" [96 responses]. The full table is not shown here. School respondents correctly identified "Wind energy", "Solar energy and "Water energy" as the best energy sources (with a relatively equal distribution between the two largest genders). Similarly, they were able to name those three as the best energy sources for the UK. The majority were able to name at least one thing that can help them, and their families reduce carbon footprints – with "use less" [118 responses], "recycling" [55 responses], "electric cars" [34 responses] and "walking" [27 responses].

Which form of energy production do you think are the most environmental, social and human friendly in the UK?

		Wind energy	Water energy	Solar energy	Coal	Oil	Natural gas	Nuclear energy	Biomass
What is your gender?	Male	138	104	129	4	3	11	34	35
	Female	234	167	208	3	9	28	17	44
	Non-binary	10	5	6	0	0	0	0	2
	Prefer not to say	16	12	15	0	0	3	5	5
	Other	3	2	4	0	0	1	1	2

Table 5: Knowledge of Energy Sources in Franklin college

Which way to produce energy do you think is the best for the environment and people?

		Biomass Count	Coal Count	Natural gas Count	Nuclear energy Count	Oil Count	Solar energy Count	Water energy Count	Wind Energy Count
What is your gender?	Male	20	13	27	31	16	106	93	106
	Female	22	16	58	31	20	97	83	100
	Non-binary	0	0	0	0	0	1	0	2
	Prefer not to say	1	1	2	0	0	4	3	3
	Other	0	1	1	0	0	1	1	2

Table 5b: Knowledge of Energy Sources in schools

Source of Information about Climate Change

Tables 6 and 6b are insightful because they show where students get their climate information from.

Where do you get your climate change information from?

		Social media (TikTok, Instagram, Facebook ...)	Internet	Local television news	Local radio stations	Local newspapers	Word of mouth from family and friends	Flyers from interested groups	Other
What is your gender?	Male	101	84	55	14	10	37	3	19
	Female	195	131	113	27	14	73	13	25
	Non-binary	7	8	2	1	1	3	1	1
	Prefer not to say	10	9	4	0	0	3	1	7
	Other	4	3	2	2	1	1	0	0

Table 6: Source of Information about Climate from Franklin college

Where do you get your climate change information from?

		Social media (TikTok, Instagram, Facebook ...)	Internet	Local television news	Local radio stations	Local newspapers	Word of mouth from family and friends	Flyers from interested groups	Other
What is your gender?	Male	70	67	45	19	15	21	8	24
	Female	91	75	49	22	20	26	10	26
	Non-binary	2	0	0	0	0	0	0	0
	Prefer not to say	2	1	1	1	2	2	0	3
	Other	0	1	0	0	0	0	0	1

Table 6b: Source of Information about Climate from schools

Popular choices for both Franklin and the 5 schools are social media and Internet. 65% of Franklin respondents get their information from social media and 48% from the Internet. 49% of school respondents get their information from social media and 43% from the Internet, while only 38 participants listed “School” as their source of information for climate change knowledge. Use of social media and the Internet is more prevalent in Franklin, although the figures from the schools are also high.

Climate Change Attitudes

This section looks at attitudes of the respondents and focuses on: **Responsibility** for CC, **Self-Belief** in Making a difference regarding CC, Efforts in **Reducing Emissions**, **Impact** of CC on Life and Family, **Discussions** with Friends and Family and Influencing People (Franklin only for the latter).

Responsibility to act in a climate friendly manner

Students were asked if they felt the need to be acting in a responsible way considering their knowledge of CC. The responses are displayed in Table 7 and 7b:

			I have a responsibility to act in a climate-friendly manner					
			Totally disagree	Disagree	Neutral	Agree	Totally agree	Total
What is your gender?	Male	Count	3	6	56	85	14	164
		% within What is your gender?	1.8%	3.7%	34.1%	51.8%	8.5%	100.0%
		% of Total	0.6%	1.2%	11.5%	17.4%	2.9%	33.6%
	Female	Count	6	10	70	142	61	289
		% within What is your gender?	2.1%	3.5%	24.2%	49.1%	21.1%	100.0%
		% of Total	1.2%	2.0%	14.3%	29.1%	12.5%	59.2%
	Non-binary	Count	0	0	2	6	2	10
		% within What is your gender?	0.0%	0.0%	20.0%	60.0%	20.0%	100.0%
		% of Total	0.0%	0.0%	0.4%	1.2%	0.4%	2.0%
	Prefer not to say	Count	0	0	5	12	4	21
		% within What is your gender?	0.0%	0.0%	23.8%	57.1%	19.0%	100.0%
		% of Total	0.0%	0.0%	1.0%	2.5%	0.8%	4.3%
	Other	Count	0	0	0	3	1	4
		% within What is your gender?	0.0%	0.0%	0.0%	75.0%	25.0%	100.0%
		% of Total	0.0%	0.0%	0.0%	0.6%	0.2%	0.8%
Total		Count	9	16	133	248	82	488
		% within What is your gender?	1.8%	3.3%	27.3%	50.8%	16.8%	100.0%
		% of Total	1.8%	3.3%	27.3%	50.8%	16.8%	100.0%

Table7: Climate Change Attitudes of students from Franklin college

			Do you think that you should behave in a climate-friendly manner?			
			Yes	No	Don't know	Total
What is your gender?	Male	Count	101	11	50	162
		% within What is your gender?	62.3%	6.8%	30.9%	100.0%
		% of Total	30.1%	3.3%	14.9%	48.4%
	Female	Count	111	5	47	163
		% within What is your gender?	68.1%	3.1%	28.8%	100.0%
		% of Total	33.1%	1.5%	14.0%	48.7%
	Non-binary	Count	2	0	0	2
		% within What is your gender?	100.0%	0.0%	0.0%	100.0%
		% of Total	0.6%	0.0%	0.0%	0.6%
	Prefer not to say	Count	4	2	0	6
		% within What is your gender?	66.7%	33.3%	0.0%	100.0%
		% of Total	1.2%	0.6%	0.0%	1.8%
	Other	Count	1	0	1	2
		% within What is your gender?	50.0%	0.0%	50.0%	100.0%
		% of Total	0.3%	0.0%	0.3%	0.6%
Total		Count	219	18	98	335
		% within What is your gender?	65.4%	5.4%	29.3%	100.0%
		% of Total	65.4%	5.4%	29.3%	100.0%

Table 7b: Climate Change Attitudes of students from schools

Taking into consideration all responses, 67.6% of the Franklin participants feel they have a **responsibility** to act in a climate-friendly manner. The percentage for females is higher (70.2%) than for males (60.3%). Of the schools' respondents, 65% believe they should act responsibly, with only 5% disagreeing in both Franklin and the 5 schools.

Self-Belief if actions can make a difference.

There appears to be a significant level of awareness and personal accountability regarding environmental issues amongst the participants, along with a willingness to take action and a positive attitude towards environmental stewardship. A considerable number might be receptive to adopting sustainable behaviours and supporting initiatives aimed at reducing carbon emissions. The tables below shows that although there is awareness about CC, students feel unable to make a difference.

			I believe I can make a difference in addressing climate change					
			Totally disagree	Disagree	Neutral	Agree	Totally agree	Total
What is your gender?	Male	Count	12	32	79	35	5	163
		% within What is your gender?	7.4%	19.6%	48.5%	21.5%	3.1%	100.0%
		% of Total	2.5%	6.6%	16.2%	7.2%	1.0%	33.5%
	Female	Count	16	42	131	87	13	289
		% within What is your gender?	5.5%	14.5%	45.3%	30.1%	4.5%	100.0%
		% of Total	3.3%	8.6%	26.9%	17.9%	2.7%	59.3%
	Non-binary	Count	1	3	4	2	0	10
		% within What is your gender?	10.0%	30.0%	40.0%	20.0%	0.0%	100.0%
		% of Total	0.2%	0.6%	0.8%	0.4%	0.0%	2.1%
	Prefer not to say	Count	1	4	13	2	1	21
		% within What is your gender?	4.8%	19.0%	61.9%	9.5%	4.8%	100.0%
		% of Total	0.2%	0.8%	2.7%	0.4%	0.2%	4.3%
	Other	Count	1	1	0	1	1	4
		% within What is your gender?	25.0%	25.0%	0.0%	25.0%	25.0%	100.0%
		% of Total	0.2%	0.2%	0.0%	0.2%	0.2%	0.8%
Total		Count	31	82	227	127	20	487
		% within What is your gender?	6.4%	16.8%	46.6%	26.1%	4.1%	100.0%
		% of Total	6.4%	16.8%	46.6%	26.1%	4.1%	100.0%

Table 8: Self Belief in Making a Difference to Climate Change in Franklin college.

			Do you agree with the statement: "I can make a difference in reducing climate change"			
			Agree	Disagree	Don't know	Total
What is your gender?	Male	Count	65	32	62	159
		% within What is your gender?	40.9%	20.1%	39.0%	100.0%
		% of Total	19.6%	9.7%	18.7%	48.0%
	Female	Count	82	18	61	161
		% within What is your gender?	50.9%	11.2%	37.9%	100.0%
		% of Total	24.8%	5.4%	18.4%	48.6%
	Non-binary	Count	1	1	0	2
		% within What is your gender?	50.0%	50.0%	0.0%	100.0%
		% of Total	0.3%	0.3%	0.0%	0.6%
	Prefer not to say	Count	3	1	3	7
		% within What is your gender?	42.9%	14.3%	42.9%	100.0%
		% of Total	0.9%	0.3%	0.9%	2.1%
	Other	Count	1	0	1	2
		% within What is your gender?	50.0%	0.0%	50.0%	100.0%
		% of Total	0.3%	0.0%	0.3%	0.6%
Total		Count	152	52	127	331
		% within What is your gender?	45.9%	15.7%	38.4%	100.0%
		% of Total	45.9%	15.7%	38.4%	100.0%

Table 8b: Self Belief in Making a Difference to Climate Change in schools.

Only 30.2% of the Franklin participants think they can make **a difference** in addressing climate change. The percentage of females is higher than for males (35% vs 25%) who feel unable to make a difference (agree, totally agree). The percentage of school respondents for the same choice is 50.9% for females vs. 40.9% for males. It is surprising that this drops as they get older for both genders. There is a **contrast between results of knowledge vs attitude**, and a discrepancy between participants perception and attitude (what they think is right and what they can do). While a majority (67.6%) acknowledge their responsibility to act in a climate-friendly manner, a considerably smaller number of participants (30.2%) believe they can make a difference. **Although participants recognise the importance of their actions in mitigating climate change, there seems to be an uncertainty about the efficacity of their actions in making a tangible difference – they might see this issue to be of great magnitude but cannot imagine how their actions can create meaningful change.**

Reduction of Personal Carbon Emissions

Respondents were asked if they wanted to reduce their personal emissions to make a difference to CC, with results shown in Table 9a and 9b below.

			I would like to reduce my and my family's carbon emissions					
			Totally disagree	Disagree	Neutral	Agree	Totally agree	Total
What is your gender?	Male	Count	3	13	78	58	12	164
		% within What is your gender?	1.8%	7.9%	47.6%	35.4%	7.3%	100.0%
		% of Total	0.6%	2.7%	16.1%	12.0%	2.5%	33.8%
	Female	Count	12	10	105	122	37	286
		% within What is your gender?	4.2%	3.5%	36.7%	42.7%	12.9%	100.0%
		% of Total	2.5%	2.1%	21.6%	25.2%	7.6%	59.0%
	Non-binary	Count	0	1	3	4	2	10
		% within What is your gender?	0.0%	10.0%	30.0%	40.0%	20.0%	100.0%
		% of Total	0.0%	0.2%	0.6%	0.8%	0.4%	2.1%
	Prefer not to say	Count	0	2	9	7	3	21
		% within What is your gender?	0.0%	9.5%	42.9%	33.3%	14.3%	100.0%
		% of Total	0.0%	0.4%	1.9%	1.4%	0.6%	4.3%
	Other	Count	0	0	1	3	0	4
		% within What is your gender?	0.0%	0.0%	25.0%	75.0%	0.0%	100.0%
		% of Total	0.0%	0.0%	0.2%	0.6%	0.0%	0.8%
Total		Count	15	26	196	194	54	485
		% within What is your gender?	3.1%	5.4%	40.4%	40.0%	11.1%	100.0%
		% of Total	3.1%	5.4%	40.4%	40.0%	11.1%	100.0%

Table 9a: Desire to Reduce Personal Emissions (Franklin college)

			Do you agree with the statement: "I would like to help reduce my family's carbon footprint"			
			Agree	Disagree	Don't know	Total
What is your gender?	Male	Count	64	20	75	159
		% within What is your gender?	40.3%	12.6%	47.2%	100.0%
		% of Total	19.5%	6.1%	22.8%	48.3%
	Female	Count	65	12	83	160
		% within What is your gender?	40.6%	7.5%	51.9%	100.0%
		% of Total	19.8%	3.6%	25.2%	48.6%
	Non-binary	Count	0	1	1	2
		% within What is your gender?	0.0%	50.0%	50.0%	100.0%
		% of Total	0.0%	0.3%	0.3%	0.6%
	Prefer not to say	Count	1	0	5	6
		% within What is your gender?	16.7%	0.0%	83.3%	100.0%
		% of Total	0.3%	0.0%	1.5%	1.8%
	Other	Count	1	0	1	2
		% within What is your gender?	50.0%	0.0%	50.0%	100.0%
		% of Total	0.3%	0.0%	0.3%	0.6%
Total		Count	131	33	165	329
		% within What is your gender?	39.8%	10.0%	50.2%	100.0%
		% of Total	39.8%	10.0%	50.2%	100.0%

Table 9b: Desire to Reduce Personal Emissions (schools)

Over 51% of the Franklin participants would **like to reduce their carbon emissions**, the percentage of females wanting to do so is higher than males. 39% of the school respondents would like to do so. The gender composition at Franklin is higher for females, 55.6% (F) vs 42% (M) but is equal in schools.

Impact on Personal Sphere of Life

Table 10 shows that 52% of Franklin respondents were concerned about **impact on personal life,** with more females concerned (moderately, very, and extremely concerned) than males (56% vs 47%). The percentage of school children who are concerned about the impact of climate change is smaller compared to the college respondents (43.4% compared to 52%).

			Your life					
			Not concerned	Slightly concerned	Moderately concerned	Very concerned	Extremely concerned	Total
What is your gender?	Male	Count	47	41	45	24	8	165
		% within What is your gender?	28.5%	24.8%	27.3%	14.5%	4.8%	100.0%
		% of Total	9.6%	8.4%	9.2%	4.9%	1.6%	33.7%
	Female	Count	48	80	100	47	14	289
		% within What is your gender?	16.6%	27.7%	34.6%	16.3%	4.8%	100.0%
		% of Total	9.8%	16.4%	20.4%	9.6%	2.9%	59.1%
	Non-binary	Count	0	4	4	1	1	10
		% within What is your gender?	0.0%	40.0%	40.0%	10.0%	10.0%	100.0%
		% of Total	0.0%	0.8%	0.8%	0.2%	0.2%	2.0%
	Prefer not to say	Count	8	4	5	2	2	21
		% within What is your gender?	38.1%	19.0%	23.8%	9.5%	9.5%	100.0%
		% of Total	1.6%	0.8%	1.0%	0.4%	0.4%	4.3%
	Other	Count	0	1	2	1	0	4
		% within What is your gender?	0.0%	25.0%	50.0%	25.0%	0.0%	100.0%
		% of Total	0.0%	0.2%	0.4%	0.2%	0.0%	0.8%
Total		Count	103	130	156	75	25	489
		% within What is your gender?	21.1%	26.6%	31.9%	15.3%	5.1%	100.0%
		% of Total	21.1%	26.6%	31.9%	15.3%	5.1%	100.0%

Table 10: Impact of Climate Change on Personal Life (Franklin college)

			Your life			
			Not concerned	Concerned	Don't know	Total
What is your gender?	Male	Count	59	60	41	160
		% within What is your gender?	36.9%	37.5%	25.6%	100.0%
		% of Total	17.7%	18.0%	12.3%	47.9%
	Female	Count	34	79	50	163
		% within What is your gender?	20.9%	48.5%	30.7%	100.0%
		% of Total	10.2%	23.7%	15.0%	48.8%
	Non-binary	Count	0	2	0	2
		% within What is your gender?	0.0%	100.0%	0.0%	100.0%
		% of Total	0.0%	0.6%	0.0%	0.6%
	Prefer not to say	Count	3	3	1	7
		% within What is your gender?	42.9%	42.9%	14.3%	100.0%
		% of Total	0.9%	0.9%	0.3%	2.1%
	Other	Count	0	1	1	2
		% within What is your gender?	0.0%	50.0%	50.0%	100.0%
		% of Total	0.0%	0.3%	0.3%	0.6%
Total		Count	96	145	93	334
		% within What is your gender?	28.7%	43.4%	27.8%	100.0%
		% of Total	28.7%	43.4%	27.8%	100.0%

Table 10b: Impact of Climate Change on Personal Life (schools)

Respondents from both institutions were also asked about the impact on family life. Tables (11a and 11b)

			Your family's life					
			Not concerned	Slightly concerned	Moderately concerned	Very concerned	Extremely concerned	Total
What is your gender?	Male	Count	37	46	56	16	9	164
		% within What is your gender?	22.6%	28.0%	34.1%	9.8%	5.5%	100.0%
		% of Total	7.6%	9.4%	11.5%	3.3%	1.8%	33.6%
	Female	Count	44	72	111	40	22	289
		% within What is your gender?	15.2%	24.9%	38.4%	13.8%	7.6%	100.0%
		% of Total	9.0%	14.8%	22.7%	8.2%	4.5%	59.2%
	Non-binary	Count	0	4	3	3	0	10
		% within What is your gender?	0.0%	40.0%	30.0%	30.0%	0.0%	100.0%
		% of Total	0.0%	0.8%	0.6%	0.6%	0.0%	2.0%
	Prefer not to say	Count	5	6	6	3	1	21
		% within What is your gender?	23.8%	28.6%	28.6%	14.3%	4.8%	100.0%
		% of Total	1.0%	1.2%	1.2%	0.6%	0.2%	4.3%
	Other	Count	1	1	1	1	0	4
		% within What is your gender?	25.0%	25.0%	25.0%	25.0%	0.0%	100.0%
		% of Total	0.2%	0.2%	0.2%	0.2%	0.0%	0.8%
Total		Count	87	129	177	63	32	488
		% within What is your gender?	17.8%	26.4%	36.3%	12.9%	6.6%	100.0%
		% of Total	17.8%	26.4%	36.3%	12.9%	6.6%	100.0%

Table 11a: Impact of Climate Change on Family's Life (Franklin college)

			Your family's life			
			Not concerned	Concerned	Don't know	Total
What is your gender?	Male	Count	40	82	38	160
		% within What is your gender?	25.0%	51.2%	23.8%	100.0%
		% of Total	12.0%	24.7%	11.4%	48.2%
	Female	Count	28	82	51	161
		% within What is your gender?	17.4%	50.9%	31.7%	100.0%
		% of Total	8.4%	24.7%	15.4%	48.5%
	Non-binary	Count	0	2	0	2
		% within What is your gender?	0.0%	100.0%	0.0%	100.0%
		% of Total	0.0%	0.6%	0.0%	0.6%
	Prefer not to say	Count	1	4	2	7
		% within What is your gender?	14.3%	57.1%	28.6%	100.0%
		% of Total	0.3%	1.2%	0.6%	2.1%
	Other	Count	0	1	1	2
		% within What is your gender?	0.0%	50.0%	50.0%	100.0%
		% of Total	0.0%	0.3%	0.3%	0.6%
Total		Count	69	171	92	332
		% within What is your gender?	20.8%	51.5%	27.7%	100.0%
		% of Total	20.8%	51.5%	27.7%	100.0%

Table 11b: Impact of Climate Change on Family's Life (schools)

Table 11a and Table 11b show a similar trend with 55.8% of the Franklin respondents. and a greater percentage of females concerned about the **impact on their family life** than males (60%| vs 49%). Over half the school respondents (51.5%) were worried about the impact on their families. There was no discernible trend regarding gender.

Discussions with wider community

Participants were questioned on whether they had wider discussions with friends and family. The results are reported in Tables 12 and 13 below.

			Discuss climate change with your friends?					
			Never	Rarely	Sometimes	Often	Always	Total
What is your gender?	Male	Count	76	65	19	4	1	165
		% within What is your gender?	46.1%	39.4%	11.5%	2.4%	0.6%	100.0%
		% of Total	15.6%	13.3%	3.9%	0.8%	0.2%	33.8%
	Female	Count	142	76	62	6	2	288
		% within What is your gender?	49.3%	26.4%	21.5%	2.1%	0.7%	100.0%
		% of Total	29.1%	15.6%	12.7%	1.2%	0.4%	59.0%
	Non-binary	Count	3	6	1	0	0	10
		% within What is your gender?	30.0%	60.0%	10.0%	0.0%	0.0%	100.0%
		% of Total	0.6%	1.2%	0.2%	0.0%	0.0%	2.0%
	Prefer not to say	Count	7	10	4	0	0	21
		% within What is your gender?	33.3%	47.6%	19.0%	0.0%	0.0%	100.0%
		% of Total	1.4%	2.0%	0.8%	0.0%	0.0%	4.3%
	Other	Count	1	1	1	1	0	4
		% within What is your gender?	25.0%	25.0%	25.0%	25.0%	0.0%	100.0%
		% of Total	0.2%	0.2%	0.2%	0.2%	0.0%	0.8%
Total		Count	229	158	87	11	3	488
		% within What is your gender?	46.9%	32.4%	17.8%	2.3%	0.6%	100.0%
		% of Total	46.9%	32.4%	17.8%	2.3%	0.6%	100.0%

Table 12a: Discussion about Climate change with Friends (Franklin college)

			Discuss climate change with your friends?				
			Always	Sometimes	Never	Don't know	Total
What is your gender?	Male	Count	5	35	104	16	160
		% within What is your gender?	3.1%	21.9%	65.0%	10.0%	100.0%
		% of Total	1.5%	10.4%	31.0%	4.8%	47.8%
	Female	Count	2	33	107	22	164
		% within What is your gender?	1.2%	20.1%	65.2%	13.4%	100.0%
		% of Total	0.6%	9.9%	31.9%	6.6%	49.0%
	Non-binary	Count	0	0	2	0	2
		% within What is your gender?	0.0%	0.0%	100.0%	0.0%	100.0%
		% of Total	0.0%	0.0%	0.6%	0.0%	0.6%
	Prefer not to say	Count	1	2	3	1	7
		% within What is your gender?	14.3%	28.6%	42.9%	14.3%	100.0%
		% of Total	0.3%	0.6%	0.9%	0.3%	2.1%
	Other	Count	0	0	1	1	2
		% within What is your gender?	0.0%	0.0%	50.0%	50.0%	100.0%
		% of Total	0.0%	0.0%	0.3%	0.3%	0.6%
Total		Count	8	70	217	40	335
		% within What is your gender?	2.4%	20.9%	64.8%	11.9%	100.0%
		% of Total	2.4%	20.9%	64.8%	11.9%	100.0%

Table 12b: Discussion about Climate change with Friends (schools)

			Discuss climate change with your family?					
			Never	Rarely	Sometimes	Often	Always	Total
What is your gender?	Male	Count	66	60	33	4	1	164
		% within What is your gender?	40.2%	36.6%	20.1%	2.4%	0.6%	100.0%
		% of Total	13.6%	12.3%	6.8%	0.8%	0.2%	33.7%
	Female	Count	101	88	71	24	4	288
		% within What is your gender?	35.1%	30.6%	24.7%	8.3%	1.4%	100.0%
		% of Total	20.7%	18.1%	14.6%	4.9%	0.8%	59.1%
	Non-binary	Count	6	4	0	0	0	10
		% within What is your gender?	60.0%	40.0%	0.0%	0.0%	0.0%	100.0%
		% of Total	1.2%	0.8%	0.0%	0.0%	0.0%	2.1%
	Prefer not to say	Count	7	9	3	2	0	21
		% within What is your gender?	33.3%	42.9%	14.3%	9.5%	0.0%	100.0%
		% of Total	1.4%	1.8%	0.6%	0.4%	0.0%	4.3%
	Other	Count	1	1	1	1	0	4
		% within What is your gender?	25.0%	25.0%	25.0%	25.0%	0.0%	100.0%
		% of Total	0.2%	0.2%	0.2%	0.2%	0.0%	0.8%
Total		Count	181	162	108	31	5	487
		% within What is your gender?	37.2%	33.3%	22.2%	6.4%	1.0%	100.0%
		% of Total	37.2%	33.3%	22.2%	6.4%	1.0%	100.0%

Table 13a: Discussion about Climate Change with Family (Franklin college)

			Discuss climate change with your family?				
			Always	Sometimes	Never	Don't know	Total
What is your gender?	Male	Count	8	45	83	24	160
		% within What is your gender?	5.0%	28.1%	51.9%	15.0%	100.0%
		% of Total	2.4%	13.5%	24.9%	7.2%	47.9%
	Female	Count	2	51	94	16	163
		% within What is your gender?	1.2%	31.3%	57.7%	9.8%	100.0%
		% of Total	0.6%	15.3%	28.1%	4.8%	48.8%
	Non-binary	Count	0	0	1	1	2
		% within What is your gender?	0.0%	0.0%	50.0%	50.0%	100.0%
		% of Total	0.0%	0.0%	0.3%	0.3%	0.6%
	Prefer not to say	Count	1	3	2	1	7
		% within What is your gender?	14.3%	42.9%	28.6%	14.3%	100.0%
		% of Total	0.3%	0.9%	0.6%	0.3%	2.1%
	Other	Count	0	2	0	0	2
		% within What is your gender?	0.0%	100.0%	0.0%	0.0%	100.0%
		% of Total	0.0%	0.6%	0.0%	0.0%	0.6%
Total		Count	11	101	180	42	334
		% within What is your gender?	3.3%	30.2%	53.9%	12.6%	100.0%
		% of Total	3.3%	30.2%	53.9%	12.6%	100.0%

Table 13b: Discussion about Climate Change with Family (schools)

The tables 12 and 13 show that 79.3% of the Franklin participants never/rarely discuss climate change with their peers and 70.5% never/rarely discuss it with their family. The figures for schools are 64.8% and 53.9% respectively. This suggests a possible communication gap and lack of dialogue surrounding climate change within the participants social circles and family. We did not investigate the reasons underpinning these results, which do highlight barriers with communication and an urgent need to foster dialogue and empower these children. The results reinforce the discrepancy between perception and action highlighted previously, adding communication as another barrier.

As can be seen in Table 14, some students from Franklin like to influence their friends and family, with 16% of females vs 13% males attempting to **influence their friends**, and 37% females vs 16% of males attempting to **influence their families**. This seems to indicate that girls are much more likely to influence

their families than friends, which may be due to peer pressure concerns. This is consistent across many indicators. It should be noted that this data was not collected at school level.

Of the total, 47.3% of the participants never try to influence their friends to act in a climate friendly manner, 27% rarely do that and 20.4% sometimes do that. While 42% never try to influence their family to act in a climate friendly manner, 26.5% rarely do that and 20.4% sometimes do that, and 9.9% often do that – This supports previous findings, the lack of engagement/action, although the vast majority of them acknowledges the importance of acting in a climate-friendly manner. However, 9.9% of the total participants actively attempt to influence their family members, indicating higher level of engagement within family compared to peer interactions. This supports the hypothesis for "Climate Change Attitude" theme that students have a high perception/knowledge but a hesitancy to influence and discuss.

			Try to influence my friends to act in a climate friendly manner					
			Never	Rarely	Sometimes	Often	Always	Total
What is your gender?	Male	Count	92	45	23	2	2	164
		% within What is your gender?	56.1%	27.4%	14.0%	1.2%	1.2%	100.0%
		% of Total	18.9%	9.3%	4.7%	0.4%	0.4%	33.7%
	Female	Count	121	78	68	16	4	287
		% within What is your gender?	42.2%	27.2%	23.7%	5.6%	1.4%	100.0%
		% of Total	24.9%	16.0%	14.0%	3.3%	0.8%	59.1%
	Non-binary	Count	4	3	2	1	0	10
		% within What is your gender?	40.0%	30.0%	20.0%	10.0%	0.0%	100.0%
		% of Total	0.8%	0.6%	0.4%	0.2%	0.0%	2.1%
	Prefer not to say	Count	10	5	6	0	0	21
		% within What is your gender?	47.6%	23.8%	28.6%	0.0%	0.0%	100.0%
		% of Total	2.1%	1.0%	1.2%	0.0%	0.0%	4.3%
	Other	Count	3	0	0	0	1	4
		% within What is your gender?	75.0%	0.0%	0.0%	0.0%	25.0%	100.0%
		% of Total	0.6%	0.0%	0.0%	0.0%	0.2%	0.8%
Total		Count	230	131	99	19	7	486
		% within What is your gender?	47.3%	27.0%	20.4%	3.9%	1.4%	100.0%
		% of Total	47.3%	27.0%	20.4%	3.9%	1.4%	100.0%

Table 14: Influencing Friends regarding Climate Change (Franklin college)

			Try to influence my family to act in a climate friendly manner					
			Never	Rarely	Sometimes	Often	Always	Total
What is your gender?	Male	Count	83	45	27	7	2	164
		% within What is your gender?	50.6%	27.4%	16.5%	4.3%	1.2%	100.0%
		% of Total	17.1%	9.3%	5.6%	1.4%	0.4%	33.7%
	Female	Count	110	70	67	37	3	287
		% within What is your gender?	38.3%	24.4%	23.3%	12.9%	1.0%	100.0%
		% of Total	22.6%	14.4%	13.8%	7.6%	0.6%	59.1%
	Non-binary	Count	4	3	2	1	0	10
		% within What is your gender?	40.0%	30.0%	20.0%	10.0%	0.0%	100.0%
		% of Total	0.8%	0.6%	0.4%	0.2%	0.0%	2.1%
	Prefer not to say	Count	7	8	3	3	0	21
		% within What is your gender?	33.3%	38.1%	14.3%	14.3%	0.0%	100.0%
		% of Total	1.4%	1.6%	0.6%	0.6%	0.0%	4.3%
	Other	Count	0	3	0	0	1	4
		% within What is your gender?	0.0%	75.0%	0.0%	0.0%	25.0%	100.0%
		% of Total	0.0%	0.6%	0.0%	0.0%	0.2%	0.8%
Total		Count	204	129	99	48	6	486
		% within What is your gender?	42.0%	26.5%	20.4%	9.9%	1.2%	100.0%
		% of Total	42.0%	26.5%	20.4%	9.9%	1.2%	100.0%

Table 15: Influencing Family regarding Climate Change (Franklin college)

Career Aspirations and Motivations/Gender

This section looks at career aspirations, motivations, and interest in CC careers. Section 3.4.1 is related to data from Franklin whereas Section 3.4.2 relates to data from Schools.

Franklin College: Motivations and Career Choice

Data displayed in Table 15 suggests that more males from Franklin would like to take up engineering as a career (28 males vs 8 females), more females would like to work in healthcare (60 females vs 8 males), more female would like to go into education (28 females vs 3 males), and only 4 participants (0.8%) would like to become an environmentalist. There is a gender preference regarding career aspirations, underscoring the importance of addressing gender disparities in career choices and promoting diversity, particularly with STEM related careers.

			What career do you dream about doing in the future?							
			Engineer	Scientist	Teacher	Healthcare	Environmentalist	Artist	Other	Total
What is your gender?	Male	Count	28	9	3	8	2	12	102	164
		% within What is your gender?	17.1%	5.5%	1.8%	4.9%	1.2%	7.3%	62.2%	100.0%
		% of Total	5.7%	1.8%	0.6%	1.6%	0.4%	2.5%	20.9%	33.5%
	Female	Count	8	14	28	60	2	26	152	290
		% within What is your gender?	2.8%	4.8%	9.7%	20.7%	0.7%	9.0%	52.4%	100.0%
		% of Total	1.6%	2.9%	5.7%	12.3%	0.4%	5.3%	31.1%	59.3%
	Non-binary	Count	0	0	1	0	0	5	4	10
		% within What is your gender?	0.0%	0.0%	10.0%	0.0%	0.0%	50.0%	40.0%	100.0%
		% of Total	0.0%	0.0%	0.2%	0.0%	0.0%	1.0%	0.8%	2.0%
	Prefer not to say	Count	0	0	3	3	0	8	7	21
		% within What is your gender?	0.0%	0.0%	14.3%	14.3%	0.0%	38.1%	33.3%	100.0%
		% of Total	0.0%	0.0%	0.6%	0.6%	0.0%	1.6%	1.4%	4.3%
	Other	Count	0	0	0	0	0	1	3	4
		% within What is your gender?	0.0%	0.0%	0.0%	0.0%	0.0%	25.0%	75.0%	100.0%
		% of Total	0.0%	0.0%	0.0%	0.0%	0.0%	0.2%	0.6%	0.8%
Total		Count	36	23	35	71	4	52	268	489
		% within What is your gender?	7.4%	4.7%	7.2%	14.5%	0.8%	10.6%	54.8%	100.0%
		% of Total	7.4%	4.7%	7.2%	14.5%	0.8%	10.6%	54.8%	100.0%

Table 15: Career Aspirations (Franklin college)

For the “Other” option – “Policing” was the number one answer [30 responses], followed by “Game Developer” [19 responses], “Designer” [18 responses], “Lawyer” [14 responses], and “in Sports” [12 responses]. Not one participant listed a career that would help tackle climate change, which will be a concern for those responsible for ensuring the availability of a well-educated workforce across the Humber Cluster.
Students were also asked to write what motivated them about their dream career in an open-ended question. This following word cloud illustrates the results based on 425 responses.

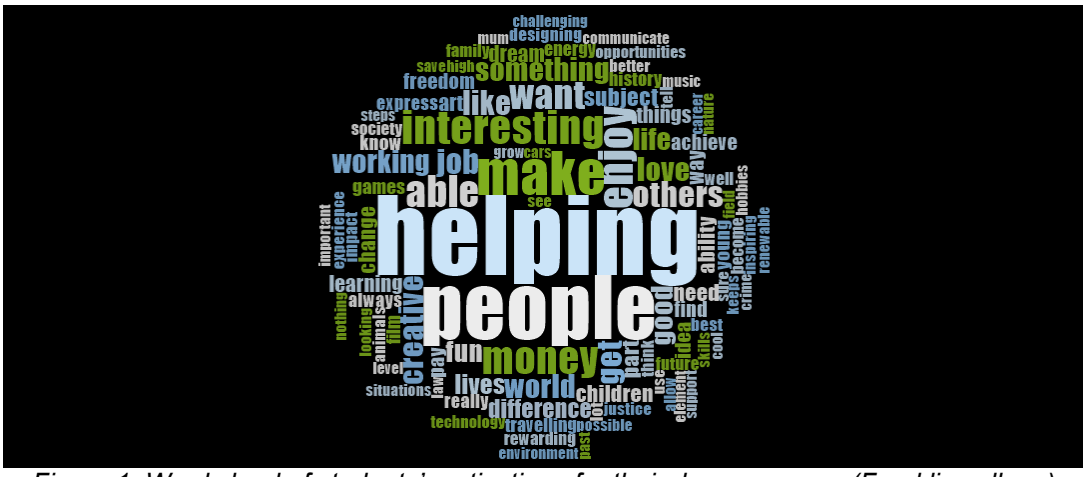

Figure 1: Word cloud of students’ motivations for their dream careers (Franklin college)

"Helping People" is the most listed response [241], "Enjoy/Enjoyable" as the second most popular [128], "Interesting" [74] and "Money" [68]. This reflects diverse aspirations and priorities amongst the children, but "Helping People" aligns very closely with addressing climate change issues, since many careers that tackle climate change involve aspects of helping others. – Highlighting this would be crucial and important to encourage these children to pursue a green career + same thing could be done for "Enjoyable" and "Interesting", emphasising these aspects in recruitment campaigns/education can play an important role in helping these kids consider green career.

Respondents were asked to list at least one job that could fight climate change; 231 participants (47% of participants) were able to list one job or more. "Engineer" was the most listed [75 responses], "Wind farm/turbine professional" [67 responses], "Scientist" [34 responses], "Renewable energy professional" [30 responses] and "Environmental profession – lawyer, Manager, Biologist, Officer, Activist" [24 responses – Almost half of the participants were able to identify at least one job that helps tackling climate change, showcasing (once again) the high level of perception/knowledge they have.

			Would you like a career that involves tackling climate change?		
			Yes	No	Total
What is your gender?	Male	Count	40	121	161
		% within What is your gender?	24.8%	75.2%	100.0%
		% of Total	8.4%	25.5%	33.9%
	Female	Count	64	215	279
		% within What is your gender?	22.9%	77.1%	100.0%
		% of Total	13.5%	45.3%	58.7%
	Non-binary	Count	2	8	10
		% within What is your gender?	20.0%	80.0%	100.0%
		% of Total	0.4%	1.7%	2.1%
	Prefer not to say	Count	3	18	21
		% within What is your gender?	14.3%	85.7%	100.0%
		% of Total	0.6%	3.8%	4.4%
	Other	Count	1	3	4
		% within What is your gender?	25.0%	75.0%	100.0%
		% of Total	0.2%	0.6%	0.8%
Total		Count	110	365	475
		% within What is your gender?	23.2%	76.8%	100.0%
		% of Total	23.2%	76.8%	100.0%

Table 16: Choice of Career tackling Climate Change (Franklin college)

Nearly 79% of Franklin participants indicated that they wouldn't want **a career** that involves tackling climate change. The survey did not delve into their reasons, but the reluctance to engage directly with a climate change career might stem from a number of factors related to lack of understanding of job opportunities and an overwhelming sense of confusion regarding such a complex subject and the range of conflicting messages they receive on Social Media.

Motivations and Career Choices

The survey issued to schools varied slightly due to a focus on younger participants. It therefore focussed on the following:

- What career do you dream about in the future?
- What motivates you the most about your dream job?
- Can you provide few examples of jobs in the region that can help fight climate change?
- Would you like a career that involves tackling climate change? If "YES", what motivates you?

As with a similar question posed to college students, school students were asked about potential career choices. When asked about their dream career, 161 of the participants "don't know/have no idea/not sure" about their future career. Some identified as Footballers [24 responses], Law/police/army [13 responses], lawyer [9 responses], vet [7 responses], architect [5 responses], and biologist [3 responses]. A limited mention of careers related to fighting climate change was seen in their responses.

As with data for the college students, "helping people" (39 responses) is the most popular response [Help community/help young people achieve what they are want/helping the earth and people invent new stuff/like old people and want to help them/help people with mental health] – as illustrated in the word-cloud below.

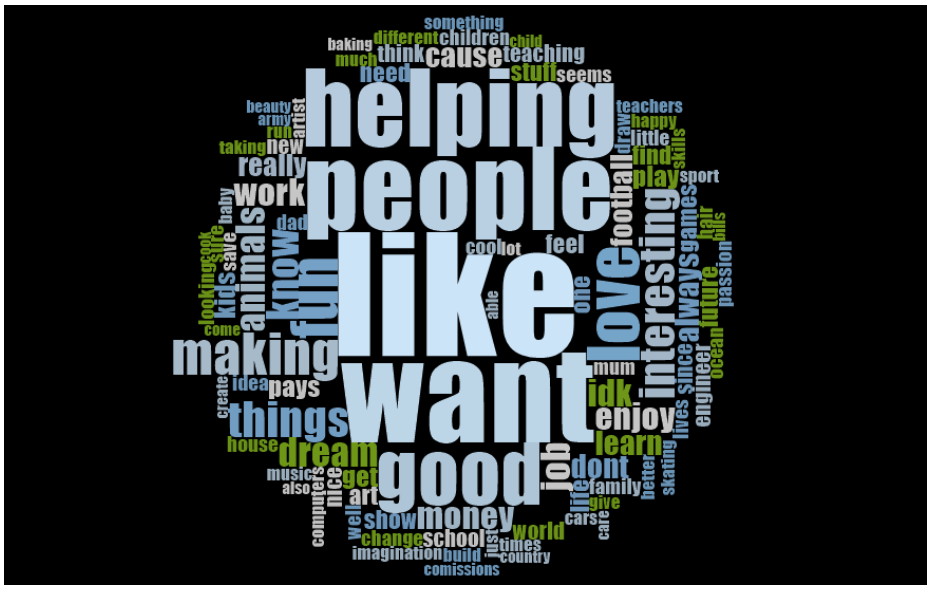

Figure 2: Word cloud of students' motivations for their dream careers (schools)

When asked "**Can you provide few examples of jobs in the region that can help fight climate change?**", 145 of the participants were able to name at least one job that can help tackle climate change: Scientist [28 responses], Engineer [22 responses], wind energy technician [17 responses], Environmentalist [10 responses]. Results are shown in the word-cloud below.

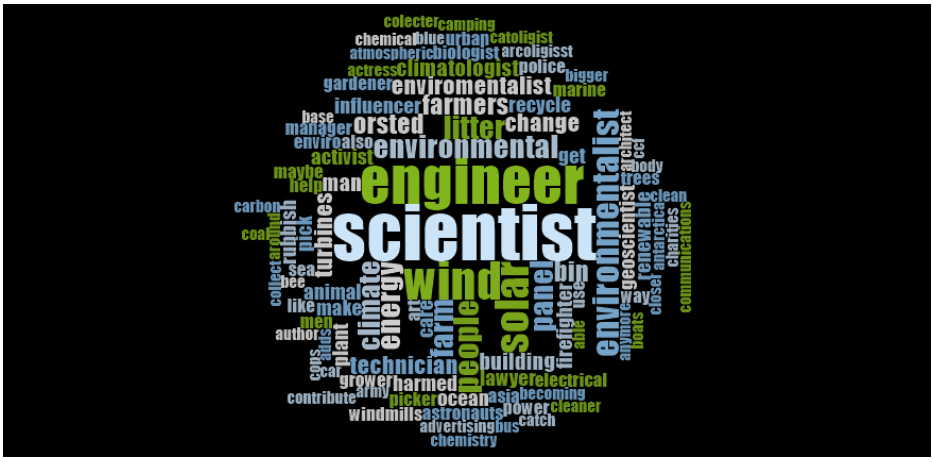

Table 18 below indicates that only 39% children would like to help with climate change.

			Would you like a career that helps to fight climate change? Yes	No	Total
What is your gender?	Male	Count	49	98	147
		% within What is your gender?	33.3%	66.7%	100.0%
		% of Total	15.8%	31.5%	47.3%
	Female	Count	69	84	153
		% within What is your gender?	45.1%	54.9%	100.0%
		% of Total	22.2%	27.0%	49.2%
	Non-binary	Count	0	2	2
		% within What is your gender?	0.0%	100.0%	100.0%
		% of Total	0.0%	0.6%	0.6%
	Prefer not to say	Count	4	3	7
		% within What is your gender?	57.1%	42.9%	100.0%
		% of Total	1.3%	1.0%	2.3%
	Other	Count	0	2	2
		% within What is your gender?	0.0%	100.0%	100.0%
		% of Total	0.0%	0.6%	0.6%
Total		Count	122	189	311
		% within What is your gender?	39.2%	60.8%	100.0%
		% of Total	39.2%	60.8%	100.0%

Table18: Choice of Career- tackling Climate Change (Schools)

Findings from Teachers' Surveys and Interviews

Surveys were sent to teachers in many schools across North Lincolnshire, although responses were limited to Franklin College, William Farr School, and 2 others despite several attempts to contact them directly, through local networks and regional links. This section is therefore reported as a summary.
In total, 18 responses were received from teachers. Figure 4 below highlights the gender composition of the teachers who participated in the responses.

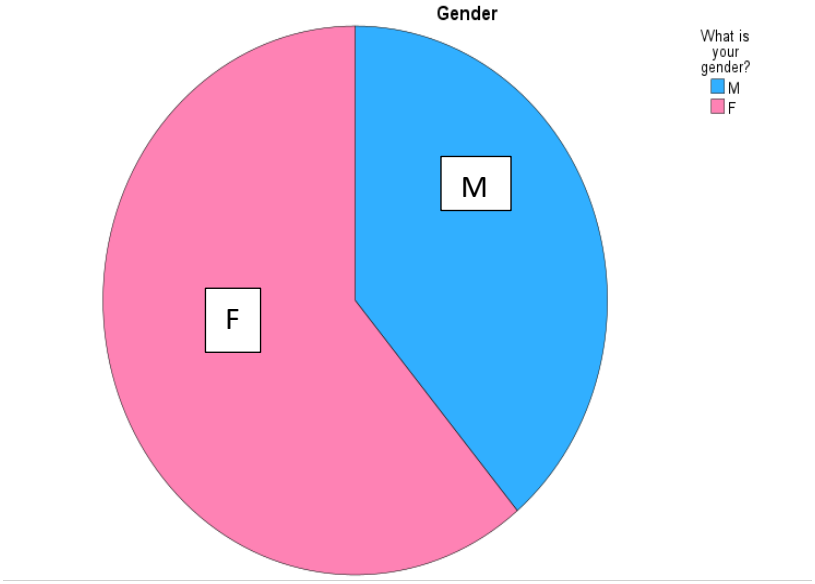

Figure 3: Gender distribution of participating teachers

61% [11/18] of those who responded to the survey were female while 39% were male, with the age distribution ranging from 20-56. Five teachers were aged between 20-31, 8 were in their 40s and the rest [5] in their 50s. There was a spread of qualifications with most having a master's degree.

The teachers were asked if they had **heard of "net zero"**– only 50% responded they were familiar with it, with 27% somewhat familiar and over 16% who had little or no knowledge. Eighty-nine of those surveyed agreed that it was important for students to understand the concept of net-zero as an equal percentage acknowledged that they had heard of the UK ambition to be net-zero by 2050. Only 2/18 (11.11%) of the respondents had ever attended a **seminar/training/workshop** on climate change. (Of the two, both had a masters' degree but worked in different institutions). When asked if their **students understood climate change**, 10/18 felt their students did to a large extent while 6/18 felt they did to some extent. More than 89% felt their students had some awareness of climate change with only half of those surveyed felt that their students were very aware of climate change. Only 11% felt they were unsure. A similar picture emerges when teachers comment on whether they feel that their students are **aware of the causes and effects** of climate change. Most teachers (55.6%) felt that the students were aware to a large extent, 11.1% felt confident that their students' awareness was very good, whereas the others felt students had some knowledge (22.3%). Only 11.11% were unsure of the student knowledge. When asked about "**decarbonisation**", 89% of the respondents had knowledge of the concept but only 33.3% of them had an idea of the decarbonisation initiatives in the Humber.

Teachers were then asked at **what age** children should start learning about climate change. All teachers suggested ages less than or equal to 11 (i.e., primary school level), with the youngest age set at 4. The average age was 7.7 years. The following graph illustrates the spread of answers.

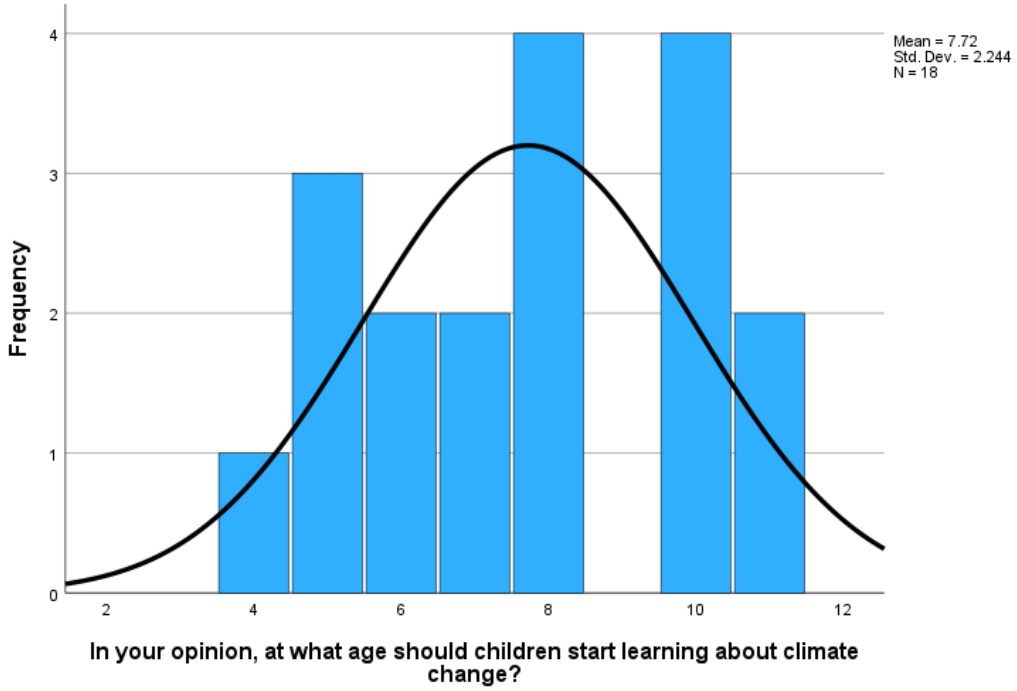

Figure 4: Perceptions of the age children should be introduced to climate change.

When asked **what subjects** should teach about climate change, half the respondents indicated "all subjects" with others highlighting geography and science.

Discussion, Summary and Outputs

Summary of findings

The table below summarises the findings of sections 3.2, 3.3 and 3.4.

	Franklin College	Schools
	KNOWLEDGE	
Climate change knowledge Interest	40.4%	31.6%
Heard of Net Zero	57%	17%
Net Zero Target of UK	55.7%	18% (may have looked up on Net)
Sources of Energy	Good knowledge (some gaps)	Good knowledge (some gaps)
Top sources of CC information (social media%, internet%)	65%, 48%	49%, 43%
ATTITUDE		
Responsibility towards CC	67.6%	65%
Belief regarding actions	30.2%	45.9%
Reduction of carbon emissions	51%	39%
Impact on Personal life	52%	43.4%
Impact on Family Life	55.8%	51.5%
Discussions with friends	20.7%	29.5%
Discussions with family	35.2%	46.1%
CAREER MOTIVATION		
Career involving CC	21%	39%
Main reason to choose a job	Help people	Help people

Table 7: Summary of the findings

Overall summary

Knowledge:

- Franklin College students show higher knowledge levels about climate change compared to other schools.
- More Franklin College students have heard of "Net Zero" and know about the UK's Net Zero target.
- Both groups have good knowledge of energy sources, with some gaps.
- Franklin College students rely more on social media and the internet for climate change information; however, school respondents also cite this as primary information source.

Attitude:

- Franklin College students have a slightly higher sense of responsibility towards climate change.
- Other schools' students have a stronger belief in taking actions to combat climate change.

- Franklin College students are more inclined towards reducing carbon emissions.
- Both groups believe climate change will have a significant impact on their personal and family lives.
- Other schools' students engage more in discussions about climate change with friends and family.

Career Motivation:

- Franklin College students show less interest in pursuing careers related to climate change compared to students from other schools.
- Both groups consider helping people as the main reason for choosing a job.

There seems to be a significant awareness of climate change among respondents, particularly as they grow older. Respondents have some knowledge about sources of clean energy and the concept of achieving net zero emissions. However, despite the awareness, there's a sense of powerlessness among respondents, with many feeling that they can't do anything to address climate change. This feeling of climate anxiety is apparent in both sets of data, with about 50% of respondents expressing concern about the negative impacts of climate change on themselves and their families. There is also a desire to take on jobs which help others, but respondents do not want to take on climate careers and can't make a connection between helping others and the environment. **Although participants recognise the importance of their actions in mitigating climate change, there seems to be an uncertainty about the efficacity of their actions in making tangible difference – they might see this issue to be of great magnitude and cannot imagine how their actions can create a meaningful change.**

Overall, our findings reinforce the findings of previous literature, there is insufficient knowledge about climate change and the potential careers. In addition, the report findings at Franklin college level threw up some interesting points about gender, which should be viewed in a broader sense. Table 20 summarises the disparity between responses between male and female respondents.

Area	Institution	Female	Male
Interest in CC	Franklin	41%	35.75%
	School	30.4%	38%
Responsible actions regarding CC	Franklin	70.2%	60.3%
	School	68%	62.3%
Belief in making a difference	Franklin	35%	25%
	School	50.9%	46.9%
Reduction of personal carbon emissions	Franklin	55.6%	42%
	School	40.6%	40.3%
Impact on personal life	Franklin	56%	47%
	School	48.5%	37.5%
Impact on family life	Franklin	60%	49%
	School	51%	51%
Influence friends	Franklin	16%	13%
Influence family	Franklin	37%	16%
Career choice	Franklin	Engineer	Education/nursing
Career in CC	Franklin	22.9%	24.8%
	School	45%	33.3%

Table 20. Gender differences between Respondents (Franklin and Schools)

The figures from above show:

Interest and Responsibility:

- Female students at Franklin College show higher levels of interest in climate change compared to male students, while the trend is reversed in other schools.
- Female students at Franklin College also demonstrate a stronger sense of responsibility towards climate change compared to male students, although this trend is similar in other schools.

Belief and Action:

- Female students at Franklin College are more likely to believe in making a difference regarding climate change compared to male students, whereas in other schools, male students show a slightly higher belief in making a difference.
- Female students at Franklin College are also more inclined to reduce their personal carbon emissions compared to male students, whereas in other schools, there's little difference between genders.

Impact and Influence:

- Female students at Franklin College perceive a greater impact of CC on their personal and family lives compared to male students. This trend is not as pronounced in other schools.
- Female students at Franklin College are more likely to influence family members regarding climate change compared to male students.
- In terms of career choice, more female students at Franklin College aspire to careers in education or nursing, while more male students lean towards engineering.
- However, fewer female students at Franklin College are interested in pursuing careers related to climate change compared to male students, a trend that is reversed in other schools.

Females, particularly from Franklin, were more knowledgeable than males about climate change, felt more responsible and more inclined to worry about impact of climate change and tried to influence family and friends more than their male counterparts. However, this doesn't translate into a desire to pursue a related career, as only 22.9% of the females were interested in climate change careers despite feeling highly responsible for their actions. This indifference to green careers may be due to lack of awareness. The survey did not investigate the reasons for this, but we have used this opportunity in one of our outputs (eLearning package) to signal that green careers may be of interest.

In addition, it appears that although school children were highly motivated, their interest dropped as they became older.
The reasons for the above could be multi-fold but one apparent factor seems to be a confusion about "green jobs". The United Nations Environmental Programme defines green jobs as positions in "agriculture, manufacturing, R&D, administrative, and service activities aimed at substantially preserving or restoring environmental quality." The United Nations System of Environmental Economic Accounting (SEEA) defines green job as "areas of the economy engaged in producing goods and services for environmental protection purposes, as well as those engaged in conserving and maintaining natural resources". The Green Force Taskforce (UK Govt.) definition of green jobs is "Employment in an activity that directly contributes to - or indirectly supports - the achievement of the UK's net zero emissions target and other environmental goals, such as nature restoration and mitigation against climate risks." While there are many definitions, the priority should be to provide clear messaging to young people, particularly in terms of relevant career choices and their environmental impact.

From the limited data collected during the teachers' survey it is apparent that teachers, as a collective, despite high qualifications, have themselves insufficient knowledge of climate change, net-zero, and decarbonisation. Even more evident is the lack of knowledge around net-zero initiatives in across the Humber region. There appears to be no systematic training given on the subject of climate change and no systematic approach to teaching it. There is a disconnect between the aims of the UNCC, the government, industry, and the potential workforce.

UNICEFUK concerns of children is focused on working with governments. Their website cites "Our Environmental Policy sets out measures to reduce their impact by utilising strategic pillars:

- Direct measures to reduce the environmental impact.
- Working with suppliers and partners whose sustainability commitments align with those of UNICEFUK.
- Continued work to influence the UK Government to promote environmental sustainability.
- Fundraising with partners to develop a suite of green programmes.

The UNICEFUK and UK government work in partnership. The UK government, through the Department for Education, set up an ambitious plan for climate education and sustainability. It highlights short, medium, and longer-term actions that will enable progress towards achieving 4 strategic aims (excellence in education and skills, resilience to climate change, net zero, better environment for all, and overarching vision through a strategy to 2030. This is informed by five key actions: climate education, green skills and careers, digital estates and infrastructure, operations and supply chain and international. The government has also set a target to put in place a sustainability lead by 2025. It is also noteworthy that with reference to sustainability as such the Dasgupta report, which recommended easy and inclusive access to biodiversity at an early age as connection to nature declines from primary to secondary age. This emphasises that young population (which in our survey was 11 years and above) should have greater understanding of the ecosystem. As the teachers' survey reports, many feel climate change education should commence as early as 7 years of age, in primary school. We propose the preparation of materials which familiarise young children with carbon literacy. We also propose an integrated curriculum, that feeds into primary school education to appraise children of sustainability from a very early age. Following on from this, secondary schools should also embed sustainability content into their curricula and emphasise the potential for climate careers as IDRIC 9.5 does.

Barriers

Interviews with two senior college leaders revealed significant barriers to sustainability education, which helps explain why less responses were received from teachers and many schools. These have been identified below:

1. **Lack of local autonomy**: Academies/trusts, rather than local authorities, often oversee educational institutions. The head offices of these academies/trusts are frequently located in different counties, resulting in a disconnect from the specific needs of regions like the Humber. To promote local regional development, schools should be granted greater autonomy over the curriculum and its delivery.

2. **Political Influence**: The national curriculum, largely dictated by government policies, leaves little room for the inclusion of emerging subjects such as climate change. This limits the development of sustainability education within schools and colleges. The political impact of changing governments has also played an important part in deciding what should be taught. Climate change needs to be depoliticised and seen through the eyes of scientists.

3. **Sustainability as an Add-on**: Sustainability education is often treated as an additional, non-essential activity rather than being integrated into the core curriculum. As a result, its implementation is left to the discretion of individual teachers. The focus on formal marks and attainment metrics further diminishes the emphasis on sustainability education. Sustainability should not be bolted on but should be integrated into the curriculum. Senior leaders believe that sustainability education should be systematically and urgently integrated into the curriculum. Given the significant impact of climate change on the lives of young people, it is crucial to prioritize and standardize the teaching of sustainability.

In addition, we note that there is no consistent terminology used to describe and explain climate change. Clear and consistent terminology is crucial for effectively communicating concepts related to sustainability and climate change. Demystifying these terms and aligning content and terminology across all spheres of education is essential for creating a shared understanding and facilitating meaningful discussions. By providing clear definitions and explanations, we can ensure that sustainability and climate change are not perceived as abstract or ambiguous concepts, but rather as concrete issues that require urgent attention and action. This can be achieved through standardized educational materials, training programs, and ongoing dialogue among educators, policymakers, and other stakeholders.

Outputs of the Project and Opportunity for Change

The following outputs have resulted due to the successful completion of this project:

Tangible Outputs

1. IDRIC Webinars (mid-term and Annual conference) which have been published in the Knowledge Hub IDRIC site. (February 1st, March 7th).

2. Journal Paper produced and accepted by British Academy of Management.

3. Workshops delivered in Franklin to Aspire Group of Students on 28th March. We used these to demystify CC but more so, to highlight careers such as architect, IT, sustainability consultancy in business and NHS etc. these workshops elicited positive interest from both career staff who stated that they wanted to repeat this in the future. In addition, anonymous feedback from 17–18-year-old groups was very positive. After the session, some of students wanted more specific advice one to one.

4. IDRIC webinar results published in Green Jobs Delivery Group - CCS Task and Finish Group Findings and recommendations of the group.

5. E-Learning materials commissions and to be delivered to CATCH to host on their site. In these eLearning materials which are open access and will be used also be CATCH, we have highlighted specific real life positive female vignettes in CC, specially from the Humber. We hope to track the interest online.

6. Report on Project.

7. Further grant applications made to the British Academy on Women and Climate Change.

Besides the tangible outcomes, intangible outcomes include networking opportunities and connections made and upskilling business school personnel regarding CCU research projects.
The project was limited by time, (4 and a half months with Christmas holidays in between as well as schools' timetables for extracurricular events sent well in advance). It is recommended that deeper interviews, more focus groups, and targeted workshops should be part of any future project extension.

The findings of the student survey may look bleak, but nodes of a network already exist in Lincolnshire. The area is the hub for renewable energy and hosts several offshore wind farms such as Hornsea and Westernmost Rough. In addition, groundbreaking work is happening with CCS. Through Humber Zero there are ambition plans by VPI, Philips 66 and Viking to capture 3.3 million tonnes of CO_2 by 2028 and 10 million tonnes by 2030. CATCH is a large apprentice training company and a national technical skills centre and plans to be an industry hub for membership and supply chain services. Given that there is good university support as well as community support, it is possible to provide much needed training and education to enable local population to find good jobs. Our project findings show a willingness by students and teachers to do so. Given the industry impetus, it is possible to make a concerted attempt to educate the young public about prospects in this area.

Appendix (Surveys)

Students Survey

Section 1: Demographic Information

- Age:
- Gender:

Section 2: Awareness

- How interested are you in the topic of "climate change"? [1: very uninterested -5: very interested].
- I have a responsibility to act in a climate-friendly manner [1: totally disagree – 5: totally agree].
- I believe I can make a difference in addressing climate change. [1: totally disagree – 5: totally agree]
- I would like to reduce my and my family's carbon emissions [1: totally disagree – 5: totally agree]
- How concerned are you about the impacts of climate change on:
    - Your life [1: not affected – 5: very affected]
    - Your family's life [1: not affected – 5: very affected]
    - Where you live [1: not affected – 5: very affected]
- How often do you? [1-Never – 5: Always]
    - Discuss climate change with your friends?
    - Discuss climate change with my family?
    - Try to influence my friends to act in a climate friendly manner.
    - Try to influence my family to act in a climate friendly manner.
- Have you heard about the term "net-zero" before? [Y/N]
- Have you heard about the UK's goal to achieve "net-zero emissions" by 2050? [Y/N]
- Which form of energy production do you think are the most environmental, social, and human friendly in the UK? [Wind energy – Water energy – Solar energy – Coal – Oil – Natural gas - nuclear energy - Biomass]
- Can you list three actions/strategies that can help you/your family reduce carbon emissions [Open ended question].

Section 3: Motivation to pursue green careers.

- What career do you dream about doing in the future?
  [Engineer/Scientist/Teacher/Healthcare/Environmentalist/Artistst/other]
- What motivates you the most about your dream career? []
- Would you like a career that involves tackling climate change? [Y/N]

- If “Yes”, what motivate you to consider such career? [You are concerned about climate change/Someone you look up to does it/to make the world a better place/you care about the environment/exciting career/other]

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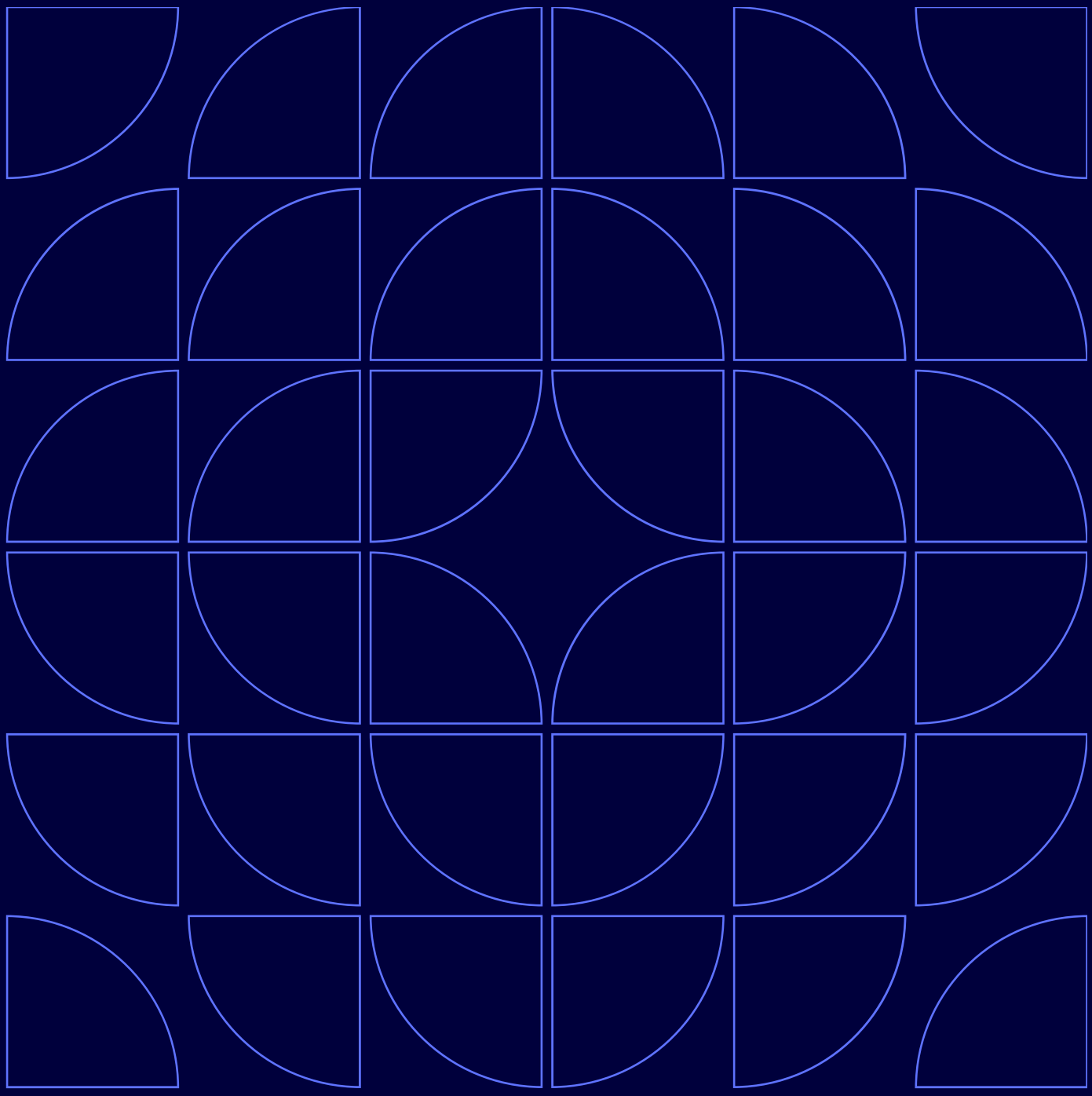
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