International student mobility and environmental sustainability. Working through the tensions

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ABSTRACT

International Student Mobility (ISM) is an important part of universities' strategy in the UK. However, environmental sustainability is also increasingly important for universities and there is a tension in how best to incorporate environmental sustainability into ISM strategy, when it is reliant on oversea students traveling to university, usually by aeroplane.

This research explored how environmental sustainability is considered by those responsible for promoting ISM within universities, and also student themselves.

Our research involved a survey of 144 full time students, 21 follow up interviews with them, and 14 staff involved in determining university strategy on ISM. These staff and students were from a range of 30 different British universities.

The survey results suggest that international students have a statistically significant higher average carbon footprint than domestic students (7.17 tonnes of CO_2e and 4.63 tonnes of CO_2e per year respectively). This difference is the equivalent of the emissions from a return flight from New Delhi to London Heathrow. Indeed, our survey indicated that it was the travel between university and usual place of residence that was responsible for the difference in emissions between domestic and international students.

In the interviews, students discussed how the pandemic had changed their perspective on travel. Students described the need for travel to be purposeful, which was partly connected to greater consideration of the environmental costs related to it.

Many of the staff described how the Covid-19 pandemic had changed their working practices to drastically reduce the travel associated with promoting ISM. Staff suggested that a reduction in travel, along with an accompanying move to online activities and in-country partners or agents, was likely to remain after the pandemic. Many highlighted how this was a way in which their universities were becoming more environmentally sustainable.

Most of the students, and all the staff, interviewed indicated that they thought the benefits of ISM, particularly with regards to learning from different cultures, outweighed the environmental costs associated with ISM.

The staff interviews indicated that environmental sustainability changes to ISM strategy were happening but ultimately not to the extent that it would impact significantly on student recruitment. Thus, whilst environmental sustainability was regarded as important, this was trumped by the financial necessity to recruit international students. There was a unanimous view that financial imperatives would continue to take precedent over environmental concerns, and that this would only change if the funding model for higher education was restructured and/or student demand changed.

Students suggested that they did feel they could influence university policy, but chiefly as a collective and not individually.

Students and staff alike, often emphasised the responsibility of universities to (a) provide education on environmental sustainability and (b) cover the financial costs of offsetting carbon emissions from ISM.

KEYWORDS

EDITORIAL NOTE

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INTERNATIONAL STUDENT MOBILITY AND ENVIRONMENTAL SUSTAINABILITY.
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1. INTRODUCTION

There is growing consensus amongst politicians and the public that we are in a climate emergency (Richardson, 2020; Tompkins et al., 2010; UN Climate Change Conference UK, 2021). The most recent IPCC report highlights that without drastic action, an increasing number of ecosystems will fail, leading to biodiversity and habitat loss, loss of services provided to human society (including food production) and decreasing resilience to increasingly prevalent extreme weather events, (Arias et al., 2021). Thus, governments across the world are exploring how best to address climate change with the Conference of the Parties (COP) in Glasgow as the most recent example of global efforts in tackling climate change (UN Climate Change Conference UK, 2021). Amongst others, the climate emergency is increasingly recognised by Higher Education Institutions (HEIs) and there have been several subsequent environmental sustainability drives on the part of universities (c.f. Universities UK, 2021). However, in the education sector and elsewhere there is concern over the effectiveness of some of these sustainability drives, with scepticism regarding 'greenwashing' (Jones, 2012), which is defined as 'behaviour or activities that make people believe that a company is doing more to protect the environment than it really is' (Cambridge Dictionary, 2022). Thus, many HEIs are currently aiming to improve their environmental sustainability in an effective and transparent manner. This report explores these issues specifically in the context of international student mobility (ISM), which is growing in quantitative and qualitative significance on the global scale.

The internationalisation of Higher Education (HE) is occurring at pace, with the number of international students globally tripling from 2 million to 6 million from 2000 to 2019 (UNESCO Institute for Statistics, n.d.). ISM is forecast to continue to grow for the foreseeable future. If the rate of growth continues as it has for the past two decades, there could be 18 million international students globally by 2038. The existing literature has focused on the drivers of ISM and there is also an evidence base which points to the considerable benefits that ISM brings to those who engage in and provide it. Some examples of the benefits of ISM for international students include: global career opportunities (Findlay et al., 2012); higher salary possibilities (Kommers & Bista, 2020); global mindedness (Roy et al., 2019); and multiple language proficiency (Roy et al., 2019).

This report explores ISM in the context of environmental sustainability. The travel and other emissions generated by students and their families travelling between their home and host institution could conceivably be very significant (Davies & Dunk, 2015). In a recent paper, Shields (2019) estimates the possible emissions from ISM to suggest that between 1999-2014, greenhouse gas (GHG) emissions associated with ISM increased from 7.24-18.96 megatons to 14.01-38.54 megatons of CO_2e (equivalent) per year, depending on which scenario is used. To put this in context, 37.01 megatons of CO_2e is the total national annual emissions in 2018 of Ireland (The World Bank, 2022).

The very vociferous promotion of ISM by most HE institutions may therefore act against their professed sustainability agendas. However, as of yet, surprisingly little is known about the following components of ISM:

- The travel and other carbon emitting behaviours of students and their environmental consequences
- How students make decisions regarding education related travel and the extent to which environmental considerations influence these choices
- The strategies of HEIs with regards to ISM and the extent to which they represent a tension with their efforts to promote environmental sustainability.

This study addresses these issues through a mixed methods approach which involves a survey disseminated to students at UK universities; follow up semi-structured interviews with some of these students; and semi-structured interviews with staff members involved in determining university strategy with regards to ISM. It is hoped that this perspective can stimulate a nascent research agenda on the environmental consequences of this significant and growing form of mobility. The following section provides a summary of the nature of existing scholarship on ISM and discusses the thus far limited evidence base relating to its environmental effects.

2. LITERATURE REVIEW

ISM has become a central part of HE over the last 30 years (Gümüş et al., 2020). ISM provides significant revenue to UK universities often acting as a replacement for reductions in government funding. The number of international students to the UK has grown at three times the rate of UK domestic students over the past 5 years (34% compared to 11% respectively)

(HESA, 2022a). Similarly, concerns over environmental sustainability have simultaneously increased during this period (Shields, 2019). This section explores how the environmental sustainability of ISM has been discussed in the literature. It is particularly focused on examining the environmental perspective on ISM and the difficult contradictions that universities potentially face: exemplifying their research on and commitments towards combatting climate change, whilst also enthusiastically partaking in the internationalisation of HE (McCowan, 2020). The literature widely regards ISM as beneficial, and this research does not aim to contest this but to explore further the thus far relatively neglected environmental perspective of it. This literature review will first provide a brief overview of ISM literature more broadly, before setting out discussions on the sustainability of the internationalisation of HE, and then more specifically with regards to ISM and associated research gaps.

2.1. ISM OVERVIEW

As ISM has increased, both in terms of the numbers of students involved and its significance for universities, so too has the volume of literature on the topic. The literature discussing ISM has seen significant growth since 2005 (Gümüş et al., 2020). Gümüş et al., (2020) carried out a bibliometric analysis to illustrate that between 1980-2005, the number of papers released on ISM every 5 years remained fairly stable at around 50-90 papers. However, this jumped to 202 between 2005-2009, 477 in 2010-2014, and 1,056 in 2015-2018. This is linked to the increase in ISM over this period and it is unsurprising that the scholarship on this issue comes from the countries most impacted: USA, Australia, UK, Canada, and China. Thus, it is largely western centric. The major disciplines which research ISM are Education, Sociology of HE, and Migration Studies (Gümüş et al., 2020). ISM scholarship is mainly focused in 5 key aspects: motivations, geography, barriers, experiences, and impact. Therefore, it is mainly focused on the perspective of international students. These aspects, as well as the impact of Brexit and the Covid-19 pandemic, are explored below.

2.1.1. MOTIVATIONS

Much of the literature highlights how ISM is attributed to career aspirations of students (Baas, 2019; Findlay et al., 2012; Kommers & Bista, 2020; Roy et al., 2019). Roy, et al., (2019) conducted a systematic review of empirical studies on ISM to indicate that students believed their employability increased due to studying abroad. Indeed, Kommers and Bista (2020) suggest that a key justification for the potentially higher financial costs of studying internationally, is because students believe they will obtain careers with higher salaries than if

they had studied in their home countries. Similarly, Findlay, et al., (2012) highlight that international student frequently desire to study at highly ranked, often 'world class', institutions and that this prestige is part of the motivation for studying internationally, and one reason why international students believe they are more likely to obtain higher salaries on graduating. Another reason for this is that international students believe it distinguishes them: they have studied abroad and are thus more cosmopolitan and more able to fit into international careers (Findlay et al., 2012). Kommers and Bista (2020) take this further to highlight how the connection of ISM to careers can lead to the entanglement of student and skills migration in policy, which Baas (2020) indicates is specifically the case for students coming from Asia Pacific, due to the largest source countries for ISM being within this region. It ties into discussions about the commercialisation of HE, which will be discussed further below.

Moreover, other researchers have suggested that the motivations for ISM are similar to those for other forms of migration (Perkins & Neumayer, 2014). Perkins and Neumayer (2014) conduct a binomial regression of ISM data from UNESCO to indicate that rather than ISM being motivated by prestige of the receiving university, it is mainly influenced by the GDP of the host country, followed by the distance from home, language, previous colonial ties, and existing migration flows to the country. Furthermore, they highlight how the economic situation of the student's home country influences which factors are most significant in determining the migration. They suggest, for example, that for students from lower income countries, distance is more important than for a student from a higher income country (Perkins & Neumayer, 2014). This touches on the equality of access to ISM, discussed in section 2.1.3. As of yet, there appears to be no research exploring the impact of climate change as a motivation for ISM specifically, although there is some suggestion that students might engage in exchange mobility to learn more about environmental sustainability issues in different contexts, for example on extended Geography field trips, as discussed by Dvorak et al., (2011) and explored further below.

2.1.2. GEOGRAPHY

Research has mapped ISM and analysed the geographical flows involved. Key sending countries to the UK regions are visible in Figure 2.1. Key sending countries for ISM globally are India and China (Perkins & Neumayer, 2014). Key receiving countries for ISM globally are the USA, the UK, and Australia (Findlay et al., 2017). As touched on, research has linked patterns of ISM to previous colonial ties and global power structures, indicating the influence

these factors have on which areas are viewed as providing high-quality education (Riaño et al., 2018). Indeed Riaño et al., (2018) highlight the importance of politics when exploring the geography of ISM, not only exploring the historical context but also the current political context around migration. This is evident in the UK with the recent reinstatement of the post-study work visa following the decision to leave the EU, discussed further below.
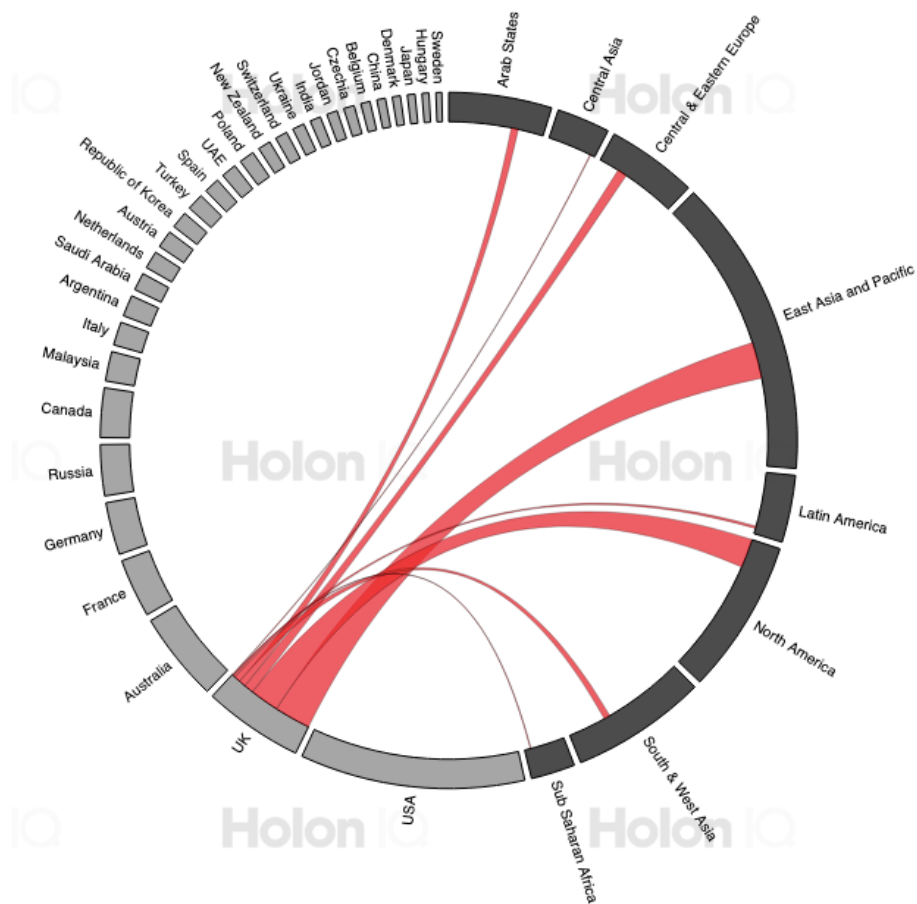
Figure 2.1: Global flows of university students to the UK in 2018.
Notes: The wider the red bar, the more students coming from those regions
Source: https://globalflows.holoniq.com/

Moreover, drawing on the discussions of motivations above, Findlay et al., (2017) have highlighted how the limited diversity of international students within the UK reduces the legitimacy of some UK universities' claim to be 'global institutions,' as they only have students from certain countries. This again, reiterates the potential unequal access to ISM, with the majority of international students coming from just a few countries. The geography of ISM has significant implications for its environmental sustainability, as students travelling further for their HE, will have a greater impact than those travelling less far (Ramaswamy et al., 2021). However, whilst Shields (2019) and Davies and Dunk (2015) have conducted carbon audits of ISM to the UK, there appears little known empirically about the impact of the geography of

ISM on its environmental sustainability and how this interacts with other factors, such as the supply of students interested in travelling internationally for their HE. Indeed, the authors of this report found no literature on how environmental concerns of international students impact where they might choose to study. This study seeks to provide a start at answering some of these questions.

2.1.3. BARRIERS

The literature on ISM highlights that not all students are able to study internationally and outlines several barriers to ISM (Beech, 2018; Gribble, 2008; Kommers & Bista, 2020; Souto-Otero et al., 2013). These barriers are present in access to HE more broadly but are accentuated with ISM, due to the additional costs involved in travel and settling in a different country. Souto-Otero et al., (2013) studied barriers for European students engaging in the Erasmus program, and identified 5 types: financial, HE system compatibility, awareness, personal, and social background. Kommers and Bista (2020) suggest the expense of ISM is the most significant barrier, and is crucial in reproducing inequalities, as mainly higher income students have the opportunity to study internationally and consequently get potential access to higher salary careers on graduation. However, other scholars focus on how certain countries, students, and subjects are viewed as more desirable than others and this can influence access to ISM (Gribble, 2008). Beech (2018) took this further by focusing on the impact of the change in visa laws in the UK in 2012 (which removed the two-year work visa for international graduates on completion of their studies in the UK) on the types of students and degree courses. The post-study work visa was later reinstated in 2019. Beech (2018) found that the change in visa laws in 2012 led to more focus on advertising of degree courses that would lead to international careers, or be useful in student's home countries, in an effort to continue to make ISM attractive.

Additionally, there is limited literature that explores the ethics of ISM from an environmental sustainability perspective, highlighting how inequalities in access to ISM can align with emissions (Ramaswamy et al., 2021; Shields, 2019), with potential that students with a higher carbon footprint have greater access to ISM. Again, there is little research on this connection. There is research however on the wider link between income and pollution levels, with a recent Oxfam report analysing data from 117 countries between 1990-2015. They highlight that carbon emissions grew by 60% during this time period, with the top 10% income group consistently responsible for around 50% of these emissions through time (Kartha et al., 2020).

The authors highlight how this is surprising, since during this period the global middle class grew at a faster rate than the top 10%, but the distribution of emissions by different income groups did not. This indicates that the per capita emissions increase has been greater for income groups in the top 10%, than the middle 40% (Kartha et al., 2020). If this analysis is combined with the analysis highlighting financial barriers to ISM, and the need for financial resources to engage in ISM (Souto-Otero et al., 2013), it suggests that ISM could enhance these inequalities in carbon emissions.

2.1.4. EXPERIENCES AND THEIR IMPACT

Scholars are interested in the types of experiences international students have during their study and what impact it has on them. There has been much focus on the increased level of global mindedness and engagement caused by ISM, and ultimately that it has the possibility to produce 'global citizens' (Paige et al., 2009; Roy et al., 2019). Indeed, there is additional discussion about its environmental benefit, making students more aware of the impact of climate change, or understanding environmental sustainability from a different perspective (Dvorak et al., 2011). The literature also shows how it can broaden the perspectives of domestic students who have contact with international students (Luo & Jamieson-Drake, 2013). However, it is acknowledged that power structures are present in ISM (Bell et al., 2021). In their study exploring the experience of Indian students conducting a social work degree in Australia, Bell et al., (2021) found that at the beginning of the course, more needed to be done to integrate students into the university. They stressed that as a university of the Global North they had a responsibility to address some of the power inequalities felt by international students coming from the Global South.

More broadly, literature is interested in where ISM fits within migration research (Findlay et al., 2012; King & Raghuram, 2013). Fitting into the discussion on motivations above, and the acknowledgement of the link between skills migration and ISM, there is a desire to situate ISM within life course trajectories to understand further the context around migration (Findlay et al., 2012). Moreover, King and Raghuram (2013) are curious to see further exploration of the impact of the securitisation of migration discourse on ISM, and to explore the intersectionality of ISM: to see student migrants, not just as students but also potentially as refugees, or workers as well. From an environmental sustainability perspective, scholars have attempted to assess the longevity of environmental awareness gained due to ISM, once the student has returned to their country, with limited success (Tyers, 2021).

2.1.5. BREXIT AND THE COVID-19 PANDEMIC

Britain's decision to leave the EU in 2016, and the Covid-19 pandemic starting in 2020, have caused significant disruption to ISM. There is modest but growing literature on the impact due to the recent nature of these developments, with UK only officially exiting the EU on the 1st January 2021 and the restrictions associated with the pandemic still ongoing in some countries, although these have lifted within the UK at the time of writing (April 2022). In their paper exploring the impact of Brexit on international student applications to the UK, Amuedo-Dorantes and Romiti (2021) find that between 2016-2019 the number of EU students applying to UK universities declined by 9.8%. They used data from UCAS (Universities and Colleges Admissions Service) from 2013-2019 to determine the impact of the Brexit vote of 2016 (Amuedo-Dorantes & Romiti, 2021). They found that STEM subjects were particularly effected, and suggest that international students may find alternatives elsewhere (Amuedo-Dorantes & Romiti, 2021). Additionally they highlight how applications dropped the most from EU countries that had lower GDPs and higher unemployment rates, whose students, they suggest, may be more interested in working within the UK after post study (Amuedo-Dorantes & Romiti, 2021). Moreover, Falkingham et al. (2021) illustrate the impact of triggering article 50 on 29th March 2017 on the return intentions of EU students. They use survey data on graduating international students from before and after the triggering of article 50 to illustrate that, after the 29th March 2017, EU students are significantly more likely than non-EU students to indicate they plan to leave the UK after graduation (Falkingham et al., 2021). Indeed, the literature highlights that Brexit could further damage the UK's reputation which may impact student applications not only from the EU but also from non-EU countries as well (Beech, 2019).

The impact of Brexit is visible in the overall immigration figures to the UK, with a sharp decrease after 2016. According to the ONS, net migration overall decreased between the year ending March 2016 to the year ending March 2017, from 327,000 to 246,000 (ONS, 2017). Since then, it has stayed relatively stable and started to increase in the most recent data available, with net migration in year ending March 2018 being 270,000 (ONS, 2018); and year ending March 2019 being 226,000 (ONS, 2019); and year ending March 2020 being 313,000, with much of this growth due to non-EU migration (ONS, 2020). The impact on ISM is less pronounced, with total non-UK students increasing year on year from 450,835 in 2016/17, 469,160 in 2017/18, 496,110 in 2018/19, 556,625 in 2019/20, to 605,130 in 2020/21 (HESA, 2022b). The numbers are increasing for both EU and non-EU students, although at a faster rate

for non-EU students (HESA, 2022b). Therefore, the impact of Brexit on ISM is less marked than on overall net migration.

From an international student perspective, the Covid-19 pandemic emphasized some of the logistical challenges apparent in ISM to the UK (Raghuram & Sondhi, 2022). Raghuram and Sondhi (2022) conducted a survey and interviews with international students in the UK to highlight how the Covid-19 pandemic had disrupted the infrastructure in place to manage mobility. They found infrastructures had become disconnected from HEIs, meaning that many international students were left in a state of uncertainty, particularly about entry to and departure from the UK. They argued that this relationship between mobility infrastructure and HEIs always existed but that the pandemic illuminated flaws within it, especially associated with the access of ISM to the UK for those from the Global South (Raghuram & Sondhi, 2022). Moreover, research suggests that the 'anthropause', where people stopped moving around, caused by the Covid-19 pandemic could be followed by an 'anthropulse', where human mobility increases past pre-Covid-19 levels in response to the pause and to make up for the time people were not able to move (Rutz, 2022). Whilst it is not yet evident whether an anthropulse will follow the anthropause brought on by the Covid-19 pandemic, Rutz (2022) highlights how anthropulses have occurred after other significant anthropauses, such as the Bubonic Plague pandemic in the 14th century. At a more institutional level, the impact of Covid-19 on the sustainability of HEIs was discussed by Universities UK (2021). This is explored further below.

2.2. ENVIRONMENTAL SUSTAINABILITY OF THE INTERNATIONALISATION OF HIGHER EDUCATION

The literature has connected the rise in ISM to the rise in the internationalisation of HE in general (Findlay et al., 2017). As state funding for universities has decreased, the commercialisation of universities has increased, and universities have become more reliant on revenue from ISM (Universities UK, 2021). HESA highlight how the income from tuition fees and education contracts for all the HEIs in the UK has increased from £15.5 billion in 2014/15 to £20.3 billion in 2018/2019, which was by far the most significant income category during that period, with all other categories at least below £9000 million if not lower (HESA, 2021). Additionally, HEPI (Higher Education Policy Institute) highlighted that the income from International students tuition fees in 2018/2019 was £15 billion, suggesting it accounts for 75% of tuition fee and education contracts income (Hillman & Stern, 2021). Moreover, universities

are interested in revenue from ISM to diversify their finances and provide independence from government funds (Findlay et al., 2017). This has coincided with increased international collaborations, conferences, and ratings. Many of these aspects are immensely valuable for furthering research. However, the literature highlights some unintended, and contradictory, consequences. Global university rankings are used to determine eligibility of migrants: those who studied at a globally high-ranking university, may be eligible for a different type of visa. Moreover, university academics need to be ever present in an international arena, to promote their university and their career (Glover et al., 2017). In this section, research that is concerned with the sustainability of the internationalisation of HE is outlined. First, concern over the structure of academia and the pressure this places on academics and universities is discussed, before engaging in suggested ways to improve environmental sustainability more broadly.

Research suggests that air travel (pre-Covid) was normalised within academia. Glover et al., (2017) highlight for Australian academics, their universities' strategies towards internationalisation meant there was an expectation for academics to travel internationally. They highlight that environmental sustainability policies of universities that seek to reduce air travel are often not aligned with the university strategy of internationalisation. Thus, aeromobility of academics is crucial for a successful career, which they argue needs to be seriously addressed. They query whether it possible to have a global impact without being globally mobile (Glover et al., 2017). Similarly, McCowan (2020) highlights the difficult contradiction present within many universities: wanting to embody their research on climate change, whilst also participating and being recognised internationally. He suggests five key areas where climate change can be addressed in universities: the governance, particularly in terms of priorities and values; education, especially curriculum design; campus operations, such as ISM; research, focusing on addressing climate change; and community outreach, spreading knowledge among local communities (McCowan, 2020).

Additionally, Universities UK (2021) highlight how the pandemic has provided an opportunity to think differently about HE, and potentially lead to more environmentally friendly practices not just with regards to internationalisation but also more broadly. Similar to Glover et al., (2017) they indicate that relying on individual carbon guilt is insufficient and that universities should make broader structural changes. They acknowledge the dependency of universities in the UK on revenue from ISM (Universities UK, 2021). In the most recent figures available, HESA sets out 6 categories of income generations for HEIs, with tuition fees and education

contracts being by far the largest, accounting for 51% of income generation for all UK HEIs combined in 2019/2020 (HESA, 2021). Universities UK (2021) suggest that where aspects are not able to be fully 'greened' attempts should be made to make them 'greener', reducing emissions where possible, and offsetting where not. They highlight six lessons from the Covid-19 lockdown experience that could aid in making universities more sustainable: travel policies based on environmental outcomes rather than cost; direct flights prioritised when flying; use of sustainable web browsers; make virtual vivas permanent; continue with virtual open days (Universities UK, 2021). Thus, they illustrate how aspects of university life previously believed as central, are flexible and can work differently and more environmentally. The Universities UK (2021) document provides an environmental sustainability strategy for HEIs more broadly.

Universities have considered their environmental sustainability for over a decade, with several universities developing net zero carbon commitments and initiatives. Holmberg et al., (2012) highlight how their university's focus on environmental sustainability has led to a compulsory environmental sustainability module for all undergraduate and postgraduate students, to ensure all students gain an environmental education. Additionally, they suggest to further environmental sustainability at universities, they should: create a neutral arena or organisation to allow faculty from all over the university to share ideas on environmental sustainability; build on individual engagement; communicate a clear commitment from senior management, so that staff and students understand the university is concerned and prepared to act (Holmberg et al., 2012). Similar ideas are echoed by scholars from Gothenburg University, when reflecting on the effectiveness of their climate strategy between 2011-2015 (Omrcen et al., 2018). They highlight how many universities' environmental management systems (EMS) focus on reducing the emissions associated with the university and also on teaching, research, and outreach. To research best practice on how to be environmentally sustainable, teach and disseminate this to students and their wider community and also illustrate exemplary practice as a university. They particularly highlight the possibility of universities to be living laboratories to explore alternative options for society to become more sustainable (Omrcen et al., 2018). Gothenburg reduced their 2015 emissions by 18.5% compared to their 2008 baseline. The methods they used to do this were; energy efficiency measures throughout their institution, which ranged from switching to renewable energy where possible to improved IT care of computers to improve their longevity; and through offsetting all staff air-travel and promoting greener travel (Omrcen et al., 2018). Additionally, they increased their environmental sustainability education and incorporated schemes such as climate awards

withing their teaching. Moreover, they highlight how their university was able to reduce their emissions and still grow as a university, both in terms of revenue and number of staff and students, indicating that growth and sustainability are not mutually exclusive (Omrcen et al., 2018).

The Covid-19 pandemic caused a significant shift in the way universities work, which can be environmentally beneficial. As much of the environmental benefits for universities due to Covid-19 were associated with travelling less and moving online, it is likely that these have ramifications for ISM, although there is yet to be literature exploring this in the sector more broadly. A core component of this study is the focus on the strategies that HEIs use with regards to the recruitment of international students and the extent to which they are informed by environmental considerations.

2.3.   SUSTAINABILITY OF ISM

The sustainability of ISM is currently discussed in the literature in two ways: first, in terms of the reliability of revenue from ISM (Lai et al., 2019; Manzoor et al., 2020); second, its ethical sustainability (Ilieva et al., 2014; Ramaswamy et al., 2021; Riaño et al., 2018; van Gaalen, 2020). These themes are discussed below.

As outlined above, since universities have become increasingly reliant on non-government funding in many countries, many increasingly depend on revenue from ISM, with over half the income for UK universities in 2019/2020 coming from tuition fees and education contracts (HESA, 2021), with international student fees significantly higher than, if not double domestic fees and therefore a central part of this income. Thus, there is interest in analysing the reliability of this revenue. Lai, Pham, and Le (2019) explore the importance of obtaining student's loyalties to universities. They highlight that they are more likely to stay for further study or recommend the university if loyalty is high. Although, they do recognise that other factors, such as family obligations, can lead to international students returning to their home country for further study (Lai et al., 2019). Manzoor et al (2020) are also interested in determining the reliability of revenue from ISM. They studied Malaysian universities, conducting a questionnaire with 223 international students to highlight the importance of the university image and branding in attracting international students.

Additionally, literature is interested in the ethics of ISM. The unequal access to ISM is a key concern in this regard (Ramaswamy et al., 2021; van Gaalen, 2020). Ramaswamy et al., (2021) use the Sustainable Development Goals (SDGs) to examine ISM, both degree and exchange mobility. They highlight how not only is access to ISM difficult in some areas, but access to HE domestically can also be challenging. They indicate how, in sub-Saharan Africa only 5% of the population access HE (Ramaswamy et al., 2021). They argue for greater internationalization of HE to make education more accessible across the globe. However, they reiterate the importance of this occurring in an environmentally friendly way. For example, they suggest focusing on closer destinations, using environmentally friendly travel schemes, making more affordable and accessible carbon offsetting options, and embracing long-term or hybrid mobilities (Ramaswamy et al., 2021). They recognize that environmentally sustainable options are more expensive but reiterate that this should not result in making them available only to the privileged.

Instead of focusing on the SDGs, van Gaalen (2020) use the People, Planet and Prosperity framework to highlight the unintended consequences of ISM. They suggest that the dominance of Western countries, especially Anglo-Saxon, risks potential re-colonisation and the decreased diversity of language and culture within education (van Gaalen, 2020). Ultimately, they question who profits and who pays for ISM to suggest there is an inequality in this, with poorer countries suffering. Ilieva et al (2014) also suggest that ISM may lead to the containment of diversity rather than its celebration. They highlight how the commercialisation of HE and the potential standardisation this may lead to, along with the lack of awareness around this, may create an environment where diversity is limited (Ilieva et al., 2014). They indicate that this is the opposite of the values and priorities of the internationalisation of HE, which they suggest are centred around encouraging diversity. Thus they argue internationalisation and ISM is unsustainable is this sense (Ilieva et al., 2014).

2.4. ENVIRONMENTAL PERSPECTIVES

Whilst some of the literature exploring the sustainability of ISM discussed above may touch on the environmental impact of ISM there is little that explicitly explores it empirically. This is a significant omission given the considerable environmental impact that the growing phenomenon of ISM is likely to have. That said, Shields' (2019) paper is influential in this area and Davies and Dunk (2015) provide significant foundations for future research. This research has not found other empirical papers exploring the environmental impact of ISM. Davies and

Dunk (2015) analyse the appropriateness of the guidelines, set out by the Higher Education Funding Council for England (HEFCE), for universities to measure emissions from student air travel for incoming international students as well as outgoing exchange students. The guidelines state that universities should allow for two return journeys (by air) for EU students and one return journey for non-EU, and that distance flown should be calculated from capital city of home country to London Heathrow (or vice versa for outgoing exchange students) (HEFCE, 2010). Davies and Dunk (2015) use data from a survey with 673 responses from international students to the UK to illustrate that the guideline assumptions tally with their survey results and indicate they are appropriate for universities to use. Moreover, they also address the impact of ISM on travel from visiting friends and relatives and raise questions about how much this should be incorporated into emissions from ISM and incorporated into universities responsibility (Davies & Dunk, 2015). Overall, Davies and Dunk (2016) start an interesting conversation about the difficulty in accounting and ascertaining responsibility for 'scope 3 emissions' for universities, which is where they place ISM.

Shields (2019) used UNESCO data on ISM to carry out a carbon audit of greenhouse gas (GHG) emissions from travel associated with ISM to the UK, and from changes in emissions from the personal consumption habits of international students. He studied data from 1999 – 2014, finding that GHG emissions associated with ISM increased between 7.24 – 18.96 megatons during this period, to 14.01 - 38.54 megatons of CO_2e (equivalent) per year in 2014, depending on which scenario is used. To put this in context, the national annual emissions in 2018 of Ireland is 37.01 megatons of CO_2e and Slovenia is 14.05 (The World Bank, 2022). This is unsurprising given that ISM increased over this period. However, he does find that emissions per student decreased during this period because of greater ISM within regions, thus less distance travelled overall (Shields, 2019). Additionally, he shows how emissions from ISM increased at a greater rate than global GHG emissions for the same period, with global GHG emissions growing 2.18% per year and emissions from ISM increasing between 6.41% and 7.09% annually, depending on the scenario used (Shields, 2019). This suggests that emissions from ISM will continue to increase at a greater rate than global GHG emissions unless emissions per international student decrease dramatically.

Moreover, Shields (2019) makes distinctions between international students from higher and lower income countries and their associated emissions. He indicates that over this period 67% ISM is carried out by students travelling between high-income countries to study and that this

accounts for 62% of emissions from ISM during this period. Whereas, students from low-income countries travelling to high-income countries for study account for 28% of ISM and 36% of the GHG emissions associated with ISM (Shields, 2019). Thus, Shields (2019) makes the argument that emissions from students travelling from low-income countries, could fall within the Paris Agreement, in that lower income countries are allowed more time to reduce their emissions, and citizens returning after studying internationally may help them reduce their emissions faster. In the most recent COP in Glasgow 2021, ISM or the environmental sustainability of HEIs more broadly, was not part of the negotiations or the Glasgow Climate Pact (UN Climate Change Conference UK, 2021).

However, due to the nature of the large secondary data set Shields (2019) uses, he outlines five key assumptions within his research. First, he does not have data for the amount, if any, trips home an international student may make each year. Thus, he uses two scenarios in which he estimates either one or two trips. Second, he does not have data for exchange mobility, and so only includes degree mobility. Third, he determines the mode of transport used based on the distance travelled to university. Before a certain distance he assumes students travel by train and after this distance he assumes air travel is used and calculates emissions accordingly. Fourth, he calculates consumption emissions through the difference in national average GHG emissions of the sending and host countries. However, he acknowledges that this assumes that the international student's GHG emissions matches those of the national average, which may not be likely. Finally, he does not allow for any mobility of any faculty staff involved in promoting the university abroad or travelling to any study abroad conferences. Thus, he suggests his estimates are conservative and highlights key areas for future research, which are outlined in section 2.5.

This research builds upon Shields' work and helps to inform these assumptions more accurately by collecting and analysing primary data regarding student experience in the UK and perceptions of the role of environmental sustainability in ISM strategy at UK universities by those involved in implementing it.

2.5.   RESEARCH GAPS

Shields (2019) suggests three key areas for future research: an environmental cost benefit analysis; measuring the environmental behaviour of international students; and further analysis on the connection to university strategies. Each is discussed further below.

An environmental cost benefit analysis weighs up the environmentally positive outcomes, such as students sharing experiences of climate change and environmental sustainability perspectives from across the globe; against the negative environmental outcomes attached to ISM, such as emissions from air travel used to get to university. This analysis would facilitate further discussion on the environmental sustainability of ISM and highlight areas for improvement. It would highlight particular geographical and subject areas for which ISM could be most sustainable (Shields, 2019). As of yet, there is limited literature exploring the environmental benefits associated with ISM (Shields, 2019).

There is other research that calls for an environmental cost benefit analysis of ISM, particularly study abroad (Dvorak et al., 2011). Dvorak et al (2011) use two different case study scenarios of long-term field trips to highlight how students can and should return with higher environmental awareness and action, to ultimately lead less carbon intense lifestyles in the future. They highlight that if this occurs, along with carbon offsetting, they believe it can justify very long-distance trips: one of their case studies is from the USA to New Zealand (Dvorak et al., 2011). However, some literature queries the longevity of environmental practices obtained during ISM (Tyers, 2021). Tyers (2021) conducted interviews with Chinese students who had studied in the UK and since returned to China. He showed that, when in the UK many recycled, used reusable bags, or took public transport, however when they returned to China most practices did not endure. The main reason for this was due to the infrastructure, which was not set up for recycling, or peer pressure (Tyers, 2021). In fact, Tyers (2021) makes the argument that many of these behaviours started in the first place due to social pressure from peers and a desire to fit in in the UK.

In order to carry out an effective cost-benefit analysis, this study gathers further information on the environmental behaviours of international students. Shields' (2019) assumes international students' consumption emissions follow the national average, although, he admits this is unlikely to be the case in reality. Thus, this research explores the environmental behaviours of international students to evaluate how much their student migration experience impacts environmental behaviour, and if so, how. This study goes further to also explore the environmental behaviours of domestic students, to assess further whether being an international student impacts environmental behaviours more than just being a student. Moreover, this could help determine the influence of degree subject and geographical area, which would give greater detail to target ISM strategies to reduce their environmental impact.

Moreover, a final area for future research identified by Shields (2019) is further examination of university strategy. This touches on the contradiction within the internationalisation of HE outlined by McCowan (2020) and discussed in section 2.2 above: how do universities be forces for sustainability, whilst also dependent on revenue from unsustainable sources? This study explores the extent to which environmental benefits of ISM are pursued in university strategies. This information is valuable to universities as they consider alternative ways of working after the Covid-19 pandemic.

2.6.   RESEARCH QUESTIONS

1. Do international students have a higher carbon footprint than domestic students?
2. To what extent do students' attitudes on the environment impact their behaviours and why?
3. To what extent are environmental sustainability considerations part of current ISM strategies within universities?

3.   METHODOLOGY

This research involved two strands. The first took a mixed methods approach to explore the environmental perspectives of full-time students (both domestic and international) at UK universities. A survey of 144 students across the UK ascertained the views, behaviours, and carbon footprints of university students at UK universities. Interviews with 21 of the students who had completed the survey elaborated on students' environmental attitudes particularly with regard to travel and ISM. The second strand used interviews with senior staff in international offices of 14 universities across the UK to analyse the role of environmental sustainability in university ISM strategy.

Both the student and the staff interviews were transcribed soon after they occurred. They were analysed through thematic coding using the software NVivo.

3.1   SAMPLING

To select the universities, we used 2020/2021 HESA data on the percentage of international students present at each UK university. We removed all the universities that had a student population less than 2000, and private universities, defined as universities that were not registered charities, of which there were 12. This resulted in a sample frame of 223

Universities. We then organised data according to the percentage of international students present, with the university with the highest percentage of international students at the top of the list descending to the lowest percentage at the bottom. Next, we used stratified purposeful sampling to select the universities to contact, selecting the universities at equal distance from each other down the list to provide a cross section. Each university was contacted to assist with both strands of the research: disseminating the survey to students and participating in an interview for university staff.

3.2.   SURVEY DESIGN

The survey was designed in three sections. The first section asked participants' demographic characteristics and degree information. The second section was the largest and was motivated by our research question on respondents' carbon footprints. The questions in this section were focused on travel, diet, energy consumption, and retail behaviours. At the end of this section the estimated carbon emissions associated with the respondent's answers were displayed to the respondent. This carbon footprint 'score' was placed in the context of the other participants of the survey, by stating what the average, below and above average scores were for respondents. The calculation of the carbon footprint is explained below. The third and final section explored the environmental attitudes of the students and how these ranked in their future life decisions.

In order to incorporate the carbon footprint calculation in the survey we used UK government emissions data (DECC & DEFRA, 2021; Department for Transport, 2021). The questions were based on a 12 months' time frame, with carbon emission calculations for each question based on that time period. For the travel section of the carbon footprint, we used Department for Transport data stating the average emissions per mode of transport per km (Department for Transport, 2021). In total we included seven modes of transport: bike, motorbike, car, bus, train, plane, and ferry. These modes of transports were simplified from those set out by the Department for Transport. To make the survey more straightforward, questions about journeys were asked in terms of hours spent on modes of transport rather than distance travelled, as it was thought that respondents would be more likely to know this. We used Statista data from 2014 on the average speed, in km/hr, of each mode of transport in the UK (Statista, 2014) to create a conversion factor to calculate the tonnes of CO_2 emissions per hour for each mode of transport, which calculated the emissions for each journey. The 2014 data is the most recent release available.

For the carbon footprint sections on diet and retail behaviours, the data used to calculate the CO_2 emissions came from the UK government 2018 conversion factors which set out the amount of CO_2 emitted per British Pound Sterling on a large variety of products, including food and clothes, beauty, grooming, and leisure goods (DECC & DEFRA, 2021). For the diet component, a recent survey of UK university students found that on average students spend £100 per month on groceries (Murray, 2021). The survey offered different options of meat consumed per month by students. Different ratios of money spent on meat and non-meat products was assumed and used to calculate the emissions for different forms of diets based on the UK Government 2018 conversion factors.

For the energy consumption component, we employed a variety of data. The survey asked information on type of home, type of energy supply (renewable and non-renewable), and heating temperature. We drew on existing literature, which set out the different emissions from different forms of energy in kwh (Amponsah et al., 2014) coupled with recent data exploring how much energy in kwh different types of home use (Topping, 2021) to estimate the emissions for different homes depending on the type of energy used. For the heating temperature, we assumed that heating is on for 16 hours per month for 5 months, with a 27kw gas boiler, and that 18-21 degrees Celsius temperature range is the norm. The difference in heating to carbon emissions was calculated using the assumption, based on a government report (Palmer et al., 2012), that altering heating by one degree Celsius, changes emissions by 10%. We used 18-21 degrees as the norm and increased / decreased emissions by 10% accordingly for higher / lower temperatures.

The survey was designed using the software Qualtrics. Questions were designed to be as engaging as possible: most options were multiple choice with limited use of open questions. Within the survey, respondents were able to see the sum of the emissions released through their answers to the carbon footprint questions. The opportunity to calculate respondent's carbon footprints within the survey was used as an incentive for students to carry out the survey when publicising the survey. The other incentive was to enter a prize draw to win either £50 (two available) or £20 (five available) vouchers to the Ethical Superstore. The survey went live on 17th November 2021 and was open until 28th February 2022.

The survey was disseminated by email to sabbatical officers, mainly student union presidents, as well as to members of sustainability teams or sustainability organisations at universities in

the sample. Contact details were found through online searches or social media and contacted directly through these platforms. For each university at least two emails were sent requesting participation. One limitation of this is approach is that we received most interest in sharing our survey from sustainability teams or organisations. This meant that the survey was mostly disseminated among students interested in sustainability. Similarly, our survey was titled: 'Environmental Perspectives of Students Survey' and the voucher incentive was for an environmentally conscious online store. Therefore, the sample may be biased towards students interested in the environment.

In total there were 144 responses to the survey by students from 23 different universities. The top two disciplines studied were humanities and social science, and natural sciences, with 38% and 19% respectively. 34 different nationalities were represented, with the top five being, in order: British, American, German, Indian, and Chinese and French joint fifth. Summary statistics are visible in Table 3.1 below.

	Count	Percentage	UK student body (%)
Male	33	23	57
Female	103	72	43
Non-binary	6	4	0*
Undergraduate	101	70	73
Postgraduate taught	26	18	23
Postgraduate research	15	10	4
International	57	40	22
Domestic	86	60	78

Table 3.1: Summary statistics for the survey

Notes: The appropriate counts or percentages for the survey may not add up to 144 or 100 respectively, as respondents did not always answer every question, and there were some time 'other' options not applicable for this table.

UK averages taken from the HESA website for 2020/2021

* This is 0% because the number is so small in comparison and HESA uses category of 'other' not non-binary. Actual count 5,505 students

The survey sample is nationally representative with regards to the proportion of undergraduate, postgraduate taught, and postgraduate research students. However, the gender balance and the proportion of international and domestic students in our sample is not representative of university students in the UK. Moreover, the majority of survey respondents were concerned about the environment: when asked to rank their concern about climate on a scale of 1 – 10,

with 10 being the highest, 52% voted 10, 11% voted 9, and 23% voted 8. Therefore, the survey sample is representative of an environmentally minded student body. It is not known how representative this is of the UK student body as a whole.

The survey data was analysed using the Qualtrics software, which also allowed the exploration of relationships between responses. Mostly simple frequency tables were used, but on occasions t tests were conducted to calculate if the difference between international and domestic students was statistically significant with 95% confidence. When t tests were conducted, the relevant tests were carried out to ensure assumptions were met despite the small sample size.

3.3. STUDENT INTERVIEWS

Within the survey there was the option for students to opt-in to discuss the survey topics further in an interview. All students who registered interest in being interviewed provided an email address and were contacted. In total 21 students were interviewed between 30th November 2021 and 11th February 2022. The interviewees were from eight different UK universities and Table 3.2 below shows further detail on the profile of the student interviewees. Additionally, only seven of the 21 student interviews were with students studying a non-environmentally related subject, further reiterating the potential environmental bias in the sample. More women than men agreed to be interviewed, with 80% of the interviews with women and 20% with men.

Type of student	Undergraduate	Postgraduate
International	7	6
Domestic	5	3

Table 3.2: Profile of student interviewees

Three of the international students were German, two French, and then one each from: China, Peru, America, Italy, Pakistan, Canada, The Netherlands, and India.

The interviews took place via Microsoft Teams and lasted between 30 and 60 minutes. They were semi structured, meaning there was flexibility in what and how the questions were asked. The questions were focused on the following themes:

- Student experience of university, particularly on the impact of ISM

- Rationale of travel behaviours, particularly focusing on the role of the environment
- Experience of the survey and calculating their carbon footprint
- Opinions on ISM from an environmental perspective
- Opinions on their university's environmental policies
- Role of the environment in student's plans for the future.

3.4.   STAFF INTERVIEWS

The contact details for senior staff in university International Offices were found through online searches. A total of 14 interviews took place. The diversity within the sample can be seen in Table 3.3 below. This diversity allowed the research to assess how environment and sustainability are considered in a variety of HEIs

	International	Less international
	Overseas students account for more than 30% of the student body (according to 2020/21 HESA data)	*Overseas students account for less than (or equal to) 30% of the student body*
Prestigious *Ranked in the Top 20 UK University (Guardian 2021 Ranking)*	6 institutions	2 institutions
	International	Less international
	Overseas students account for more than 25% of the student body	*Overseas students account for less than (or equal to) 25% of the student body*
Less prestigious *Institution not ranked in the Top 20 Ranked UK Universities*	3 institutions	3 institutions

Table 3.3: Profile of UK HEI'S Interviewed

Semi-structured interviews were conducted with the Head of the International Office (or equivalent) within each of the 14 institutions. These individuals were (in most cases) Senior Managers responsible for the International Strategy within their institution and leading the recruitment of international students. Similar to the student interviews, the interviews took place online and lasted between 30 and 60 minutes. The interviews focused on the following themes:

- The geography of ISM to their university and how this is changing
- The impact of Covid-19 and Brexit
- Considerations environmental sustainability in ISM strategy.

4. RESULTS

4.1. STUDENT SURVEY

The survey consisted of questions on students' environmental behaviours and attitudes. The questions on environmental behaviours were used to ascertain the carbon footprint of students and carry out a carbon audit. The results from the survey are set out below.

4.1.1. TRAVEL

Figures 4.1 Shows student journeys to university from their non-term time address.

Figure 4.1: Average duration of journey (hours) to university and the number of respondents using each mode of transport for all students.
Notes: The train option also includes tram and underground. This survey question was about students' overall journey to university and more than one mode of transport could be chosen to answer the question, therefore these categories are not mutually exclusive.

Only three respondents in our sample travelled to university from their non term time address by bicycle, their average journey time was 9 hours, the longest for all modes of transport. The mode of transport with the second longest average journey time was aeroplane, which 51 respondents used in their journey to university. The most popular modes of transport used were train and car, with 65 and 62 respondents respectively. The difference for international and domestic students in journey duration and mode of transport, is illustrated in Figures 4.2 and 4.3.
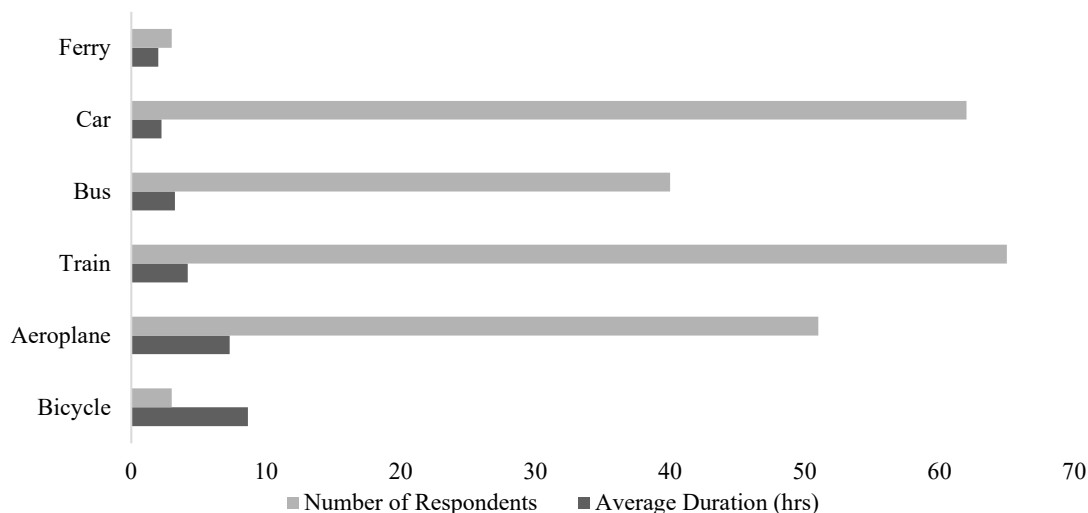
Figure 4.2: Average duration of journey (hours) to university and the number of respondents using each mode of transport for international students.
Notes: The train option also includes tram and underground. This survey question was about students' overall journey to university and more than one mode of transport could be chosen to answer the question, therefore these categories are not mutually exclusive.

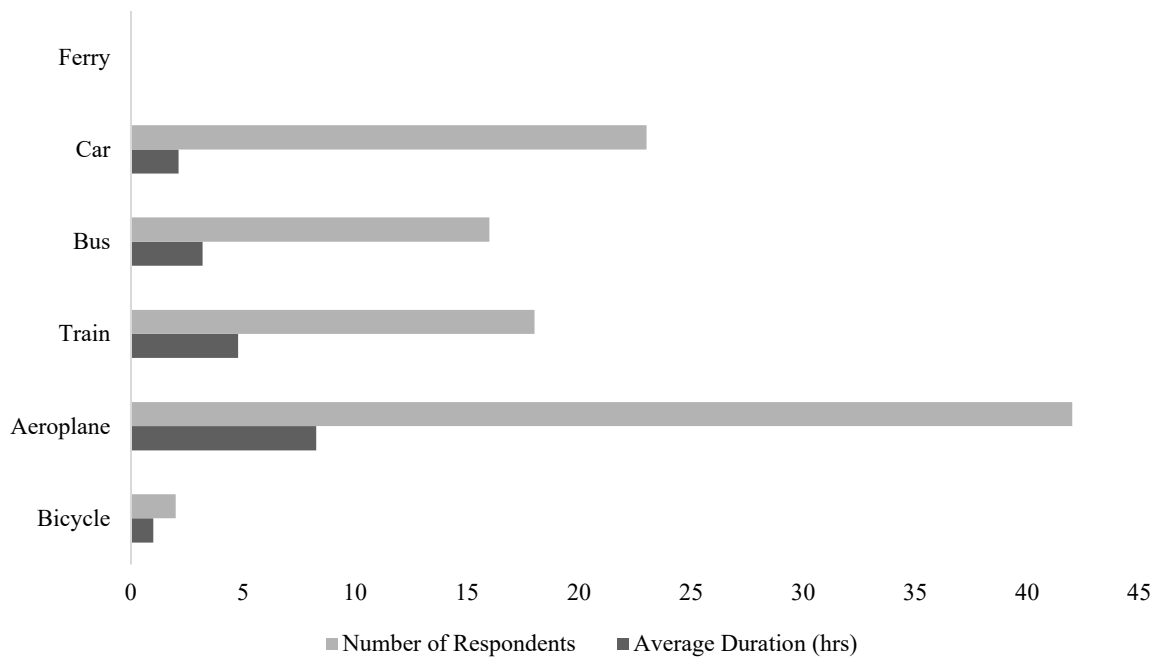**Figure 4.3:** Average duration of journey(hours) to university and the number of respondents using each mode of transport for domestic students.
Notes: The train option also includes tram and underground. This survey question was about students' overall journey to university and more than one mode of transport could be chosen to answer the question, therefore these categories are not mutually exclusive.
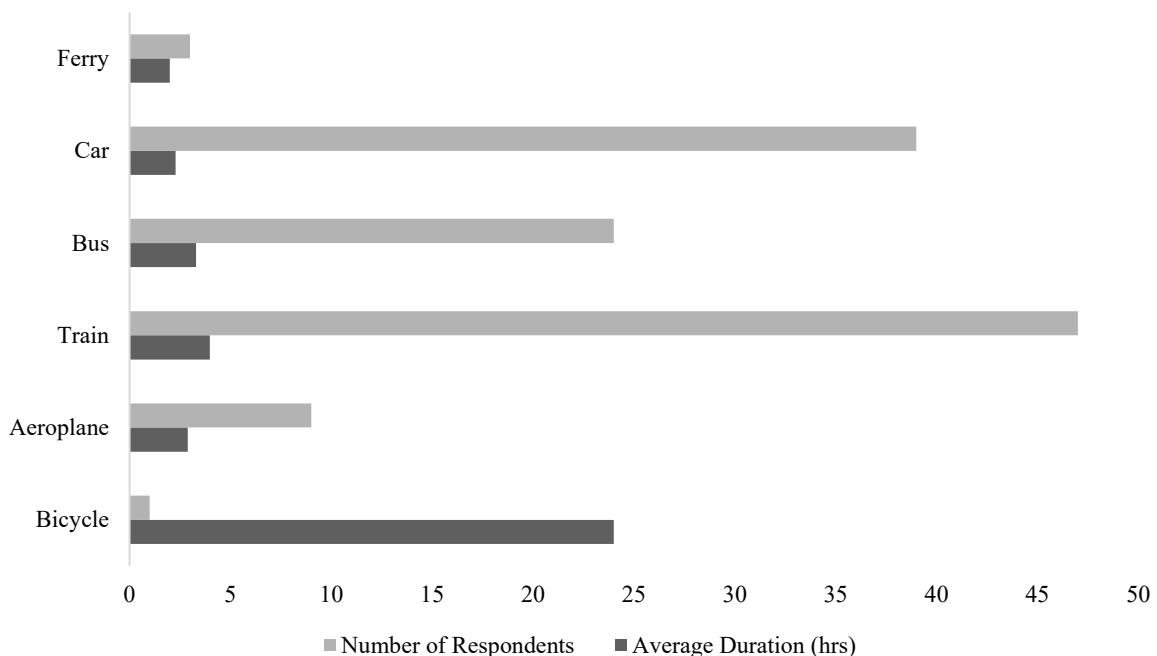
More international students travel by plane, and travel longer distances when they do. The most popular mode of transport to university for domestic students is train, with car coming second. Excluding the one domestic student who travelled by bicycle, the average journey duration per mode of transport for most domestic students is under 5 hours. . For international students the average journey time per mode of transport varied greatly depending on the mode of transport.

The survey also asked questions on commuting habits and extra trips made in a typical month during term-time. We excluded walking due to all travel involving some form of walking even if small. We also excluded trips over 100 miles which was investigated in a separate question. The habits of domestic and international students for these types of travel are similar, as shown in Figures 4.4 and 4.5.
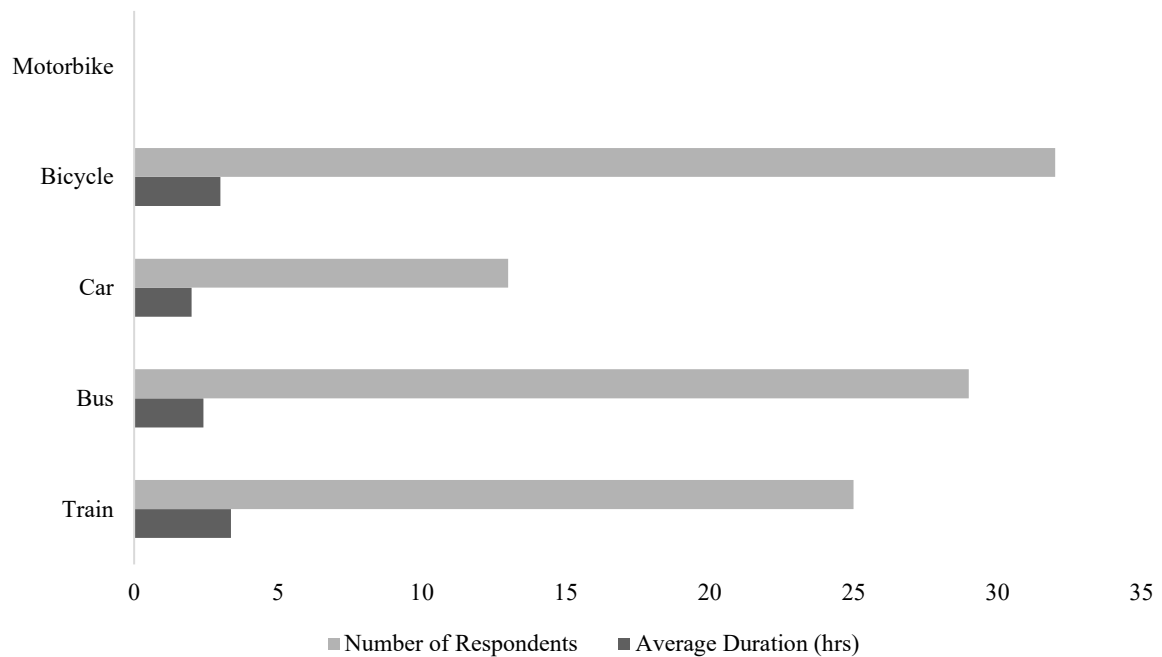
Figure 4.4: Average duration of commute (hours) to university and the number of respondents using each mode of transport
Notes: The train option also includes tram and underground. More than one mode of transport could be chosen to answer the question, therefore these categories are not mutually exclusive.
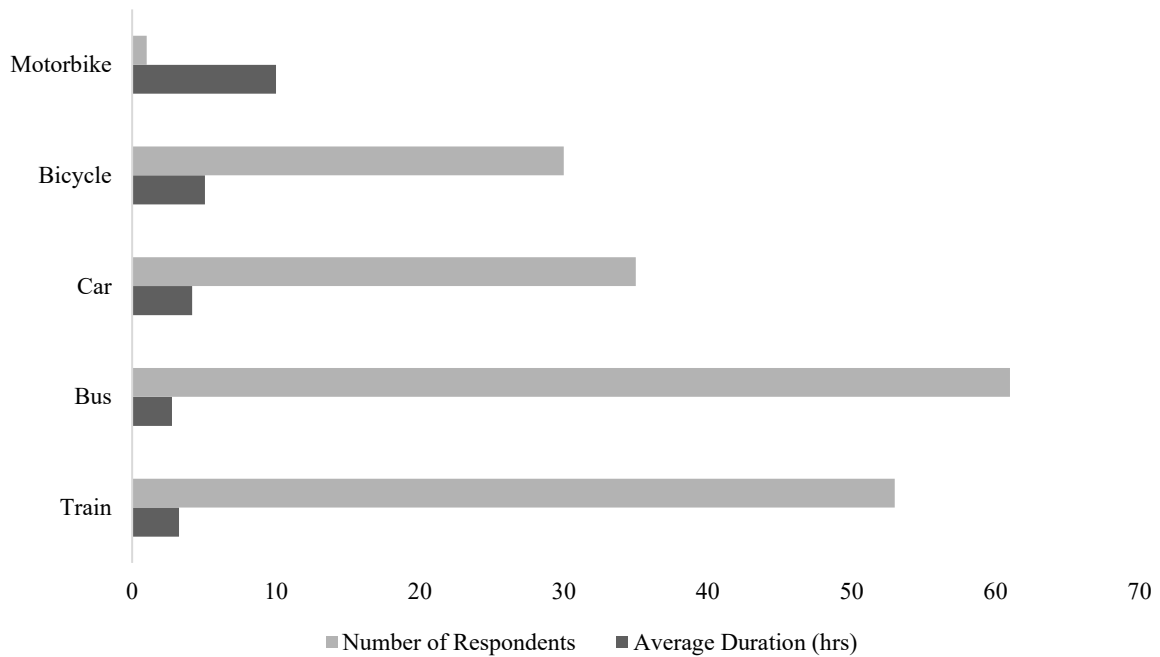
Figure 4.5: Average duration of extra journeys in a month (hours) to university and the number of respondents using each mode of transport
Notes: The train option also includes tram and underground. More than one mode of transport could be chosen to answer the question, therefore these categories are not mutually exclusive.

Figure 4.4 illustrates that bicycles are important for respondents' commute to university. As well as trains, trams, or underground, and buses, which are also important for extra trips carried out within a month, see Figure 4.5. It is interesting that once at university, travel behaviours did not vary much between international and domestic students.

Students were asked about the number of trips over 100 miles respondents had carried out before and during Covid-19, or were looking to carry out in a post Covid-19 future. The results from this are evident in Figure 4.6 below.
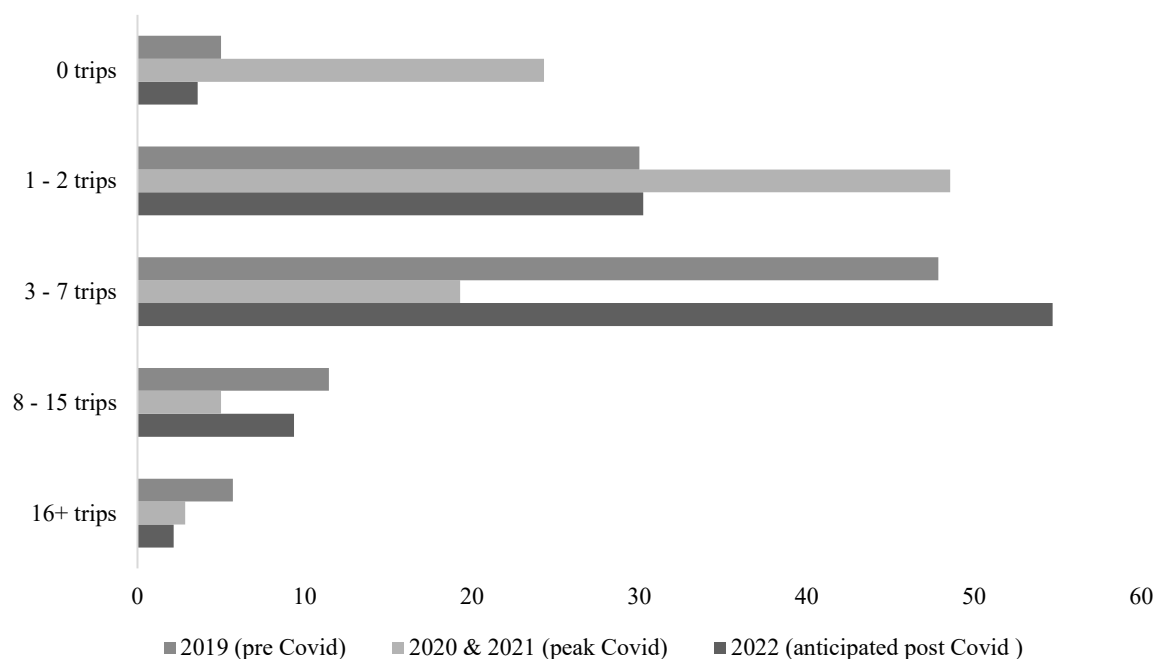
Figure 4.6: The percentage number of students who took varying numbers of trips during different phases of the Covid-19 pandemic.

Figure 4.6 illustrates that the Covid-19 pandemic reduced the number of trips taken by respondents. Students were planning to take more trips post-Covid but the expected number is below pre-Covid levels, with fewer respondents planning 8-15 trips or 16+ trips than before Covid-19. This implies that the disruption of the Covid-19 pandemic on travel has had a lasting impact over and above those purely related to travel restrictions. The interviews with students suggest that some students are thinking differently about travel in a post Covid-19 environment. There was a difference between international students and domestic students. Whilst both international and domestic students showed a decrease in trips taken in 2020 and 2021, domestic students showed greater intention to take fewer long trips. No international students stated they would take zero trips over 100 miles in 2022, while in all three timeframes some domestic students said they wouldn't take any trips over 100 miles. This is intuitive, as international students would need to make a trip over this distance to come to and return from university.

4.1.2. DIET

The survey asked one question on diet. This was to ascertain how much meat respondents consumed. The results are visible in Figure 4.7.
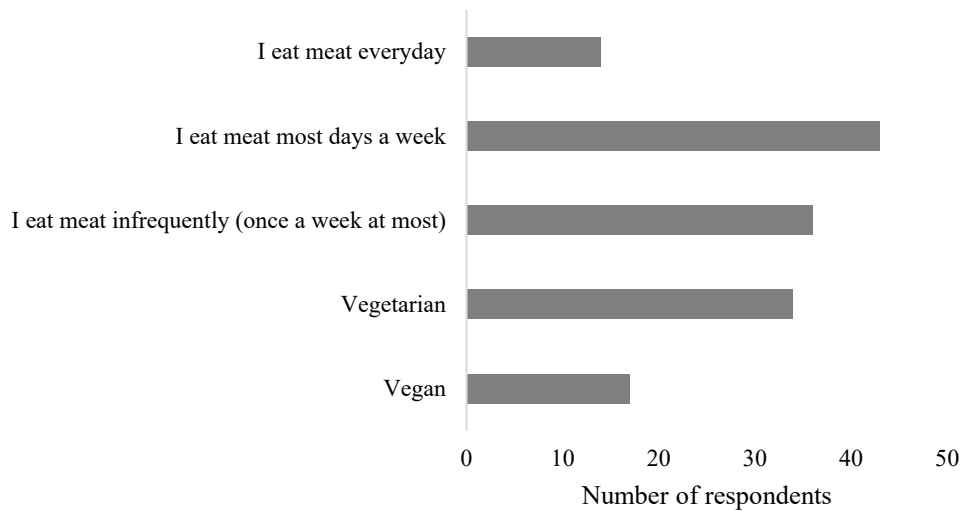
Figure 4.7: The number of respondents who chose different diet choices

Figure 4.7 illustrates that the most popular choice was eating meat most days a week and that more than half respondents ate meat at some point. This only provides data on choices and not the reasons behind the choices. In the environmental attitudes section of the survey, respondents were asked about how much environmental concerns impacted their diet decisions. The survey data showed little difference between international and domestic students' diet choices, with the only noticeable difference that a greater percentage of domestic students ate meat most days than international students.

4.1.3. HOME

The survey explored respondents' energy usage within the home. The first question in this section ascertained the type of housing respondents were living in. The results are visible in Table 4.1.

Type of Housing	Percentage of Respondents
Halls of residence	35
Apartment	28
Semi-detached house	17
Detached house	10
Terraced house	10

Table 4.1: Percentage of respondents in different types of housing

For those in halls of residence, no further questions about their energy consumption were asked in the survey, due to the limited control over energy supplier and heating temperature, the subsequent areas of interest in the survey. Overall, 23% of respondents stated that their energy supplier was exclusively renewable, with 38% stating it was not renewable and 39% unsure of their type of energy supplier. The ONS highlights how in 2019 (most recent data available), 13% of UK's energy came from renewables (ONS, 2021). This suggests our survey respondents are more likely to use renewable energy than the UK population on average, which reiterates the potentially environmentally minded nature of our respondents. There was little difference between international and domestic students. The pie chart below indicates the different heating temperature chosen by respondents.
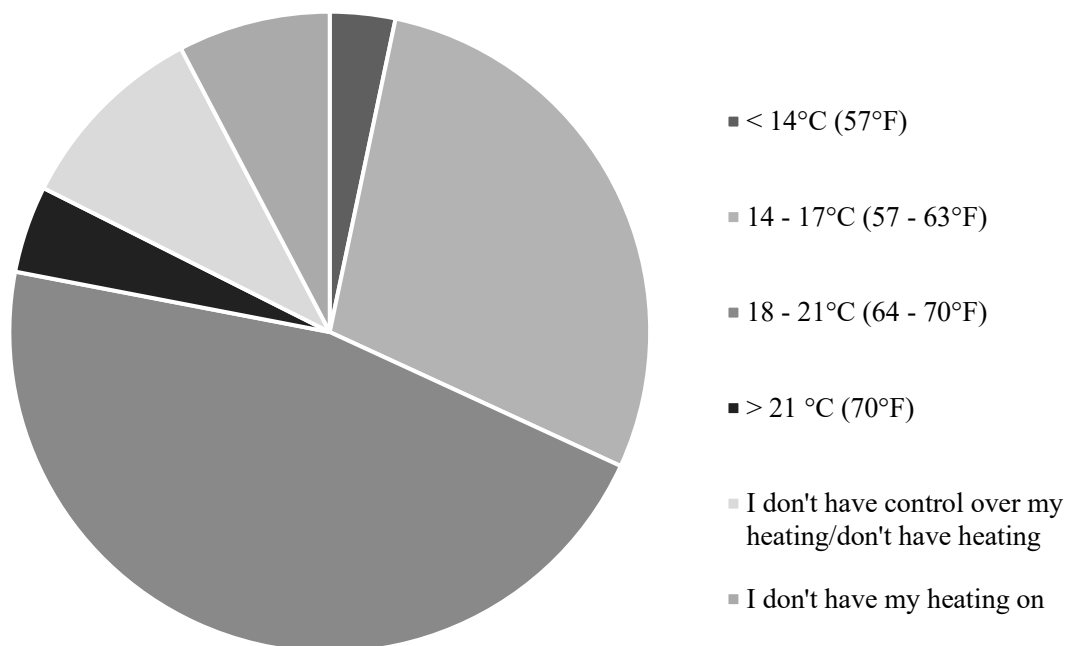
Figure 4.8: Different heating temperatures chosen by respondents

The most common choice for respondents was 18-21°C, which is the standard choice for heating temperature in the UK (Marcus, 2020). Again there was little difference between international and domestic students.

4.1.4. RETAIL

Additionally, the survey asked questions on whether students had purchased any specific technical equipment during the academic year. The results from this are visible in Figure 4.9 below.
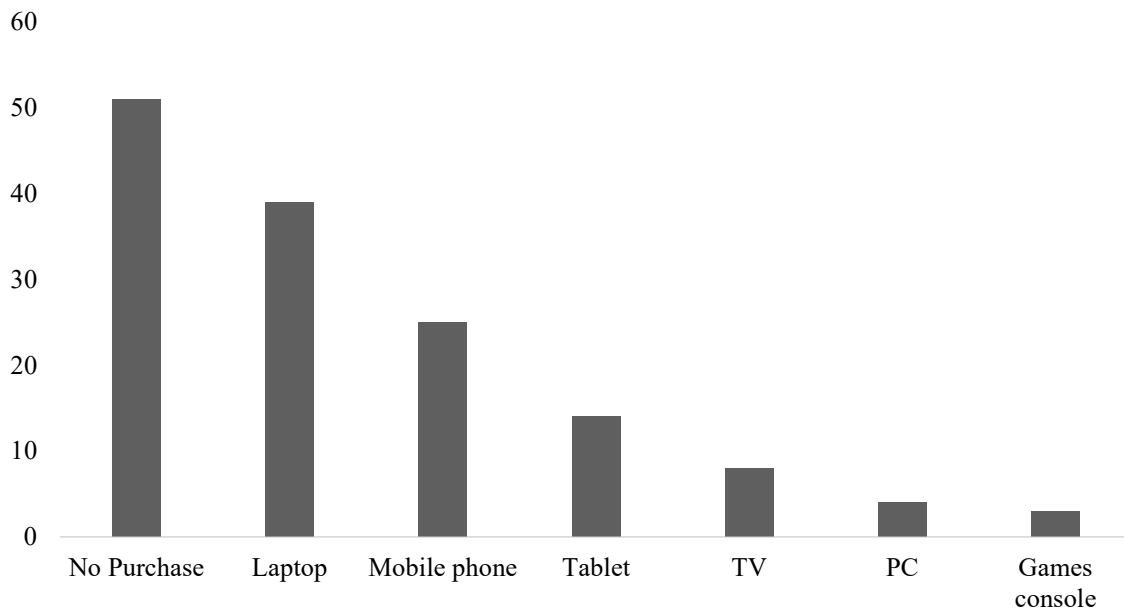
Figure 4.9: The number of respondents who bought certain technical items during the academic year

It was felt that students may be more likely to buy certain technical items due to their study purposes. The relative popularity of laptops over other technical items supports this. Respondents were also asked about their purchasing habits in a typical month. The average amount spent per month on clothes and footwear was £31 and £22 on health, beauty, and grooming products. There was no discernible difference in purchasing habits between international and domestic students.

4.1.5. CARBON AUDIT

The answers to the questions in the environmental behaviours section of the survey allowed for the estimation of the carbon footprint of respondents. The range of carbon footprints in our sample evident in Figure 4.10 below. The figure highlights how, whilst there were some higher carbon footprints, the majority of carbon footprints were between 0-8 tonnes of CO_2e, with the average carbon footprint being 5.6 tonnes of CO_2e. To put this in context a return flight from London Heathrow to New York JFK emits around 2 tonnes of CO_2e. The biggest contributor to the carbon footprint for the students came from the transport section of questions i.e.

according to our calculations, transport related activities are the largest contributors to students' education related carbon footprints.
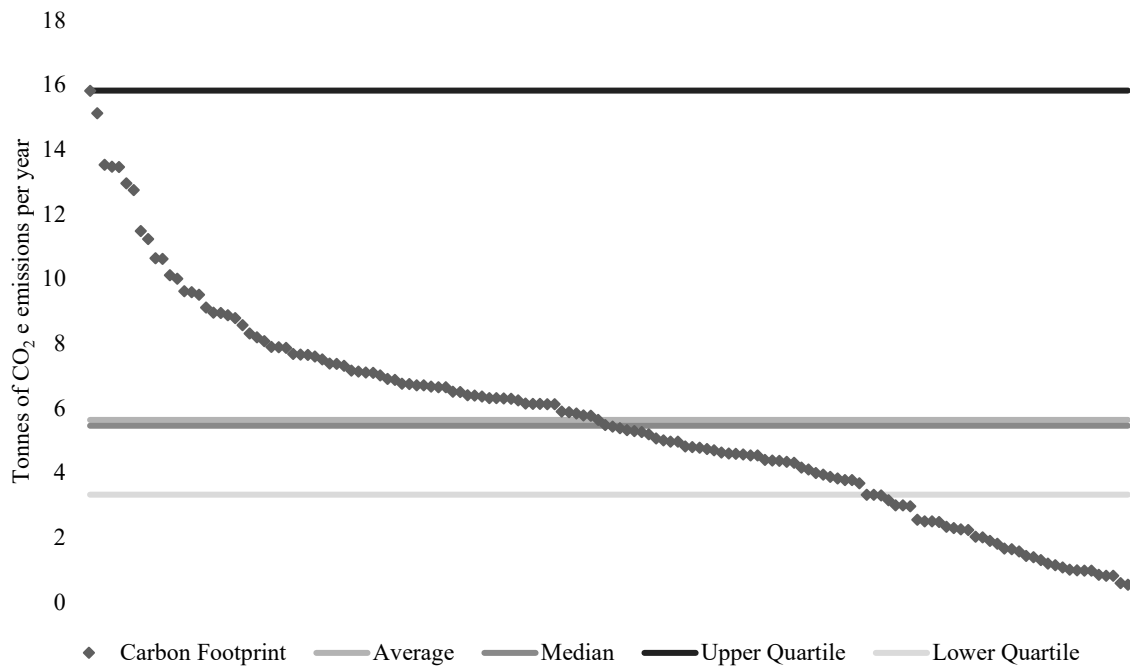
Figure 4.10: CO_2e emissions per student with average, median, upper and lower quartile emissions outlined

In answer to our first research question, there is a difference between international and domestic students. The average emission for domestic students is 4.63 tonnes of CO_2e and the average for international students is 7.17 tonnes of CO_2e. The difference between the averages equates to 2.54 tonnes of CO_2e, which is the equivalent of a return flight between London Heathrow and New Delhi. This difference is statistically significant at 0.01%. The different ranges of CO_2e emissions per international and domestic respondents are visible in Figure 4.11.
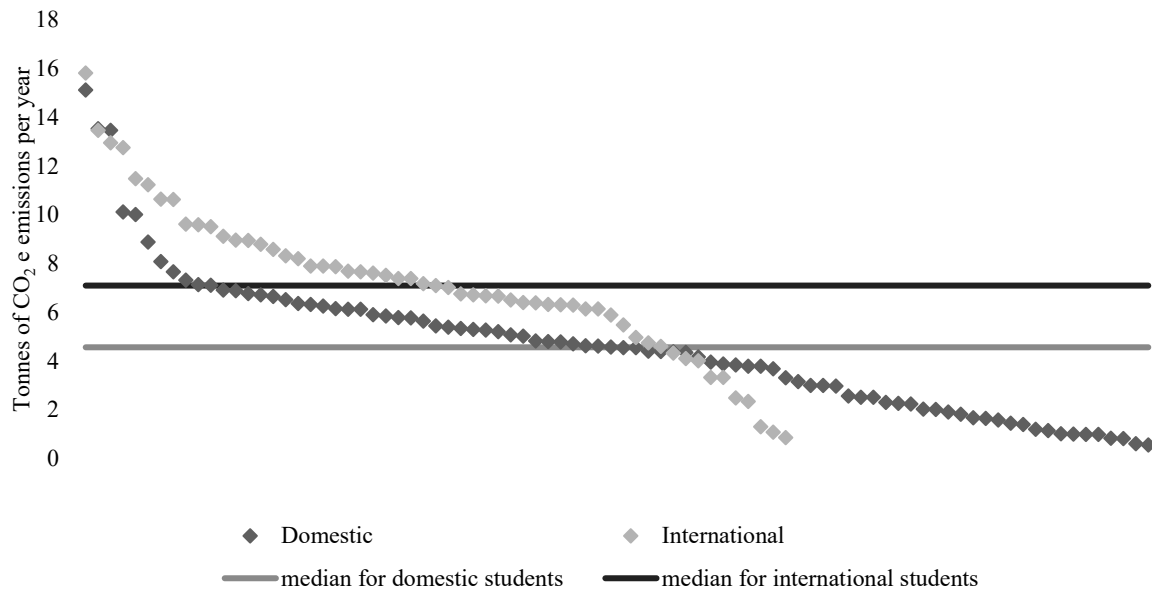
Figure 4.11: CO_2e emissions per international and domestic student respondents with medians

These differences are likely to be due to the emissions involved with the initial journey to university, as there did not appear to be substantial differences in the answers to other questions in the travel behaviours section.

From this data on average carbon footprints for international and domestic students it is possible to extrapolate and provide an estimated carbon audit for ISM in the UK. HESA 2020/21 reports 605,130 international students during that academic year (HESA, 2022b). If we assume that all international students are roughly similar to those international students who took our survey, then the total emissions for ISM to the UK would equate to 4.3 megatons of CO_2e emissions. This is substantially lower than the 14.01 - 38.54 megatons of CO_2e emissions for 2014 Shields (2019) estimated to be produced by ISM. In his paper, Shields (2019) suggests that he underestimates emissions, but our research suggests the opposite. One explanation could be because students are travelling less than the time period Shields (2019) was exploring, due to the Covid-19 pandemic. It could also be due to the environmentally minded nature of our sample, which may not be representative of international students across the UK.

Similarly, it is interesting to compare the estimated carbon audit of international students with that of domestic students. HESA 2020/21 data reports 2,146,475 domestic students during this academic year. Using the average carbon footprint for domestic students in our survey, this

would cause a carbon footprint from domestic students in the UK of 9.9 megatons of CO_2e emissions. This is over double the emissions released from international students, due to the greater number of domestic students.

The difference in the average carbon footprint of international and domestic students in our survey is 2.54 tonnes of CO_2e emissions. When this is multiplied by the number of international students it in theory produces the extra emissions caused by ISM than would have occurred through the equivalent number of domestic students attending university. Our research calculates this as 1.54 megatons of CO_2e emissions. This is similar to the annual emissions from Malawi in 2018 of 1.57 megatons of CO_2e emissions (The World Bank, 2022). It is also around a third of the figure initially calculated for the emissions from ISM, when the average emissions for international students, rather than the difference in average emissions, was used. This indicates the importance of conducting a carbon audit in the appropriate context. It is useful for universities to know, as is evident in the staff interviews, as it allows universities to understand the emissions associated with ISM and to explore ways in which they might address these. However, it is important to remember that our survey sample was modest in size and likely orientated towards relatively environmentally minded students, therefore our estimates should be considered somewhat crude and conservative. Further, more in-depth research on this topic would be useful in addressing any biases and in calculating a more representative result.

4.1.6. ENVIRONMENTAL ATTITUDES

The survey also asked questions about environmental attitudes of respondents to give greater detail to their environmental behaviour choices. The first question in this section ascertained how much concern for the environment impacted respondents' behaviours. The results for this are illustrated in Figure 4.12.
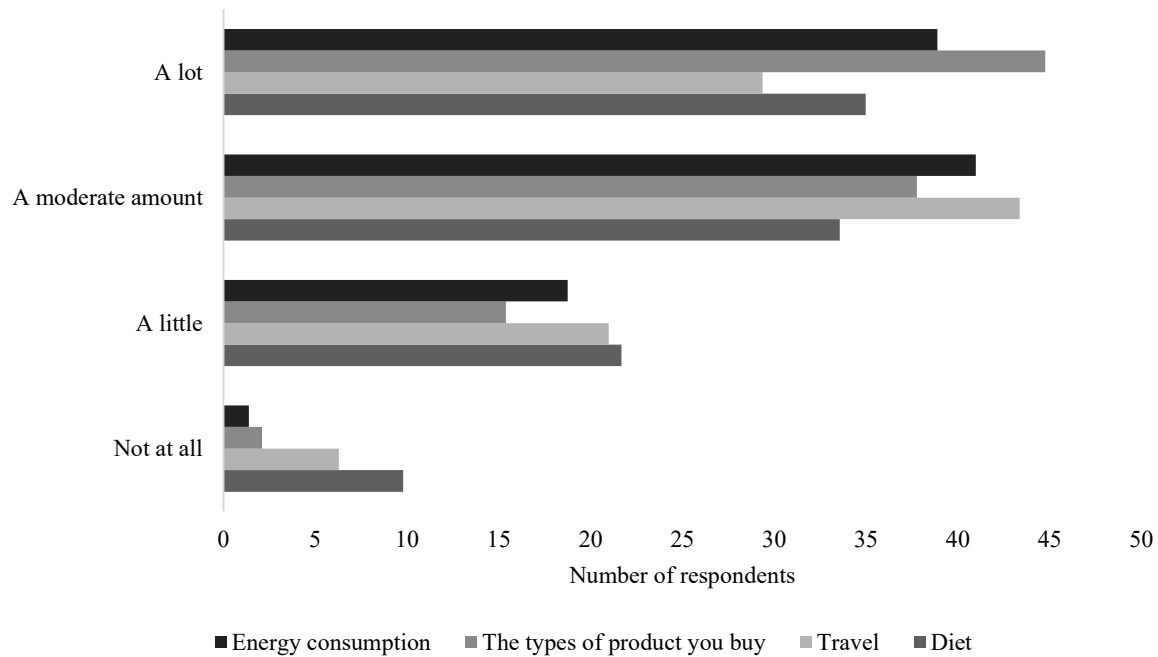
Figure 4.12: The amount of influence concerns about climate change had on respondents' choices with regards to diet, travel, retail, and energy.

This indicates that students particularly consider climate change in their purchasing habits, as well as their energy consumption. The impact of respondents travel behaviours on climate change was only considered a moderate amount, this may be due to the limited options regarding travel students feel are available to them either due to logistic, cost, or convenience reasons. This was discussed in the interviews. There was little difference between international and domestic students.

The respondents were asked about their view on climate change. Their answers are visible in Table 4.2.

Statement about climate change	Percentage of Respondents (%)
I don't believe that climate change is taking place	1
I believe that climate change is taking place but not as a result of human actions	0
I believe that climate change is taking place and is, at least partly, a result of human actions	31
Don't know	0
I believe that climate change is taking place and is entirely a result of human actions	68

Table 4.2: Survey respondents' views on climate change

The table illustrates that 99% respondents viewed that climate change was taking place, with the majority viewing it as entirely due to human actions. Similarly, when asked about their concern about climate change on a scale of one to 10, with 10 being the highest level of concern, as mentioned, the majority of respondents ranked 8 or above. The visual representation of these results is shown in Figure 4.13.
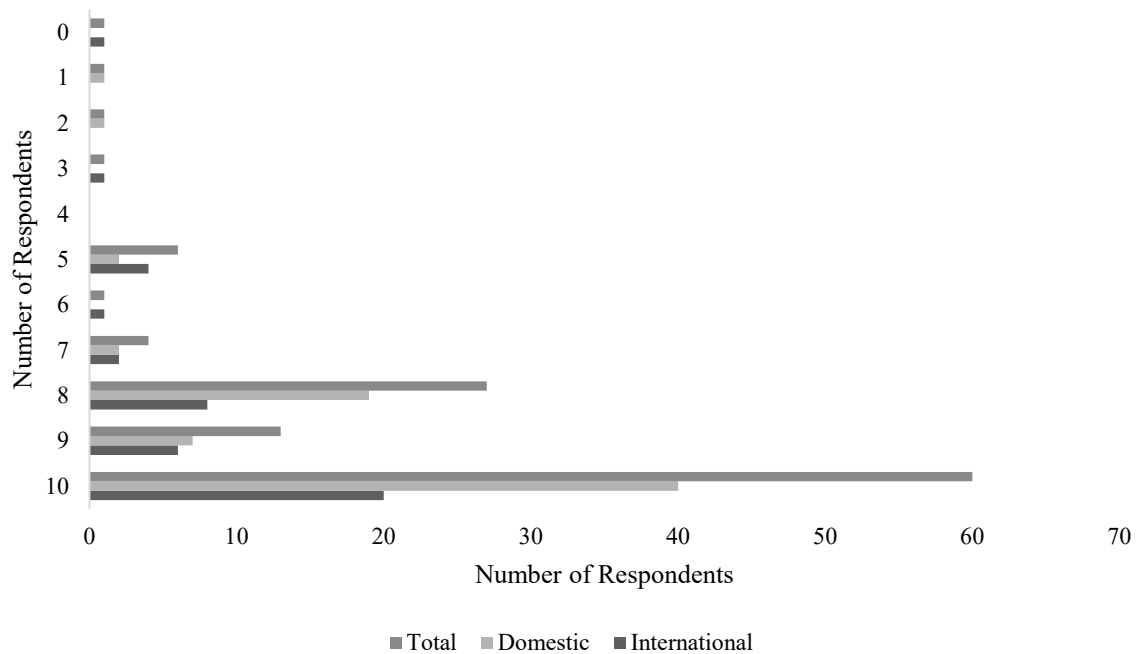
Figure 4.13: Concern of respondents about climate change on a 1 to 10. Split by international and domestic students.

This further illustrates the high level of concern about the environment in our survey sample, it is not clear how representative this attitude is of the student body at UK universities as a whole. Additionally, it is also important to remember when looking at this figure, that there were fewer international than domestic students in our sample.

To further establish what influenced students' environmental awareness, and the role their university experience played within this, questions were asked about the level of influence certain factors played in determining respondents' environmental behaviours, on a scale of 1 to 10. The results for this are evident in Figure 4.14
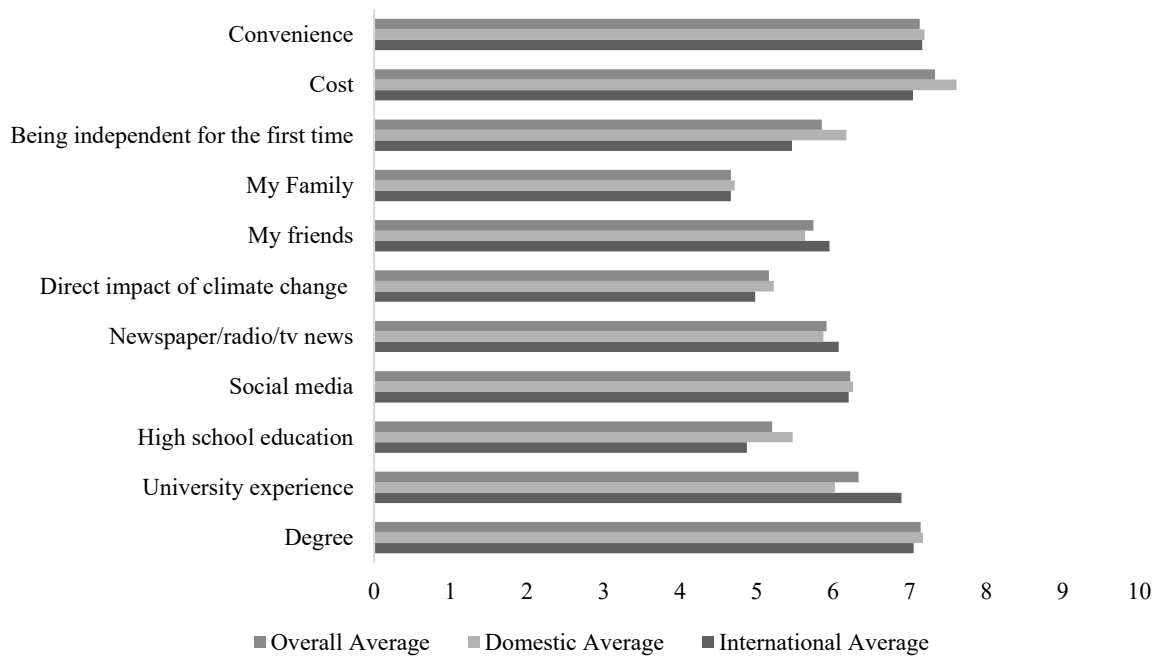
Figure 4.14: The average score out of 10 for how each factor influences respondents' environmental behaviours. Split by international and domestic students.

Respondents' degree did have a high influence on their environmental behaviours, indicating that many respondents came across issues around environmental sustainability within their degree. However, of greater importance was cost and convenience of environmentally sustainable options. This was echoed in the interviews with students, who particularly stressed the importance of financial efficiency when a student. This helps to answer our second research question on how much environmental attitudes impact behaviours, as it highlights how factors such as cost and convenience can prevent environmental concerns turning into action. There is little difference between international and domestic students.

Finally, the survey focused on students' future career aspirations and the relative importance of certain factors within this. Similar to above, students were asked to rank out of 10 the importance of these factors. The average score out of 10 for each aspect is shown in Figure 4.15.
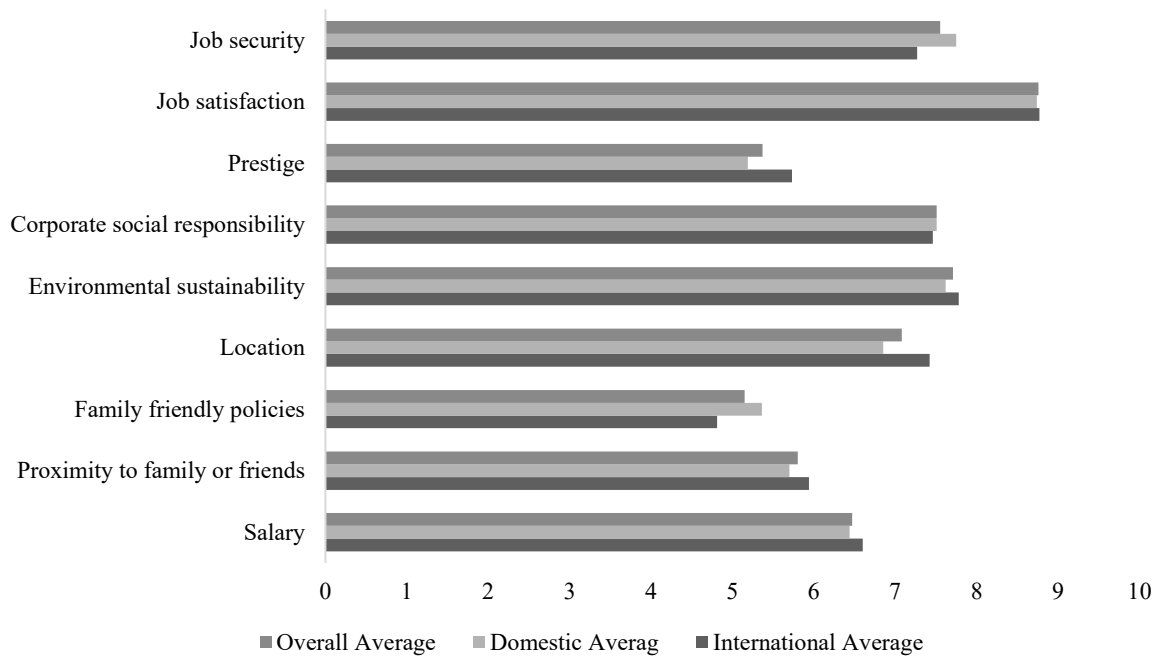
Figure 4.15: The average score out of 10 for the importance of each factor on respondents' career aspirations. Split by international and domestic students.

Job satisfaction had the highest score, but environmental sustainability and corporate social responsibility were ranked higher than all other factors, apart from job security. This further reiterates the environmentally minded nature of our respondents, which was apparent in the interviews. The overrepresentation of females and social scientists in the sample might also have contributed to the relative importance attached to job satisfaction. Again, there is little difference between international and domestic students.

4.2. STUDENT INTERVIEWS

The student interviews focused on four key areas: travel behaviours, environmental attitudes, perspectives on ISM and perspectives on their university and university experience more broadly. The issues of interest arising from these areas are discussed below.

4.2.1. TRAVEL BEHAVIOURS

Students discussed the main reasons why they travelled. The primary reason was to travel to university or work. A third (14 of the 21) of the students interviewed mentioned this as a motivation for travel. This is exemplified in the following quote from Freya:

'I think, even if Covid wasn't thing, I think most of the time I would travel would be just for school [university]. And maybe to like, if there was like an internship and it was like, you know, maybe not directly in the area that I would go for that.'

<div align="right">Freya, American undergraduate student</div>

Freya highlights that for her, the main purpose of travelling currently is to learn or work. The second highest reason for travel was to visit friends and family, with 12 students discussing this. Only two students referred to sightseeing or leisure being a reason why they might travel, and one student, who was currently undertaking a Sustainable Development Masters, mentioned how they wanted to travel to see sustainable development or climate change issues in person, which is also related to university reasons. It is surprising that sightseeing and leisure featured so low on students' reasons for travel. Besides resource constraints discussed by the students, two key reasons for this may be the role of the environment in students travel decisions and the impact of Covid-19.

As mentioned in the methodology, many of the students who took part in the interviews were environmentally conscious. This meant that for many, the environment was an important consideration in their travel decisions. In fact, 16 of the 21 students suggested that the environment played a role in their travel decisions. Five students explicitly stated that the environment was not part of their decision at all, because travelling to see family or cost was more important. Indeed, 17 students highlighted the importance of cost and convenience, with several indicating that cost was their main priority, and many citing the difference in train and flight prices within the UK and their frustration that flights are often cheaper. This reiterates the results from the survey discussed above and helps to answer the second research question on the extent to which environmental behaviours translate into actions. One international student from Germany explained how they often took the train to their university in the north of the UK, but they were the only student who highlighted how they had used train transport to travel between the UK and the EU. The intricacies of how the environment ranked with other factors in travel decisions can be seen in the quote from Jessica:

'I think the problem for me mostly with air travel is that there's no good alternative. So, if there was a train that was cheaper than air travel, I would absolutely take it, I have the time, I don't mind going by train at all. I actually love riding trains. I think it's much less of a hassle. But

since that doesn't exist, and especially between countries, the connections are so poor. I think that's the main issue, and then having flight tickets that are just so cheap. Yeah, I think for students, there's very little room to do it differently.'

<div align="right">Jessica, German postgraduate student.</div>

Jessica highlights a key point to come out of the interviews, that whilst participants considered the environment in their travel decisions, it was not necessarily going to stop students from making trips for the reasons outlined above: visiting friends or family, or travelling to university or work.

The impact of the Covid-19 pandemic on students' travel habits was discussed by most students. Many highlighted how they had not travelled much in the past two years due to the travel restrictions and how they were being cautious about travel plans in the immediate future, because of the uncertainty around potential restrictions. However, a quarter of the interviewees highlighted how the disruption to travel caused by the pandemic had led them to think differently about their travel habits more broadly, with a potentially longer lasting impact. Juliet illustrates this:

'During the pandemic, I did fly, … I went to South America, or Central America rather, for a volunteering trip. And that was really good. But it kind of, it made me look at what stuff is in the UK, things that I could do, maybe closer to home, and kind of the value behind going. So, like I've always said, oh I want to travel and go to different places around the globe. But now I'm thinking maybe I just go, because there's something there that I want to do rather than just travelling for the sake of travelling if that makes sense. So, I think being a bit more critical about stuff like that.

<div align="right">Juliet, British undergraduate student.</div>

Juliet highlights how the experience of travelling during the pandemic, made her think differently about travel to focus on the purpose of her trips. The importance of purpose in travelling is evident in the reasons students cited for travelling discussed previously. Very few respondents mentioned travelling to sightsee or see new places, which would potentially fit the 'travelling for the sake of travelling' referred to by Juliet above. Most students highlighted either a work, study, or relationship purpose for their travel. This increased consciousness

around travel is a possible positive outcome of the travel disruptions caused by the Covid-19 pandemic.

4.2.2. ENVIRONMENTAL ATTITUDES

Students elaborated on key influences on their environmental consciousness. Students experience at school was discussed as the main influence, or initiator of environmental awareness for half the respondents and had the largest proportion of students. Other key influences mentioned, in order of number of respondents who discussed them, were: friends and family; news or media; reflections on diet; documentaries, with three students mentioning the impact of David Attenborough in particular and students own experience in nature. Reflections on diet were often connected to interactions with friends and family, as it was often other people's perspectives on diet, which caused students to reconsider their own diet and its impact on the environment. The quote below shows an example of how many discussed their environmental consciousness changing over time:

'I do remember ... switching the lights off being drilled into your head as I went through primary school. But I think, like an honest interest in it, probably during secondary school partly because of geography lessons I'd say. And just kind of general increase in interest in the environment and the world in general. And then, seeing in the media and other places like Oh, actually, it's kind of going downhill. And so yeah, probably through secondary school, maybe around GCSE choices ... but yeah, it has kind of always been there but that was probably when my interest was piqued.'

Isobel, German-British undergraduate student

Isobel highlights another common theme in the interviews, how environmental behaviours, such as recycling or switching off appliances, were part of students' upbringings, but they weren't always aware of the environmental impact of them, and therefore school was an important influence, as it helped connect behaviour with awareness.

Students also reflected on the role that university played in their environmental awareness. Often this was connected to meeting and communicating with a diverse group of people, but it was also related to specific advertisement through the university and also students' degree programmes. This again chimes with the results in the survey. Over half the respondents were

undertaking a degree that was related to sustainability and nine students out of the 21 interviewed reflected specifically on the impact of their degree on their environmental attitudes. For example:

'I certainly think, ... it just felt like the environment was its own thing on itself, to the side, when I was a kid, as I grew older, I was more aware of how I directly impacted it. And now [during an environmental Masters] I sort of see it, as, as I say, very much interconnected with just about everything, it's impossible to like, disentangle it from the other issues in society and the other dynamics and relations.'

<div align="right">Tom, British postgraduate student</div>

Tom highlights the impact of his degree on the way he views the environment. His focus on the complexity of environmental issues was a common discussion point with postgraduate students studying environmental issues, as well as undergraduates. The environmental awareness of the respondents in this study indicates that the findings portrayed here may not necessarily be representative of the entire student body in the UK.

4.2.3. ISM

Most respondents viewed ISM as a positive contribution to their university experience. There was some reflection on the environmental impact of ISM and on where any responsibility lies for this.

The key benefits respondents highlight echo the literature (Roy et al., 2019). The most significant benefit, discussed by 13 of the 21 students interviewed, was the facilitated sharing of perspectives and exposing students to ideas different to their own or the culture in which they grew up. This was discussed as particularly beneficial for environmental sustainability issues, where it was recognized that these vary across the world and therefore having an international student cohort enables students to hear a greater variety of first-hand experience, as is evident in this quote from Jessica:

'Sustainable development is a global issue. I think we're always discussing case studies from everywhere. Of course, we don't have someone from everywhere, but it's always cool to hear

those perspectives. Because sometimes I think if you read a research paper, not all of the aspects ... that are driving certain decisions are considered. And then having someone like, let's say, from the ground that can kind of explain why people are acting in certain ways, it really helps.'

Jessica, German postgraduate student

The benefits of an international cohort for environmental education were discussed by eight of the 21 students interviewed. This is likely to be connected to the fact that many of the respondents interviewed were studying an environmentally related discipline. Other benefits were connected to exchanging perspectives, such as the benefit of having a diverse learning environment, or challenging assumptions. There was only one respondent who suggested they were expecting to be impacted more by ISM but ultimately only found a limited impact, due to little socialising between students of different nationalities, who tended to stick as they within groups.

Respondents were also asked about the challenges to ISM. Often, respondents found this question harder to answer, with many respondents taking time to try to think of a challenge. The most significant challenge discussed by students interviewed was around communication and language and culture barriers. Diana's experience provides one of the stronger examples of this:

'I feel like the other students in particular are not like, they're not equipped to interact with me. So, they find me very foreign. And the things I do and the things I say and how I act, they find it very strange. And I was like, Oh, wow, like I thought that studying in an international university, you would be like, more well equipped to, to interact with international students, but apparently not'.

Diana, Peruvian postgraduate student

Diana is referring to the difficulty she found in the reception from other students. Other interviewees referred to their own difficulty in communicating or understanding English or British culture. Two students discussed the difficulty of being an international student during the Covid-19 pandemic and not being able to physically meet co-students. Similarly, another

student highlighted the practical difficulties with being an international student from the EU after Brexit. Finally, one student discussed the difficulties they felt being away from home.

Interestingly, the majority of students interviewed, had not thought about ISM from an environmental perspective prior to the interview. Eight of the 21 students interviewed suggested that the environmental impact of ISM was offset, or outweighed by the benefits of ISM, as Lilly sets out below:

'Okay, well, so when it comes to the plane trips, that's, of course, quite a thing. So many people come from so many different countries, and even if we studied virtually, here, people travel here. And, yeah, it must be quite an impact. But I think it's worth it. For the multiculturalism, but also, it is some kind of exchange of ideas. I think, for example, like, people have different environmentalism in the different countries, of course, different kinds of awareness. And that's the one thing bringing ideas, bringing the skills of discussion and being able to discuss with the family about all the things you learned from the different countries or your friends.'

Lilly, German undergraduate student

Lilly focuses on how the environmental impact of student travel is justified by the environmental benefits. However, other students suggested that the environmental cost did not need to be offset just by environmental benefits but also through broader benefits, such as widening access to education that ISM can provide, or through making students better equipped to live in a global world.

Five of the students interviewed also reflected on the difficulty in navigating this issue, with some discussing the personal conflict they feel with travelling to university. Jeremy provides an excellent example of this:

'I'm kind of torn apart sometimes. Especially when I was taking the plane between like, okay, I have decided to go to the UK, but now I have to take the plane each time I want to see my family and that is against my beliefs. So, I can't say anything about like, the broader picture, but about like, how, I felt it was a bit like that kind of dissonance, where like, yeah, I wanted to go there to meet new people, but now I am forced to take these decisions that are very bad for the environment.'

<div align="right">Jeremy, French postgraduate student</div>

Jeremy separates the broader picture from his own individual experience, indicating how although students may be aware of the overall benefits, environmental or otherwise, that might outweigh the environmental cost of ISM, it does not necessarily mean they will personally feel content about it. However, other students interviewed suggested they did not see the environmental impact of ISM as an important consideration, with one suggesting it was an inevitable part of the university system, and another indicating it was insignificant compared with other emissions associated with universities.

Indeed, the responsibility to address any environmental impact associated with ISM was contested in the student interviews. Only two of the 21 student interviewees suggested it was the responsibility of the student themselves to address. Six students interviewed indicated that they thought the university should address the environmental impact. For example, Anne's views:

'I think it would be good if the university did [something], considering it tries to recruit international students a lot. It's very, very proud of its international student body, and it really encourages international students to come. So, I think there should be some form of, like, restoration is that the right word, restoration, like a balance.'

<div align="right">Anne, British undergraduate student.</div>

Anne uses the argument that as universities gain a lot from having a large international student body, they should address the negative consequences of this. However, six other student interviewees highlight how it would practically be difficult for universities to take responsibility for the emissions from student travel. For example, Juliet's perspective:

'I wouldn't say it was like their responsibility for people because it's such a diverse group, like if you're talking about, they're responsible for who gets on what flight to the UK and back again, and when people go home, and how they do that. Like how would they take on that responsibility? Because they can't pay for people's flights?'

<div align="right">Juliet, British undergraduate student.</div>

The difficulty of practically addressing the environmental impact of flying was widely discussed, there was some suggestion of carbon offsetting, but the most prominent suggestion was to ensure there was effective university wide sustainability education, so that students could make their own sustainably conscious decisions and not just on travel but on all aspects of their life.

4.2.4. UNIVERSITY

Students discussed several aspects of their relationship with their university during the interview. The first aspect they discussed were the reasons why they chose to study at that university. This was mostly connected to the ranking or reputation of the university, the location of the university, or the accessibility of the university, in terms of entry requirements. This mirrors what much of the literature discusses as key factors behind students' university decisions (Kommers & Bista, 2020). For postgraduate students there was a greater focus on the reputation for the specific course, subject area, or specific academics. The interviews also discussed the extent to which the environment was important in their university decision. As 14 of the 21 students interviewed were undertaking a degree related to the environment, it is unsurprising that many students commented on the significance of the environment in their university and degree choice.

There were varying degrees of awareness in the student interviews of the environmental policies of students' universities. Due to the environmental nature of the survey and the fact that it was shared with students by sustainability societies and teams within universities, as well as student associations, it is not surprising that there was at least a high level of interest from students in their universities environmental policy, even if they did not currently have a high level of awareness of them, due to factors such as time constraints, the Covid-19 pandemic, only being at the university for a few months. Around half (12 of the 21) of the

interviewees discussed feeling empowered to influence their universities' environmental policies. Indeed, some students had already done this, for example Zara:

'When I came to university, I would say it was like early second semester of my first year, I was like, I want to join an Environmental Society. And I realised that [university name] didn't have one. And that really, really bothered me. So, I was like, Okay, I'm going to start one. And it wasn't something that I was like, really, really passionate about, but just putting in all that work into the society, you know, started making me very, just made me feel like, you know, I guess at that point it was 2020 and I was like, how does [university name], not have these resources for their students or any of that. So, I just I put a lot of love into it and then I started meeting people getting appointed to different positions and all of that. And then I got to where I am now. And now it's like, my number one thing, I love it so much, I love connecting with the people and I love feeling proud of what I do.'

Zara, Canadian undergraduate student

Zara provides an excellent example of the importance of student groups and many student interviews highlighted how students did not feel like they could influence policies on their own, but through a collective. Sometimes this collective was organised through the university, with sustainability forums and such like and sometimes externally through student groups, such as the one set up by Zara. However, some students queried the extent of the influence of such groups or forums on university policy, suggesting some scepticism about the role of students in determining university strategy. This is interesting when compared to the findings from the staff interviews.

4.3.   STAFF INTERVIEWS

The interviews with staff at 14 different universities involved in determining and implementing ISM strategy had two key purposes. Purpose 1. To explore respondents' experiences and strategies regarding ISM and 2. To discuss how this fits with respondents' institutional goals with regards to environmental sustainability. The areas of interest are discussed further below.

4.3.1. CURRENT CLIMATE OF ISM

4.3.1.1. Geography

The largest sending countries for all the universities interviewed were either China or India. Other significant source countries were the United States and Nigeria, with some European countries mentioned, such as France, Germany, or Italy, depending on the university. Most staff interviews discussed a decrease in students from the EU after Brexit, however this was less the case for the most prestigious universities. The international student profile and changes to it varied for undergraduate, postgraduate taught and postgraduate research, depending on the university, their reputation or ranking, and specific strategy for student recruitment. For example, Jennifer's experience with Brexit:

'The statistics this year are showing exactly the same trends [for EU students] as last year ... I think the disappointing bit is that it's not been as strong at PGT. So that is an area that is definitely suffering because of Brexit specifically. Undergraduate overseas is a bit like what I was saying about China, there's a kind of almost global elite there that are very attracted to [university name], and it doesn't really matter where they're from, even that they didn't have to pay a fee before ... so my main worry with Brexit is PGT.'

Jennifer, high ranking international university

Jennifer illustrates the variation between undergraduate and postgraduate at her university. Her experience fits into the discussions in the literature about the accessibility of ISM, with international students of a higher income having greater access to studying abroad (Gribble, 2008; Ramaswamy et al., 2021; van Gaalen, 2020). Inequality within ISM was discussed in some interviews, with respondents highlighting how they would like to diversify not just the nationality of international students, but also the socioeconomic status of students and widen access to HE. This is an unanticipated finding of our research, as it has not been greatly covered in the ISM literature. It is discussed further below.

For the majority of universities spoken to, China was the largest source country, both currently and in the recent past. There was some discussion about the need to diversify, particularly within some subjects that were especially attractive to Chinese students, such as business. There was concern about the risk of depending too heavily on one source country, particularly

with regards to income security and student experience. This echoes the literature (Findlay et al., 2017) and is evident in Tom's perspective below:

'If you look at what's happened over the last sort of 5, 10 years, in terms of the source countries UK institutions recruit from, generally it's flatlined for most countries, but China, you know, it's sort of a fairly steep curve. So, the big challenge really is that if it is flatlining for most countries, i.e., you know, the pie isn't getting any bigger, if we want to increase our numbers from the USA or Malaysia or Singapore, we're going to have to take market share from someone else in order to try to rebalance away from China… It's also about ensuring that the students have a, I suppose an experience at [university name] that has a global focus, an experience of learning and interacting with students from all over the world, which again, can be an issue if you suddenly turn up and 90% of your class is from one particular country.'

Tom, high ranking international university

Tom highlights how the market has changed over the last decade to lead to the dominance of one country and how this causes broader problems for universities overall. However, some universities discussed how recently there has been a drop in students from China, due to concerns over how the Covid-19 pandemic is managed in the UK, which has made many Chinese students reticent to start studies in the UK or return to the UK to complete their studies. Two interviewees discussed the difficulty in maintaining online education for Chinese students after the pandemic, as it is harder to resolve any communication issues or language barriers.

Additionally, the recent reinstatement of the post-study work visa has impacted the geography of ISM in the UK, with around a third of the interviewees mentioning the impact on India in particular. Martin explains well the impact of the post-study work visa:

'I think Australia responded [to the post study work visa], and now have gone with three years post study work and Canada have got permanent immigration, which I don't think we'll ever compete with. But definitely the two years is a good compromise, it certainly, you know, as soon as it was brought back in overnight, the numbers of applications from India, in particular jumped, other countries less influenced by that, but the countries where students would traditionally take out some sort of bank loan to afford to come and study in the UK, and then

are able to earn money, either to gain experience or to help pay back their fees, or both. And I think that's always going to be attractive.'

<div align="right">Martin, high ranking, less international university</div>

Martin illustrates the context in which the UK competes with other English-speaking countries for international students. Most emphasised the influence that UK government policy had on ISM, as well as the policies of other sending and receiving countries for international students.

4.3.1.2. The Covid-19 Pandemic

Moreover, the interviews highlighted the extent to which the Covid-19 pandemic has impacted ISM strategy over the past few years. The most significant impact discussed by interviewees was the reduction of travel, both student and staff, which led to university activities occurring online. Many indicated that they believe much of these changes that occurred during the pandemic will stay and suggested this is partly due to environmental sustainability reasons. This will be discussed in the environmental sustainability section below. The main negative impact discussed by respondents was the damage to the UK's reputation caused by its handling of the Covid-19 pandemic, as was mentioned above. Interviewees mentioned how many students from Southeast Asia did not feel it was safe to come to the UK.

Many interviewees also highlighted the positives of the Covid-19 pandemic on their working practices. The most significant being the shakeup that the pandemic caused, forcing them to work in a new way. This can be seen in Hailey's quote below:

'To be honest, I feel really, I know, it's a difficult time and what we've been through has been very sort of traumatic for lots of people. But I also think what is blown open, in a positive way is the idea that education could only be delivered in this way, in this context. You know, I think what we're now seeing is people asking for more, you know, the service user saying actually, I want it to look different to that, and that supports the discussion around flexibility, because I'm a big supporter of inclusivity. For me, that can only be a good thing because I know that a lot of students are cut out of being able to access that main model. So, I would like to see the other side of that flourish. And also, to see that just become one big picture in terms of what does a typical student look like, you know, they could fit any one of 20 profiles. So, I think in the end, this is probably a really good thing that we're starting to think about this.'

Hailey, not high ranking, less international university

Hailey highlights how the pandemic has potentially increased the accessibility of international education, which has previously been a critique of ISM (van Gaalen, 2020). Others also referred to the decrease in staff travel opening new ways of working internationally which, without the pandemic, could have taken much longer to establish. Thus, most interviewees highlighted approval and appreciation for the long-term direction of working online or with in country partners that the Covid-19 pandemic had forced on them.

4.3.1.3.   Motivations

The interviews discussed the key reasons why international students were attracted to studying at their university. The reasons discussed in the interviews echoed those found in the literature (Baas, 2019; Findlay et al., 2012; Kommers & Bista, 2020; Roy et al., 2019). There was much focus on the academic reputation and ranking of the university. This was often linked to the importance of employability prospects for students. Joey, for example, illustrates the key selling points his team needs to keep in mind:

If I'm an undergraduate student, I've got dreams of joining a really good company at the start of my career, is the course at [university name] and do the facilities at [university name] allow me to do that? If I'm a postgraduate student, with three, four or five years of work experience, I'm at the middle stage of my career or the middle stage of my nascent career, I want to know how can I get on to the next level by doing that postgraduate Master's degree? So, then the bigger question is, what kind of networks, contacts, influences do we have? What kind of

external reach are we able to tap into? Those things become very important. And that in turn is important for us to constantly evaluate.

<div align="right">Joey, high ranking, less international university</div>

Respondents highlighted how future prospects were becoming more important for domestic students as well, but that these had always been important for international students, potentially because the fee for international students has always been higher than for domestic students. Indeed, the interviews highlighted how many of the attractions for studying in the UK have not changed. Interviewees also discussed the attraction of certain cities, as well as the desire for students to conduct a degree in the English language. Interviewees also highlighted how the motivations behind ISM were likely to vary dependent on the source country, and this results in universities creating bespoke marketing strategies within different countries.

4.3.1.4.   Benefits

Most respondents discussed the key benefits of ISM and the reasons for their respective universities interest in ISM. Two thirds of the interviewees prioritised the financial benefits: that ISM provides a significant income to universities. Most also discussed the non-financial benefits, such as the benefit to future research connections, or to overall student experience both within their studies but also socially. These non-financial benefits match with the benefits of ISM discussed in the student interviews above. From a strategy perspective, Tim illustrates his university's view on international students:

'It is undoubtedly the case like almost every other institution in the country that we rely on the fees that international students bring, and the contribution that makes to the research, to the development of the institutions overall. So that's a big part of why we do it. But I think it's absolutely recognised that they [international students] make a huge contribution to every programme, to the experience of our UK students in being able to learn from them, that they broaden the way that programmes are experienced and delivered by all so there's a much wider benefit.'

<div align="right">Tim, not high ranking, less international university</div>

The idea that ISM brought a myriad of benefits both financial and non-financial was discussed by most interviewees, with many keen to stress that the financial aspect of ISM was not the

only focus of ISM strategy. However, when discussing the role of environmental sustainability in ISM strategy, it was widely accepted that financial concerns were prioritised over sustainability considerations.

4.3.2. ENVIRONMENTAL SUSTAINABILITY PERSPECTIVE ON ISM

All the interviews with staff suggested that conversations around the environmental sustainability of ISM were happening, with many highlighting how the experience of the Covid-19 pandemic had accelerated these conversations, due to the reduction in staff travel and further exploration of online learning options. However, there was less agreement on the extent to which universities could dictate or interfere with student travel decisions and whether environmental factors would be prioritised over financial aspects. These factors are explored below

4.3.2.1. The Covid-19 Pandemic

Staff operations were discussed as most impacted by environmental sustainability concerns. This was mainly because these aspects of ISM strategy were easiest for staff within international offices, or equivalent, to control. The reduction of staff travel and the beneficial environmental impact of this was discussed by over two thirds of the staff interviewed. Many highlighted how the Covid-19 pandemic had forced them to stop travelling and grow their in-country offices, or agents. For example, Nancy's institutions experience:

I think also from a carbon perspective, … and Covid, was the perfect excuse to really do this, … you don't need to get on the plane and go to Vietnam four times a year to recruit students, and you're doing something wrong if you have to do that. So, I had already kind of grounded my team to a fair bit when I first started … And what I started doing before Covid was growing our overseas offices, essentially, so that we've got local colleagues locally employed that do that for us, and therefore reduce our need to get onto planes A it is expensive and B for the carbon footprint that you talk about. I think that was accelerated happily during Covid actually, because we couldn't get on the plane. And it really has demonstrated to my team, even my recruitment team, but I think possibly some academics as well … you don't need to… just reiterated that you really don't need to.

Nancy, not high ranking, international university

Nancy highlights how staff travel is now not regarded by many necessary to carry out ISM objectives. Other interviewees also discussed how they were not just travelling less but changing the way they travel across the university by focusing on making travel as effective as possible. This could involve having a certain threshold over which is an acceptable purpose to travel, or combining purposes of trips, so one member of staff could fulfil the travel purpose of another member of staff, potentially even from a different department. Many, like Nancy, discussed Covid-19 as being the key catalyst for this change in thinking. This also echoes findings from the student interviews, with some students highlighting how they were focusing on making travel more purposeful after the pandemic.

Another factor significantly altered by the Covid-19 pandemic was delivery of teaching, with universities moving to online delivery. For some universities this is not something they are looking to continue once travel restrictions are lifted, often this was discussed as being due to their belief that their strength came from in-person teaching and they did not want to jeopardise this. However, for others the pandemic had helped them streamline their ongoing development of distance learning (DL) or transnational education (TNE) and they were looking to continue this. However, a significant difficulty discussed was the recognition of DL or TNE programmes by other governments or organisations. Interviewees suggested the experience of the pandemic may change this. Most interviewees discussing the options of TNE, or DL did not think that these options would replace ISM, but rather that it would open up education to other groups and potentially be a more preferable option to some of the current international students. Some interviewees also discussed the possibility of virtual short-term mobility for exchanges and internships, particularly with reference to widening accessibility to these options. Marie provides an example of how her institution views the future of alternative teaching delivery options:

'We're in the process at the moment of rolling out a new strategy. And that new strategy does include some diversification away from traditional kind of on campus, bringing students to the UK recruitment, looking at more TNE, and looking for some sort of models that allow, you know, access to our courses, which don't require a student to be necessarily in the UK. I think there's probably, again, there is a sustainability angle to it. But there probably is also an opening the market up to students who couldn't come here, whether that's sort of fees wise, visa

wise or also sort of, you know, somebody that's working, so there is a little bit, you know, where we put that in the plan'

<div align="right">Marie, not high ranking, not international institution</div>

Marie highlights the mixed motivations for focusing on alternative delivery options. Widening access was discussed by another interviewee as a reason why their institution was also exploring this further. This would help to address unequal access to HE , which as mentioned in the literature review is not unconnected to environmental sustainability concerns (Ramaswamy et al., 2021). However, as with other areas of international education where sustainability environmental concerns are discussed, they currently do not seem to be the primary motive.

4.3.2.2.   Environmental sustainability priorities

The role of environmental sustainability concerns within ISM strategy are often added onto aspects that are already happening or happening for other reasons. The interviews implied that it is unlikely changes to ISM strategy will occur purely for environmental sustainability reasons. For example, as mentioned, the area where most interviewees discussed a positive environmental impact was the reduction of staff travel. However, one interviewee highlighted how, when thinking about environmental sustainability, focusing on staff travel is insignificant compared to student travel. This is evident is Tom's quote below:

'I think the other thing is, there's been a few, you know, presentations at conferences and discussions over the past few years about whether student recruitment teams at universities should be engaged in flying over to China or the USA or Singapore or whatever to recruit students. My feeling has always been that pales into insignificance, if, by doing that, the whole goal is to recruit a whole load more students who are only going to be flying over to the UK in turn. So, I think it's sort of missing, missing the point really. And that if an institution like [university name] wants to have an impact on, let's say, the, the carbon footprint of flights, what you really need to focus on is student number targets. … In theory, rebalancing away from China and getting more EU students would tick a few boxes, because you would not, if you, if you rebalanced, you know, 100% for 100%, then you wouldn't lose tuition fees, but those students would have the option to travel by train. Having said that, realistically, it's just not

going to happen. You're not going to rebalance, or you're not going to offset a reduction in Chinese students with an increase in EU students.'

<div align="right">Tom, high ranking international university</div>

Tom raises the issue of targeted student recruitment for reducing emissions associated with ISM. However, no university, including Tom's, suggested they were actually looking to do this because there was not the capacity to obtain the required number students from targeted more environmentally sustainable areas to maintain the revenue stream from ISM. The geography of demographic (growing and more youthful populations) and economic (expanding middle class) change means that the orientation towards Asia and increasingly Africa is unlikely to shift going forward.

Indeed, many interviews highlighted the tensions between the importance of sustainability and environmental concerns within discussions of future ISM strategy but also the significance of the financial revenue that ISM brings in. Bill illustrates his perspective:

'I think this has been a pause in our normal working life and it will be much harder for a number of reasons to go back to what we used to do and the type of travel that we were used to. The sector was probably already going towards this kind of remote office type approach, because it's more effective. And I think it was getting so competitive, that being close to your customer, and close to our client was the only way to really to be effective. So that's, helped, in that it has been able to reduce travel from people like me overseas. I would imagine this kind of mass adoption of Zoom and Teams will help kind of the more spurious travel in the future. … I think that we're now used to that. And I think that sort of thing won't change. Will we go back to travel? Yeah, we will go back to travel, it will be a competitive driven thing, ultimately, because climate is part of the conversation, but ultimately, it is the bottom line that will drive tactics.'

<div align="right">Bill, not high ranking, less international university</div>

Bill highlights how the reduction in staff travel driven by the pandemic has changed working within ISM positively with regards to environmental sustainability but that financial considerations are the main concern. This is similar to the views of Martin:

I think financially, we're kind of happy to commit some level of budget to working more sustainably. It's just yeah, it's just within reason, obviously. Budgets are still going to be budgets, and possibly a case of something else doesn't happen. If you're you know, you make a decision to visit a country twice a year, rather than four times a year, some stuff does have to drop off. But if you can do that, in a way, that means you main priorities are still met, then then that's great.

<div align="right">Martin, high ranking, less international university</div>

Martin indicates that whilst environmental sustainability may be considered, ISM strategy needs to allow for the key priorities to be achieved, which are often connected to growth. Thus, sustainability currently appears a second level priority within ISM strategy. This helps to answer our third research question on the extent to which environmental considerations are part of current ISM strategy within UK universities. Some interviewees suggested that universities needed capital to invest in sustainability of the university as a whole, and that this revenue could come from ISM. This fits into a cost benefit analysis of ISM, the argument that ISM is environmentally beneficial because it allows for further sustainability investment on site.

4.3.2.3.   Student demand for sustainability

An additional difficulty with increasing the environmental sustainability of ISM discussed by respondents, was the reticence of universities to interfere in students' decisions. Most interviewees indicated that their universities did not feel they could tell students when and how to travel. However, some did mention they might try and promote certain travel behaviours, such as Chris below:

'I guess one thing we'll probably look to do with our student body is get more messaging out to them about, you know, thinking about their carbon footprint, and do you need to travel home at Christmas? .... So, it's sort of, I guess, trying to promote staying in the UK a little bit more.'

<div align="right">Chris, not high ranking, international university</div>

Chris highlights the role of sustainability education, touched on in the student interviews. Many interviewees referred to the sustainability focus of their research and teaching, but not all explicitly linked this to mitigating the environmental costs of ISM. There was a recognition in

the interviews that environmental sustainability was becoming increasingly important for universities and governments, and it was likely to have an ever increasing role in their strategy and operations. Indeed, it was also recognised to be increasingly important for students.

A third of the interviewees mentioned the influence that students have in determining the direction of ISM strategy. They suggest that pressure from students may lead to greater incorporation of sustainability concerns within ISM strategy. For example, Adam and Tim's perspectives below:

'I think from the institutional perspective, student experience is always going to come first. But there's probably an interesting dynamic between the institution and the student in that the student is probably more conscious of climate issues than the university at the moment and, you know, rather than supply, it might be demand that sort of drives change there.'

Adam, high ranking, international university

I think lots of young people are very conscious of these issues. You could argue, probably not enough yet. But I would say, for me, it will start to shift when I get a student rock up to an exhibition in China and say, you know, I really want to come to your institution, but I'm concerned about this as an area, what do you do about it? How can I offset it? Do you discount my fees if I travelled by train? You know, I have never, in my experience had a conversation along those lines with a student. Now I'm a middle-aged man, maybe that's just because I'm getting a bit old. But once we start to see students asking that type of question, and being impressed by a university that says that this is an important thing for them, and that universities can start to use that as a recruitment tool or a brand building tool, then I think we'll start to see bigger change

Tim, not high ranking, less international university

Tim and Adam highlight the power that students could have within ISM decisions. This links into the student interviews and the amount that students felt they could influence university decisions. In those interviews, students suggested they felt they could influence as a collective, but Tim is suggesting that just one student querying the environmental nature of ISM could impact the policy. This shows the significant possibility of student influence. Related to this, interviewees noted apprehension that university strategies in relation to ISM may become overly subject to consumer demand and thus lack sincerity.

'I have a feeling that it will get to a position where universities are forced to do things whether they believe in it or not. So, universities may be forced to do, I don't know, may be forced to denounce something, because the overriding student voice or the overwhelming majority expects that to be done. Whether that's the right thing at that point, whether it makes good business sense or not, we will have to do that because by not doing that, we are then getting you know, flack, or we're getting criticised. That will increase I think, because of the social media, the power of social media, the power of influencing, the power of stories getting out. ... But my concern is that ... I hope that the sentiment is backed with concrete action, as opposed to just let's just get it done, but not really believe in it so much.'

<div align="right">Joey, high ranking, less international university</div>

Joey highlights concerns that external influence might take environmental considerations too far out of control of those in charge of determining strategy, so that it becomes a tick box exercise, rather than a purposeful pursuit.

4.3.2.4.   Future

Many interviews suggested that they expect that environmental sustainability will have a growing importance within ISM strategy in the future and highlight that a carbon audit of all activities associated with their ISM strategy would be effective in assisting their reduction in emissions. Tim illustrates this clearly:

'The conversation needs to be okay, how do we measure the impact of that on the climate? And then once we're able to measure it, how do we assess whether it's a good thing to continue to do or not? And if it's a good thing to continue to do, what steps can we take to mitigate and minimise the impact of that? And I think we're not yet at the stage of having those conversations about, I'm throwing out there's a trivial thing, but do we offset some of that? Do we encourage students to take fewer flights in some way? All of those types of things We're not there yet. I think there's absolutely an agreement that we need to, and we need to put that into strategic planning in the future, but we're not yet at the stage of people saying, okay, when I see your recruitment plan for the long term, that has to build these factors in.'

<div align="right">Tim, not high ranking, less international university</div>

Tim's situation echoes many other interviewees, who discuss their desire to do more with regards sustainability, but the system is not in place yet. Indeed very few of our interviewees stated that their institutions had tried to gauge the carbon consequences of their ISM strategies or had specific policies in place to offset them.

Overall, the staff interviews highlighted a general move towards more sustainable practices, with the pandemic being a significant catalyst for positive change. There still remains a tension between sustainability and financial priorities, but student demand may redress the balance so that sustainability becomes more of a priority.

5.   CONCLUSIONS

This study focused on the current and potential future role that environmental sustainability has in ISM. It was inspired by the apparent tension within universities between being a global institution with a global influence, and also being climate conscious and acting in an environmentally sustainable way. The research did not aim to imply that these two factors are automatically mutually exclusive, but that previously, being a global institution involved travel around the world, either by existing employees travelling to other parts of the globe, or through attracting staff and students from around the world. In this study we explored the role of environmental sustainability within ISM not only through talking to staff involved in the designing ISM strategy, but also through gaining information from UK university students on how concerned they were about the environment and how much this impacted their actions.

Our research from the survey of UK students highlights that international students do have a statistically significant higher carbon footprint than domestic students. However, the difference between international and domestic students' carbon footprints is similar to a return long haul flight between London and New Delhi, and reflects the greater distances involved in attending university. For those universities interested in further addressing emissions associated with international students, we suggest focussing on this difference between domestic and international students' emissions. Our research did not illustrate any significant difference in environmental behaviour of international and domestic students once physically at university. This highlights the main environmental impact of ISM from a student perspective, is students travelling to and from their home and university.

Indeed, the survey and interviews with UK university students highlighted how the environment was considered greatly by students. More environmentally minded students were probably more likely to take part in our study. However, the student participants did highlight that the area where they felt it was hardest to change behaviour was travel, due to the logistical, financial, and convenience elements, that many felt were out of their control. It also links to the finding that travel was the main difference between carbon emissions from international and domestic students, as this was the area students felt hardest to act environmentally. This helped to answer our second research questions on the extent to which students' attitudes on the environment impact their behaviour.

However, most staff and students interviewed indicated that they believed the benefits of ISM outweighed the environmental costs associated with it. Notable environmental benefits discussed were environmental sustainability education provided to all students at university and the sharing of environmental perspectives from different countries. Although, there was some discrepancy about how to further address the environmental sustainability of ISM: some students thought that the university had a responsibility to address environmental issues relating to ISM; whereas staff highlighted the significant role that students had in influencing environmental sustainability in ISM strategies. This suggests a potential disparity over the role of universities and the role of students in addressing environmental sustainability issues, which in some ways mirrors difficulties more broadly in tackling the climate emergency and the role of the individual or larger structures, such as government.

Moreover, it appears that the most significant changes to ISM were caused by the shake-up induced by the Covid-19 pandemic. Staff indicated that many of the changes caused by the Covid-19 pandemic were environmentally beneficial, particularly with regard to staff travelling less, moving to more online meetings, and using in-country partners; and that much of this is likely to continue post pandemic. Therefore, the staff operations involved in ISM are significantly more environmentally friendly than before the Covid-19 pandemic. However, there were mixed opinions among staff interviewees over the longevity of changes to teaching delivery made during the pandemic, which meant that many international students worked remotely from their home country and did not need to come to university, which is likely to have further reduced emissions from ISM during the pandemic. Whilst some universities suggested they would like to continue this, it was mainly motivated by widening participation within education, and not environmental concerns. Indeed, it was not referred to as replacing

ISM but in addition to ISM. Moreover, some universities indicated they would not be pursuing DL modes of teaching delivery, as they prided their in-person teaching.

Our research was interested in the tensions within ISM. We find these tensions still evident, particularly regarding the financial contributions of ISM and the environmental costs. Whilst all staff members spoken to highlight the significance of environmental sustainability concerns and indicated that they believed they would have an ever more important role in ISM, many conceded that currently it was the financial bottom line that took priority. This helped to answer our third research question regarding the extent to which environmental sustainability was considered within ISM strategy at UK universities. The biggest contender discussed as challenging the current financial priority within ISM was student demand: if students desired their universities to address further the environmental sustainability considerations within ISM and were actively requesting this, then there was a suggestion from some staff interviewees that this would further push them to work more environmentally. Therefore, it is of even greater importance that students appreciate their potential power and responsibility within this issue.

Overall, from the interviews and surveys, seven key areas for further research and action are advocated. These are:

1. Lobbying by Universities UK for universities to continue to use the environmental advantages they established in Covid-19, as set out in their paper (Universities UK, 2021)
2. Carbon audits of their ISM by HEIs, to better appreciate the extent of associated emissions
3. The standardisation of offsetting of ISM (using the emissions calculated in the carbon audit).
4. Continued and increased incorporation of remote learning.
5. Continued and increased activities for students outside of termtime to promote international (and domestic) students to stay close to university over holidays.
6. Green travel schemes to assist and celebrate travelling in a more environmentally friendly manner.
7. Continued and increased communication between students and staff involved in determining ISM and, or, university strategy about concern for environmental sustainability, to appropriately gauge student demand and university capability.

6. REFERENCES

Amponsah, N.Y., Troldborg, M., Kington, B., Aalders, I., & Hough, R.L. (2014). Greenhouse gas emissions from renewable energy sources: A review of lifecycle considerations. *Renewable and Sustainable Energy Reviews*, *39*, 461-475. https://doi.org/https://doi.org/10.1016/j.rser.2014.07.087

Amuedo-Dorantes, C., & Romiti, A. (2021). International Student Applications in the United Kingdom after Brexit. *IZA Discussion Paper*, *No. 14247*.

Arias, P.A., Bellouin, N., Coppola, E., Jones, R. G., Krinner, G., Marotzke, J., . . . Zickfeld, K. (2021). *Technical Summary* (Climate Change 2021: The Physical Science Basis. Contribution of Working Group I to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change, Issue.

Baas, M. (2019). The Education-Migration Industry: International Students, Migration Policy and the Question of Skills. *International Migration*, *57*(3), 222-234.

Beech, S.E. (2018). Adapting to change in the higher education system: International student mobility as a migration industry. *Journal of Ethnic and Migration Studies*, *44*(4), 610-625.

Beech, S.E. (2019). Conclusion: Developing a Theoretical Framework of International Student Mobility. In *The Geographies of International Student Mobility: Spaces, Places and Decision-Making* (pp. 227-245). Springer Singapore. https://doi.org/10.1007/978-981-13-7442-5_9

Bell, K., Cash, B., Boetto, H., & Thampi, K. (2021). International study abroad programmes: Exploring global south student perspectives, reciprocity and sustainability. *Social Work Education*, *40*(4), 492-504.

Cambridge Dictionary. (2022). *greenwashing*. Retrieved 02 / 03 / from https://dictionary.cambridge.org/dictionary/english/greenwashing

Davies, J.C., & Dunk, R.M. (2015). Flying along the supply chain: accounting for emissions from student air travel in the higher education sector. *Carbon Management*, *6*(5-6), 233-246. https://doi.org/10.1080/17583004.2016.1151503

DECC & DEFRA. (2021). *UK government GHG conversion factors for company reporting*. DECC, DEFRA. Retrieved 09/ 03 / from https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1049332/conversion-factors-2021-condensed-set-most-users.xls

Department for Transport. (2021). *Emissions from journeys (ENV07)*. Online: Gov.uk Retrieved from https://www.gov.uk/government/statistical-data-sets/energy-and-environment-data-tables-env#emissions-from-journeys-env07

Dvorak, A.M., Christiansen, L.D., Fischer, N.L., & Underhill, J. B. (2011). A necessary partnership: Study abroad and sustainability in higher education. *Frontiers: The Interdisciplinary Journal of Study Abroad*, *21*(1), 143-166.

Falkingham, J., Giulietti, C., Wahba, J., & Wang, C. (2021). The impact of Brexit on international students' return intentions. *The Manchester School*, *89*(2), 139-171. https://doi.org/https://doi.org/10.1111/manc.12356

Findlay, A.M., King, R., Smith, F.M., Geddes, A., & Skeldon, R. (2012). World class? An investigation of globalisation, difference and international student mobility. *Transactions of the Institute of British Geographers*, *37*(1), 118-131.

Findlay, A.M., McCollum, D., & Packwood, H. (2017). Marketization, marketing and the production of international student migration. *International Migration*, *55*(3), 139-155. https://doi.org/https://doi.org/10.1111/imig.12330

Glover, A., Strengers, Y., & Lewis, T. (2017). The unsustainability of academic aeromobility in Australian universities. *Sustainability: Science, Practice and Policy*, *13*(1), 1-12. https://doi.org/10.1080/15487733.2017.1388620

Gribble, C. (2008). Policy options for managing international student migration: the sending country's perspective. *Journal of Higher Education Policy and Management*, *30*(1), 25-39.

Gümüş, S., Gök, E., & Esen, M. (2020). A Review of Research on International Student Mobility: Science Mapping the Existing Knowledge Base. *Journal of Studies in International Education*, *24*(5), 495-517. https://doi.org/10.1177/1028315319893651

HEFCE. (2010). *Carbon Management Strategies and Plans, a Guide to Good Practice*. Retrieved 14 / 02 / from https://dera.ioe.ac.uk/9068/3/09_27b.pdf

HESA. (2021). *What is the income of HE providers?* HESA. Retrieved 28 / 02 / from https://www.hesa.ac.uk/data-and-analysis/finances/income

HESA. (2022a, 10/02/2022). HESA. Retrieved 28 / 02 / from https://www.hesa.ac.uk/data-and-analysis/students/where-from

HESA. (2022b, 10/02/2022). *Where do HE students come from?* HESA. Retrieved 28 / 02 / from https://www.hesa.ac.uk/data-and-analysis/students/where-from

Hillman, N., & Stern, V. (2021). *The costs and benefits of international higher education students to the UK economy*. https://www.hepi.ac.uk/wp-content/uploads/2021/09/Summary-Report.pdf

Holmberg, J., Lundqvist, U., Svanström, M., & Arehag, M. (2012). The university and transformation towards sustainability. *International Journal of Sustainability in Higher Education*, *13*(3), 219-231. https://doi.org/10.1108/14676371211242544

llieva, R., Beck, K., & Waterstone, B. (2014). Towards sustainable internationalisation of higher education. *Higher Education*, *68*(6), 875-889. https://doi.org/10.1007/s10734-014-9749-6

Jones, D.R. (2012). Looking through the "greenwashing glass cage" of the green league table towards the sustainability challenge for UK universities. *Journal of Organizational Change Management*, *25*(4), 630-647. https://doi.org/10.1108/09534811211239263

Kartha, S., Kemp-Benedict, E., Ghosh, E., Nazareth, A., & Gore, T. (2020). *The Carbon Inequality Era: An assessment of the global distribution of consumption emissions among individuals from 1990 to 2015 and beyond* (1787486494).

King, R., & Raghuram, P. (2013). International student migration: Mapping the field and new research agendas. *Population, space and place*, *19*(2), 127-137.

Kommers, S., & Bista, K. (2020). Study Abroad and Student Mobility: From Educational Experience to Emerging Enterprise. In *Inequalities in Study Abroad and Student Mobility* (pp. 1-8). Routledge.

Lai, S.L., Pham, H-H., & Le, A-V. (2019). Toward sustainable overseas mobility of Vietnamese students: Understanding determinants of attitudinal and behavioral loyalty in students of higher education. *Sustainability*, *11*(2), 383.

Luo, J., & Jamieson-Drake, D. (2013). Examining the educational benefits of interacting with international students. *Journal of International Students*, *3*(2), 85-101.

Manzoor, S.R., Ho, J.S.Y., & Al Mahmud, A. (2020). Revisiting the 'university image model'for higher education institutions' sustainability. *Journal of Marketing for Higher Education*, 1-20.

Marcus, S. (2020). *What's the idea room temperature for your home?* OVO energy. Retrieved 03 / 03 from https://www.ovoenergy.com/guides/energy-guides/average-room-temperature

McCowan, T. (2020). The impact of universities on climate change: a theoretical framework.

Murray, J. (2021). *Student living costs in the UK 2022*. SAVE THE STUDENT. Retrieved 10/ 02 / from https://www.savethestudent.org/money/student-budgeting/what-do-students-spend-their-money-on.html

Omrcen, E., Lundgren, U., & Dalbro, M. (2018). Universities as role models for sustainability: a case study on implementation of University of Gothenburg climate strategy, results and experiences from 2011 to 2015. *International Journal of Innovation and Sustainable Development*, *12*(1-2), 156-182. https://doi.org/10.1504/ijisd.2018.089254

ONS. (2017). *Migration Statistics Quarterly Report: August 2017*. https://www.ons.gov.uk/peoplepopulationandcommunity/populationandmigration/internationalmigration/bulletins/migrationstatisticsquarterlyreport/august2017

ONS. (2018). *Migration Statistics Quarterly Report: August 2018*. https://www.ons.gov.uk/peoplepopulationandcommunity/populationandmigration/internationalmigration/bulletins/migrationstatisticsquarterlyreport/august2018

ONS. (2019). *Migration Statistics Quarterly Report: August 2019*. https://www.ons.gov.uk/peoplepopulationandcommunity/populationandmigration/internationalmigration/bulletins/migrationstatisticsquarterlyreport/august2019

ONS. (2020). *Migration Statistics Quarterly Report: August 2020*. https://www.ons.gov.uk/peoplepopulationandcommunity/populationandmigration/internationalmigration/bulletins/migrationstatisticsquarterlyreport/august2020

ONS. (2021). *A review of household behaviour in relation to food waste, recycling, energy use and air travel*. Retrieved 11 / 03 / from https://www.ons.gov.uk/economy/environmentalaccounts/articles/areviewofhouseholdbehaviourinrelationtofoodwasterecyclingenergyuseandairtravel/2021-11-01

Paige, R.M., Fry, G.W., Stallman, E.M., Josić, J., & Jon, J.E. (2009). Study abroad for global engagement: The long-term impact of mobility experiences. *Intercultural Education*, *20*(sup1), S29-S44.

Palmer, J., Terry, N., & Pope, P. (2012). *How much energy could be saved by making small changes to everyday household behaviours?* Online: Gov UK Retrieved from https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/128720/6923-how-much-energy-could-be-saved-by-making-small-cha.pdf/

Perkins, R., & Neumayer, E. (2014). Geographies of educational mobilities: Exploring the uneven flows of international students. *The Geographical Journal*, *180*(3), 246-259.

Raghuram, P., & Sondhi, G. (2022). The Entangled Infrastructures of International Student Migration: Lessons from Covid-19. In *Migration and Pandemics* (pp. 167-184). Springer, Cham.

Ramaswamy, M., Marciniuk, D.D., Csonka, V., Colò, L., & Saso, L. (2021). Reimagining internationalization in higher education through the United Nations Sustainable Development Goals for the betterment of society. *Journal of Studies in International Education*, *25*(4), 388-406.

Riaño, Y., Van Mol, C., & Raghuram, P. (2018). New directions in studying policies of international student mobility and migration. *Globalisation, Societies and Education*, *16*(3), 283-294.

Richardson, B.J. (2020). Climate strikes to Extinction Rebellion: environmental activism shaping our future. *Journal of Human Rights and the Environment*, *11*(3), 1-9.

Roy, A., Newman, A., Ellenberger, T., & Pyman, A. (2019). Outcomes of international student mobility programs: a systematic review and agenda for future research. *Studies in Higher Education*, *44*(9), 1630-1644. https://doi.org/10.1080/03075079.2018.1458222

Rutz, C. (2022). Studying pauses and pulses in human mobility and their environmental impacts. *Nature Reviews Earth & Environment*, *3*(3), 157-159. https://doi.org/10.1038/s43017-022-00276-x

Shields, R. (2019). The sustainability of international higher education: Student mobility and global climate change. *Journal of Cleaner Production*, *217*, 594-602. https://doi.org/https://doi.org/10.1016/j.jclepro.2019.01.291

Souto-Otero, M., Huisman, J., Beerkens, M., De Wit, H., & Vujić, S. (2013). Barriers to international student mobility: Evidence from the Erasmus program. *Educational researcher*, *42*(2), 70-77.

statista. (2014). *Average speed on roads in Great Britain in 2014, by road and vehicle type*. Retrieved 10 / 02 / from https://www.statista.com/statistics/303443/average-speed-on-different-roads-in-great-britain-by-vehicle-type/

The World Bank. (2022). *CO2 emissions (kt)*. Retrieved 11 / 03 / from https://data.worldbank.org/indicator/EN.ATM.CO2E.KT?most_recent_value_desc=true

Tompkins, E.L., Adger, W.N., Boyd, E., Nicholson-Cole, S., Weatherhead, K., & Arnell, N. (2010). Observed adaptation to climate change: UK evidence of transition to a well-adapting society. *Global environmental change*, *20*(4), 627-635.

Topping, C. (2021). *Average electricity usage in the UK: how many kWh does your home use?* OVO energy. Retrieved 10 / 02 / from https://www.ovoenergy.com/guides/energy-guides/how-much-electricity-does-a-home-use

Tyers, R. (2021). Barriers to enduring pro-environmental behaviour change among Chinese students returning home from the UK: a social practice perspective. *Environmental Sociology*, 1-12.

UN Climate Change Conference UK. (2021). The Glasgow Climate Pact. COP26,
UNESCO Institute for Statistics. (n.d.). *UIS statistics*. Retrieved 04 / 03 / from http://data.uis.unesco.org/

Universities UK. (2021). *Resetting not recovering: greening post-pandemic international strategies*.

van Gaalen, A. (2020). Mapping undesired consequences of internationalization of higher education. In *Inequalities in Study Abroad and Student Mobility* (pp. 11-23). Routledge.

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