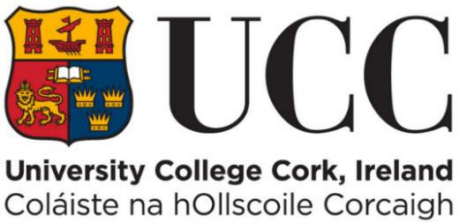
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UCC
University College Cork, Ireland
Coláiste na hOllscoile Corcaigh

Ollscoil na hÉireann, Corcaigh
National University of Ireland, Cork



Plastic-free UCC: Exploring societal and marketing levers

Thesis presented by

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for the degree of **MSc (Commerce)**

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December 2020

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Declaration

This is to certify that the work I am submitting is my own and has not been submitted for another degree, either at University College Cork or elsewhere. All external references and sources are clearly acknowledged and identified within the contents. I have read and understood the regulations of University College Cork concerning plagiarism.

Aoife Hughes

Abstract

Plastic pollution is a visible symbol of the increasingly urgent environmental issues facing our world. Single-use plastic packaging comprises about half of plastic waste produced, much of which is used briefly before disposal (UNEP 2018). Meanwhile only approximately 9% of all plastic generated by 2015 were recycled (Geyer *et al.* 2017). Such figures highlight an entrenched and unhealthy reliance on single-use plastic (SUP) within the current dominant social paradigm which promotes unsustainable levels of growth in consumption and disposal.

This research examines how sustainable practices can be facilitated and supported within University College Cork to transition away from SUP. This was done using a mixed method approach of surveys and interviews to examine how stakeholders and community members navigated sustainable behaviour and what barriers they encountered. The research highlights the persistence of cost, availability of alternatives, personal preferences and unsustainable defaults as barriers to sustainable consumption. Infrastructure also influenced behaviour with a lack of supporting infrastructure limiting the adoption of sustainable alternatives. The attitude-behaviour gap also emerged as a barrier to behaviour change re-affirming the need for systemic change rather than relying on individuals to drive changes. The research shows the importance of those in leadership roles prioritising sustainability and the importance of sustainable champions to drive middle-out change in behaviours and policies. Finally, the research highlights the need for stakeholder involvement and collaboration to sustain sustainability initiatives and for their feedback to be used to adapt initiatives.

Chapter 1.

Introduction

1.1. Research Context

Single-use plastic (SUP) serves as a vivid symbol for unsustainable growth-based consumption and poor resource management which have culminated in major global environmental, social and public health issues (UNEP 2018). Only approximately 9% of all plastic generated by 2015 have been recycled (Geyer *et al.* 2017). Meanwhile, an estimated 11 million tonnes of plastic leaked into the ocean in 2016, with that number expected to triple by 2040 under a business-as-usual model (Trusts and Systemiq 2020). Such reports highlight the urgent need for a paradigmatic shift in how societies use plastics and their alternatives. As thought and action leaders, it is recognised that higher education institutions (HEIs) have a moral obligation to integrate sustainability into all aspects of their operations, and strongly advocate for the paradigmatic shift away from society's unsustainable trajectory (Freidenfelds *et al.* 2018; Ramísio *et al.* 2019).

1.2. Aim of this research

In the context of the broader issue of global plastic proliferation, this research aims to understand how sustainable practices could be enabled and encouraged to facilitate the removal of certain single-use plastic from University College Cork (UCC) through societal and marketing levers. This research stems from a UCC Students' Union petition ('Ditch the Disposables') to remove common SUP from the campus by 2023, and a corresponding University commitment to achieve this aim (University College Cork 2019, p.16). As such, the research gathered and examined interview and survey data from the UCC community to identify and understand the barriers and drivers around sustainability in UCC and what tools were useful for leveraging sustainable

behaviour. In doing so, it aimed to add to the literature regarding sustainability in HEIs and how institutions can engage with systemic sustainability changes.

1.3. Thesis Structure

The thesis is divided into six chapters. Chapter 2 outlines the literature regarding sustainability, examining its relationship with society, consumer behaviours and higher education institutes (HEIs), along with an exploration of the literature on plastic pollution and efforts to tackle it. Chapter 3 explores research philosophies and methodological approaches, while explaining the approach taken in this research. It then outlines the data collection and analysis process used to generate findings along with the ethical considerations taken. Chapter 4 outlines the survey and interview findings. Chapter 5 then discusses the findings in the context of the literature and answers the research questions. Chapter 6 summarizes the research undertaken, the results obtained, and forwards recommendations on how UCC can progress towards the elimination of SUP.

Chapter 2.

Literature Review

2.1. Introduction

This chapter broadly introduces literature on sustainability, single-use plastic, behaviour change for both individuals and organisations, and how sustainability has been integrated into HEIs. This review covers the concept of sustainability, how it has developed over time, how it has been integrated into society and the challenges faced in trying to reach the goal of sustainability within a society that is still entrenched in unsustainable consumption. Literature regarding plastic is then explored particularly single-use plastic (SUP). Finally, societal and behaviour change literature is introduced, which examines how behaviour can be changed, what drives or inhibit these changes and what tools could be used to catalyse new social norms around sustainability, particularly in the setting of a HEI.

2.2 What is Sustainability?

"Sustainability is indeed characterized by deep-seated contradictions – paradoxes, conflicts, and tensions – between perhaps irreconcilable goals or directions." (Dovers and Handmer 1993)

There are a wide variety of conceptions and corresponding definitions of sustainability available, arising perhaps from contradictory visions of sustainability itself, as Dovers and Handmer observe in the above quote. This conflict is particularly notable in the concept of 'sustainable development' as discussed below. Indeed, the 1991 'Caring for the Earth' report highlighted the paradoxical or vague nature of the definitions of sustainability offered. This ambiguity has led to such terms as 'sustainable growth,' and 'sustainable development' being used interchangeably with the term 'sustainability' (IUCN *et al.* 1991).

Sustainable development (SD) has come to the fore in recent decades following the Brundtland report (1987) and the 1992 Earth Summit, which was followed up in 2012 (Rio+20). Following this, the UN adopted the 17 UN Sustainable Development Goals (SGDs) in 2015 (United Nations 2019). However, when considering sustainability, the concept of SD is often discussed due to the interchangeable use of the terms. Even within the scope 'sustainable development' there are various definitions of the term. In the 1987 Brundtland report, SD was defined as "development that meets the needs of the present without compromising the ability of future generations to meet their own needs" (WCED 1987, p.43). To act on this definition of SD, plans at all levels of governance need to be framed by an intergenerational justice perspective (Dovers and Handmer 1993). However, this definition has also been criticised for being too ambiguous to provide appropriate guidance on what constitutes sustainable development. An alternative definition was proposed by the IUCN, UNEP and WWF who defined sustainable development as 'improving the quality of life of humans while living within the carrying capacity of supporting ecosystems' (IUCN *et al.* 1991).

In his 2009 book, John Ehrenfeld proposes that the connection and conflation of sustainability with sustainable 'development' acts as a break on any required transformative change (Ehrenfeld 2009). Ehrenfeld argues that the word 'sustainability' loses potency when reduced solely to quantitative metrics (such as efficiency gains), and in this guise acts just as a means of reducing unsustainability, which, although critical, cannot create sustainability. He suggests that to talk about sustainability in a meaningful way, as an emergent and qualitative property, we need a word with the power to communicate it's meaning without acting as a descriptor for another word. In his 2019 book he reflects that we need to move to a vision of what

sustainability as a "flourishing" world might look like and communicating it effectively to achieve meaningful change (Ehrenfeld 2019). As such, he proposes a definition of sustainability as flourishing, which is "the possibility that human and other life will flourish on the Earth forever." Plastic has the potential to impact on this goal, given that at current rates there will be more plastic by weight than fish in the ocean by 2050 (UNEP 2016, 2018). Oceans in such a state could never be described as flourishing!

Nevertheless, while potentially problematic, adopting Sustainable Development (SD) practices have been proposed as a way of tackling issues such as poor resource use and recovery and unsustainable consumer behaviour. SD is often taken to incorporate interlocking spheres of sustainability: environmental, economic and social sustainability (fig. 1). However, other variations on the concept exist such as the concentric circles or Russian Doll model (fig. 2), which reflect a reality that dictates that the human economy can only reside within society (though all in society is not necessarily economic), while all human activities can only exist within the confines of the environment (Levett 1998).

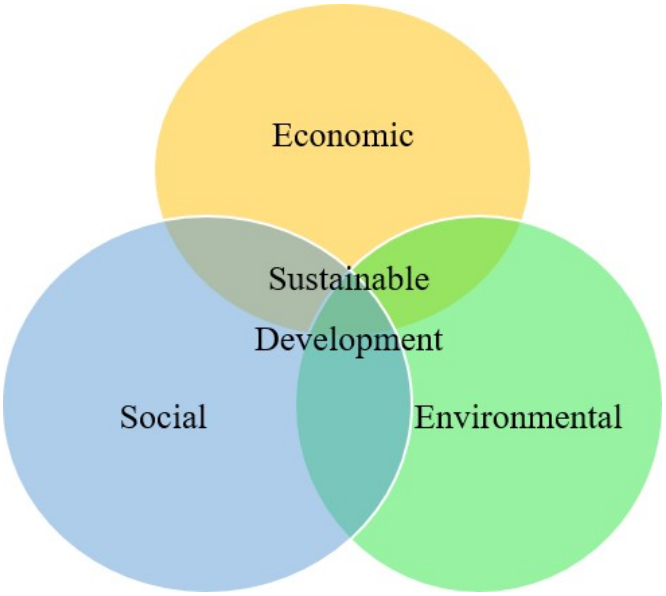


Figure 1: The interlocking circles model of sustainability

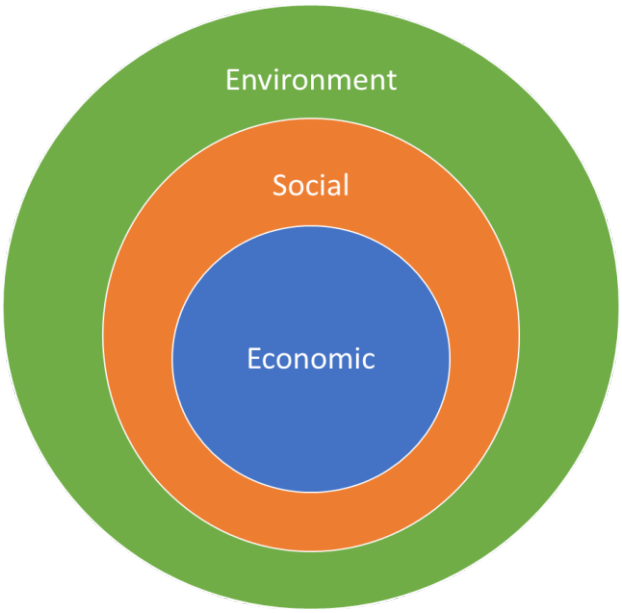


Figure 2: Russian Doll Model of Sustainability, adapted from Levett (1998).

SD has been critiqued as method of improving efficiency while continuing an "almost business as usual" trajectory (Ehrenfeld 2019). Proponents of steady-state economic and de-growth argue that (as prescribed by figure 2) planning for continued growth cannot be aligned with growing resource scarcity and pressure on natural ecosystems

(Daly 1974, 2008; Sol 2019). There is growing dialogue on the inherent ideological divisions between the concepts of SD and those of a circular, closed loop economy (Dovers and Handmer 1993; Hickel 2019).

A conflict of interest has been specifically raised about SD as presented by the United Nations Sustainable Development Goals (SGDs). Specifically, SDG 8 (Decent Work and Economic Growth) presents the idea of continued growth and development at a lower cost to the current and future environment. The notion that economic growth can be sustained or is a worthwhile pursuit is becoming increasingly contested (Hickel 2019). This goal aligns with the current dominant paradigm that promotes a system of ever-increasing consumption and production which permeates the world's economic systems today. The resulting economic model has been increasing critiqued as being deeply problematic, not just among proponents of disciplinary strands such as ecological economics, but by global organisations such as the Paris-based OECD and its New Approach to Economic Challenges (NAEC) unit (OECD 2020), which seeks out more integrative economics to confront (un)sustainability-related emerging planetary emergencies. Consumptive growth is particularly troubling in the area of plastic production. Moreover, there remains a divide between where goods are produced, used and disposed of, with high-income companies producing *ca.* 34% of global waste despite accounting for 16% of the population (Kaza *et al.* 2018) and moving that waste and plastic to Eastern countries such as China, resulting in pollution there (Bielenberg 2018). If plastic production does not move away from business as usual, it could account for 15% of the world's annual carbon budget and the mass of plastic waste could exceed fish in the ocean by 2050 (Ellen MacArthur Foundation

2017). Thus, the concept of continued development is challenged by the inherently finite resources available on the planet bringing SDG 8 problematically into potential conflict with other SDGs focused on the preservation and restoration of natural systems such as SDGs 6, 12, 13, 14 and 15 (Hickel 2019). As such, rather than seeking to believe we can 'have it all', some highlight the need to assess human development within the context of planetary tipping points and ecological boundaries (Rockström *et al.* 2009; Steffen *et al.* 2015; Hickel 2020).

2.2.1. Commitments to Sustainability

Global commitments by the 197 signatories of the Paris Agreement in 2015 signalled a forward momentum towards achieving a more sustainable future. By 2050 the EU aims to reduce its greenhouse gas (GHG) emissions by 80-95% compared to 1990 levels in an effort to curb climate change impacts (European Commission 2015). Within the EU, new legislation to tackle other environmental issues include rules to reduce the prevalence of single-use plastic pollution (European Commission 2018) and improve waste management (Brivio 2018).

An example of a successful environmental initiative was the introduction of an Irish plastic bag levy in 2001.[1] Importantly, this was an example of how people's behaviours were encouraged away from an unsustainable option via a campaign which successfully promoted intrinsic values (saving the environment for the good of all) over extrinsic values (savings in your own pocket), thus changing the societal norm regarding plastic bag use from single-use to reusable bags (Lehner *et al.* 2016). The Irish National

[1] In 2014 plastic bags constituted 0.13% of litter compared to approximately 5% pre- 2001. There was an associated decrease in the amount of marine plastic bags litter from an estimated 5% in 2001 to 0.25% in 2010 (Anastasio and Nix 2016).

Implementation Plan 2018-2020 set out the governmental approach to tackling the 17 SGDs through four main pathways: awareness, stakeholder participation, support for groups tackling the goals and finally by aligning national policy with the SDGs (Department of Communications, Climate Action & Environment 2018). Other Irish governmental initiatives include a ban of certain single-use items in government offices ahead of the EU-wide rules banning or limiting the use of certain single-use plastic items which is expected to come into force in 2021 (O'Sullivan 2018). The Irish waste action plan 2020-2025 includes policy tools such as bans on certain SUPs in line with the EU's Plastic Directive (European Parliament and European Council 2019) and a waste recovery levy that aims to emulate the success of the Irish plastic bag levy (Anastasio and Nix 2016). The role of policy in shaping infrastructure is evident in plans to introduce national deposit and return schemes for plastic bottles and aluminium cans and restrict the flow of SUP onto the Irish market (Department of Communications 2020). Such schemes are needed given Ireland's position as one of highest plastic waste producing countries in the EU at over 40kg/person annually as of 2015 (Heinrich Böll Foundation and Break Free From Plastic 2019).

The integration of sustainability at an international, European and national policy level marks a possible transition from the linear model of economic growth to a circular closed loop system. This may be consistent with support for a New Environmental Paradigm (NEP) in response to global environmental threats as was triggered by the oil crisis of the 1970s (Dunlap 2008). According a 2017 Eurobarometer survey 86% of Europeans agree they can play a role in protecting the environment with that number reaching 96% in Ireland (European Commission 2017). However, despite high reported self-efficacy, behaviours do not always follow such beliefs. As such, current

challenges require major systemic changes in how our societies function. Society must restructure to favour and incentivise innovations and behaviours that tackle global issues while remaining within the bounds of what ecosystems can support (Westley *et al.* 2011).

2.2 Sustainability and Society

Awareness of sustainability and the impacts of human activities on the planet have grown in recent decades (Gell 2019). Many political gatherings since the 'Earth Summit' in Rio in 1992 have placed the environment as a central topic or theme (Holt 2012), including the Paris Climate Accord in 2015 and the UN Global Climate Change Summit in 2019. Social movements such as Fridays For the Future (Cwienk 2019; DW 2019; Wright 2019) and Extinction Rebellion (Harvey 2019; Taylor 2019; Fegan 2020) have worked to incite action and increase awareness of sustainability and climate issues. The portrayal of environmental issues in documentaries such as 'Blue Planet II' and 'David Attenborough: A Life on Our Planet' have increased awareness of issues such as climate change, biodiversity loss and plastic pollution in the world's oceans (Calderwood 2018; Winkelman 2020). Economic theory has also been influenced by sustainability with the emergence of steady-state economics (Daly 2008; Sol 2019) and economic de-growth (Kerschner 2010; Germain 2017) along with other versions of green economics in response to dwindling environmental resources (Gibbs and O'Neill 2017).

It is important to consider how society interacts with the environment. This can be done through the lens of a social paradigm. The current dominant social paradigm (DSP) was first defined as the "collection of norms, beliefs, values, habits, and so on that form the world view most commonly held within a culture" and later expanded to

include social and political aspects (Kilbourne 2014). The consumption driven DSP of the western world in recent decades has placed higher emphasis on consumer culture, individualism and the value of constant economic growth (Dunlap 2008). However, there is consensus that this linear model of consumption and disposal associated with a 'throwaway culture' is unsustainable (Bick *et al.* 2018; Hellmann and Luedicke 2018; Sol 2019). Constant demand for new items drives resource depletion, greenhouse gas emissions, pollution and a demand for cheap labour which can undermine human rights (Luz 2007; Vince 2013; Bick *et al.* 2018). There has been limited progress moving away from this throwaway culture, and despite innovations and changes towards alternative approaches such as circular economics, there has not yet been a significant shift away from increasing consumption and production of plastics (Geyer *et al.* 2017).

2.3 Plastics

2.3.1. Plastic Waste: Scale of the problem

Geyer *et al.* (2017) estimated that only 9% of plastic waste ever generated had been recycled as of 2015. Single-use packaging accounts for the largest portion of plastic waste produced and is generally used for only a short time (fig. 3). This corresponds with a throwaway, convenience culture as the DSP in many countries across the world (UNEP 2016; Geyer *et al.* 2017; Hellmann and Luedicke 2018). Since its large-scale adoption in the 1950s, plastic has become an almost ubiquitous part of modern life (UNEP 2016). However, due to a lack of end-of-life management options and its persistence in the environment, plastic poses a major transboundary environmental threat.

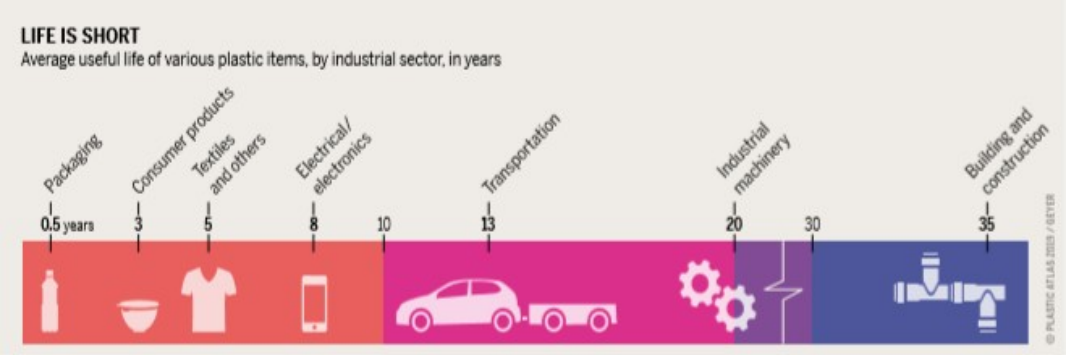


Figure 3: Average useful life of various plastic items. Source: Plastic Atlas, 2019

Plastic is found across the world including in all the main ocean basins (Geyer *et al.* 2017). Plastic ingestion and entanglement threaten wildlife (UNEP 2016). Additionally, increasing focus has been given to the potential threat of bioaccumulation from contaminated plastics entering the food chain (UNEP 2016). Plastic's abundance, persistence and associated threats have raised concerns globally about plastic's impact on the environment, wildlife and human health (Los Angeles Times 2020). Increasing public awareness of plastic pollution has been attributed by some to documentary series such as 'Blue Planet II' (Aldous 2018; Bawden 2018; Calderwood 2018). A clear marker of the plastic's ubiquity in modern life is that it has been proposed as a geological indicator of the Anthropocene era (Geyer *et al.* 2017). This points to the entrenched role plastics currently play in our societies.

2.3.2. The Role of Plastic in Society

Demand for plastic is projected to rise over the coming years. Due to its flexibility, lightweight and adaptable nature, plastic is almost constantly used in modern society (Nature Communications, 2018). Plastic is used in many areas including construction, clothing, furniture, packaging and food receptacles. It also plays an important role in hygiene-related tasks such as in hospitals due to its unreactive nature. This has come to the fore with the widespread use of disposable hygiene products such as gloves and

masks during the COVID-19 pandemic. However, plastics characteristics and popularity twinned with our current economic model promoting both linear waste pathways and consumptive growth have led to an ever-increasing problem of plastic pollution. This has been highlighted by the upsurge in the use and associated littering of disposable hygiene products due to the COVID-19 pandemic (Los Angeles Times 2020; Parkinson 2020). Nonetheless, reusable masks have also been widely adopted with efforts also being made to improve reusability in clinical settings (Veera 2020). These efforts suggest that the pandemic has not completely subverted efforts to improve sustainability and that the role of plastics and its alternatives are constantly evolving.

2.3.3. Tackling Plastic Pollution

Plastic pollution is a multi-faceted issue with impacts along and beyond its supply chain. As such, solutions are needed that align with the waste hierarchy (fig. 4). Strongest emphasis must be placed on preventing further plastic use to reduce demand, followed by reuse and then recycling of materials (UNEP 2018, p.19). However, while inherently logical in its own right, this hierarchy is deeply problematic to the DSP and its attendant economic model, since the topmost waste hierarchy imperative to avoid and reduce is exactly the opposite to what consumer-driven economies need and demand.



Figure 4: Waste Hierarchy. Source: UTS

Geyer, Jambeck and Law (2017) highlight the issue of increased plastic production into the future (fig. 5). While levels of recycled plastic are expected to increase to approximately 44% by 2050, these increases are not enough to cope with the predicted rise in primary plastic waste production. As such, stemming the increase in non-essential plastic usage needs to be prioritised to reduce total plastic waste production.

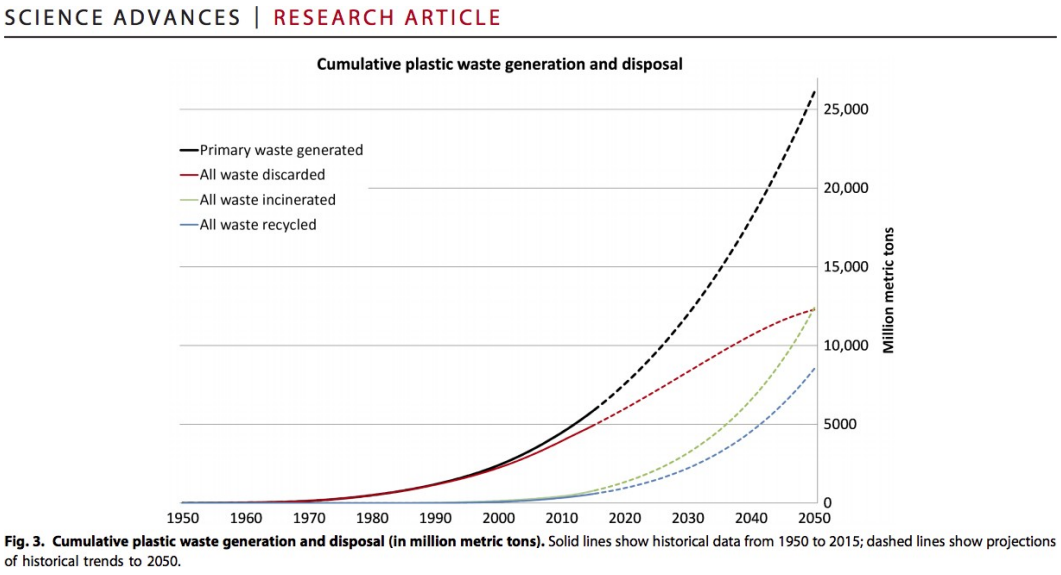


Figure 5: Plastic Production and waste generation model. Source: Geyer (2017)

Currently almost half of plastic waste produced is plastic packaging, designed to be used only once and then disposed of (UNEP 2018). In 2018, over 1 trillion units of

packaging were used in the food industry in Europe (Heinrich Böll Foundation and Break Free From Plastic 2019). This pre-packaged culture is present across industries and runs counter to the reuse tenet of the waste hierarchy. Nor is recycling a silver bullet in tackling the issue of plastic waste.

"Recycling delays, rather than avoids, final disposal. It reduces future plastic waste generation only if it displaces primary plastic production"- (Geyer *et al.* 2017)

To combat existing plastic pollution, improved infrastructure is needed in the countries that produce and process the most waste. As many of these countries are developing and have growing populations, these improvements will require major investments (Jambeck *et al.* 2015). Alternatively, capping the waste generation and plastic use levels of developed countries may be used to tackle higher waste generation per capita usage. This approach may be less expensive than the major infrastructure investments needed in developing countries. However, to comprehensively tackle plastic pollution both approaches are needed (Jambeck *et al.* 2015; Trusts and Systemiq 2020).

2.3.4. Plastic Reduction Policies

Plastic reduction polices are increasingly being implemented within the EU (European Commission 2018). Examples of successful plastic reduction policies include the Irish plastic bag levy (Anastasio and Nix 2016) and deposit-return schemes in 38 countries (Carrington 2018) among many others (UNEP 2018).

While a reported 30% of bans and levies were successful, the main failings in some other national plastic reduction bills were a lack of consultation with key stakeholders, ineffective enforcement of legislation, lack of alternative options and a lack of awareness amongst the public and stakeholders of the value of the policy (UNEP 2018,

p.28). The introduction of plastic bag bans and levies in Zimbabwe and Cameroon resulted in a demand for smuggled bags from other countries due to a lack of suitably priced alternatives (UNEP 2018). Guinea-Bissau introduced an unsuccessful ban on plastic bags in 2016 that faced strong push-back from retailers and consumers due to a lack of public consultation. Additionally, the ban was not strictly enforced (UNEP 2018, p.28). Poor enforcement also limited the impact of a plastic bag ban in Niger and South Africa (UNEP 2018, pp.29 & 30). As such examples show suitable alternatives, prior consultation and public awareness are important factors in introducing any plastic reduction strategies.

2.3.5. Alternatives to Single-Use

When discussing the prevalence and issues of single-use plastics, it is importance to consider alternative pathways. Alternatives to single-use plastics can be reusable items or single-use items made of other substances such as wood or biopolymers. Each material type has an impact on the environment. As such, it is important to take a life-cycle analysis approach which considering the feasibility and sustainability of alternatives (Razza *et al.* 2009).

Life cycle assessments (LCAs) have been carried out as a standardised way to assess the environmental and ecological impact of various goods and services. This methodology has also been used to compare the environmental impacts of plastics with various alternatives (Ibbotson *et al.* 2013; Pawelzik *et al.* 2013; Accorsi *et al.* 2014, 2015; Potting and van der Harst 2015).

However, the system and boundary conditions and scope of LCAs can vary depending on the approach taken e.g. cradle to (factory/consumer) gate, cradle to grave or cradle to cradle (Madival *et al.* 2009), and assumptions made (including system boundaries, e.g. where to draw the line), which can make direct comparison between LCAs both

challenging and problematic.

This can result in conflicting results regarding reusables versus SUP or disposable alternatives (Potting and van der Harst 2015). For instance, Potting and van der Harst found no preference for reusable over disposable cups, nor for biobased and compostable disposable cups over fossil-based polystyrene in their LCA analysis (2015). In their study, the impacts of each cup type declined with continued use but users washing behaviour reusables played a role in how well reusables compared with disposables (Potting and van der Harst 2015). Similarly, a study by Garrido found that reusable cups needed to be used at least 10 times to have a lesser environmental impact than its SUP counterpart (Garrido and Alvarez del Castillo 2007). Such findings suggest facilitating continued reusable use is important to offset the higher environmental inputs of making reusables.

Contrastingly, Razza et al. found the biodegradable and compostable cutlery did better across all environmental categories when biodegradable waste was 100% composted compared to an average Italian waste mix (plastic cutlery and food waste) using 84% landfill and 16% incineration (2009). Where single-use items are still required, as may be the case with COVID-19 considerations, the presence of SUP alternatives may be more environmentally sound than single-use plastic cutlery. Nonetheless, simply switching from one form of single-use item to another is still problematic as it does not address the underlying issues of a throw-away society and should be treated as a step towards sustainability rather than a final solution. This is especially relevant given that access to compost bins is not universal either in UCC or in wider society.

Alternatives to SUP packaging include marine-based bioplastics (e.g. MarinaTex and Notpla), amphiphilic coatings for foods (e.g. Apeel), fungal-based custom packaging (e.g. Mushroom® Packaging), paper-based disposables (ButterflyCup 2020) or biobased, biodegradable bioplastics made from feedstocks like corn-starch. MarinaTex uses fish waste and red algae to create home-compostable bioplastics which divert organic waste away from landfill (MarinaTex 2020). Notpla uses brown algae to produce biodegradable bioplastics to replace plastic food packaging (Notpla 2020) and were used instead of bottles at the 2019 London Marathon (Nace 2019). Apeel creates an edible plant-based amphiphilic film for fruits and vegetables to slow spoilage (Apeel 2020). Mushroom® Packaging uses hemp hurds and mycelium to grow packaging for goods into predesigned shapes and was awarded a cradle-to-cradle gold certification (Mushroom® Packaging 2020). Many conventional paper cups contain a thin plastic lining that is difficult to separate, making them difficult to recycle. New iterations of disposable cups include those that are commercially recyclable (fig. 6) or compostable and biodegradable. However, alternatives to SUPs also have an environmental impact though consuming material and energy which can be greater than the SUP it replaces (Ahamed *et al.* 2020), making the elimination of all single-use preferable to substitution, preferably with a move towards reduction (i.e. no packaging) (Fig. 4), or if that's not possible, then towards reusables (Herberz *et al.* 2020).



Figure 6: Butterfly cup. Source: Butterflycup.com

The ReCircle initiative is an example of a move away from single use in the food sector. It uses deposit-refundable reusable takeaway boxes to prevent the use of disposables (fig. 7) (Zero Waste Europe 2018). The ReCircle initiative was launched in Bern, Switzerland in 2016 and was adopted in over 400 restaurants there by 2018. A trial of this system commenced in UCC in late 2019.

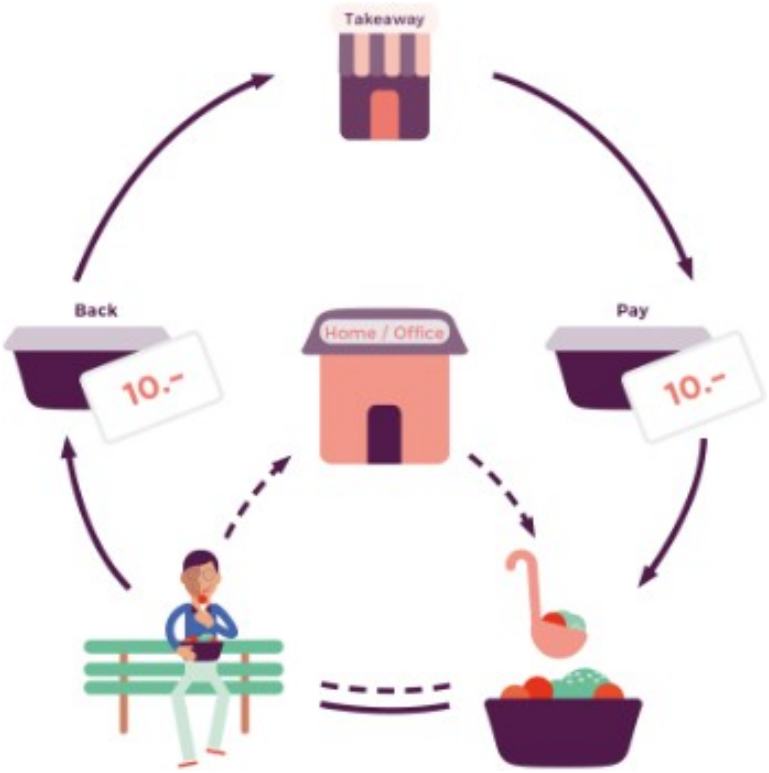


Figure 7: How the ReCircle deposit-use-return-refund system works. Source: recircle.ch

While reusable alternatives are an important tool in moving away from SUP, they do not negate the need for a paradigmatic change in the social and economic paradigm to one which remains within planetary boundaries.

2.4. Alternatives to the Current Economic Paradigm

The relationship between society and resource use must change to fully prioritise waste avoidance in line with the waste hierarchy. This goes beyond SUP and requires paradigmatic changes in how society evaluates progress in the context of planetary boundaries (Steffen *et al.* 2015). In recent years, the growth-based economic model has been challenged by increased focus on sustainability and a closed loop circular economy. Commentary on the issues with the current growth-driven economic paradigm have existed for many years including the 'Limits to Growth' report by Meadows *et al.* (1972) and a follow-up paper 30 years later by Turner (2008). Turner concludes that "*the global system is on an unsustainable trajectory unless there is substantial and rapid reduction in consumptive behaviour, in combination with technological progress.*" Such changes call for a paradigmatic shift away from a consumption-based social paradigm.

Some proponents of alternative forms of economic organisation have put forward the concepts of 'steady state economics' (SSE) from ecological economics (Daly 2008, 2019; Kerschner 2010; Sol 2019) or economic de-growth (Kerschner 2010) as alternatives to the current economic system. In a global system underpinned by the notion of economic growth as a measure of progress, *"economic de-growth in the North provides a path for approximating the goal of a globally equitable SSE, by allowing some more economic growth in the South"* (Kerschner 2010). To achieve this 'dynamic equilibrium' international co-operation at a grand scale would be needed.

However, some proponents of SSE have acknowledged that it "*has yet to provide an explicit, realistic pathway for fully achieving its goals in the face of existing power structures and near religious belief in market forces in much of the world"* (Farley and Washington 2018). While this literature review is not focused on the economic systems that underpin society, it is important that such systems are acknowledged, and the presence of alternative economic pathways mentioned.

2.5. Consumer Behaviour

Consumer behaviour can influence society's trajectory. Consumer behaviour is influenced by a variety of factors, one of which is environmental awareness (Kikuchi-Uehara *et al.* 2016; Mustikaningrum 2018). Consumers may be unaware of the issues surrounding sustainability and the impacts caused by current consumption habits. Alternatively, others may be aware of the issue but immobilised by a lack of knowledge or perceived self-efficacy in tackling such issues constructively (Gifford 2011). However, even engaged and informed consumers can be constrained by the choices available to them as part of the dominant social paradigm (DSP) (Cherrier *et al.* 2012) pointing to the need to also address the structural and societal barriers that influence individuals' behaviour (Darnton and Evans 2013a).

Assessment measures such as the New Ecological Paradigm (NEP) scale have been used in many countries to evaluate environmental beliefs (Dunlap 2008). Through successive versions and adaptions, the NEP has been used to assess the emergence of a new social paradigm based on increased environmental awareness. However, while the results of assessments using the NEP scale suggests a value shift away from the DSP towards more environmentally conscious paradigm, it does not predict pro-environmental behaviour (Dunlap 2008). This is because consumer behaviours depend

on psychological elements (e.g. values, attitudes), social and environmental context, along with the product choices available and how they are presented (Carrigan 2017). As a result, consumer behaviour may not be consistent over time and across locations. Consumers often exhibit an attitude-behaviour gap, where prior attitudes about sustainable choice is not used to inform the choices made (Lorenzoni *et al.* 2007; Young *et al.* 2010; Rettie *et al.* 2012; Carrigan 2017).

The attitude-behaviour gap was interrogated by Holt (2012) through the examples of SUV and bottled water usage in America. Holt explored the idea of consumers being ideologically 'locked-in' to unsustainable behaviours as a result of their cultural and social context, thus explaining the gap between positive attitudes and actual behaviours. This idea is similar to that of the DSP where consumers actions are mainly dictated by the prevailing social framework and the default options available to them (Dunlap and Van Liere 1978; Prothero *et al.* 2010; Lehner *et al.* 2016). Gifford also suggests social norms and a predisposition to maintain the status quo can inhibit change in consumers behaviour (2011).

Alternatively, consumers can be unaware or overwhelmed by the complexity of making the 'correct' ethical choice (Carrigan 2017). Consumers are often reliant on producers' own claims and may be sceptical that such claims are 'greenwashing' rather than true sustainability efforts (Cherrier *et al.* 2012; Carrigan 2017). Trust is an essential ingredient in group behaviour change. As such, mistrust in the claims of businesses, scientists and governments can inhibit buy-in of consumers into sustainability initiatives, thus preventing behaviour change (Gifford 2011). Efforts have been made to identify and encourage green consumption. Nevertheless, the 'green consumer' remains an elusive concept.

2.5.1. Behaviour Change Strategies

To avoid ecological tipping points, all levels of society must transition to behaviours cognisant of planetary boundaries and ecological tipping points (Rockström *et al.* 2009). Donella Meadows addressed mechanisms for inciting systematic change in her article on leverage points ranging from taxes and incentives to paradigmatic changes (1999). Various approaches to behaviour change exist including the theory of planned behaviour (Ajzen 1985), value-belief norm (VBN) theory (Stern 2000), social cognitive theory (Bandura 2000) and prospect theory (Kahneman and Tversky 2013) which were used to inform this research. The theory of planned behaviour expands upon the concepts of the theory of reasoned action (Ajzen *et al.* 1980). It suggests that attitudes, social norms and perceived behavioural control shape behaviour (Ajzen 2002). Similarly, the VBN theory outlines various causal factors influencing behaviour including values and personal norms and highlights the role context and self-efficacy can play in constraining behaviour (Stern 2000). The social cognitive theory explores how observation of others influences behaviour, and explores different forms of agency (personal, proxy and collective) (Bandura 2000). The role of modelling was also addressing through various examples in the book '*Fostering Sustainable Behaviour-An introduction to Community-Based Social Marketing'* which highlighted how modelling of behaviour can prompt behaviour changes amongst farmers, dog owners, and shower users and be done in person, or via technology (McKenzie-Mohr 2011, pp.74, 85, 104–105). Prospect theory is a behavioural economic theory examining loss aversion behaviour (Kahneman and Tversky 2013). These theories were used to interrogate the links between attitudes, norms, context and others' behaviour and personal behaviour, including how individuals approached sustainability and its perceived trade-offs (e.g. extra costs).

2.5.2. Defining Green Consumers

Identification and segmentation of consumers into separate groups is a general tenant of marketing theory (Piercy and Morgan 1993). Segmentation research helps to understand how the population varies within the sustainability context and how to target groups within a population. However, such consumer segments are not rigid and consumers within them are unlikely to reach the standard of the potentially mythic 'ideal' green consumer given that context influences consumers choices (Holt 2012).

In trying to identify those consuming in an environmentally conscious way, marketing makes a basic division into 'grey' unconscious consumers and 'green' ethically conscious consumers. These environmentally conscious consumers may be labelled as voluntary simplifiers, ethical consumers or green consumers amongst other names. Voluntary simplifiers are well-informed individuals who willingly reduce their consumption rather than changing the type of product they buy (McDonald *et al.* 2012). Ethical consumers are those that change their consumption to prioritise products that are more ethically produced such as Fairtrade or organic rather than choosing to reduce consumption (Harrison *et al.* 2005). The 'green' or 'ethical' consumer labels are often used interchangeably to denote a consumer who is aware of and trying to reduce the impact of their consumption habits (O'Neill and Buckley 2015).

However, McDonald *et al.* (2012) argues that there is no homogenous group of green consumers. Rather, there are a variety of consumers that may act as 'green' consumers, in one or more aspects of their consumption behaviour. These consumers may have exceptions to their ethical buying habits or solely focus their 'green' purchasing habits on a specific aspect of sustainable behaviours e.g. food, water or energy. This

channelling of environmental behaviour may inhibit behavioural spill-over into other 'green' behaviour as has been seen in the lack of uptake in 'green consumerism' and the perceived mythic nature of the green consumer (McDonald *et al.* 2012; Carrigan 2017).

2.5.3. Green Marketing

The identification and promotion of ethical or green behaviour by green marketing is a potential tool in changing the established social norms. Green marketing has the potential to challenge entrenched social norms regarding the over-use and mis-use of resources through a reframing of consumption patterns and an encouragement of sustainable consumption behaviours (Cherrier *et al.* 2012). By identifying the general drivers of green consumerism among its many varied proponents, green marketing may be a useful tool in leveraging behavioural change (Lorenzoni *et al.* 2007; McDonald *et al.* 2012; Blanco-Portela *et al.* 2018). This may be done by challenging the aforementioned 'consumer society' tenets and normalising sustainable behaviours such as voluntary simplification and alternative or reduced consumption. Such sustainable behaviours can be very difficult to achieve within the prevailing consumption driven DSP (Cherrier *et al.* 2012). Concerted effort is needed on the part of governments and institutions to facilitate a paradigm shift to a more sustainable social and economic paradigm (Lorenzoni *et al.* 2007; Myers 2017; Sol 2019).

Historically, marketing has helped shape the perception of environmentally conscious consumers as tree-huggers and outcasts, adding a social stigma to the process of reducing your carbon footprint (Cherrier *et al.* 2012). Marketing is still used to promote unsustainable consumption patterns currently entrenched in society (Cherrier *et al.* 2012) and can lead to fears of greenwashing (Lorenzoni *et al.* 2007; Chen and

Chang 2013). Green marketing needs to combat this legacy by normalising the ideas of sustainable consumption, and environmentally conscious behaviour (Rettie *et al.* 2012). Thus, it must move beyond recycling and emphasise the hierarchical nature of the waste pyramid, with prevention as the primary and most preferred option. This requires green marketing to focus on reduced consumption alongside marketing sustainable alternatives, such as the 'Don't Buy This Jacket' campaign by Patagonia (Hwang *et al.* 2016). Within national and international organisations, there has been an increased focus on introducing and promoting the waste hierarchy which is a potential use of anti-consumerist green marketing (European Commission 2010; UNEP 2018, p.22; Department of Communications, Climate Action and Environment 2019, p.118).

2.5.3.1. Social Marketing

Social marketing has been used to promote community-based pro-environmental changes (Carrigan *et al.* 2011; McKenzie-Mohr 2011). Social marketing is described as *"the use of marketing to design and implement programs to promote socially beneficial behaviour change"* (Grier and Bryant 2005) which aligns with the goals of green marketing. The community-based social marketing approach identifies various strategies to encourage behaviour change such as using commitments, prompts, social norms and social diffusion (including behaviour modelling), communication, incentives and making the desired action more convenient (McKenzie-Mohr 2011). An example of Modbury in the UK as a 'plastic bag-free' town, shows the role organisations can play in spreading sustainable changes in a community (Carrigan *et al.* 2011).

2.6. Sustainability in Higher Education

Many universities can be regarded as small towns or cities due to their size. They are seen as thought and action leaders in the drive for sustainability (Bezbatchenko 2010). As such HEIs can provide a model for wider society to follow in incorporating sustainability into daily life (UNEP 2014; Leal Filho *et al.* 2015 in Ramísio *et al.* 2019).

Alshuwaikhat (2008) proposed the pillars of integrating sustainability in HEIs were introducing a university-wide environmental management system, promoting public participation, increasing social responsibility, and integrating sustainability into teaching and learning (2008). These pillars could be considered under two headings: university management systems and education. Campus management could be altered though changing the campus infrastructure, prioritising sustainability initiatives and integrating sustainability into university policies (Alshuwaikhat and Abubakar 2008; Msengi *et al.* 2019). Education as an environmental pillar includes both internal research and education, and outreach activities with the wider community. For sustainability to become a social norm, pro-environmental awareness must be integrated into students experiences of both taught modules and university overall (Reidy *et al.* 2015; Msengi *et al.* 2019).

Given the challenge of defining of sustainability, it is unsurprising that there is currently no globally accepted definition for what sustainability in a higher education institute (HEI) is or should be (Freidenfelds *et al.* 2018). Many HEIs have recognised they have a large impact on their environment due to their size and their resource use and have voluntarily committed to reducing their environmental impacts such as through the Talloires Declaration in 1990 or membership of organisations e.g. the

Association for the Advancement of Sustainability in Higher Education (AASHE) (Alshuwaikhat and Abubakar 2008; Bezbatchenko 2010). A lack of agreement between HEIs as to what sustainability entails limits benchmarking ability when comparing universities (Freidenfelds *et al.* 2018; Shawe *et al.* 2019) however, there may be value in having a diversity of models given the emergent qualitative nature of sustainability, as Erhenfeld describes. Current globally used metrics to assess HEI sustainability include UI GreenMetric, STARS, Times Higher Education Impact Rating based on the UN Sustainable Development Goals and the Eco/ Green Campus initiative. A drawback of these methods is that they are quantitative and thus unable to understand sustainability as an emergent qualitative aspect of a system (Ehrenfeld 2019).

Sustainability needs to be integrated as a core principle in HEIs. That qualitative ethos can be demonstrated in how the HEI manages its facilities and services, including the policies for both itself and its extended stakeholders such as service providers (Blanco-Portela *et al.* 2018; Ramísio *et al.* 2019). Similarly, engagement across all levels of the university community is essential in building a sense of community and momentum behind sustainability initiatives and ensuring widespread adoption of sustainable behaviours (Filho *et al.* 2019). As centres of learning and research, universities have the capacity to empower their students to tackle global issues. For example, increasing knowledge of sustainability initiatives on campus may promote higher engagement from students (Msengi *et al.* 2019). They can also demonstrate best practice and act as leaders in the field of sustainability (Bezbatchenko 2010). Additionally, community engagement is a central theme in HEIs' role in leading the transition to a more sustainable world.

2.7. Drivers of Sustainable Behaviour

The introduction of sustainability into an organisation can have many positive benefits. However, its integration can be dependent on several factors. These factors can be internal and/or external to the organisation and are outlined below.

2.7.1. Organisational Structures and Infrastructure

The organisational framework and systems for monitoring and feedback for sustainability projects can influence their success (Blanco-Portela *et al.* 2018). As sustainability is seen as a holistic, system-wide process, existing unsustainable structures may prevent sustainability integration at a system-wide level (Alshuwaikhat and Abubakar 2008). Efforts to improve these structures may drive or be driven by the goal of improving an organisation's sustainability.

Similarly, larger HEIs can struggle to implement sustainability policies due to their size (Ferrer-Balas *et al.* 2008). The devolved nature of university departments and schools and the autonomy of individual staff can make the integration of sustainability challenging (Alshuwaikhat and Abubakar 2008; Ferrer-Balas *et al.* 2008). Likewise, the level of bureaucracy involved in creating change can deter student and staff participation and create a sense of removal between the staff, students and policy makers (Blanco-Portela *et al.* 2018).

Campus infrastructures, the allocation of resources for sustainability initiatives and attitudes towards integrating sustainability into university policies are also important in dictating whether initiatives succeed or fail at a HEI organisational level (Filho *et al.* 2019). Similarly, internal and external resource availability can act as a driver in advancing sustainability on campus (Ferrer-Balas *et al.* 2008; Blanco-Portela *et al.*

2018; Akins *et al.* 2019; Vargas *et al.* 2019). A lack of resources in the form of finances, incentives, or human capacity can also hinder the implementation of sustainability initiatives (Ávila *et al.* 2017; Leal Filho *et al.* 2019).

2.7.2. External pressure

Changes in HEIs can also be driven by pressure from society and peer institutions to lead the charge in tackling major issues such as climate change and sustainability (Blanco-Portela *et al.* 2018). This social pressure may drive HEIs to maintain and improve their green reputation through university sustainability rankings (Ferrer-Balas *et al.* 2008; Blanco-Portela *et al.* 2018; Akins *et al.* 2019).

2.7.3. Leadership

Strong leaders and sustainability champions act as role models in the driving sustainability initiatives (Blanco-Portela *et al.* 2018; Akins *et al.* 2019). People are more likely to adopt behaviour if that behaviour is modelled by others (Bandura 2000) and seems normalised in their community (Institute for Government and The Cabinet Office 2010, p.31).

Consequently, lack of leadership or champions was seen as a barrier to sustainability in HEI while their presence can provide an important driver of change (UNEP 2014, p.20; Blok *et al.* 2015). Initiatives may fail due to a lack of clear vision and strong leadership (Velazquez *et al.* 2005; Blanco-Portela *et al.* 2018). At present the standard incentive structure of universities based on wages, promotions and tenure do not promote active engagement in sustainability initiatives (Ferrer-Balas *et al.* 2008). As such, sustainability leaders within HEIs are often taking on these responsibilities in excess of their existing roles. As effective leadership is considered one of the drivers

of sustainability in universities, it is important to support sustainability champions and leaders to drive lasting change within HEIs (Ferrer-Balas *et al.* 2008; UNEP 2014).

2.7.4. Stakeholders

Stakeholders' engagement and commitment is seen as a key driver of systematic change within HEIs (Blanco-Portela *et al.* 2018; Vargas *et al.* 2019). Clear communication channels between stakeholders are essential in establishing and maintaining sustainability initiatives (Vargas *et al.* 2019). Without a clear understanding of the roles and responsibilities of stakeholders, it is difficult to achieve buy-in and leverage systematic change (UNEP 2018).

Stakeholder engagement can also act as a barrier to progressing a sustainability agenda (Filho *et al.* 2019). Where stakeholders are unengaged, uninformed or disconnected from other stakeholders with similar aims, sustainability movements may flounder (Blanco-Portela *et al.* 2018). For example, lack of stakeholder engagement and consultation has been cited as a major stopping block in the integration of plastic reduction policies in multiple countries (UNEP 2018).

2.7.5. Social Norms

Social norms can also influence sustainability integration. Social norms are considered the "*common standards within a social group regarding socially acceptable or appropriate behaviour in particular social situations, the breach of which has social consequences*." (Allaby *et al.* 2007). Social norms can impact on individual's choices through tailoring the choices available to them and the ease of accessing those choices. The overarching physical and informational structures that influence decision making are known as the 'choice architecture' (Thaler and Sunstein 2008). Social pressure due

to the prevailing social norms can cause internal conflict as individuals balance their values with those of their social group (Cherrier *et al.* 2012; Perera *et al.* 2018). As such, an individual's social network can act as either a driver or a barrier to sustainable action depending on their level of engagement with environmental issues (Gifford 2011).

Introduction of self-reinforcing pro-environmental policies which have public backing could be a key tool in creating a new social norm with sustainability at the fore (Kinzig *et al.* 2013). Facilitating new social norms is essential as the example of recycling proves. It has been shown that increasing the ease of recycling improves recycling rates, highlighting the importance of choice architecture in shaping behaviours (Kinzig *et al.* 2013). As a choice becomes easier, the behaviour associated with it becomes a self-reinforcing positive feedback loop. Pro-environmental habit formation is important as up to 45% of our daily choices are made by relying heavily on habits and mental shortcuts, rather than active decision-making (Verplanken and Wood 2006; Lehner *et al.* 2016).

Individuals do not act in isolation when making choices, nor do they always make the most rational choice even when well-informed, as attitude-behaviour gap research shows (Cherrier *et al.* 2012; Rettie *et al.* 2012; Lehner *et al.* 2016). For instance, Stern (2000) suggested that attitude plays a role in shaping behaviour but is dependent on contextual factors in the VBN theory. Individuals' choices are influenced by the DSP and their social network. Pressure from family, friends, and larger societal structures can shape the access to and acceptability of sustainable alternatives (Gifford 2011; Cherrier *et al.* 2012). As such, social context may have inhibited the emergence of green consumers. Additionally, the inability to reconcile the ideals of voluntary

simplicity with practice in the context of an overarching consumption driven DSP may account for the lack of evidence for the emergence of a 'green' consumer within the current social context (Szmigin *et al.* 2009).

2.7.6. Attitudes towards sustainability

A perceived lack of self-efficacy or delegation of responsibility to external factors such as industry can inhibit personal engagement (Kollmuss and Agyeman 2002; Lorenzoni *et al.* 2007; Gifford 2011). Similarly, a lack of desire to change can hinder HEI sustainability initiatives at an individual and organisational level (Ferrer-Balas *et al.* 2008; Leal Filho *et al.* 2019).

However, the surge in youth activism and protests in recent years regarding climate change suggests that a lack of political power does not preclude strong self-efficacy towards political activism. Such social movements include Fridays For the Future Schools Strikes For Climate and Extinction Rebellion. Youth climate activist Greta Thunberg's address to major gatherings of world leaders such as the UN Climate Summit 2019 (Milman 2019) and the World Economic Forum 2020 (Pylas 2020) signal a change in youth perception of accountability for climate action (Holmberg and Alvinius 2020).

2.7.7. Levers of Sustainability Integration

HEIs can build on the experience of other sustainability initiatives to identify the most effective levers for systemic change (UNEP 2018). For instance, bans, levies, voluntary restrictions and sustained education about issues have been effective in changing unsustainable behaviour (UNEP 2018). Plastic bag bans and levies have been introduced in more than 60 countries (UNEP 2018, p.vii). Of the 50% of bag

bans which have available data, 30% have been successful in reducing plastic usage, while the other 20% of bans have seen little change due to a lack of affordable alternatives and enforcement (UNEP 2018, p.viii). This emphasises the importance of well-planned policy instruments that provide feasible alternatives and monitoring to ensure success. Voluntary commitments to increase corporate sustainability have also increased in recent years such as the collaboration between Greenpeace and McDonalds to halt the deforestation of the Amazon through a soy moratorium from deforested land (Skar 2015). Global movements such as 'One Percent for the Planet' have increased awareness of the role corporations can play in protecting natural resources and promoting sustainable development (One Percent For The Planet Org 2016). However, promotion of green products or a green ethos can be met with scepticism or distrust by consumers who are wary of potential greenwashing (Peattie and Crane 2005). Nonetheless, awareness campaigns can play a role by altering perceptions towards issues such as littering, for example Southwark's 'Stalking Litter' campaign (Institute for Government and The Cabinet Office 2010, p.35). However, once-off information-based campaigns can have limited impact (Howarth and Butler 2004), highlighting the need for sustainability awareness to be embedded into sustained education. However, Axon et al. highlights an over-reliance on awareness and education in community-based initiatives which are unlikely to precipitate lasting change (2018). Meanwhile, other forms of change such as top-down financial, policy and legislative changes are under- or not used (Axon *et al.* 2018).

Nudging has also been proposed as a possible tool in shifting people's automatic behaviours towards more sustainable defaults (Institute for Government and The Cabinet Office 2010; Lehner *et al.* 2016). A nudge was defined as "any aspect of the choice architecture that alters people's behaviour in a predictable way without

forbidding any options or significantly changing their economic incentives" in the book '*Nudge*: *Improving Decisions about Health, Wealth and Happiness'* (Thaler and Sunstein 2008). The effectiveness of the nudge is context-specific and is influenced by the behavioural bias of the nudged person (Lehner *et al.* 2016).

However, as nudging targets unconscious behaviours, it is not a useful tool for actively engaging people in sustainable practices (Lehner *et al.* 2016). As such, nudging is most effectively used in conjunction with other behavioural tools such as policies, incentives (such as the deposit-return scheme on plastic bottles), bans, fines or levies along with changing the choice architecture to encourage sustainability as the default (Lehner *et al.* 2016). However, understanding the 'how', 'where' and 'why' of sustainability initiatives can play a role in how successful these techniques are (UNEP 2018). As such, understanding how and why people within a HEI behave in a certain way is important in integrating sustainability into campus life without behavioural boomerang effects.

2.8. Characterising a Sustainable University

For HEIs to embody the sustainable principles they research and teach, there are several areas that must be addressed. Ferrer-Balas et al. (2008) suggested that transformative education, commitment to trans- and interdisciplinary research and collaboration, strong leadership and a future-thinking mindset with a focus on solving societal issues are key features of sustainable universities. Mendoza et al. iterated the need for HEIs to embed the principles of circular economics (CEco) into their structures (Mendoza *et al.* 2019). They suggest CEco thinking is needed to shift away from the DSP within universities which is associated with a high environmental footprint.

The path to sustainability varies between universities (Ferrer-Balas *et al.* 2008). While awareness of the importance of sustainability in HEIs has improved over time, holistic integration of sustainability into HEIs remains a challenge. Ramísio *et al.* (2019) and Shawe *et al.* (2019) highlight the lack of standardised and clearly documented information on the paths HEIs have taken to successfully integrate sustainability. A mix of bottom-up and top-down approaches are suggested for sustainability to permeate all parts of a HEI, (Lee and Schaltegger 2014; Ávila *et al.* 2017; Ramísio *et al.* 2019; Shawe *et al.* 2019). Shawe et al. (2019) suggest that the bottom-up approach currently dominates sustainability initiatives within universities with a lag in sustainability policies representing a top-down approach. Byrne at al. (2017) reflect on how holistic and transdisciplinary approaches incorporating on-campus research and teaching, student and academic activism, external community engagement, university buildings and estates offices and university leadership can help operationalise such top down, bottom up and middle out approaches, despite numerous challenges and constraints (Byrne *et al.* 2017, pp.237–243). Some progress has been made in advancing sustainability in Irish universities such as the Green Campus initiatives with 12 campuses awarded green flags nationally as of 2019 (Green Campus Ireland 2019). Incentivising sustainability at a university scale require strong leadership, financial support and a good support network of informed, committed stakeholders (Lee and Schaltegger 2014; Blanco-Portela *et al.* 2018).

Disterheft *et al*. (2015) proposed that sustainability has been integrated into HEIs in two main ways using the build-in or build-on approach. The build-in approach attempts to integrate sustainability into the existing teaching and learning pathways. The build-on approach creates new courses and research paths related to sustainability. Universities often focus sustainability initiatives on specific areas such as recycling or

energy use on campus, corresponding to a more built-on approach. These policies can be effective e.g. UCC's Saver Save's Scheme resulted in a 7% annual reduction in energy use in the UCC Boole Library (UCC Green Campus 2019a). However, the lack of an established framework for sustainability within universities at a policy level can result in a unsystematic approach to sustainability integration, which runs counter to the holistic, system-wide approach needed to achieve lasting sustainability (Alshuwaikhat and Abubakar 2008; Mustapha *et al.* 2017; Shawe *et al.* 2019).

In focusing solely within the confines of the university campus, HEIs often neglect their potential role as changemakers at a wider societal level (Blanco-Portela *et al.* 2018). Educational institutes have the potential to act as testing grounds for sustainability initiatives that can then be extended into or influence wider society (Siegner 2018; Shawe *et al.* 2019) or as a thought-leader in advancing the national and international dialogue on what is needed for a sustainable future (Ferrer-Balas *et al.* 2008; Blanco-Portela *et al.* 2018). For instance, in 2009, the European Commission recommended the integration of SD into research and how HEIs function (Reidy *et al.* 2015).

In a study of the Technical University of Catalonia (Spain), leadership, committed sustainability champions, a co-ordination group for greening activities, governmental financial support and influence of other HEIs all drove advances in the university's sustainability standing (Ferrer-Balas *et al.* 2008). However, barriers such as a lack of staff buy-in, sufficient administrative support and financial support all limit the implementation of sustainability initiatives in HEIs (Ferrer-Balas *et al.* 2008; Larrán Jorge *et al.* 2015). Lack of dedicated funding, a clear sustainability policy framework

and limited communication between stakeholders were also cited as major barriers to campus sustainability in a study by Vargas et al. (2019).

2.9. Sustainability at UCC

University College Cork (UCC) is one of the largest universities in Ireland with approximately 22,500 students. UCC is a recognised green leader in the HEI sector. It was the first university globally to be awarded a Green Flag by the Foundation for Environmental Education (FEE) in 2010 as a green campus. Green Campus is a seven-step environmental programme aimed at continuously improving environmental education and management at HEIs. This flag was renewed in 2013, 2016 and 2019. The achievement of the Green Flag was driven by student engagement with campus management.

The Green Campus committee is a weekly, student-led committee open to students and staff which discuss issues and organise campaigns to improve UCC's sustainability. These meetings feed into a higher-level Green Forum which is co-chaired by the current Vice-President for Teaching and Learning and the Director of Building and Estates and includes staff and student representatives. The Green Forum has biannual meetings aimed at strategic improvements of UCC's sustainability. Thus, UCC's sustainability journey is based around the ethos of a student-led, research informed and practice focused approach (Reidy *et al.* 2015).

UCC has been recognised for a variety of sustainable achievements. For instance, UCC has been in the top ten of the UI GreenMetric World University Rankings since 2012 (UCC 2016). It was the first university to achieved ISO5001 certification for Energy

Management Systems (Reidy *et al.* 2015). In 2018, UCC was the first European university to be awarded a gold star from AASHE (Kirrane *et al.* 2020). In 2019, UCC ranked first in the world for its contribution to the UN Sustainable Development Goal of Responsible Consumption & Production in the inaugural Times Higher Education University Impact rankings (2019). Overall, it ranked 21st globally in the Times Higher Education University Impact Rankings for the UN SDGs. Additionally, UCC has signed the Talloires Declaration, the GUPES (Global Universities Partnership on Environment and Sustainability), and the UNEP Water programme. UCC has also been to the forefront of inter- and transdisciplinary research initiatives around transitions to sustainability (Byrne *et al.* 2017).

UCC Polices Relating to Sustainability:

In 2016, UCC published its Sustainability Strategy to provide a policy base for improving UCC's standing regarding sustainability. The Sustainability Strategy works in tandem with the goals of the Green Campus programme and UCC Strategic Plan 2017-2022 to incorporate sustainability as an integral part of UCC. The Sustainability Strategy outlines sustainability goals across nine main areas: 1) sustainable citizenship, 2) teaching and learning, 3) research, 4) food, health and wellbeing, 5) landscape, heritage and natural resources, 6) recycling and waste management, 7) energy, water and climate change, 8) procurement and contracts, and 9) commuting and business travel. The management of UCC's environmental impact is co-ordinated by the Buildings and Estates department as they are responsible for the management of the majority of UCC's activities which can impact the environment (such as energy, waste, utilities, and commuting). A sustainability management group, consisting of key personnel related to everyday sustainability management practices was also created.

Additionally, the head of each school, administrative unit or department is also responsible for ensuring that actions in their area align with the university's Environmental Policy. UCC's Environmental Policy 2013 includes aims to integrate environmental considerations into teaching and learning, meet or exceed relevant environmental legislative or regulatory requirements, enhance efficiency, set and monitor progress towards environmental objectives, reduce pollution from activities and adding environmental considerations to procurement, building management, waste management, commuting and maintenance of the UCC grounds.

UCC also introduced a 'Connected Curriculum' with sustainability as one of its pillars. The aim of the Connected Curriculum is to "*emphasises the holistic development of students and staff through research-based, collaborative enquiry. It is designed to prepare students for their future… [and]… to develop values, skills and aptitudes that promote civic participation, social inclusion, sustainability and impactful, global citizenship*."- UCC Academic Strategy 2018-2022, p. 12.

UCC Practices relating to Sustainability

UCC has committed to removing SUP by 2023 with both the President and Deputy President signing the 'Ditch the Disposables' petition in 2019. The petition called for the removal of 'Disposable Cups, Plastic Bottles, Plastic Straws, Plastic Salad Containers, Plastic Cutlery & Plastic Packaging for UCC products (e.g. Sweet Tubs/Sandwiches etc.)' by 2023 (UCC Green Campus 2020b). The 2019/2020 Sustainability Report highlights developing a plastic-free plan for UCC as a key action. At present, the journey to eliminate SUP from UCC consists of incremental steps by a variety of stakeholders, some of which are highlighted in fig. 8.

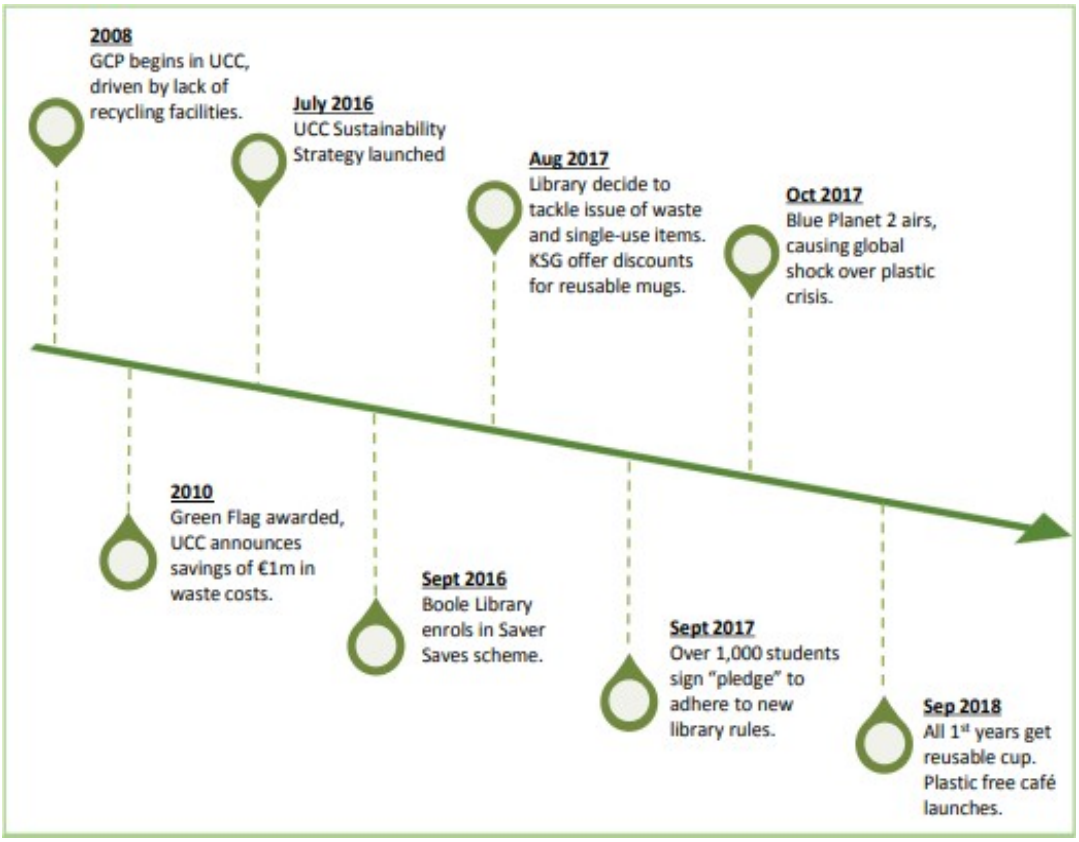


Figure 8: A timeline of sustainability initiatives in UCC. GCP=Green Campus Programme. Source: UCC Sustainability Report 2017/18.

In 2018, UCC caterers launched Ireland's first front-of-house plastic free café, the 'Bio

Green Café' ('Biocafe') in the Bioscience building. In establishing the café, a lifecycle approach was taken to remove as much plastic as possible during procurement and use. As such, all plastic bottles were replaced by glass or cans and plastic sachets were replaced by a condiment station. No plastic wrapped food is available. A hydration/ washing station was also installed to allow reusable mugs to be washed and water bottles to be refilled. Compostable take-away containers are available at a price and dine-in meals are available on crockery.

UCC also has a 'Farm to Fork' initiative which supplies fresh vegetables from a local UCC-owned farm to restaurants on campus (Jennings 2016).

To reduce energy use, a Saver Saves Scheme was implemented in UCC in 2016. It targeted 13 Significant Energy Users (SEUs), which were buildings which accounted for 87% of the university's energy budget. In these cases, the energy budget was given to the SEU staff at the beginning of the financial year, to manage as they saw fit, with support from the UCC energy manager. Any savings made through improved energy efficiency could then be reinvested in further environmental projects in a revolving 'green' fund.

The Boole library is the most successful SEU in the Saver Saves Scheme. It accounts for 8.6% of UCC's energy budget. It has seen a 45% reduction in electrical power usage since 2008, resulting in savings of €720,000. In October 2016, the Boole library signed up to the Saver Saves Scheme. A team including members of UCC buildings and estates department and library staff members gathered to plan and implement sustainability initiatives in the library. The team reduced lighting in summer, re-balanced the heating and ventilation, and altered operating times of the building,

saving €65,000 between 2016-2019 (UCC 2019).

These savings have been reinvested in the environmental projects in the Boole including an air barrier at the entrance to decrease energy consumption, new recycling stations and a living green wall in the Quad Reading Room to improve air quality. In 2018/19 there was a 2% reduction in energy consumption, along with savings of 1,234,000l of water, and 930,000 kWh of energy (UCC Green Campus 2019a). Implementation of a new bin station system has resulted in a seven-fold increase in recycling rates. All small bins were removed from offices and library floors and replaced by centralised compost and recycling stations. This resulted in the removal of 3,500 plastic bags per month which previously had very low recycling rates due to contamination, especially by liquid from unfinished drink cups. To combat this issue, the library implemented a disposable cup ban as part of their 'Love Our Library' campaign while encouraging library users to bring reusable travel mugs and reusable bottles.

Following a petition by the UCC Students' Union in 2018, UCC is working to be free of certain single-use plastics by 2023. The petition pertains to the following items: "Disposable Cups, Plastic Bottles, Plastic Straws, Plastic Salad Containers, Plastic Cutlery & Plastic Packaging for UCC products (e.g. sweet tubs, sandwiches *etc*.)." In seeking to achieve this goal, UCC is following a phased approach by introducing more water fountains, removing plastic from the 'front of house' of cafés on campus, introducing sustainable and single-use plastic free policies into procurement, market stalls, and labs where possible (UCC Green Campus 2019a).

2.10. Chapter Conclusion

This chapter has highlighted the progress towards and challenges with improving sustainability. The issue of plastics, particularly SUP is outlined. Literature regarding the classification and pursuit of green consumption is addressed as are the challenges of achieving sustainable behaviour within the context of the prevailing social paradigm. Such literature highlights the persistence of the attitude-behaviour gap in behaviour and the influence of context on behaviour. Such literature suggests that green consumption remains difficult to achieve within a social paradigm that emphasises continuous consumption without constraining it within planetary boundaries. The challenges of 'flourishing' within the planetary boundaries directly affects HEIs though their research, teaching and their own environmental impacts. As such, HEIs including UCC need to investigate and pursue increased sustainability that moves beyond just quantitative measures and includes an understanding of qualitative context of human behaviour. As such, this research positions itself on the border of both traditions through using an interpretivist approach with mixed methods to investigate how societal and marketing levers influence the pursuit of sustainability in UCC. This was done though three research questions which will be discussed in chapter 5:

1. How to structural and infrastructural interventions influence SUP behaviour in UCC?
2. How to promote and incentivise sustainability regarding SUP amongst the UCC stakeholders (students, staff and third parties associated with the university)?
3. What lessons can be learned from the UCC living lab for achieving sustainable behaviours in wider society?

Chapter 3.

Methodology

Introduction

This chapter will briefly outline the concepts of research philosophy, ontology, epistemology and methodology. It will then outline how these concepts inform the approach taken for this research, including the assumptions and limitations inherent to this approach.

In deconstructing the approach taken to this research, the 'research onion' concept used by Saunders, Lewis and Thornhill (2016) was followed (fig. 9). Within that context, this study is classed as an interpretivist, inductive, simple mixed method study that used cross-sectional action research.

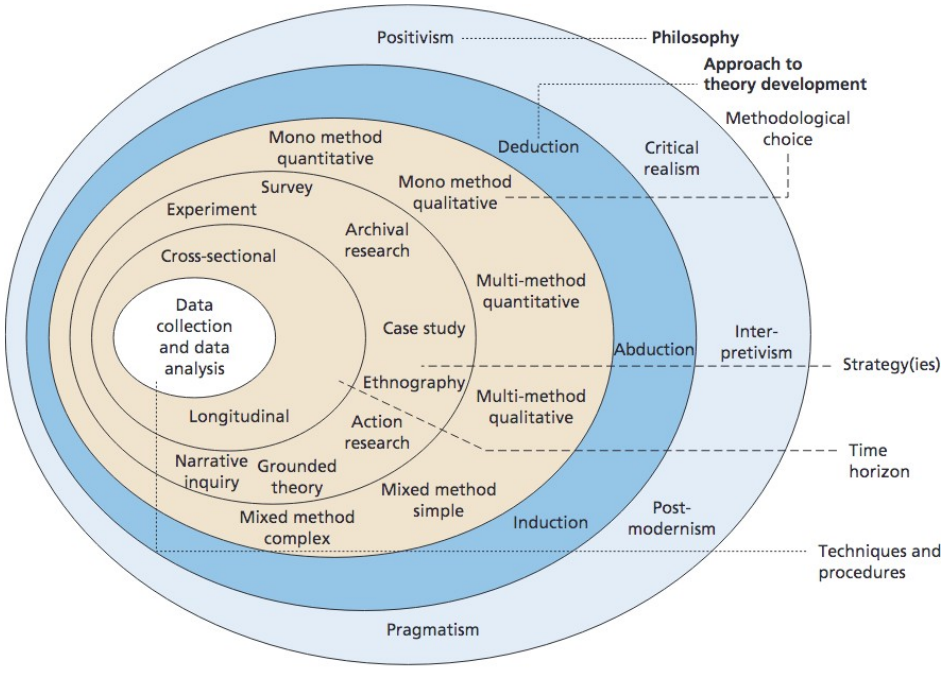


Figure 4.1 The research 'onion'
Source: © 2015 Mark Saunders, Philip Lewis and Adrian Thornhill

Figure 9: Research onion. Source: Saunders (2016).

3.1. Researcher Philosophy

When approaching any study, there are three questions that must be asked:

1. What is the ontological stance taken for this research?
2. What is epistemology used to investigate the ontology?
3. What methodology will be used to investigate this research based on the epistemological stance taken?

3.1.1. Ontology

Ontology is '*the study of what exists, and how things that exist are understood and categorised'* (O'Leary 2010). When considering ontology, there are two main schools of thought regularly presented as opposing beliefs (Hammond and Wellington 2012, p.114). These contrasting positions are based on the whether a reality is dependent or independent of perception.

The **foundationalist** or **realist** stance posits that the world exists independent of perception, i.e. the world seems the same to everyone (Ryan 2018). This line of thinking is similar to the empiricist view of the scientific method.

On the other hand, **anti-foundationalists** put forward the stance that social realities are created by groups and shaped by the researcher's perception i.e. the world seems different to different people (Ryan 2018). This viewpoint is informed by an interpretivist epistemology (Hammond and Wellington 2012, p.114).

On the other hand, anti-foundationalists put forward the stance that social realities are created by groups and shaped by the researcher's perception i.e. the world seems different to different people (Ryan 2018). This viewpoint is informed by an

interpretivist epistemology (Hammond and Wellington 2012, p.114). This research follows an anti-foundationalist stance that holds that reality is perceived and interpreted differently by different individuals. This ontology informed the epistemological approach taken to gathering knowledge. As such, meaning is considered as constructed rather than discovered in this study. Therefore, the situational context of the research, the experience and perceptions of research participants and the role of the researcher in interpreting the data all combine to create an emergent understanding of a subjective reality.

In this research, the stance that research participants experience subjective realities was chosen to help better understand where there was divergence and convergence in opinions towards SUP. The researcher's role in investigating and assessing the importance of various barriers, drivers and levers of sustainable behaviour adds to the interpretive value of the research and is underpinned by the assumption that a researcher cannot be whole divorced from their underlying beliefs and experiences and that this adds another layer of meaning to the analysis of the data.

3.1.2. Epistemology

Epistemology is regarded as '*the rules of knowing'* (O'Leary 2010). Essentially epistemology is our beliefs about how knowledge is gained. As the '*rules of knowing*' epistemology sets the standards for how knowledge should be gained, rather that outlining how it is gained in reality. The difference in ontological and epistemological approaches and role they play in shaping methods used are illustrated in fig. 10.

Ontology (nature of reality or being)	Epistemology (what constitutes acceptable knowledge)	Axiology (role of values)	Typical methods
	Positivism		
Real, external, independent One true reality (universalism) Granular (things) Ordered	Scientific method Observable and measurable facts Law-like generalisations Numbers Causal explanation and prediction as contribution	Value-free research Researcher is detached, neutral and independent of what is researched Researcher maintains objective stance	Typically deductive, highly structured, large samples, measurement, typically quantitative methods of analysis, but a range of data can be analysed
	Critical realism		
Stratified/layered (the empirical, the actual and the real) External, independent Intransient Objective structures Causal mechanisms	Epistemological relativism Knowledge historically situated and transient Facts are social constructions Historical causal explanation as contribution	Value-laden research Researcher acknowledges bias by world views, cultural experience and upbringing Researcher tries to minimise bias and errors Researcher is as objective as possible	Retroductive, in-depth historically situated analysis of pre-existing structures and emerging agency. Range of methods and data types to fit subject matter
	Interpretivism		
Complex, rich Socially constructed through culture and language Multiple meanings, interpretations, realities Flux of processes, experiences, practices	Theories and concepts too simplistic Focus on narratives, stories, perceptions and interpretations New understandings and worldviews as contribution	Value-bound research Researchers are part of what is researched, subjective Researcher interpretations key to contribution Researcher reflexive	Typically inductive. Small samples, in-depth investigations, qualitative methods of analysis, but a range of data can be interpreted

Figure 10: Research Philosophies. Source: Saunders 2015 pg. 13

Interpretivism:

Interpretivism aims to understand the subjective meanings and context of experiences for different people. In interpretivism, the complex, social reality that humans create is the ontological foundation. As such, the researcher is not seen as separate from the research, nor wholly objective as their experiences inform their interpretation of the data they collect and analyse (Hammond and Wellington 2012; Ryan 2018). This concept is often closely associated with the concept of social constructionism, which holds that humans create their world/ reality as they interact with it and interpret those interactions (O'Leary 2010, p.6).

This research took an interpretivist approach based on the ontological stance that meaning is socially constructed. An interpretivist approach was taken as it was considered more suitable for the research questions given that participants interactions with SUP were subjective and influenced by their role and contextual factors. Thus, qualitative interviews and surveys were used to understand the narratives and opinions around SUP in UCC. This research positioned the researcher as a member of the UCC community, thus not wholly impartial nor entirely uninformed of the lived experience of UCC community members. As such, the data interpretation by the researcher adds to the understanding of SUP behaviour in UCC, while acknowledging the influence of researcher bias.

3.2. Approach to theory development

There are two main types of reasoning: inductive and deductive (Hammond and Wellington 2012; Saunders *et al.* 2016; Ryan 2018). The main difference between these two forms of reasoning is the way the data is gathered and used. In deductive reasoning the data is used to prove or disprove a hypothesis. In inductive reasoning, data is gathered to form a hypothesis, rather than challenge an existing one.

Inductive reasoning uses a bottom-up approach. In inductive reasoning, observations and experimentation are the primary steps. Any patterns in the data can then be identified and a theory built from there. When using induction, a hypothesis is generated from exploration of the data. This hypothesis is informed by the themes and patterns found though the data gathering and analysis steps. Inductive reasoning allows more flexibility in study design and provides more contextual information than its deductive counterpart (Hammond and Wellington 2012). Induction allows an understanding of how the research subjects interpret and interact with their reality.

This research used inductive reasoning to identify common themes within the data. This approach was chosen given its flexibility and its openness which allowed unexpected themes to emerge. This was important given the focus on social constructed meanings emphasised by the interpretivist, anti-foundationalist stance taken.

3.3. Methodological Approach

There are two main methodological approaches: quantitative and qualitative. Mixed method approaches have emerged more recently as a way of bridging the quantitative/ qualitative divide (O'Leary 2010).

3.3.1. Quantitative

Quantitative research is often based upon positivist and empiricist assumptions which underpin the scientific method. This deductive based methodology focuses on establishing a distance between the researcher and the research topic to remove bias.

Due to its positivist assumptions, quantitative research strives to be objective and reproducible. As such, the data provided by quantitative methods aim to be able to produce generalisable law-like assumptions about the topic of research (Saunders *et al.* 2016).

Quantitative studies often focused on rigorous use of highly structured methods to test a predetermined hypothesis. However, due to their broad scope, quantitative studies can lack depth and contextualising information about the population studied (O'Leary 2010; Hammond and Wellington 2012; Saunders *et al.* 2016).

3.3.2. Qualitative

In contrast to quantitative research, qualitative methodology is often based on the paradigm of interpretivism (Saunders *et al.* 2016). Researchers play an active role in interpreting the social realities and subjective perceptions of the research subjects. This stance acknowledges the role of the researcher's experience and their values in interpreting the data. In qualitative studies, inductive reasoning is often used to seek an understanding of the complex social realities that people construct. As such, qualitative research focuses less on large scale studies that aim for generalisability and more on small scale studies that aim to provide in-depth, contextual insights into the research topic. Qualitative research often employs more methodological variation than quantitative research due to quantitative its inductive 'ground-up' approach (O'Leary 2010; Saunders *et al.* 2016).

3.3.3. Mixed methods

Mixed methods research involves the use of both quantitative and qualitative methods to collect data. Mixed methods can be based on a positivist or interpretivist approach,

For instance, quantitative research may be used to test an existing hypothesis followed by qualitative research to provide a rich, more contextualised understanding of the research topic. Alternatively, qualitative research may be used to form a hypothesis using a small-scale bottom-up approach, which is subsequently tested using larger scale quantitative methods. Due to the diversity of epistemological positions that can be used to carry out the research, there are a variety of methodologies that can be used. As such, research can be based on deductive or inductive reasoning or others such as adjunctive methods which are beyond the scope of this research (Saunders *et al.* 2016). However, Wiggins (2011) argues that integrating methods stemming from positivist

and interpretivist paradigms remains a challenge. He highlights that the hierarchical approach to methods, generally stemming from positivism, can relegate qualitative research to hypothesis testing, while ignoring other valuable aspects of those methods.

Mixed methods can be used to broaden the scope of the research and tackle some of the limitations encountered by using either quantitative or qualitative methodologies alone (Wiggins 2011). For instance, the use of qualitative interviews can provide an in-depth, individualised perspective from various stakeholders on the issue. However, qualitative research is limited by the inability to generalise for a whole population based on a small number of interviewees (O'Leary 2010). Quantitative methods have the strength of being more generalisable and objective. As such, quantitative methods such as surveys can be used to augment the interviews to assess the awareness and self-reported actions of a wider population in a small time-frame. However, surveys are limited by the inability to ask follow up questions or access the accuracy of the responses reported. Surveys can have low responses rates, which prevents them from providing an accurate representation of the overall population surveyed.

Mixed methods were used to provide a more comprehensive understanding of the issue of SUP in UCC. In this study an adaption of action research was used to conduct a concurrent mixed method approach. Mixed methods are not commonly associated with action research however, combining them can allow researchers *"to rigorously explore and intervene with a heterogenous sample of participants"* (Bailey and Gammage 2020). This research contributes to the long-term initiative to remove SUP through research informed by action, to facilitate further action. The aim of the survey was to get a sense of the general awareness and behaviours of students and staff, while the interviews examined challenges and success stories amongst key stakeholders. Both methods were used concurrently as the results of one method were not dependent on the other. Together these methods provided an insight into both specific challenges to and drivers of sustainability as well the attitudes and behaviours of a wider sample of the UCC population towards it. This approach exploited the short- time frame available to the researcher and reflected the position of this research as part of a larger long-term action research project to remove SUP from UCC.

3.3.4. Conclusion about stance taken

An interpretivist philosophy was adopted in researching the perspectives of various stakeholders within the university towards sustainability. This approach was adopted given the subjective perspective of the researcher and the anti-foundationalist stance taken. The data was collected using an action-research-informed mixed method approach of interviews and surveys to gather a broad range of data in a short amount of time. In adopting this approach, it is hoped that this study can shed some light on the meaning behind human behaviour regarding sustainability. The persistence of an attitude-behaviour gap towards sustainable actions (Lorenzoni *et al.* 2007; Cherrier *et*

al. 2012; Carrigan 2017) and plastic (Mühlthaler and Rademacher 2017) points to the challenge of individual behaviour change within the DSP and highlights the need for structural changes including supply chains and active governmental leadership (Newton and Meyer 2013). The barriers to sustainability are often social or societal (Gifford 2011) and can shape how people behave. By taking an interpretivist stance, it was hoped that the underlying social context for such behaviours could be found.

3.4. Research strategy

The research strategy is the action plan used to answer the research questions and connects the research philosophy (interpretivism) with the tools used for data collection (survey and interviews) (Saunders *et al.* 2016). In qualitative research, the researcher can also be seen as a research tool (Maguire and Delahunt 2017). This research aligns with action research as it is part of a wider project researching and implementing change towards SUP in UCC. As such, the research is informed by stakeholders' actions and experiences and provides feedback for future action.

3.5. Data Collection Strategy

In line with the mixed-method approach taken, an online survey and face-to-face interviews were carried out.

Surveys are useful for collecting data from a large sample size. They are generally used for descriptive or explanatory research (Saunders *et al.* 2016). The aim of the survey was to provide a quantitative snapshot of the views of students and staff on sustainability and plastics. It was designed to get a view of the position of the student and staff body in broad strokes towards sustainability. Of the 19 survey questions, 17 were closed questions. Two open-ended survey questions allowed collection of

codable qualitative responses. These questions provided a richer qualitative focus than the closed questions in highlighting barriers to and sources of sustainability information. Codes are discussed in more detail on pg. 57. The survey questions are listed in appendix 3.

Survey Design

A broad scale survey was created to target as many current students and staff as possible. The survey was hosted online on Google Forms. The only defined exclusion criteria for carrying out the survey were the pre-requisite that the participants were 18 years or older and that the participant consented to be part of the survey (see appendix 2: Survey consent questions). The survey information gave a descriptive context to the interviews by provide a brief snapshot into people's awareness of and behaviour towards sustainability within UCC.

The survey comprised of two sections, the consent section followed by the 19 survey questions, three adopted from a 2001 An Taisce Green Schools survey (Q3, 14, 19), two from ASSHE survey (Q6 & Q8). All other questions were created by the researcher. The survey questions were divided into six preliminary themes (see table 1). Some questions addressed more than one theme, particularly where themes were related (e.g. awareness and attitude). This was further refined into four areas for the findings section: Awareness, Behaviour, Barriers and Influence of UCC.

Table 1. Preliminary themes of survey questions

Themes of Survey:	Main theme
Awareness/ Knowledge	Q5, 6, 8, 9, 15, 17, 19
Attitude towards sustainability	Q3, 4, 14, 18
Behaviours	Q7, 12, 16
Plastic Use	Q10, 11
Facilities and Structures	Q13, 16

The awareness/ knowledge themed questions aimed to understand respondents' knowledge of sustainability initiatives and what impacts campus events had on their concern (Q5, 8). Questions 6 and 10 assessed their awareness of what sustainability or SUP means. Questions 15 and 17 examined practical knowledge towards waste separation (Q15, 17). Finally, Q19 examined how respondents learned about the environment.

Sustainability themed questions examined how respondents perceived environmental issues (concerns, beliefs) (Q3, 4) and reported values towards the sustainable behaviour (Q14, 18). The 'behaviour' themed questions aimed to understand whether people considered sustainability in everyday tasks (Q7). Behaviour towards SUPs,

alternatives (Q12) and towards waste infrastructure (Q16) were also examined under this theme. The facilities and structure questions investigated barriers to engaging with alternatives to SUP (Q13) and behaviour towards waste infrastructure on campus (Q16). Finally, the plastic use questions directly examined reported trends in plastic use (Q10, 11).

Nonetheless, many of the questions covered overlapping themes (e.g. behaviour and plastic use). As such, the above categorisation was not to silo questions but rather to highlight the main themes the questions were initially generated to investigate.

Survey Distribution

The survey was initially distributed via email to staff and students through the Green Campus mailing list in UCC. When this distribution pathway yielded low numbers of responses, the survey was distributed to student and staff mailing lists.

To reach the student population, the survey was distributed via email to all registered students via a university mailing list. The mailing list distributed the email with an attached link to the survey. The content of the email provided a brief synopsis of the research project and explained the goal of the project. To distribute the same email to staff, a supervisor distributed the email through the all-staff email platform. This method of distribution was used because as a postgraduate student, the researcher did not have direct access to staff-only mailing lists.

This survey was distributed via email to approximately 22,651 students and 4,638 staff via university mailing lists, with a response rate of *ca.* 2.4% (n=660). The limitations of the methods used are outlines in section 6.3.

Interviews

Seven interviews were also carried out, one of which had two interviewees rather than one (Library Green Team-LGT). These key stakeholders were chosen based on the roles they had within the university and the advice of the researcher's supervisory team. The list of interviewees can be found in Table 2.

These interviews were semi-structured, with pre-defined questions and the opportunity to prompt further expansion of topics. Silence and minimal prompting were used to encourage further information from the interviewees. These interviews ranged between approximately sixteen minutes and an hour, dependent on interviewee availability.

What was done to organise interviews?

Seven interviews, including one with two interviewees (LGT), were carried out with stakeholders across UCC, third party service providers, staff and students. The interviews ranged from 16 to 60 minutes. All interviews took place on campus at times and locations that were convenient for the participants. Prior to the beginning of the interviews, the participants were all given hard copies of an information sheet and consent form. These documents outlined the purpose of the research and how and why the data was to be used. Additionally, the participants were briefed verbally on the project and their right to withdraw consent within two weeks of the interview to ensure the participants were giving their informed consent to participate in the study. Participants also had the option to give permission for extracts of the interviews to be used in this thesis. Only if signed, informed consent was given did the interviews take

place. All the interviews were then audio-recorded with permission of the participants using an audio-recorder application on the researcher's phone.

What made up an interview?

The interviews consisted of a set of pre-determined guiding questions, some ofwhich were specific to each interview and some of which were generic across the interviews. However, a high proportion of flexibility was given to the interviewees to interpret and respond to the questions in their own manner (see appendix 4: Sample interview transcript). In line with Newton's description of interviews as corresponding to a continuum between structured and unstructured, these interviews were considered semi-structured (Newton 2010) using open ended questions. Silent pauses were used to prompt further information from interviewees, along with minimal probing.

How was the data handled after the interviews?

The interviews were then transcribed verbatim using F4 transcription software as soon as possible after the interviews took place. Once the audio files were correctly transcribed, the audio files were deleted in line with ethical approval requirements. To retain a sense of context, interviewees were given codes related to their area of influence in the university (e.g. Waste Management Employee = WME). The full list of codes is in table 2 below:

Table 2: List of interviewee codes

Role in University	**Interview Code**
Catering Employee	CE
Student Facilities Centre Employee	SFCE
Waste Management Employee	WME
UCC Student Union Representative	SUR
UCC Student	UCC-St
Library Green Team Member 1	LGTM 1
Library Green Team Member 2	LGTM 2
Procurement Employee	PE

3.6. Data Analysis

The transcribed data from the interviews was analysed using a top-down theoretical thematic analysis based on pre-determined research questions. The analysis and interpretation of the data by the researcher resulted in the generation of insights and themes from the data (Spiggle 1994). Following the example of the methodology used by Braun and Clark (2006) and Maguire and Delahunt (2017), open coding was used to code the data collected. As such the codes were developed in response to the data

collected rather than according to pre-set codes. These codes were informed by the predefined research questions that bound and focused the study. As such, codes were emergent with focus given to those codes that were relevant to answering the research questions.

To analyse the data, the transcripts were first read in fully, then again line-by-line to highlight any relevant themes. Such sections were grouped and coded using Nvivo 12 software to create a provisional map of themes. The categorisation of data in this way evolved iteratively as themes emerged. Related themes were initially clustered in broad categories e.g. barriers, drivers and levers of sustainability. This was then refined into subsections such as plastics, suppliers, education, and leadership, which each had further sub-sections. This process was repeated with all interviews. The open questions in the survey were likewise analysed. This approach highlighted reoccurring patterns in the data and prominent themes that influenced participants. These emergent findings were then used to inform the research questions and the subsequent recommendations.

3.7. Researcher Identity, Voice and Bias

It is important to recognise the role the researcher plays as both a research instrument and as an interpreter of data in social research particularly using an interpretivist philosophy (Hammond and Wellington 2012; Ryan 2018). As such, it is important to outline the motivation for undertaking research and how prior experience influenced motives to undertake research (Caelli *et al.* 2003). The researcher carried out this research due to her inherent interest in the intersection between human behaviour and the environment which stemmed from her natural science background. As such, the researcher would consider herself environmentally literate, however, lacked detailed

knowledge of what factors shape human behaviour and how it could be changed. As such, the researcher's presuppositions that behaviour change could be easily achieved was challenged by the information gathered during the study. On self-reflection, the researcher became aware of barriers to sustainability within her own life such as a lack of public transport in her area or sharing meals with family members who would not or could not eat plant-based meals which altered her behaviour. As such, the researcher strove to remain non-judgemental both in the interviews and in the data analysis, while using her previous knowledge to contribute to the discussion and recommendations of this study.

3.8. Ethical considerations

For non-clinical research with human participants in UCC, the research must be approved by the Social Research Ethics Committee (SREC). Ethical approval was required and received prior to the beginning of the research.

Ethical considerations included ensuring that participants voluntarily gave their informed consent for the use of their data in this research. Survey participants were provided with an information letter at the beginning of the survey explaining the purpose of the survey and how their data would be used. The participants could withdraw their consent at any point up to the submission of the survey. Participants were reassured of the anonymity of their data. The interviewees were debriefed by the researcher which involved reiterating the purpose of the study and outlining how they could withdraw their consent up to two weeks post interview, at which point their data would be deleted. Contact details for the researcher and supervisors were provided if they needed further information about the study. The group interview participants were likewise debriefed by the researcher. However, it was highlighted that they could

not withdraw their consent during or post completion of the group interview as their data was mixed with the other interviewee's and impossible to separate at that point. Participants could withdraw their consent at any time up to the start of the group interview. Participants were encouraged to keep the information discussed by participants during the group interview confidential.

Data collected was stored securely during the study by the researcher. Physical data will be converted to electronic form (notes typed up, etc.) and the original copies were shredded as soon as practical after collection. In the interim, physical documents were kept in locked filing cabinets, in a locked office in UCC. Signed consent forms were stored securely in a locked filing cabinet in the office of supervisor Dr Claire O'Neill in the Department of Marketing and Management. The electronic data was stored on an encrypted password protected UCC-owned laptop and backed up to UCC-supplied OneDrive for Business. The transcripts and notes from the interviews were fully anonymised prior to uploading to OneDrive. Once the audio files were transferred to the encrypted laptop, they were deleted from the recording device. Codes were used for participants to maintain anonymity while retaining the context of the interviewee's roles, (i.e. Library Green Team Member = LGTM). As such, the main ethical consideration for this study was the risk of breaching participants anonymity. However, all efforts were taken to ensure so far as possible that the participants will not be identifiable.

Chapter 4.

Findings

4.1. Introduction

This section examines the key findings of the research. The chapter is divided into survey and the interview findings.

The survey section is divided into four sections: environmental awareness, self-reported behaviour, barriers to purchasing non-SUP items and sustainability at UCC. The survey findings suggest while there was widespread awareness and environmental concern amongst respondents, an attitude-behaviour gap persists towards engaging in sustainable behaviour. Additionally, it shows the role the university plays in engaging its community in sustainability initiatives and providing environmental information and the scope for improvement in those respects. This is particularly relevant given the reported lack of practical knowledge towards sustainable behaviour (e.g. waste separation). This echoes the findings regarding barriers to sustainable consumption, where structural, infrastructural, informational and behavioural barriers were cited.

The interview section comprises six sections: values/beliefs/attitudes, knowledge, leadership, infrastructure and policy. Many of the interview findings echo those of the survey. For instance, values were seen to guide pro-behaviour but did not uproot the attitude-behaviour gap. Increased environmental knowledge guided more sustainable behaviour with an emphasis on the role of education and persistent social marketing campaigns to embed pro-environmental habits. Leaders played a clear role in shaping organisational ethos and behaviour towards sustainability. Top-down sustainability was driven by leaders acting as sustainability champions and supporting other such champions within all levels of the organisation. Middle-out sustainability champions such as staff and contractors also demonstrate the potential of such leaders to drive major changes within an organisation (e.g. the library). These middle actors facilitated

changes in the social norms within their domain and catalyse changes beyond their boundaries. In UCC, such changes included infrastructure, policy, and alternatives to SUP.

4.2. Survey Findings:

Survey findings were divided into four sections:

- **Environmental Awareness**
- **Self-Reported Behaviour**
- **Barriers to purchasing alternatives to SUP**
- **Influence of UCC**

The sections on environmental awareness and self-reported behaviour broadly looked at these topics. The final section examined whether UCC's activities influenced respondents.

4.2.1. Environmental Awareness

Environmental awareness and concern within the surveyed population was assessed through seven main questions (Q3, Q4, Q6, Q9, Q15). These questions were divided into general environmental awareness, awareness around single use plastics (SUP), and personal beliefs.

4.2.1.1. General Environmental Awareness

Q3, Q4 and Q6 assessed the level of concern and awareness participants had towards environmental issues in general. Over 90% of respondents reported believing environmental issues were an urgent problem (fig. 11: Q3) and that reports of ecological collapse are legitimate (fig. 12: Q4).

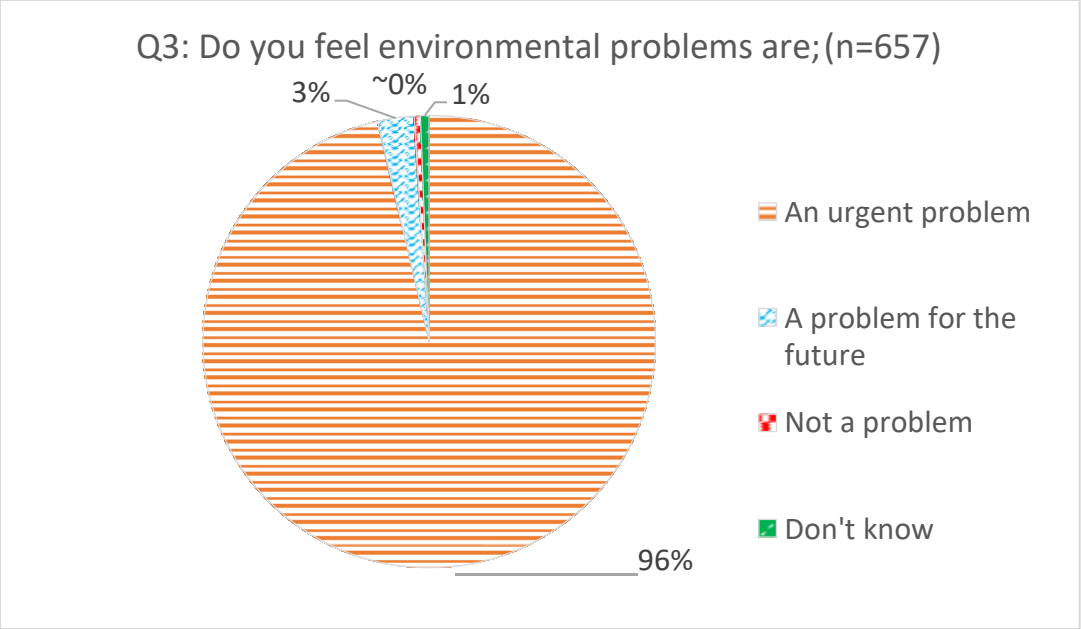


Figure 11: Results of Survey Q3, n=number of responses

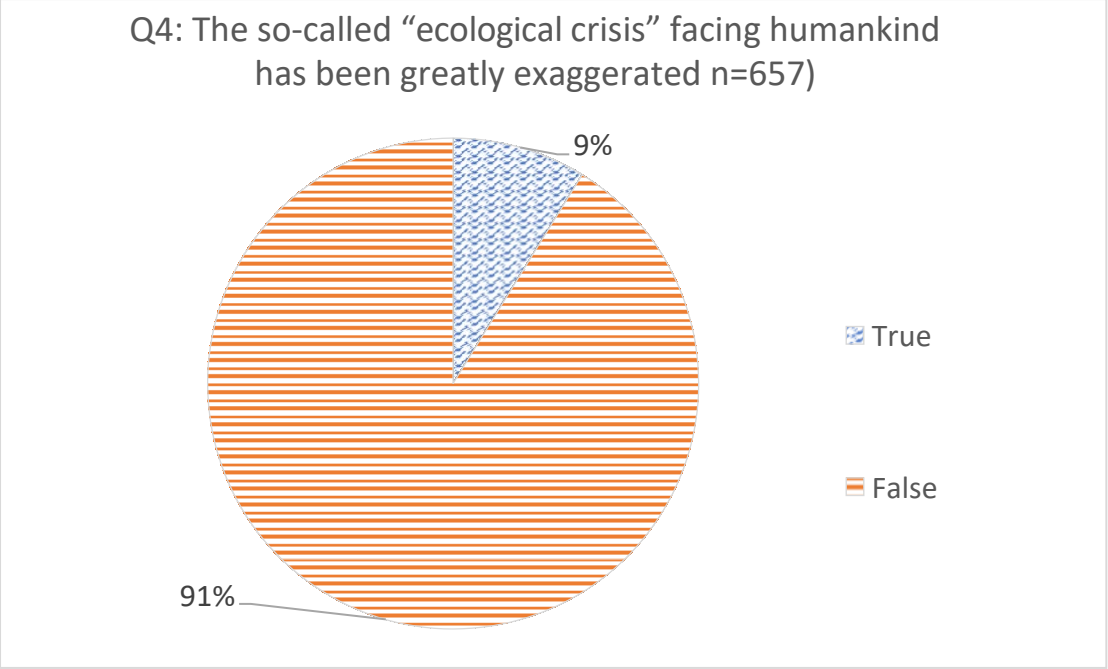


Figure 12: Results of Survey Q4

Additionally, more than 85% of respondents agreed or strongly agreed that they understood what sustainability means (fig. 13: Q6). This question and its responses are prefaced by the understanding that the meaning of sustainability is contested and

thus, the responses are taken to show people's confidence in their interpretation of sustainability not their alignment to a particular definition as the normativity of the word remains contested.

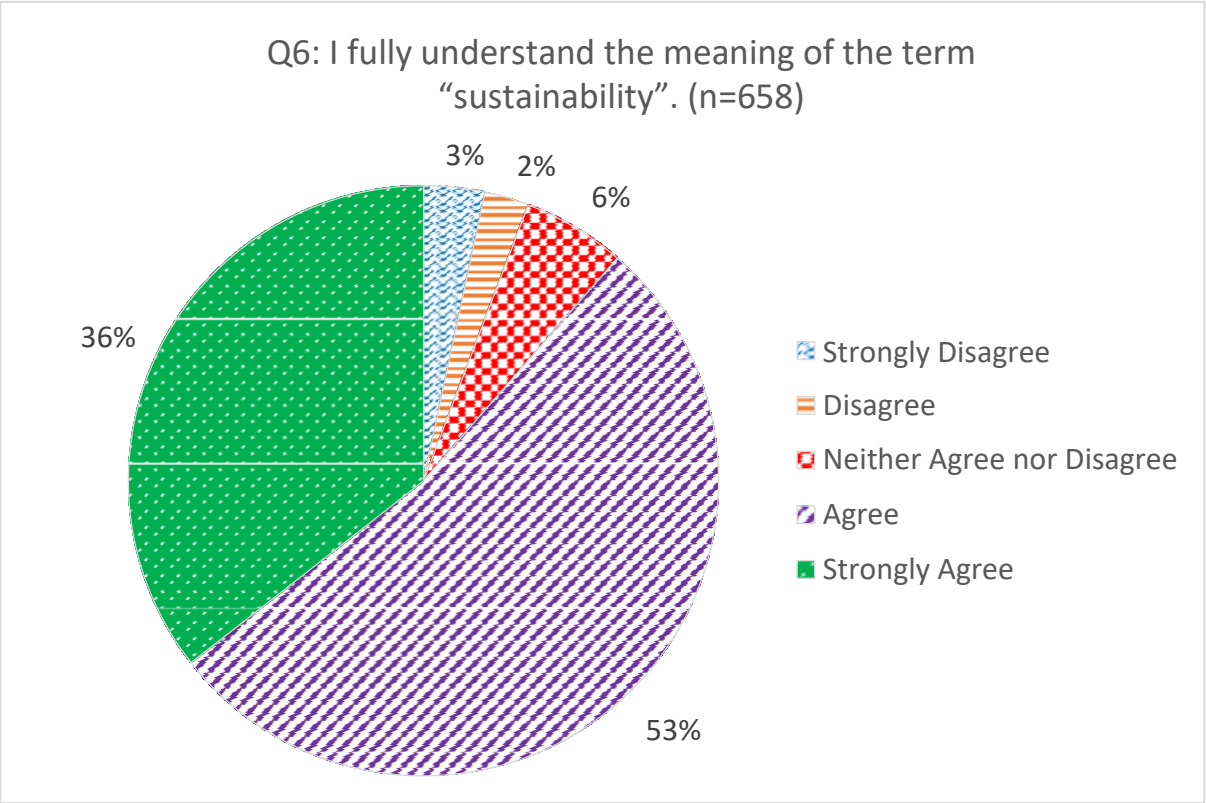


Figure 13: Results of Survey Q6

This suggested that those surveyed felt informed and concerned about the urgent environmental issues facing the world today. Awareness and concern are two of the potential antecedents to behaviour change and may play a role in motivating people to behave more sustainably as seen with the VBN theory (e.g. Stern, 2000). This may be done by leveraging their concerns to add immediacy to the need to change how we behave as a society and as individuals. However, awareness or concern alone have not been successful in bridging the attitude-behaviour gap. Therefore, other factors

influencing behaviour change must be considered such as social norms, facilities and infrastructure (Kollmuss and Agyeman 2002; Gifford 2011; Cherrier *et al.* 2012).

4.2.1.2. SUP Awareness

Q9 and Q15 focused on respondents' awareness of issues regarding plastic and their knowledge of waste separation. The results showed that almost all people (98%) surveyed reported some level of knowledge of the issues regarding plastic (Q9) (fig. 14).

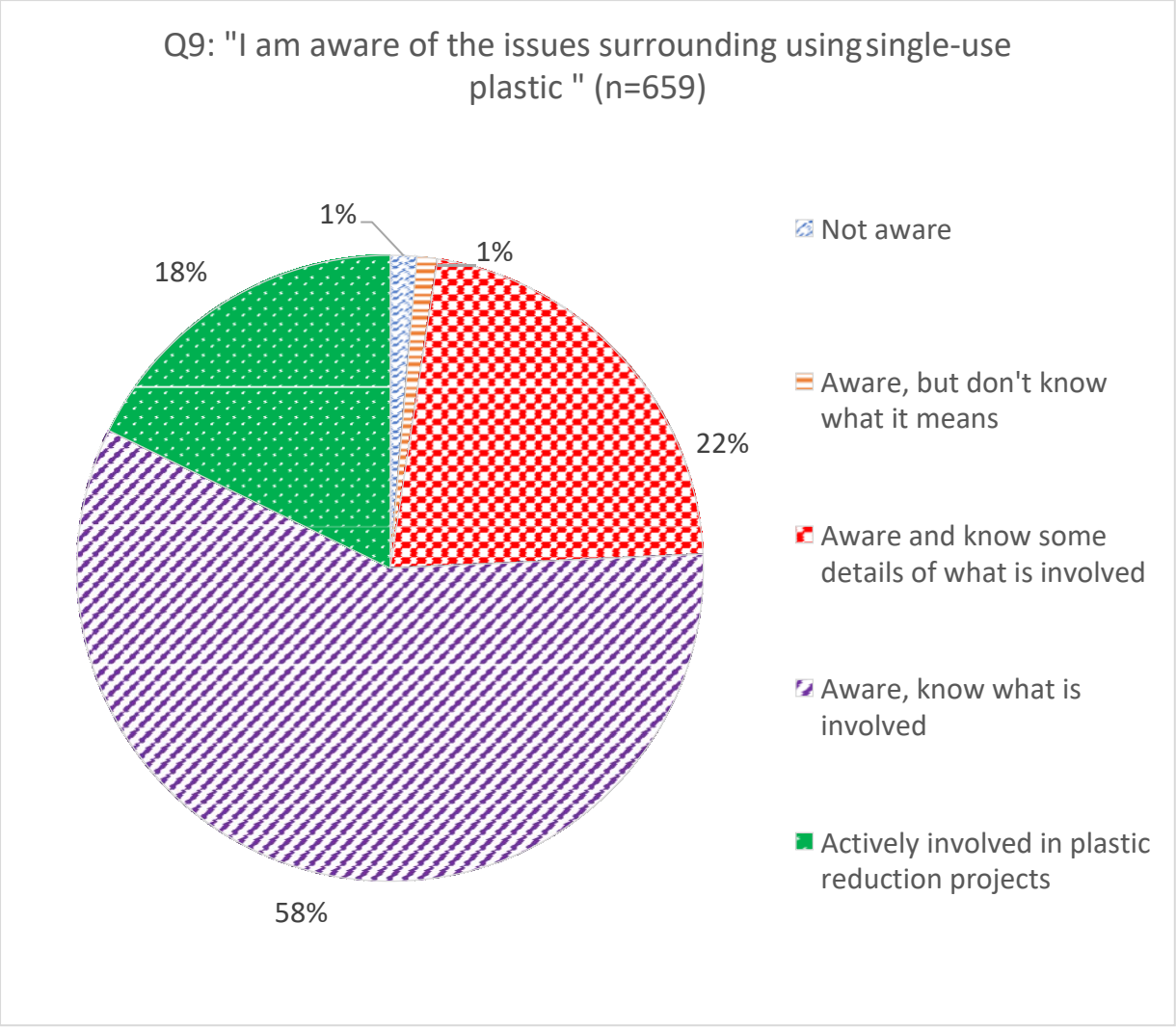


Figure 14: Results of Survey Q9

However, when questioned on behaviour-related practical knowledge almost a quarter (*ca.* 24%) of respondents either disagreed with or neither agreed nor disagreed that they knew how to segregate their waste in Q15 (fig. 15).

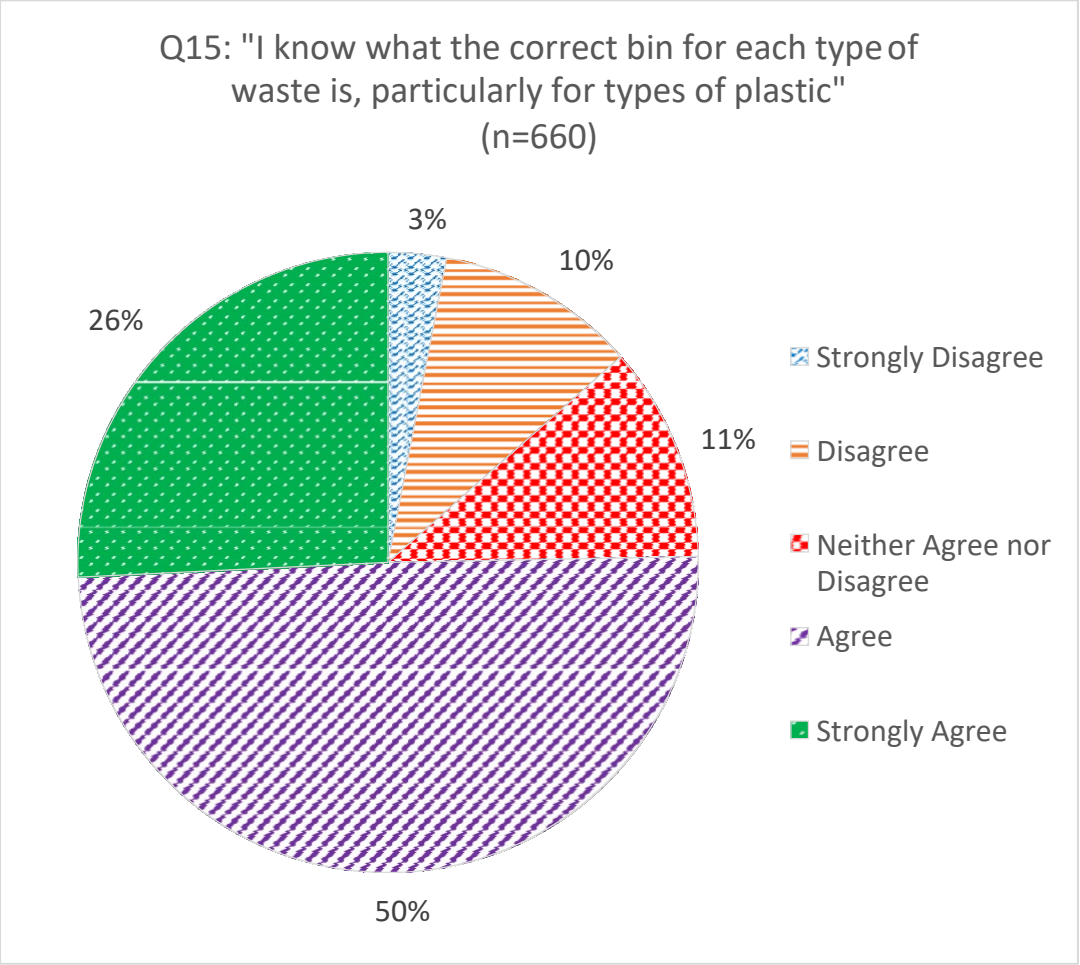


Figure 15: Results of Survey Q15

This suggests that despite widespread general awareness of the issues surrounding plastics, the detailed knowledge of how to dispose of plastics correctly was lacking in a sizable portion of those surveyed in Q15 (13% disagreed, further 12% neither agreed nor disagreed). While these results are not generalisable, they highlight issues with relying on individuals to correctly separate waste, especially plastics. It also suggests that there is scope for a focused education and/or social marketing campaign on

campus to improve practical knowledge of waste separation amongst the UCC community as discussed in section 5.4.

4.2.1.3. Personal Beliefs

Q14 and Q18 assessed whether respondents felt a personal responsibility to act sustainably. In both Q14 and Q18 most respondents reported pro-environmental stances towards personal behaviour. For instance, 94% of respondents either agreed or strongly agreed with the statement '*I believe that living more sustainably is my responsibility'* (fig. 16: Q18).

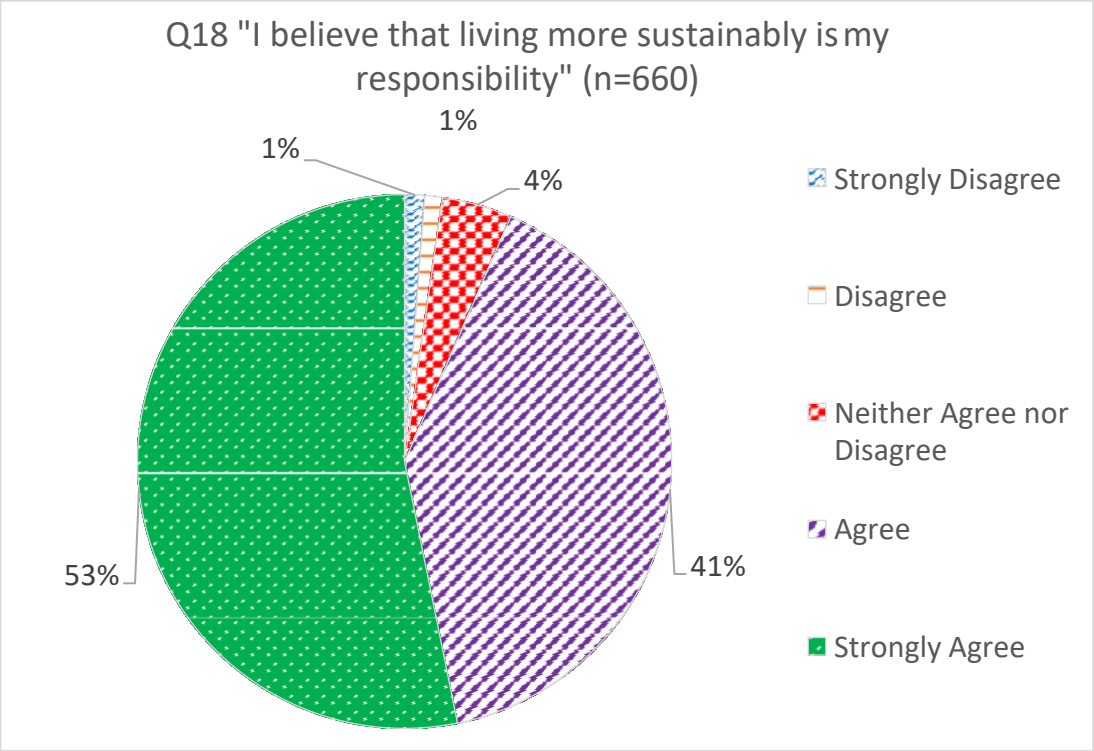


Figure 16: Results of Survey Q18

Similarly, 93% respondents suggested that reduction was more important than recycling (fig. 17: Q14).

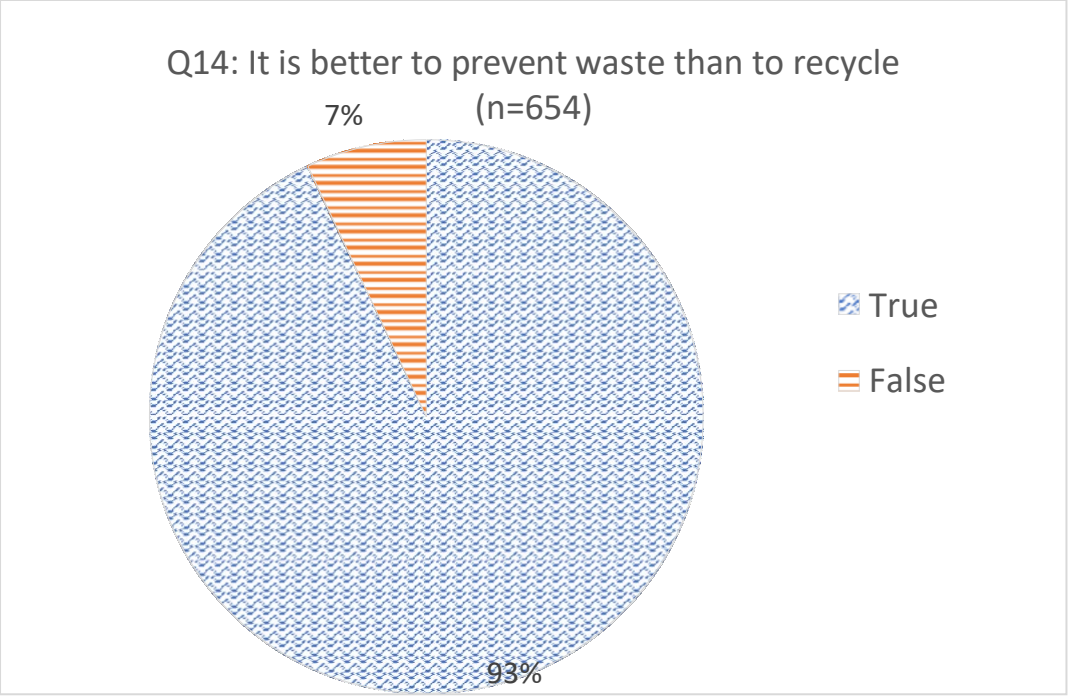


Figure 17: Results of Survey Q14

The trend seen in general environmental concern and urgency was consistent with the respondents' reported beliefs regarding personal responsibility. Given this sense of urgency and personal responsibility reported by respondents, similar trends in personal involvement in sustainable behaviour may be expected in the surveyed population (albeit with the caveat that this is a small self-selecting slice of the broader university population). Such behaviour is explored in the following section.

4.2.2. Self-Reported Behaviour:

Following the examination of environmental beliefs, people's self-reported behaviour regarding sustainability was investigated. The two main questions that examined people's self-reported actions regarding general behaviour were Q7 and Q16.

4.2.2.1. General Sustainable Behaviour

Q7 and Q16 suggest that recycling was the aspect of the waste cycle that was perceived as the most accessible to individuals. This suggests the systemic challenge of behaving sustainably within the context of a consumerist society such as how products are packaged and the accessibility of alternatives.

In Q7, 95% of respondents either 'often or 'always' considered sustainability when dealing with rubbish. This number drops to 44% when buying clothing, which is a waste generating activity (fig. 18).

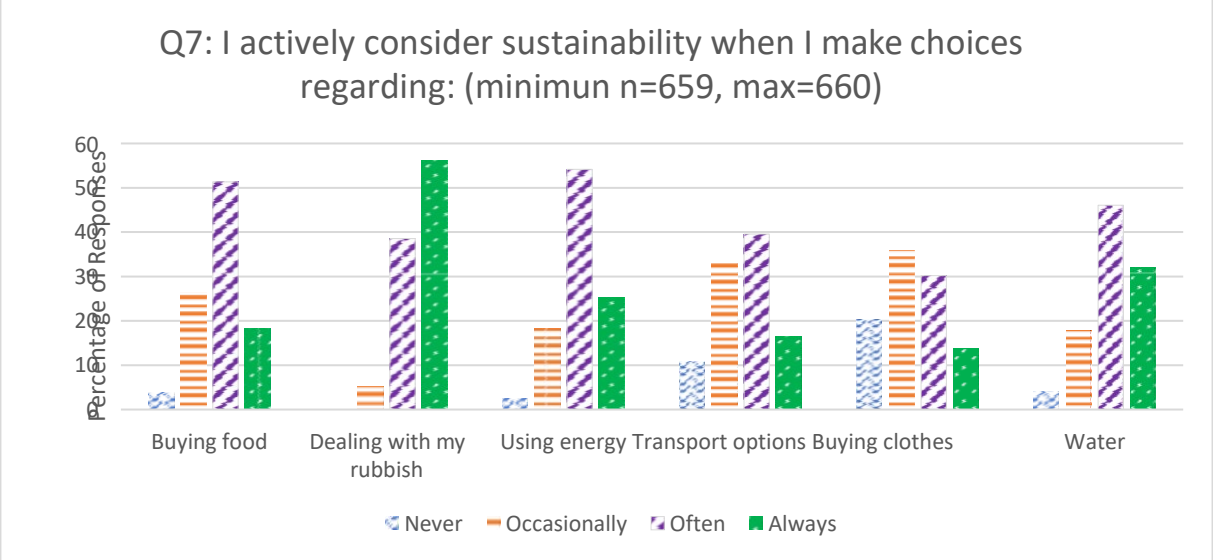


Figure 18: Results of Survey Q7 ('buying food' and 'water': n=660. All others: n=659 each).

This could be due to the availability of recycling facilities in UCC and nationally through bottle banks and segregated bins, resulting in widespread awareness of recycling and its association with sustainability. Recycling programmes in Ireland are widely available along with information about what goods can and cannot be recycled.

Further to this, recycling programmes have been incentivised over time through the introduction of heavier charges for general waste. This suggests that availability of

facilities, accurate information about how to use those facilities, incentives and enforcement of waste charges may have combined to normalise recycling behaviour and promote self-efficacy towards recycling. The results of this question suggest that participants tend to conflate 'waste' with quickly disposed of items destined for bottle banks, recycling bins, etc., As such, sustainability considerations aimed at recycling do not ameliorate other potential waste streams such as clothes and electrical goods that are not as readily recyclable or rapidly disposed of.

This result highlights a divergence between people's belief that waste avoidance is better than recycling (Q14) and their behaviour regarding such activities. Currently much of the emphasis and promotion related to the waste triangle is focused on recycling, with less attention given to reducing consumption. This may skew consideration of sustainability amongst consumers towards waste disposal rather than waste prevention. This is especially troubling given that only 9% of the world's plastic was estimated to have been recycled by 2015 (Geyer *et al.* 2017). To successfully create a new social norm where SUP is no longer ubiquitous, the narrative regarding waste must move from recycling to waste avoidance and circular thinking.

In Q16, 94% of individuals responded with 'always' or 'often' to the statement '*I use the correct bins when on campus e.g. recycling, compost, general waste'* (fig. 19).

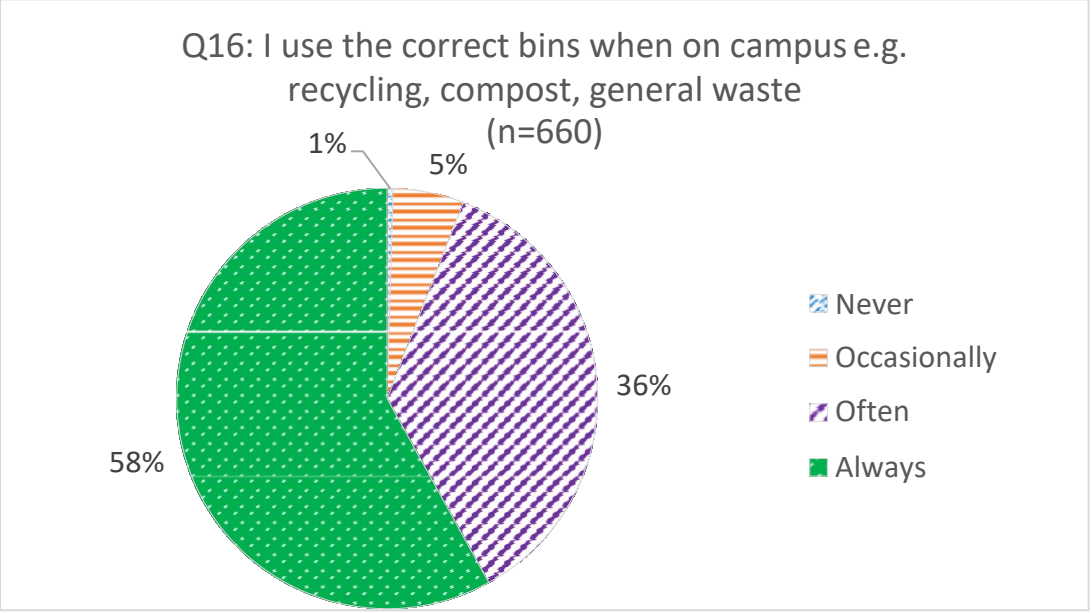


Figure 19: Results of Survey Q16

This result was consistent with Q7, suggesting reported behaviour towards waste did not vary much between general life and within UCC. However, Q15 suggested that up to 24% of respondents did not know the correct bin for their rubbish, highlighting a discrepancy between the reported knowledge in Q15 (fig. 15) and reported behaviour in Q16 (fig.19). This may be a result of social desirability bias.

In summary, the questions regarding self-reported sustainable behaviour suggested that many respondents did not appear to take a life-cycle approach to sustainability. Many respondents considered it most frequently for the end of a product's life (waste disposal) rather than for the start of it (buying clothes). This contrasted with the majority reporting that it was better to avoid waste than recycle (Q14). Over 90% of the respondents reported frequently using the correct bins (Q16) despite 24% of respondents not agreeing that they knew what the correct bins were. These responses

suggest that people's reported actions are not always consistent with their reported beliefs or awareness levels. Q7 and Q16 suggest that recycling is the most accessible aspect of the waste cycle to individuals.

4.2.2.2. SUP Related Behaviour

SUP play a huge role in 'grab and go' culture with SUP predominately used in packaging (UNEP 2018, p.2). This section explores SUP related behaviour.

Table 3 shows that greater than 35% of respondents reported using SUP goods 1-2 times weekly in all cases except plastic straws (9%). The low reported frequency of plastic straws (9%) may be due to the changing social norms or the general move towards alternatives such as compostable straws. Reusable straws use was reported by 28% of respondents. This shows that alternatives are not always widely adopted or successful. The adoption of alternatives is explored in the interview findings in section 4.3.5.4 (Alternatives). Alternatively, it may suggest that some respondents have focused on 'reduction' of straw use rather than substitution of plastic with alternatives, corresponding to voluntary simplification ideals (Shaw and Moraes 2009).

Table 3: Summarised Results of Survey Q12

Q12. How regularly would you use each of the following	Never	1-2 times per week	3-5 times per week	More than 5 times per week
Plastic straws	91%	9%	0%	0%
Plastic bottle	55%	36%	7%	2%
Non-reusable paper cup	57%	35%	6%	2%
Plastic food wrapping e.g. cling film	34%	44%	17%	5%
Plastic wrapped food	**13%**	**49%**	**29%**	**9%**
Reusable bottle	**6%**	**8%**	**14%**	**72%**
Reusable coffee/ tea mug	**9%**	**11%**	**16%**	**65%**
Reusable lunchboxes	11%	6%	19%	65%
Reusable straws	72%	13%	5%	10%
Water fountains	18%	15%	18%	49%

The highest cumulative frequency (at least 1-2 times/week) of plastic use was for plastic wrapped food (87%). This suggests there is both an opportunity and a responsibility for food retailers to provide alternatives to plastic wrapped food to

reduce food-related SUP waste. Providing alternatives to SUP is a structural change (policies, supply chain etc.) that could help reduce the use for plastic packaging.

Approximately 13% of respondents reported never using plastic wrapped food. This result was surprisingly high considering how widespread plastic packaging for food is. Respondents may have considered plastic wrapped food as items such as pre- packed sandwiches as opposed to raw meat, crisps, confectionaries, frozen food or sliced cheese etc. The inability to know how the respondents interpreted the questions is a drawback of surveys as acknowledged in section 6.4 (limitations of research).

SUP items may experience a resurgence due to the outbreak of COVID-19 and fears about hygiene. The initial refusal of reusable keep-cups at cafés is one example of hygiene fears influencing how SUP and its alternatives are used. Such situations have driven innovations such as 'contactless coffee' to facilitate reusables (ConciousCup Campaign 2020) along with defence of reusables safety by health experts (Greenpeace International 2020). The necessity for commercially viable, hygienic and convenient alternatives to SUP in the area of food is especially pressing given the impact that the COVID-19 pandemic may have on how food and packaging are perceived by the public going forward. 89% of respondents reported using a reusable lunchbox at least 1-2 times per week in this survey. If people were willing to bring their own food to work/ college prior to the pandemic, it may indicate that a mass return to reliance on SUP packed food is not entirely inevitable, especially with heightened concerns around hygiene and cross-contamination.

Tipping points in behaviour are frequently associated with times of change (Chapman *et al.* 1982; McDermott *et al.* 2004), including starting at a HEI. Given the broader

policy changes towards SUP (European Commission 2018; Department of Communications 2020), HEIs could leverage the transition period associated with a new academic term/year to remove SUP and establish new norms. For example, 75% of respondents reported a change in the volume of plastic used from the previous year (fig. 20).

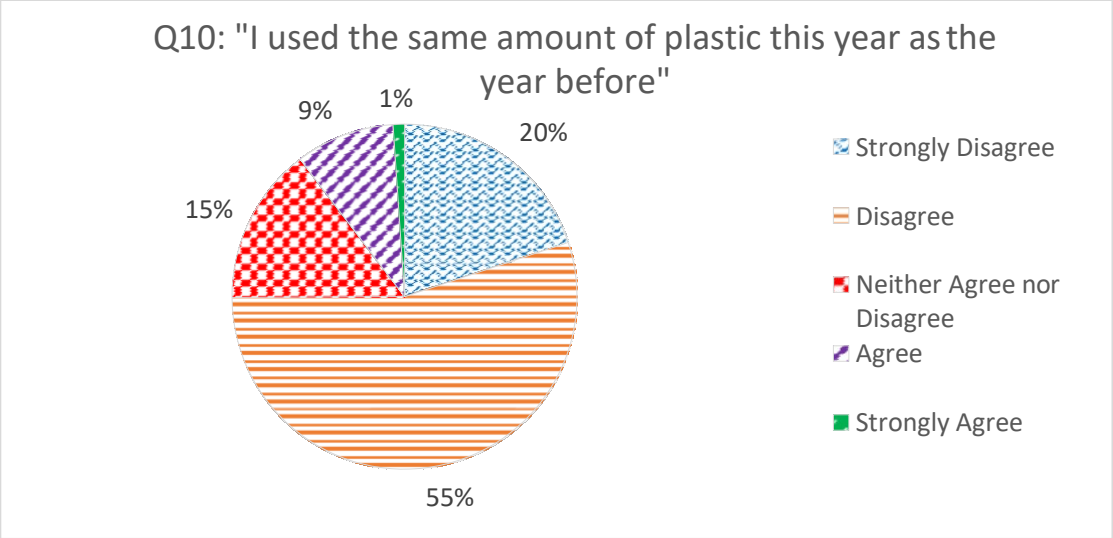
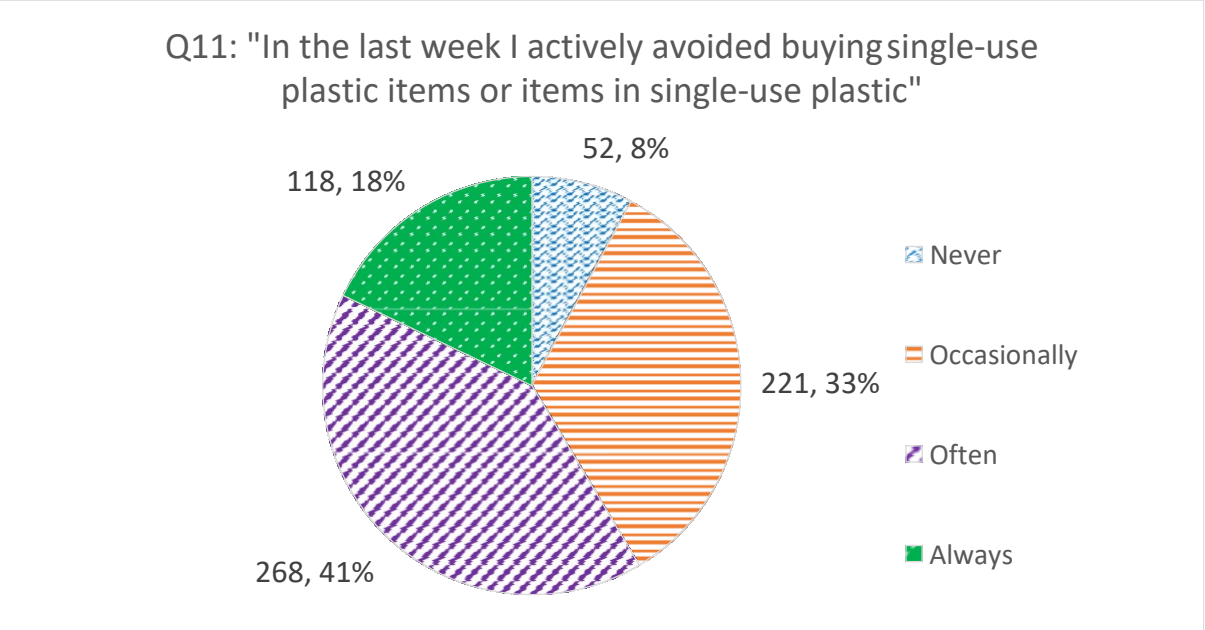


Figure 20: Results of Survey Q10

This change was likely a decline in plastic use given that 59% of respondents reported ‘always’ or ‘often’ avoiding in the previous week (fig. 21: Q11).

Figure 21: Survey results of Q11



A sizable portion (41%) of the population reported 'never' or only 'occasionally' avoiding SUPs. On an individual level, if widespread concern (Q3) and awareness of the issues surrounding plastic (Q9) are not enough to instigate behaviour change amongst respondents, other barriers may prevent sustainable behaviour. These results underscore the issues associated with relying on individuals to drive changes in entrenched social norms without also tackling the barriers to sustainability. The reported barriers to avoiding SUP are explored in the next section.

4.2.3. Barriers to purchasing non-SUP items

The barriers to purchasing non-SUP items were examined in Q13. The barriers found in this question were divided into:

- Market Barriers
- Structural and Infrastructural Barriers
- Informational Barriers
- Behavioural Barriers

In this question, market barriers such as the availability, cost and poor choice of alternatives to SUP were chosen by at least 40% of respondents (fig. 22). These barriers were listed as options in the survey. An 'other' option with a text box was also provided to allow respondents to qualitatively address barriers that were not listed in the question. These responses included structural and infrastructural barriers (the governance, supply chains and facilities), informational barriers (a lack of knowledge) and behavioural barriers (personal preference and convenience).

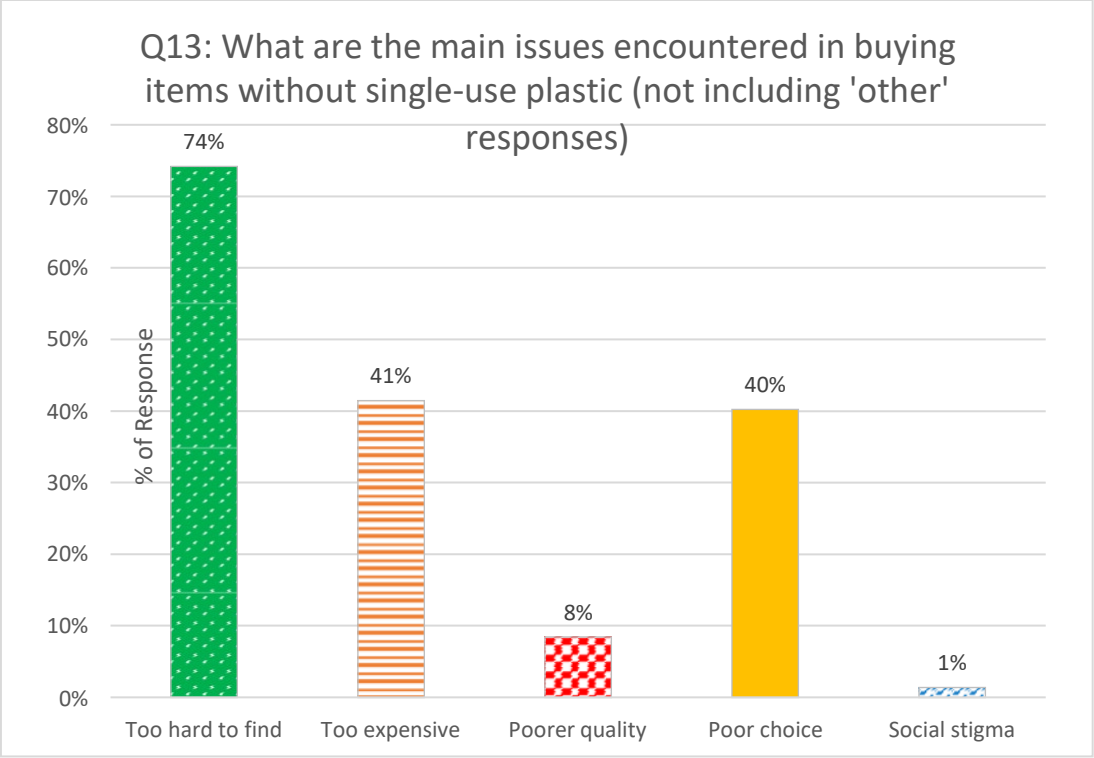


Figure 22: Results of survey Q13, with responses to the 'other' option excluded.

4.2.3.1. Market Barriers:

Market barriers restricted individuals' access to goods and services. For instance, food packaging in supermarkets is controlled by the suppliers and to an extent by packaging regulatory requirements. In Q13, food shopping was frequently reported as a large source of plastics for individuals. The responses to this question suggest that a lack of economically viable, attractive alternatives to SUP was a barrier to sustainable consumption. In Q7, 70% of respondents reported 'often' or 'always' considering sustainability when purchasing food. However, Q13 highlighted the barriers consumers face in acting on those considerations.

For instance, the widespread use of SUP for food was a reoccurring theme amongst the qualitative responses to Q13:

"…There are rarely any sustainable alternative options available, especially in supermarkets or small shops"- Survey Reference 152

Such comments suggested that despite most respondents reporting environmentally conscious beliefs, issues in the food supply system continue to restrict individual's perceived ability to act sustainably. Most large retailers do provide some 'loose' fruit and vegetable options. However, they generally are not as prominently placed or abundant as SUP packaged alternatives. Given that people often rely on habit to carry out frequent tasks without active thought (Lehner *et al.* 2016), people may be unlikely to seek out SUP-free alternatives if they are harder to find. This issues also occurs amongst interviewees (section 4.3.5.4, Alternatives).

Some survey respondents acknowledged the availability of loose food. However, they also highlighted perceived trade-offs between good's ethical credentials and packaging:

"While it is possible to find some items that are not wrapped in plastic, it is not always possible, especially if you end up doing the bulk of your food shopping, for example, in a supermarket where organic produce, for example, is wrapped in plastic."- Survey Reference 380

Consumers may be forced to choose between ethically important options which conflict with each other, such as choosing between buying plastic-free vegetable with high food miles or plastic wrapped, local or organic food. The consumer can become overwhelmed by the complexity of making the correct ethical choice (Annunziata *et al.* 2011) and thus deterred from making the effort to act sustainably (Carrigan 2017). However, at the root of this problem is supply issue regarding how goods are sold and

packaged. Such structural issues can inhibit even informed and engaged respondents from making pro-environmental choices, i.e. making them choose ethical trade-offs. This points to a need for changes in policy and supply chains structures to make sustainable options more prominent and affordable for consumers which will be discussed further in section 5 (Discussion).

The facilities available to consumers also influenced how consumers navigated sustainability trade-offs. This includes the infrastructure and types of shops in their area. For instance, one respondent highlighted the dilemma faced in choosing between online shopping and driving to shops which could supply goods without plastic:

"*I live out in the country and I try to minimise car use by working from home and shopping online. Only Tesco will deliver to my address, but the products available for home delivery are often plastic-wrapped. To go to shops selling loose vegetables, bread in paper bags, etc., I would have to drive at least 15km each way, with associated costs and carbon footprint. It's difficult to know which would be more sustainable!" – Survey Reference 430*

Again, such respondents seem to be aware of the presence of trade-offs in their choices. However, the trade-offs involved in shopping sustainably do not seem to be fully understood or practiced with any great level of confidence. This quote suggests there may be a mix of market and informational issues that prevent pro-environmental behaviour. The market barriers present include a lack of local markets/shops to supply SUP-free goods and a lack of plastic-free goods in retailers online and physical shops. The information gaps amongst consumers about practice-based sustainable behaviour are explored further in the next section.

Another trade-off mentioned by respondents was the trade-off between convenience and sustainability. Buying alternatives to SUP was *"Inconvenient"* (Survey Reference 639) for some, especially when *'on the go'* (Survey Reference 257). Similarly, the convenience of SUP was attractive for some respondents as it removed the need for people to plan ahead, such as making lunches and carrying reusables:

"Have not got in the mindset and always rushing doing the shopping" - Survey Reference 421

Such comments illustrate the role SUP plays in our current convenience culture. The need for consumers to adopt a 'mindset' in order to shop sustainably suggests that the default options available to them are not sustainable. This places the onus on the consumer to actively seek out sustainable items which the survey responses suggest are too hard to find. This highlights an issue with relying on consumers to actively adopt sustainable consumption habits that contrast to the SUP-dominated context they find themselves in.

Supplier Responsibility

How businesses approach sustainability can influence consumer behaviour. For instance, one respondent to Q13 mention the lack of bulk stores or refillable alternatives to plastic packed goods as a barrier:

"Supermarkets and food producers not offering choice to bring your own container(s) and fill."- Survey Reference 491

This suggests some consumers perceive businesses as failing to accommodate sustainable consumption. For instance, many consumers pointed to the abundance of

SUP-wrapped food as a barrier. This is especially relevant given that many consumers rely on such stores as it's *"[n]ot always practical or possible to shop in other settings"* (Survey Reference 581).

One such respondent said too much emphasis is currently placed on consumers to act sustainable despite the barriers they face, rather than on prioritising sustainability in the supply chain:

"*…it is very difficult to avoid plastic as many big companies has not changed. too much onus is placed on the consumer (sic)"* -Survey Response 487

This sentiment was echoed by some interviewees who suggested companies and suppliers must also take responsibility for improving sustainability as too much pressure was put on individuals to behave sustainably within a system that promotes and incentivises consumption. For instance, one respondent cited that *"...shops on campus still sell plastic bottles"* as a barrier to purchasing alternatives to SUP (Survey Reference 259).

Such comments highlight the contradictory messages consumers are receiving of being encouraged to act sustainably, while seeing a lack of sustainable options on sale and perceived unwillingness to change from some businesses.

4.2.3.2. Informational Barriers

A lack of clear, practical knowledge of how to apply sustainability to daily life emerged as a barrier on several questions, especially Q13, Q15 and Q17.

As mentioned above, consumers appeared to be making trade-offs under an air of confusion in Q13. This suggests that the environmental impacts of different trade-offs are poorly understood and a source of confusion for people. A lack of clear guidance or knowledge about which trade-offs are more sustainable seems to hinder individuals from making choices regarding sustainability. Such informational issues are expanded further in section 5.5 (discussion: RQ2)

Q15 and Q17 assessed participants' knowledge of certain sustainability related tasks, focusing on waste disposal and recyclability. As mentioned in section 4.2.1.1. (General Environment Awareness), 24% of respondents to Q15 did not agree with the statement "*I know what the correct bin for each type of waste is, particularly for types of plastic.*" Similarly, Q17 showed over 30% of respondents believed non-recyclable drink cups (paper and compostable) could be widely recycled (fig. 23). This suggests that while general environmental knowledge was widespread (Q3, Q4, Q6), practical day-to-day knowledge about sustainable behaviour was lacking. This finding highlights the futility of trying to base behaviour change on general environmental awareness and concern. This practices-based knowledge gap could pose problems when implementing alternatives to SUP as these results suggest confusion about waste segregation, especially towards compostable cups. This was a considerable result given the focus on recycling nationally and within UCC.

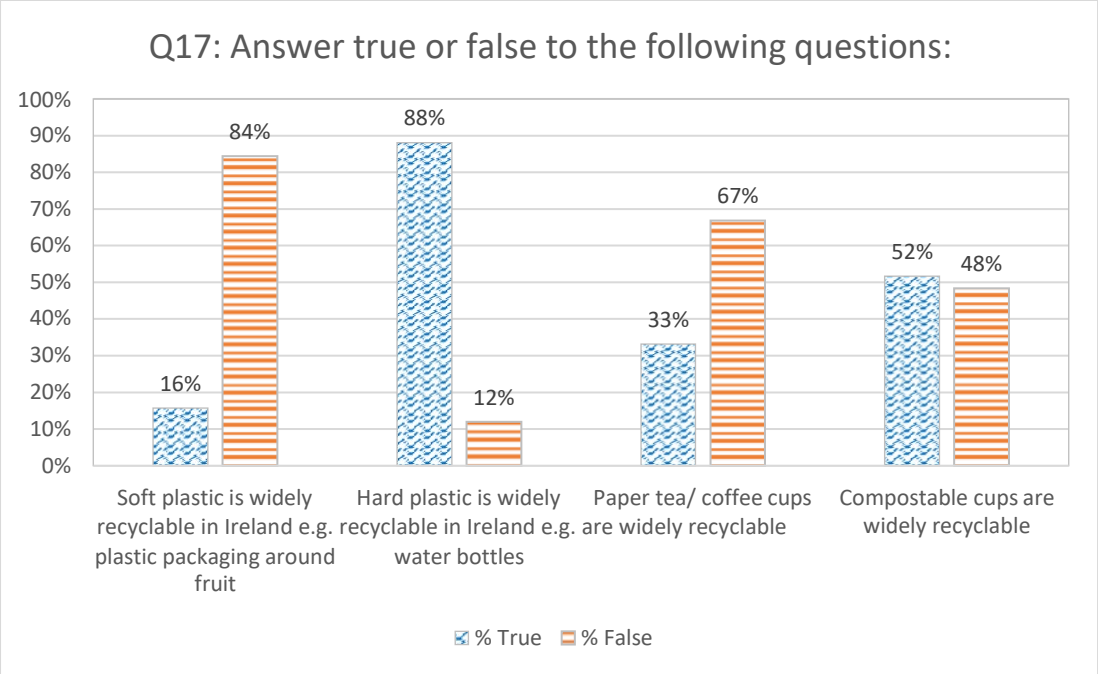


Figure 23: Results of survey Q17

Over 30% of respondents considered conventional paper and compostable cups as widely recyclable. This suggests a sizable portion (>30%) of respondents were unaware/ confused about the difference between compostable and recyclable. As new alternatives to conventional single-use plastic lined paper are introduced, there is a need to inform people of the appropriate waste stream for both novel and existing products. This confusion is also seen amongst the qualitative responses to Q13 regarding barriers to avoiding SUP:

"People are not informed enough on what is and what isn't single use plastic"-

Survey Reference 28

Given the confusion surrounding what is recyclable, compostable and SUP, there is scope for such information to be interwoven into the fabric of the university, including into course content and staff training to ensure both staff and students have access to

clear accurate information which includes practical guidance on sustainable behaviour.

4.2.3.3. Behavioural Barriers

A smaller portion of respondents were deterred from pro-environmental behaviour due to habits or preferences such as disliking the taste of reusables/ tap water. In such cases, there is a need to challenge the narrative that drinks taste better out of SUP containers. Tools like marketing may help normalise the use of reusables and tap water given its success in promoting and normalising the use of bottled water (Holt 2012; Brei and Tadajewski 2015).

As seen in section 4.2.3.1. (Market Barriers), consumers can be deterred for sustainable options if they are too difficult to find:

"We are lazy, often can't be bothered to find alternatives because it's a hassle"-
Survey Reference 345

Such comments speak to a convenience culture that has yet to fully facilitate reusables, meaning consumers feel that sustainability requires effort rather than being the norm. This comment also speaks to the inertia inherent to habits, making large-scale voluntary shifts in behaviour unlikely (Gifford 2011).

In summary, the survey findings suggest there are market, informational and behavioural barriers to sustainability in amongst those surveyed. Individuals have a responsibility to behave sustainably and inform themselves of conventions surrounding actions like recycling. However, while consumers have the freedom to choose what businesses they support, they are often constrained by time pressure, costs and the accessibility of alternatives to SUP and confused by how to navigate choice

trade-offs. For meaningful change to occur, systematic changes are needed to facilitate and incentivise pro-environmental behaviour along all parts of supply chains, not just amongst consumers.

4.2.4. Influence of UCC

This survey was distributed to staff and students within UCC. One aspect of the survey looked at the impact that UCC had on the respondents' awareness of sustainability both within the university and in general. This theme was explored in Q5, Q8 and Q19.

Interestingly, despite UCC's Connected Curriculum and status as a Green Campus, only 37% of respondents said their concern for the environment had grown due to events, activities or courses on campus (Q8) (fig. 24).

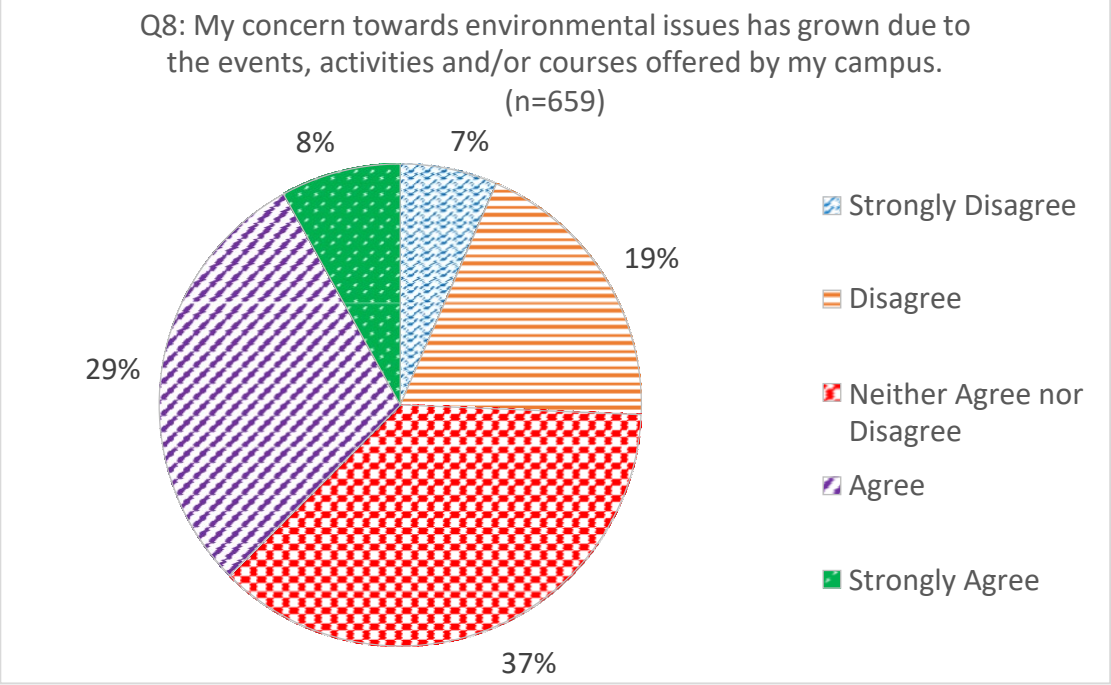


Figure 24: Results of survey Q8

Given the high level of concern reported in Q3 and Q4, the results of Q8 highlights a possible disconnect between the sustainability initiatives carried out in the college and

the engagement of staff and students. This is a potential barrier that must be addressed to facilitate the transition to a SUP-free university. This is further discussed in chapter 5.

In Q19, 43% of respondents reported UCC as a source of environmental information. When this result is considered in tandem with the results of Q8, it suggests that while UCC is an information source for *ca.* 40% of respondents, most respondents did not feel that UCC was not influencing their concern for the environment (Q8). As an information source, UCC has the potential to leverage change though education and clear guidance about how to behave sustainably. Presently, there is potential for UCC to reach more of its staff and students and remove some of the barriers both systemic (e.g. lack of available, affordable alternatives, supply chain changes through policy instruments e.g. tenders/incentives) and individual (lack of practical knowledge of sustainable behaviour).

The need for transparent and robust action on sustainability was addressed by one qualitative response to Q19 of the survey:

"UCC is overly obsessed with single-use plastics as an issue, and needs to move on from that to other issues e.g. insisting that all meat that's consumed on campus comes from free-range animals (compassionate farming etc) […] all coffee on campus should be fair trade etc. I do feel that UCC's commitment to 'Green' is not as robust as it might be. UCC should use its purchasing power to insist on its supply chain being more transparent than it is e.g. that no goods are bought from places where there may have been slave labour. […]"-Survey Response 528 to Q19.

The need for transparency in communication and actions was shared by some interviews in section 4.3.3.4. Transparency is important to avoid a perception of 'greenwashing.' The above quote suggests frustration towards progress being made in UCC and highlights the need for a multifaceted approach to sustainability. Marketing may play a role in communicating the aim of UCC's Green Campus to continuously and transparently improve campus sustainability. The influence of media and marketing will be further explored in the interview findings section.

The disconnect between environmental awareness in general level and on campus is also seen in Q5: '*How aware are you of the following sustainability initiatives at UCC?'* (fig. 25).

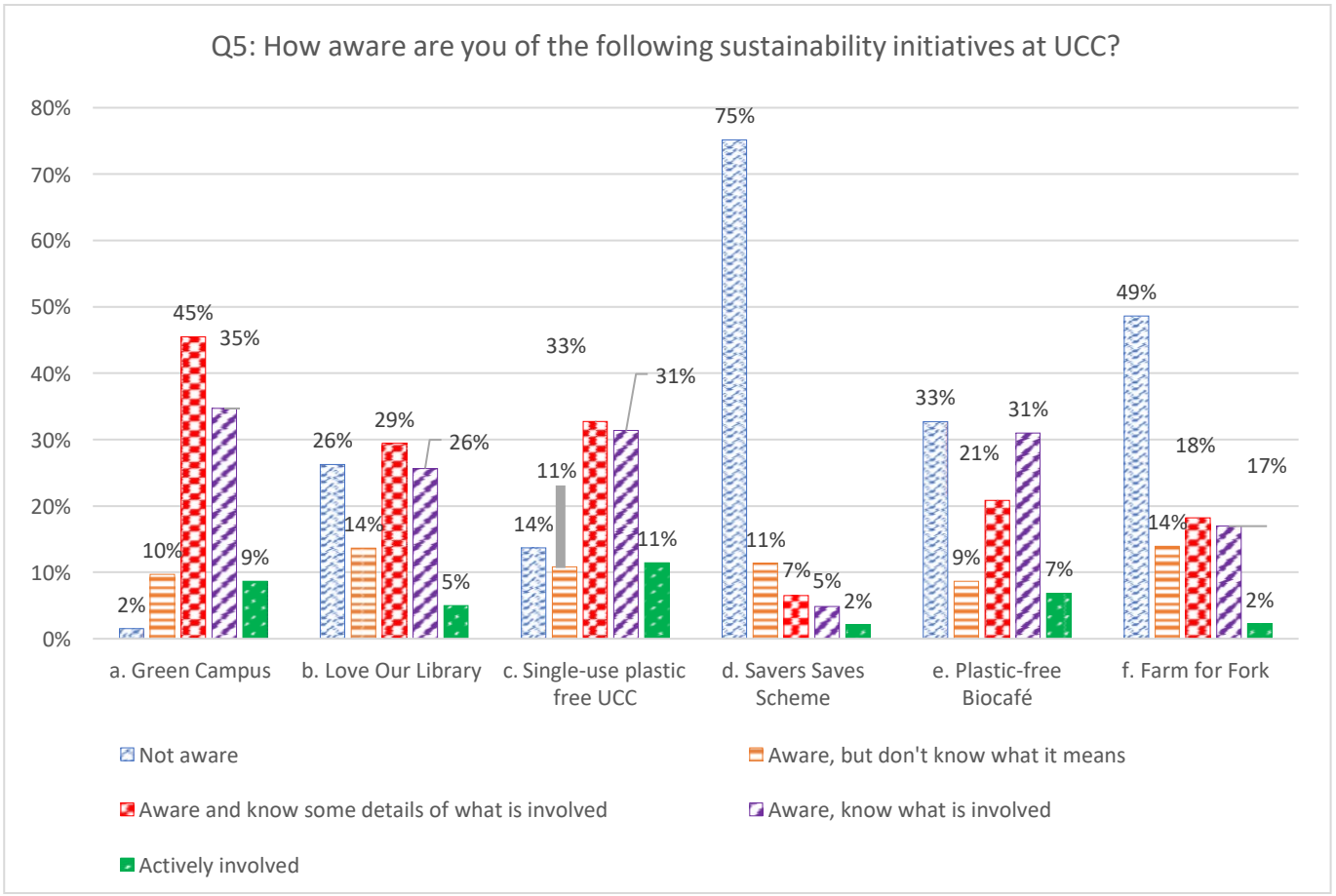


Figure 25: Results of survey Q5.

Surprisingly high numbers of respondents were unaware of the Love Our Library campaign (26%) and the Biocafé (33%) which are two successful sustainability initiatives in UCC. Such findings suggest the UCC cannot assume that information about its sustainability initiatives is widespread amongst its community. Both initiatives are linked to specific buildings which may limit awareness of them. Back-of-house initiatives such as the Farm to Fork initiative and Saver Saves were also unknown to high proportions of the respondents at 49% and 75% respectively. The Green Campus and Single-Use Plastic Free UCC initiatives has the highest levels of awareness and higher levels of understanding of what the projects entailed. One potential reason is that these projects included community engagement[2]. This suggests that community involvement is an important for increasing informed awareness of sustainability initiatives. The influence of involvement on increased awareness was echoed by interviewees in section 4.3.2.1. (Personal Awareness).

[2] Green Campus is student-led and chaired by the UCC Student Union Deputy President and the Environmental Society chairperson. The Plastic-Free UCC campaign stemmed from a Student Union petition ('Ditch the Disposables') which gathered over 8,700 signatures (UCC Green Campus 2019b).

4.3. Interview Findings

The interview findings were divided into five sections:

- Values/attitudes/beliefs
- Knowledge
- Leadership
- Infrastructure
- Policy

4.3.1. Values, Beliefs, Attitudes

For the purpose of this study, the values, beliefs and attitudes will be aligned to their description in Darnton & Evans (2013b). In Darnton & Evans (2013), values are abstract "guiding principles", beliefs are how people frame experience based on values, and attitudes are what people believe or feel about other people or things. The model of reasoned action and theory of planned behaviour suggest beliefs and attitudes inform intentions which in turn inform behaviours (Ajzen *et al.* 1980; Ajzen 2002). However, literature on the attitude-behaviour gap suggest that attitude is not a consistent indicator of behaviour (Mühlthaler and Rademacher 2017). Evidence of the attitude-behaviour gap is presented in section 4.3.1.1.

Some interviewees viewed their intrinsic environmental values as a driving force behind their involvement in sustainability initiatives. For instance:

"*I was adamant we were going to [ban disposable cups and restructure the bin system], that you know it was the right thing to do."* – Library Green Team Member 1 (LGTM 1).

This quote suggests that the underlying beliefs of initiative leaders can play an

important role in driving major changes, such as changing policies and infrastructure. The library interviewees were focused on doing the 'right thing' for sustainability. This concept was the lens through which they viewed their actions and gave them a strength of purpose to enact projects to improve the overall sustainability of the library regardless of popularity:

"…if we wanted to do something in the morning and it wasn't going to be very popular, we'd still do it if it was the right thing to do…" – LGTM 1.

Such environmental beliefs were grounded in pro-environmental values. For instance, both LGT interviewees identified themselves as environmentally conscious as did the procurement employee (PE). The UCC Student (UCC-St) interviewed suggested that intrinsic values and moral obligations should also play a role in motivating change in how the university engages with sustainability.

"But I would hope that the primary drive would be […] this is our duty as an institution and as like, a community to make positive changes and encourage people to make those changes in their lives as well." – UCC-St

The literature regarding the impact of values, beliefs and attitudes on personal behaviour is lengthy (Stern 2000; Kollmuss and Agyeman 2002; Steg *et al.* 2005; Hassan *et al.* 2016). However, having pro-environmental beliefs does not always translated into pro-environmental consumption (Carrigan 2017) as the following section suggests. As such, while pro-environmental values may have motivated some interviewees, such values are unlikely to be shared uniformly across the university population.

4.3.1.1. Attitude-Behaviour Gap

The disconnect between professed attitudes and actual behaviours was commonly cited across all interviews:

"Some people kind of like, just don't care and then some people […] care but they don't take action."– UCC-St

Even amongst self-identified environmentally conscious interviewees, there remained a gap between professed values and behaviour:

"We're all guilty of that. You know, you say 'I sure, I'll go and protest now,' but when it comes to it, its pouring rain and I don't go out and protest. I stay in the library…" – LGTM 2.

These comments suggest that raising awareness or promoting pro-environmental values is not enough to sustain behaviour changes as other barriers persist both at an individual and structural level. For instance, SUR spoke about the challenge of maintaining interest and commitment amongst the general UCC populations for initiatives that require top-down structural changes:

"…obviously there was a lot of momentum last year when the [Ditch the Disposables] petition was set up. […], but once the petition's signed, it's very […] hard to get students to remain I suppose interested in what's going on, because the university have agreed to it so like, what else can I do?" – SUR

This example illustrates a challenge facing those involved in sustainability initiatives in retaining community engagement in initiatives where they have a perceived lack of self-efficacy and/or a need for top-down action. However, community buy-in to such projects remains important for ensuring plans are followed through on and that

alternatives to SUP are accepted and adopted. For instance, a lack of sustainable consumption by campus users can deter stakeholders from committing wholeheartedly to SUP removal, as is examined in section 4.3.5.6. (Availability of Alternatives).

The attitude-behaviour gap literature shows that consumers actions are not always consistent with their values (Lorenzoni *et al.* 2007; Hassan *et al.* 2016). Thus, while improving environmental awareness is an important element of engaging in sustainable behaviour, it cannot be the only intervention used. Similarly, individual engagement may be dampened by a perceived lack of self-efficacy towards larger structural issues. As such, there is need to sustain a sense of community engagement in advancing structural and infrastructural changes. This will be discussed in greater detail in the discussion chapter.

4.3.2. Knowledge

This section presents evidence of the knowledge base/knowledge gaps discussed by interviewees. Knowledge was subdivided into two sub-themes: awareness and education.

4.3.2.1. Awareness

The awareness theme covered direct and indirect allusions to awareness and how it influenced reported behaviour. Awareness was divided into personal awareness and how interviewees perceived awareness levels across the UCC population (fig. 26). Interviewees frequently cited a lack of awareness of the SUP issue and alternatives amongst the UCC population as a major barrier to SUP removal from UCC.

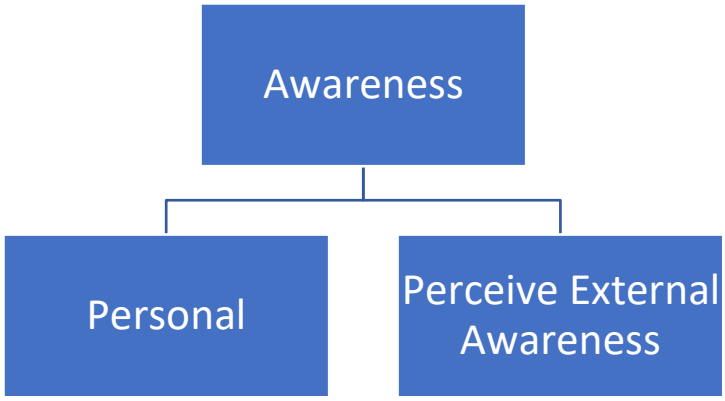


Figure 26: Subdivisions of the Awareness sub-theme

Personal Awareness

Awareness was cited as playing a role in motivating behaviour change amongst those interviewed. For instance, the UCC-St attributed some of their pro-environmental behaviour to environmental awareness:

"...I'd be [...] very aware of [...] single-use plastics in general and single-use items. That I wouldn't really buy a lot of them now. But I think it's just [...] now that I'm more aware of it, I buy less. But it took a while to get to that point, I think."

The UCC-St suggested improved awareness of the SUP-related issues was a precursor to behaviour change. However, as they alluded to above, behaviour change based on personal awareness was a slow process that required concerted effort from the individual. Furthermore, studies of information-based behaviour change campaigns have shown that providing information alone is frequently not enough to motivate consistent behaviour change (Howarth and Butler 2004; McKenzie-Mohr 2011, pp.88–89) suggesting UCC needs to look beyond awareness campaigns and towards embedding behaviour change within systemic changes.

Involvement in sustainability projects increased sustainability awareness and triggered

behavioural change for some interviewees. CE explained how sourcing plastic-free goods for the Biocafé made them realise the proliferation of plastic and prompted to change their habits around SUP:

"I mean it's scary the amount of plastic. That's one of the things. I actually didn't even think there was as much plastic as there was. It's made me more aware even when I go shopping…"

Here involvement in the Biocafé led to increased awareness rather than the other way around. This sentiment was echoed by LGTM 2, who reported becoming more environmentally friendly due to their involvement with the library's sustainability initiatives. These examples suggest that the link between awareness and behaviour is iterative rather than linear as the theory of planned behaviour implies. This finding echoes the reverse-causal relationship found between attitudes/social norms and behavioural intention (Sussman and Gifford 2019).

However, if involvement in sustainability initiatives is a precursor to increased environmental awareness and behaviour change, then such changes are restricted to those involved in such initiatives and is unlikely to incite the scale of behaviour changes needed to eliminate SUP. This presents a challenge and opportunity to UCC to reach out and engage more of its community in sustainability initiatives, such as the staff-based savers saves scheme, green campus initiatives or club/society green projects. Other forms of student and staff engagement are discussed in section 4.3.2.2. (Education).

To summarise, increased awareness was associated with pro-environmental behaviour however, whether it was a precursor or result of such behaviour was difficult to determine. Regardless, awareness of sustainability appeared to positively influence

some interviewees. However, the experience of these interviewees cannot be generalised for the whole UCC population as interviewees were involved in sustainability due to their roles in associated initiatives. Nonetheless, it appears that engagement in active learning about sustainability via work/college roles can impact personal behaviour (Young *et al.* 2013). This implies that triggering behaviour change towards SUP in UCC could potentially influence behaviour outside the university (O'Neill and Buckley 2019). The following section explores interviewees' perception of awareness levels at UCC.

Perceived External Awareness

The interviewees varied in how aware they believed the UCC population were. Of those that brought up awareness levels, the opinion of all bar one was that awareness was low. The student facilities centre employee (SFCE) suggested that environmental awareness is not as widespread as might be expected given UCC's status as a Green Flag campus:

"...I guarantee you now that if you would have walked out that door and said-

. Picked 10 students out there and said, 'Tell me about the university's sustainability thing.' I mean, we'd be shocked at the answer. Because this is what [the SFC] do. Every one of [the] managers…takes a group once every 2 weeks, random…Green comes on the agenda whenever. […] And we use that information to, […] develop our business […] but you'd be surprised some of the answers. And the general education out there is limited enough on the green thing…." – SFCE

SFCE backs up his assertion with evidence from previous focus groups done with students. Such comments echo the survey findings about a lack of specific

environmental knowledge amongst respondents. While survey respondents reported high environmental awareness, the interviewees' comments suggest that does not always reflect their lived experience dealing with sustainability in UCC. Some interviewees also highlighted the scope for practical (e.g. waste separation) or UCC-specific (e.g. green campus) sustainability education.

LGTM 1 commented on the lack of sustainable behaviour in the library prior to the introduction of a new bin system and associated social marketing campaign:

"…the students never, they just put everything into any bin. They never looked at the colour of the bag. So, there was really no recycling bin at all." – LGTM 1 (prior to new bin system in the library)

LGTM 1's comment that the colour of the bin bag should influence behaviour suggests that recycling information is or should be common knowledge. Thus, students either didn't notice the bag colour, were unaware what the colours meant, or they were aware and did not act on this knowledge. If students were aware and did not action accordingly, this may suggest an attitude-behaviour gap, which will be discussed further in section 4.3.1.1. (Attitude-Behaviour Gap). Evidence of the conflict between improving awareness and changing behaviour was seen in the WME's comment:

"… I go into businesses [to provide training] all the time […] And you can pick the [people] that just couldn't be arsed and that's the truth of it. […] They just don't care, you know. And to be fair, some of them are like that because they had tried for a period of time. Ironically, you know, a lot of the people that you look at and […] they're just so annoyed, or so fed-up with it all, […] They don't even want to listen […]. They've said '[…] this is great what you're

saying [about waste management] but I done it before, you know.' And it's goes back to the auld 'But I go and do the right thing and […] you've somebody that just comes along and just ruins everything that I've done. Throws this full cup of coffee in on top of the recycling bin or whatever, you know.' And you're always going to have those people, unfortunately."– WME

These quotes again suggest that the relationship between awareness and behaviour change is neither linear nor straightforward. While the WME believed that awareness was central to improving sustainability, they also acknowledged that other barriers deter or prevent those with awareness from acting. The other person in the anecdote seemed disenfranchised and frustrated with the lack of collective responsibility. In this case, it appears that environmental actions were undermined and actively deterred by previous experiences trying to act environmentally. Such negative experiences then acted as a barrier to further environmental engagement for the person in the anecdote. Given the role modelling plays in behaviour adoption (McKenzie-Mohr 2011, pp.104–105) and the social cognition theory (Bandura 2000), it could be such individuals are deterred from sustainable behaviour due to the persistent modelling of unsustainable behaviour around them. This is a further example of the issues surrounding relying on awareness as a tool for behaviour change. Behaviour change prompted by increased awareness can be undermined if the prevailing social norms inhibit such behaviour, or the individual feels unfairly put-upon. Bearing these challenges in mind, the following section looks at interviewee's suggestions for how to motivate behaviour change and increase practical knowledge through education.

4.3.2.2. Education

Education focused on interaction between sustainability educators and those whose behaviour they were trying to change, predominately through training and student curricula. Interviewees focused on educating students and staff about the everyday ways to improve sustainability while also connecting them to UCC's sustainability actions/initiatives. Comments regarding education were broadly divided into those focused on 'practice-based' training about everyday behaviour, such as composting or a more general knowledge/understanding of sustainability. SFCE and SUR both suggested that embedding sustainability into all courses was a powerful tool for raising awareness and helping people to understand how their actions influence the environment. SUR highlighted education's potential to influence personal awareness of sustainability in their own life:

"I think a lot of the things I've learned were because I did quite specific modules in Geography that were based around […] the environment in general. Like sustainability. There was one on food geography and waste. And that just got me think about like my own waste and what I produce as just myself as a person. So I feel like if something like that was incorporated into like every single degree, like, there would be much more like thinking going on behind it instead of like deniers and 'oh sure it's just one this, or it's just one that. It doesn't really matter."- SUR

She demonstrates an understanding of the link between personal sustainability and waste in this quote. Here, sustainability education was linked directly to personal awareness and responsibility towards the environment. This form of campus engagement could be used to bridge the practical knowledge gap suggested by both the interviews and surveys. By grounding sustainability education in practice-based

actions, educators and sustainability initiatives could connect such actions to personal behaviour and UCC initiatives.

Community engagement took place at a smaller scale in the library through collaboration between the LGT and Buildings and Estates department through the Saver Saves scheme:

"… [The Energy Manager] was great for giving us feedback and explaining. He came into the library then and he did talks with the library staff about showing us how all the different systems worked…" – LGTM 1

In this case, sustainability education was used to engage with the library staff. In doing so, the library staff improved their understanding of how to improve library sustainability through infrastructural changes. WME also spoke about the importance of understanding how systems work in behaving sustainably:

"*…if you had a compostable cup and a biodegradable cup, would you know the difference between that? You may well do, most people would not, I would suggest, okay…"* – WME

This point echoed the results of the survey, which showed that more than 30% of respondents believed conventional paper and compostable cups are widely recyclable. This highlights the persistent confusion that surrounds alternatives to SUP and the need for practical education about these topics.

Media

The role that media and publicity played for those interviewed was complex and varied. While some viewed the cultivation of a green image as a main driver of

sustainability in UCC, others viewed media and the publicity it creates as levers to promote sustainability or as a by-product of sustainability achievements.

Media and advertising were frequently mentioned in interviews as key parts of previous successful sustainability campaigns:

"So, we trialled putting the signs outside the door saying no smoking in this area because the smoke was coming into the building and affecting the students studying. And actually, they were very compliant." – LGTM 1

This suggests that communicating what projects are about was a noteworthy element of previous successful campaigns. This was particularly relevant given that the LGT signage was referenced by both those directly involved in that project (LGTM 1) and those that were not (WME).

In these situations, the interviewees focused on the use of advertising and social media to inform the public of the changes taking place and to normalise the new behaviour being promoted. LGTM1, SFCE and CE all spoke about promoting reusable cups as an alternative to single-use cups. However, marketing campaigns aimed at behaviour change generally also had enforcement (e.g. library cup ban) or incentives (e.g. reusable discounts) associated with them. As such, the messaging provided by the media and marketing efforts was re-enforced by on-the-ground actions. Such examples highlight the need for such campaigns to have actions tied to them to ensure increased awareness is translated into behaviour.

UCC-St and SUR considered media as a method of engaging with and educating students about sustainability.

"...I was on [the Environmental Society Committee] last year [...] and we've had a huge increase on social media and engagement with our posts and campaigns and stuff, which is really great to see."- UCC-St

In UCC-St's case, they note that marked uptake in engagement with the UCC Environmental Society between the previous academic year and the current one. This may point to increased environmental consciousness amongst the UCC population. If so, it could indicate that a tipping point in awareness is being approached, where environmental information is spreading beyond the environmentally conscious/ activist sphere and into the general UCC population. However, without data to back up this suggestion, it remains speculation. Regardless this quote does highlight the potential to use media to engage with an audience and promote pro-environmental behaviour. Nonetheless, an attitude-behaviour gap was also noted by interviewees which is explored in the next section.

4.3.3. Leadership

Leadership features strongly across the interviews. The primary sub-themes of leadership were organisational leaders, collaboration and the influence of organisational ethos on how organisations approach sustainability.

4.3.3.1. Organisational Leaders

This form of leadership refers to those in positions of authority within an organisation and how they influence pro-environmental actions/ethos. These types of leaders can capitalise on their position to drive change and act as sustainability leaders within the organisation. This was most clearly referred to by CE:

"I suppose that's one of the reasons we're good at [sustainability], is because we've got a CEO who's behind it. And that's really the thing, if I ring him in the morning and say I have a great idea like plastic free or something, he'd say 'oh yeah, yeah tell me, tell me, yeah fine.' 'Now it might be at a cost.' He'd say 'yeah, if you think it's worth it, go for it.' So, it's good, and that really counts."

In this case, the support of company leadership was essential for supporting existing sustainability initiatives and encouraging the development of new ones. Leaders with a clear, pro-environmental stance may drive their company to increase sustainability while encouraging those under their authority to become involved in sustainability as occurred with CE. The CEO's behaviour of promoting and encouraging sustainable innovation helped drive sustainability within that organisation. The leadership in UCC could echo this example by communicating and acting on UCC's pro-environmental stance and facilitating others to engage in sustainable initiatives. If UCC leadership can normalise sustainable behaviour, this may facilitate social diffusion of pro-

environmental behaviour. This is already occurring on campus, as described by LGTM 1:

"[The UCC Deputy President] is having a coffee morning [in a new student building…]. [The building's project manager] said, 'I really want to try and have the [building] paper cup free.' […] So, they are going to put it on the invite that you are going to have to bring your own cup."

The example demonstrates a commitment from multiple people in leadership roles to encourage sustainable behaviour in a newly opened building. Further in the conversation, LGTM 1 said that the event organisers were planning to provide the library's reusable cups for sale for those who had forgotten to bring a cup, demonstrating the potential for collaboration between environmental champions.

However, those in leadership roles can also inhibit the adoption of sustainable alternatives if they perceive the trade-offs as too costly. Lack of buy-in from top-level management prevented the removal of plastic bottles from the SFC. In this case, the potential loss of revenue acted as a deterrent. Such trade-offs are commonly mentioned and legitimate concerns for those trying to incorporate sustainability while remaining competitive, as is examined in section 4.3.5.5 (Costs).

The contrasting experiences of CE and SFCE demonstrate the importance of strong, sustainability-focused leadership in driving change. In both cases, there were financial barriers associated with the introduction of sustainability initiatives. However, where leaders prioritised sustainability, the costs were less of a deterrent. Thus, the approach of leaders can influence if and how sustainability is integrated into organisations. Given the social, infrastructural and structural barriers facing sustainability, proactive

leadership emerged as an important driver of the sustainability agenda at UCC. However, the scope of leaders' influence in UCC can be bounded by their role. As such, prioritising sustainability in tenders to companies outside of the scope of internal leaders may help prompt changes in external companies for example the print management company and SFC delivery contractors (see section 4.3.5.7, Supply chains).

4.3.3.2. Collaboration

Collaboration between sustainability champions was a useful way to support sustainability in UCC. For instance, LGTM1 and LGTM2 cited teamwork as a driver in the library. For instance, the LGT was formed with the help of an existing green champion from Buildings and Estates through the Savers Saves Scheme.[3] The library team also facilitates sustainability initiatives by UCC Environmental Society, such a Terracycling crisp bag bins and a book swap station, helping to foster grassroots sustainability champions. Another example of a collaborative forum for students and staff to work on improving sustainability in UCC is the Green Campus committee, which was mentioned by SFCE, CE, UCC-St and SUR.

The SFC have improved their sustainability through LED lighting, solar panel installation, biodegradablecups, recycling stations and reducing energy consumption. However, SFCE highlighted a lack of acknowledgement of the such initiatives in green campus communications, suggesting stakeholders can feel side-lined if their efforts are not recognised:

[3] The Savers Saves Scheme involved devolving the energy budget for buildings with high energy use to a specific team within that department/ school. These teams then implemented projects to improve building efficiency and could reinvest any savings made in a revolving green fund for other environmental projects in the building.

"*...they have got to consider us part of the campus green initiative rather than us force ourselves on them*" – SFCE

Additionally, such comments raise questions about where the responsibility for engagement lies. Should stakeholders reach out to join initiatives like Green Campus or should initiatives reach out to stakeholders to ensure all relevant areas are represented? PE suggested that consultation is essential to progressing sustainability in UCC as "*making a decision in UCC Inc. doesn't necessarily mean that it translates for all of the [subsidiary companies] as well."* Such engagement is an iterative process suggesting both sides have a responsibility to engage. Stakeholder consultation and collaboration are needed to identify potential barriers to the integration of new sustainability initiatives (e.g. consumer attitude-behaviour gaps, structural, infrastructural and market barriers), to co-ordinate sustainability efforts (e.g. reusable cup discount coincided with library cup ban) and to support new environmental initiatives (e.g. SUP- Free UCC).

4.3.3.3. Organisation Ethos

'Organisational ethos' was used to describe the guiding beliefs of an organisation. These organisations included UCC as a governing body, third party organisations such catering and student facilities services and groups such as the Student Union or student and staff clubs/societies/committees. An organisation's values can have a direct impact on whether sustainability is prioritised.

UCC is a recognised leading green university in Ireland with a clear focus on sustainability and that reputation is reflected in the responses of the interviewees:

"The college here […] have always been seen as one of the leading operators in trying to do the right think, okay. And […] I genuinely believe that the college want to do that." – WME

Interviewees were aware of the university's emphasis on sustainability as they were all involved in sustainability-related projects on campus. UCC's involvement in sustainability was considered part of its identity, which can influence the behaviour of its community:

"People want to come to UCC, and they just need to know if you come to UCC, we are plastic free, we are...whatever we are." – CE

CE's comments suggest that adopting a sustainability-focused ethos emphasises an expectation for UCC community members to align their behaviour with UCC's pro-sustainability stance, thereby influencing social norms on campus. The aim of 'doing the right thing' echoes the intrinsic motivation of the LGT and suggests that values can influence organisations as well as individuals.

Similarly, how third parties can reflect their company's ethos. For instance, where sustainability was central to a company's identity, further sustainability actions were considered more favourably, even if they came with additional costs:

"…we went to one local company just to provide [the Biocafé] with we'll said, chicken, ham and various different things like that. So obviously it's costing us more…Now we're not charging customers more so that was a cost to us, but one that as a company we were willing to absorb in the - for the sake of going forward and trying to move things on..." – CE

However, where sustainability was not central to a company's ethos, there appeared to be less incentive to take drastic action to remove SUP. In the case of the SFC, the economic focus of their company charter was seen to make it more difficult to take sweeping action such as banning plastic bottles due to the potential for financial losses and its implications for those employed by the SFC:

"...we reflect what these people out here want, not what a small committee in the university want, you know. There's 20 people on the committee, there's 24,000 students. And we have got to respond, for our livelihood and the livelihood of our staff, we have got to respond to their needs. And that's what we do. Whilst we're fully behind every green initiative that comes up and we do our level best. But we don't do bans."

The SFCE's stance contrasts with CE towards bans. This may be a result of the ethos of the companies and the willingness of their leadership to engage with certain sustainability-related actions with less emphasis on potential costs. There are questions to be raised about the viability of relying on the current system of SUP consumption to provide profits and income given the long-term, disperse economic, social and environmental costs the system generates (UNEP 2018; Trusts and Systemiq 2020).

4.3.3.4. Role of Publicity

Organisations' ethos can be informed by the current sustainability-focused zeitgeist. For instance, some interviewees suggested that publicity was a driver of sustainability initiatives given the rising pressure act 'green'.

"Environmentalism and sustainability is […] massive in media at the moment. […] it's favourable for a business to be sustainable as well. And obviously since UCC is a business, it's going to work in their favour as well." –UCC-St

"I know UCC, they love to be the first, you know what I mean, and I love that too" – CE

CE's point regarding 'being first' links to the role that status or reputation plays in motivating change. As mentioned in section 2.6 (Sustainability at HEIs), external pressure can motivate HEIs to improve their green reputation through university sustainability rankings (Ferrer-Balas *et al.* 2008; Blanco-Portela *et al.* 2018; Akins *et al.* 2019). Various interviewees recognised UCC's role as a 'leader' in sustainability (e.g. SUR, UCC-St, WME, CE) and some cited rankings as testament to progress achieved. However, SFCE pointed out that publicity towards sustainability must be supported by meaningful action:

"*…publicity seems to be the single tenant of the entire green university initiative [is] narrowing the focus too much. There's a lot more to be done out there, a lot more to be done."*- SFCE

In this case they demonstrated a slightly negative outlook towards sustainability in the university, suggesting that it is driven by image and thus perceived as 'skin-deep' to a certain extent. Ensuring that publicity is driven by and informs further action is important to avoid 'greenwashing' which can impair trust. Providing clear, accessible information for students and staff is one possible use of media channels which targets knowledge gaps rather than image cultivation. For instance, UCC-St suggested using media channels to disseminate accurate sustainability-related information and

guidance to the community. The following sections explore findings regarding how governance structures and infrastructure influence sustainability at UCC.

4.3.4. Infrastructure

Infrastructures referred to physical structures that influenced behaviour. Infrastructure was divided into back of house facilities, reuse facilities and waste segregation facilities (fig. 27).

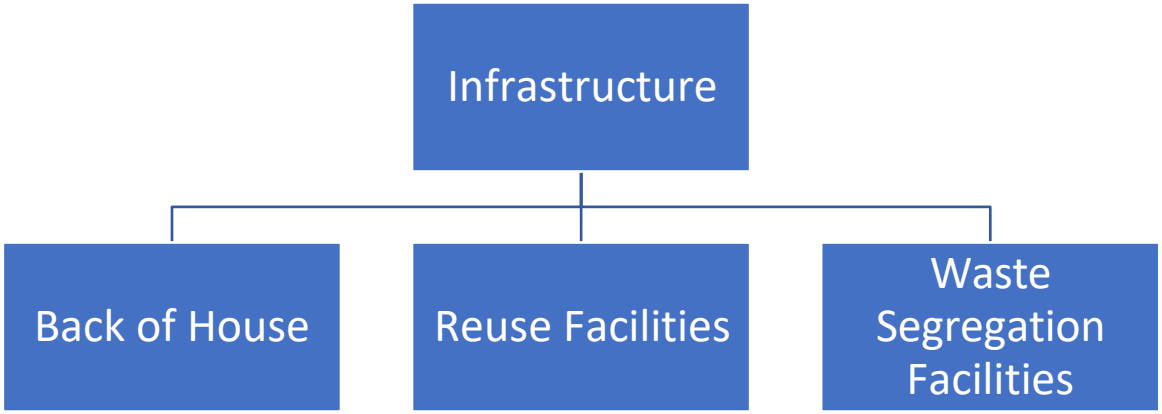


Figure 27: Infrastructure sub-themes

4.3.4.1. Back of House facilities

The prevailing infrastructure can promote or inhibit pro-environmental behaviour. Many older buildings both in UCC and in wider society were not built to prioritise sustainability. As such, buildings setups can discourage sustainable behaviour. For instance, some cafés on campus were set up on to reflect single-use take-away culture and did not have the back of house infrastructure to allow reusable crockery use. For instance, a lack of back of house washing facilities was mentioned as a challenge by CE:

"A bit more difficult in some restaurants to [eliminate waste] because, [the Biocafé] is you're served everything. So, in a self-service it's a bit more difficult to do that. […] we would plan to do [more]. Like, we keep adding on little bits. Like we would […] try to replace crockery as much as we can. Now, it's not set up like that because a lot of our units don't have back of house wash- up systems. They're meant for to-go; you know." – CE

This aligns with the current convenience consumer culture which places the emphasis on take-away and disposability. It also highlights the need for systemic change in how goods and services are provided, and the challenges facing such changes. Changing infrastructure requires financial investment which may be disincentivised by the prevailing DSP and lack of conscious consumerism amongst individuals.

Infrastructure changes can facilitate sustainable behaviours. For instance, the library facilitated crockery use by providing crockery supply depots and washing facilities to remove need to transport catering supplies across campus:

"*…it's difficult for [the caterers] to be trundling across campus with cups. So, we have a place here now where we keep cups for them and when there's events here then they can just use them*"- LGTM 1.

This approach of providing infrastructure to support reusable use and storage aided the library's transition away from SUP. This collaborative approach demonstrates the importance of understanding barriers and working with other stakeholders and could guide future infrastructure changes across campus. Catering supply stores and washing facilities benefit the catering supplier and the university by establishing infrastructure to support reuse at all stages from use, to washing and storage. As mentioned in chapter

2, COVID-19 has prompted changes to reusable use. In some cases, this has resulted in a switch to disposables while also creating a 'contactless coffee' movement to allow reusable use without risking cross-contamination (ConciousCup Campaign 2020).

4.3.4.2. Reuse Facilities

Central to reducing SUP reliance is the availability of facilities that encourage and enable reuse and waste reduction such as cup washing stations and water fountains. These facilities are visible symbols of a new norm while enabling reusable use. Normalising reusable use is essential to reducing SUP and other single-use waste. This has begun to happen at UCC with the introduction of water fountains on campus as described by LGTM 2:

"*And the fountains as well is another thing to try and encourage people to bring their own bottles. […] There's lots of signage up as well encouraging people to bring their own bottles*." – LGTM 2.

The water fountains allow students and staff to refill their bottles for free or at a low cost and are widely available across campus. The low cost of using the fountains makes them an attractive option compare to more expensive bottled water. LGTM 1 suggested the 'need' to buy bottled water can be unrooted by providing an inexpensive and convenient alternative. By introducing infrastructure that eliminates the need for single-use bottles, UCC can enable students and staff to engage with reuse behaviour. Such changes are also occurring outside UCC, for instance, the Irish Government currently proposes nation-wide drinking water fountains to reduce plastic bottle litter (The Irish Government 2020, p.41).

Cup washers were introduced in three cafés/restaurants in the university. They allow students and staff to wash out their reusables on site. Survey results suggest that knowledge of these facilities may be limited. SFCE, CE and the LGTM interviewees noted the presence of cup washing facilities. SFCE emphasised the use of student feedback to implement facilities that reflected the behaviour and needs of the students:

"We redid our coffee station last year to reflect the use of keep-cups. So that we introduced […] in our coffee station in the coffee shop em, cup washers. […] And that came out of our research that we felt that having a lot of our focus groups says-. We were saying 'Why aren't you using keep cups?' And the question kept coming back, 'Well, what do you do with a dirty cup?'" – SFCE.

This quote emphasises the need for infrastructure to encourage and facilitate reusables at all stages in their use from purchase, through to washing and reuse, just as the LGT example illustrated for crockery. It is important that ancillary infrastructure is in place to support reusable use, such washing stations and storage areas.

4.3.4.3. Waste Segregation Facilities

There is also a need for waste segregation facilities which allow individuals to appropriately dispose of their waste. Such facilities have been introduced across campus, with varying levels of waste separation. For instance, catering outlets have at least three bins (waste, recycling and compost) and the Biocafé has five bins including a liquids bin. Elsewhere, a two-bin system is in place for recyclable and waste goods.

In the library, waste collection by cleaning staff often resulted in all rubbish left on tables going into the waste bin, including liquids. This highlighted the need for liquid

disposal facility as occurred in the Biocafé. The LGT demonstrated one solution to this issue:

"*Obviously, [students] were getting [energy drinks] for nothing, so they weren't even drinking them. […] The cleaning ladies then were just putting them into the rubbish. Because they felt they couldn't put them into the recycling because it was full of liquid. […] They wouldn't have the time to be going around emptying all the cans. So, [we've] got this trolley and there's a little place that they can empty [liquids]. But […] there's been a bit of a kickback to actually using that."* - LGTM 1.

The introduction of waste segregation trollies into the library received some mixed feedback according to LGTM 1, with some cleaners reporting that the trollies were slowing them down. Such feedback is an important aspect of trialling new sustainability projects within the university to ensure stakeholders are willing to adopt new tools/behaviours. Currently dedicated liquid bins are scarce on campus. As such there is an opportunity for the university to install or direct students to stations to empty and wash their drink containers to facilitate effective recycling. The issue of poor waste separation featured prominently for WME. An awareness of waste segregation rules and a sense of personal responsibility are required to ensure individuals segregate their waste properly:

"Internally, if you've a recycling bin and 10 people put 10 plastic bottles into that recycling bin, and somebody comes along then and throws […] a cup of coffee in on top of it. Again, we've an issue there in terms of contamination straight away. It only takes one individual to ruin everything that everyone else has been trying to do."- WME

This echoes WME's previous comments that witnessing other's unsustainable behaviours can disincentivise sustainable behaviour. In both cases, other's actions can erode the sense of collective responsibility needed. As such, a paradigmatic shift is needed in collective behaviour and the structures and infrastructures that encourage and support it.

For instance, introducing a new system was easier when pre-existing systems were removed in two major initiatives in UCC; the library ban on disposable cups and new bin system and the removal of SUP from the Biocafé.

"And, yeah, I mean it's very easy to change behaviour if you don't have the, if you don't have the old system in place. You introduce a new system that people have to go to the bins." – LGTM 2.

The creation of new systems and associated norms was suggested as successful method of creating behaviour change within UCC. Such systems need to be communicated clearly ahead of time to ensure that all stakeholders are engaged and on-board with the initiative, as SFCE's comments suggest in section 4.3.3.2. (Collaboration). In these cases, the new systems or bans were successful established by promoting a new social norm and changing the infrastructure to support it. Such initiatives may have had knock-on impacts beyond those buildings such as the increased sale of reusables within the campus. Data from the caterers and student facilities centre suggest there has been a change in consumption patterns regarding single-use items in UCC. The caterers reported a reduction in disposable compostable cups of 33,183 in 2019. Similarly, the student facilities centre reported a 35% reduction in disposable compostable cup use along with "*a considerable increase in own cup or keep cup usage in [their] cafes.*" Such changes suggest that behaviour change can be facilitated by changes in infrastructure and the policies that shape it.

4.3.5. Policy

Policy findings looked at the current policies at UCC, policy levers (bans, preferential pricing), alternatives and supply chains. Some policies targeted specific products such as disposable or reusable cups to change how people interacted with them through bans, taxes or discounts. Other broader policies focused on the integration of sustainability at a broader scale such as in UCC's Sustainability Strategy.

4.3.5.1. Policy At UCC

There is currently no specific policy targeting SUP in UCC. However, PE did highlight that SUP is currently being considered in a piecemeal manner through an emphasis on sustainability in new tenders:

"…we don't have a formal policy on […] reducing single plastic use. […,] but I think […] it's being done incrementally anyhow by looking at certain products, as a university as a whole."- PE

For instance, polices that targeted certain behaviours featured in some sustainability campaigns examined. These included the library's disposable cup ban and introduction of discounts in the SFC and catering. This incremental approach echoes the approach taken by the caterers in removing certain disposables (e.g. sachets and plastic containers) from cafés. The lack of SUP-focused policies highlights a potential weakness in the chain between high-level structures (e.g. policy and governance) and holistic implementation of sustainability. As mentioned above, other interviewees from both catering and the library suggested that change is more effective if it completely alters the status quo to create a new social norm, which requires structural

changes and commitment from leaders and stakeholders. If such a tipping point is reached, a new culture can be established (Ehrenfeld 2009).

Policy is a major tool which the university can use to leverage changes in upstream supplier behaviour:

"…we're in a very unique position I think being in the public sector by […] creating a market for environmentally friendly products and services, it helps to change the supplier's way of delivering products and services and services as well. Because we're demanding it." – PE

For substantial change to occur, there is a need for a holistic approach to ensure sustainability is central to how new and existing contracts are carried out. UCC's capacity to drive change by creating demand for sustainable goods and behaviours amongst suppliers was demonstrated by the example of UCC's current print service provider:

"[The print management supplier is] driving around now in electric vehicles. Why are they doing that? Because they want to […] show that they are being environmental, environmentally friendly in delivering their services as well, because […] we're looking for it in our tender documents…" – PE

This is an interesting example of suppliers responding to market demands by increasing their sustainable behaviour (e.g. transport) beyond the scope of the service itself (e.g. printing). Such actions suggest that green credentials are used to improve brand reputation, as businesses market themselves in a business-to-business context. Both CE and SFCE also described how they engaged with suppliers to improve

sustainability. For instance, SFCE shows how businesses can influence each other, and the spill-over implications this can have of service delivery:

"One of the biggest things we did with regard to sustainability is we entered into a contract and a working arrangement, into a contract for the supply of our goods. In 2015, into that delivery yard there would have been 10 different, 10 or 15 different trucks a day coming in, deliverables in here. So, we did a supply contract with one. We put it out to tender, we worked with a few companies. And we gave the contract to one company as long as they could deliver on their trucks once a day, six days a week: frozen, chilled, ambient and chemical and hard goods, on the one truck. We worked with [a company]. We were the trial for their development of their new trucks. So, after the trial here, now all [their] trucks are five compartment trucks. So, one truck comes in there now and has taken out the carbon footprint of eight to ten trucks a day. Eh, and that was before green was in anyway sexy." – SFCE

Here, the SFC's efforts to improve sustainability influenced the development of streamlined delivery services, which minimised truck use and associated environmental impacts. Throughout the interviews, CE, SFCE and PE spoke about the ways that supplier behaviour had been altered based on their interaction with UCC and its third-party stakeholders. These examples demonstrate the potential of policy tools like tenders and supply contracts to improve the sustainability of goods and services provided while also prompting suppliers to integrate broader sustainability measures (such as adopting electric vehicles or more efficient delivery methods). In these cases, engagement with suppliers worked to shift the responsibility back along the supply chain rather than towards individual consumers. The need of producer responsibility

was a reoccurring theme across interviews and will be discussed in chapter 5. However, leveraging supplier behaviour was not always easy:

"*…some people were really willing like [our local, plastic-free poultry supplier]. He was happy to do what we wanted because he felt like-minded again. So, if you get the right person. But then again, it's hard to...like, he's the owner of that company and he could see the value. Whereas you know, you go to a big company, you never get to see the owner, you get to see something you talk to […] to at the end of the phone, and they don't have that passion so...that's just the way it is."* – CE

CE's comments about the capacity of small businesses to adapt faster to sustainability suggests that diverse small-scale supply chains may be a possible alternative to reliance on a single supply chain for goods. CE's description of the movement to small-scale SUP free suppliers highlights a potential benefit to local businesses of emphasising sustainability in tendering policies. This contrasts with SFCE's example of improved sustainability from a centralised large supplier. This highlights the lack of a 'one size fits all' approach to improving supply chain sustainability. Nonetheless, various interviewees suggested large businesses are less proactive in tackling sustainability. Given the volume of SUP associated with large businesses, there is a need for corporate responsibility towards their environmental impacts, in line with the polluter pays principal of environmental law[4].

[4] Principle 16 of the Rio Declaration on Environment and Development (1992) states: 'National authorities should endeavour to promote the internalization of environmental costs and the use of economic instruments, taking into account the approach that the polluter should, in principle, bear the cost of pollution, with due regard to the public interest and without distorting international trade and investment.'

The size and perceived lack of responsibility over waste produced were seen as barriers to advancing alternatives to SUP amongst larger suppliers. While large companies such as Fanta, Coca-Cola and Costa were named by interviewees as contributing to the proliferation of SUP, especially plastic bottles and takeaway cups, these interviewees considered such companies less active in moving away from SUP:

But you know […] it goes back to the supplier ultimately […] The likes of Coca-Cola, Fanta, you know, Lucozade, all these bottles that are there and I see them every day of the week inside in the bins. […] I firmly believe that the only way of addressing this is pushing the problem back to the guys that are supplying and packaging the material in the first instance." – WME

Some efforts have been made by large organisations to improve sustainability, for instance Coca-Cola collaborated with the University of Reading in 2017 to install drink dispensers that could be used with RFID-chipped refillable bottles to reduce the packaging waste associated with their products. Such systems are a welcome step away from single-use culture. However, this initiative has flaws as it requires individuals to purchase specialised Coca-Cola refillable bottles rather than allowing them to use those they already have, which generates unnecessary waste.

Supplier behaviour towards sustainability is an important aspect of reducing SUP in UCC. All of the items listed in the 2018 'Ditch the Disposables' petition were associated food or retail outlets. If UCC is to successfully honour the commitment to remove such SUP, there is need for such outlets to provide alternative forms of packaging or loose varieties for such goods. This creates a space for a policy focused on ensuring UCC and third parties provide sustainable alternatives to SUP. In

considering such policies, the trade-offs of different alternatives need to be considered. These trade-offs will be considered in section 4.3.5.4. (Alternatives).

The impacts of policy changes can be far reaching if they are embedded in how the university operates. For instance, the introduction of a sustainability strategy in the university can enable the systemic changes needed to move away from unsustainable practices such as single-use items and throw-away culture:

"[Sustainability is] in our library strategy now. So, that's a good thing because any works that are going to be done in the library for the future, one of the things that they're going to have to make sure is that it's got some kind of an environmental, sustainability...you know. [...] That'll be campus wide as well so there'll be no... there'll be no new things done anywhere that they won't look first to see how does this effect the environment." – LGTM 1.

Amongst those interviewed, policy frequently featured as a tool to enable the elimination of SUP. Policy changes that ensured sustainability are central to the tendering process and were mentioned directly in four of the seven interviews:

"It should be part of the tender to ensure that whatever waste you're generating, you're supplying a service into us, make sure you take that waste away from us and recycling it. Em, and that doesn't appear to be the case. In some areas it is, in some areas it's not." – WME

Policy implications will be further discussed in Chapter 5. The following sections look at various policy tools that have already been used in UCC.

4.3.5.2. Bans

While there was widespread consensus from the interviewees about the need for holistic change to improve UCC's sustainability, opinions varied on how this should be done. For instance, the Biocafé and the library are two examples of how bans have influenced waste behaviour within UCC. In these instances, the library and catering interviewees agreed that a radical change with appropriate advertisement was a useful way to ensure behaviour change:

"…you just have to say 'Right, as of this day, we're done with plastic, or whatever.' And you want to be here, this is it." – CE

Both LGTM 1 and CE had experience of facilitating sudden changes in the social norm through bans. It is worth noting that both initiatives were successful in improving sustainability as a result. CE referenced *"a huge reduction in waste"* in the Biocafé following the removal of SUP and the introduction of a five-bin waste segregation system. Similarly, LGTM 1 recounted that the library recycling rate "*went from about 6% to 70% within a matter of weeks."* In these cases, bans proved an effective lever to promote behaviour change. While both bans were initially enforced, LGTM 1 and LGTM 2 commented that strict enforcement is no longer needed as the students *"know they're not supposed to be doing it"* (LGTM 1).

SFCE strongly opposed bans, citing their impact on people's choice and the potential financial ramifications for retailers if plastic bottles were banned. Concerns regarding economic impacts are warranted and cost features strongly as a barrier amongst interviewees and survey respondents. The cost implications of alternatives will be examined in further detail in section 4.3.5.5. (Cost). However, arguments regarding choice neglect a current '*monopoly'* (SUR) of SUP in stores. Currently sustainable consumption is seen as the consumer's responsibility. However, both survey responses and various interviewees including SFCE highlight a lack of consumer awareness of

how to navigate these choices. Similarly, the convenience of SUPs, plus higher investment costs and lower availability of sustainable alternatives combine into major barriers to sustainable consumption. The elimination of SUP from shops moves some of the responsibility for sustainability towards the supply chain. However, some changes were contingent on a sense of shared responsibility with some stakeholders unwilling to remove SUP if others retained it. Such sentiments recall earlier references to modelling unsustainable behaviour disincentivising changes in other's behaviour in section 4.3.2.1. (Perceived External Awareness).

4.3.5.3. Preferential Pricing

Most interviewees viewed the cost of alternatives as a barrier. Preferential pricing through discounts or levies were suggested to encourage more sustainable consumption.

Discounts for using reusable cups are available in UCC. Such discounts can result from prioritising sustainability in tenders as PE explained:

"...one of the things that came out of the last [catering] tender was that there is a reduction on your price of coffee or tea if you bring in your own reusable cup, whereas that wasn't there before."

Such incentives can make sustainable alternatives more competitive compared to SUP options. The reusable discount coincided with the library cup ban, helping encourage reusable use, as the library enforced it.

Financial penalties were mentioned as a way of inciting behaviour change by some interviewees. For instance, the example of the plastic bag tax was discussed by CE as an example of a successful penalty:

"There's a lot of new taxes coming in again isn't there with the coffee cups and all that. So, I do think all those penalties on people are going to make them more aware. It's like the plastic bags. You know, whereas every time I went to the shops I thought 'Ah I have to buy bags.' And then it really started to bug me. That I was paying like- I remember they were 5 cent first, then they were 15, now they're about 50 cent a bag or something. And it just bugs like, be if I need 4 or 5 bags. I know it's only 2 or 3 quid but it's just more waste. And it took a while. Now I always have my own bags."

The plastic bag tax disrupted the entrenched habit of relying on shops to provide bags by adding a cost to a previously free commodity. While CE's original incentive to bring their own bags was to avoid financial penalty, this expanded to a realisation of the waste generated by using single-use bags. In this case, the tax forced CE to consciously consider actions which previously had relied on habit. The plastic bag tax did reduce demand for and consumption of plastic bags, amounting to systemic change. However, WME advocated applying financial penalties to larger waste suppliers to encourage more sustainable supply chains. It is important to assess where along the supply chain such penalties should be applied to ensure they do not neglect unsustainable supply chains or place all the financial cost of unsustainability on individuals.

The implementation and communication of penalties can also influence how it is received. For instance, the purpose of the Irish plastic bag tax was successfully

communicated to the general public and was widely accepted (Anastasio and Nix 2016). Taxes are outside of the scope of universities however; disposable cup levies have been successfully trialled in universities and could serve a similar role (Poortinga and Whitaker 2018).

4.3.5.4. Alternatives

Many interviewees cited the need for suitable alternatives to SUP. These alternatives were broadly divided into two types: single-use and reusables. This section explores how interviewees viewed these options and what they considered the main barriers to their adoption.

4.2.5.4.1. Single-Use Alternatives

Single-use alternatives replaced SUP plastics with other materials such as compostable or recyclable options. This topic was related to compostable cups on campus but also touched on items such as straws or bottles.

Many on-campus cafés have introduced compostable cups. This move was welcomed by most interviewees as a *'good step in the right direction'* (UCC-St). For instance, compostable alternatives replaced 12,000 SUP salad bowls in catering and SFCE highlighted the biodegradability and compostability of their cups. Sustainable alternatives are important as some cafés rely on takeaway containers due to a lack of washing facilities. However, initiatives such as the deposit-refund ReCircle scheme by the caterers may reduce the reliance on disposable takeaway containers where suitable infrastructure exist.

Given that compostable cups require lots of energy and material (Razza *et al.* 2009; van der Harst *et al.* 2014; Potting and van der Harst 2015), some interviewees viewed

them as a '*cop-out'* (UCC-St) that avoids a systemic change to reusables. For instance, LGTM 1 suggested that providing compostables diverted attention from avoidance to substitution:

"[An on-campus retailer] brought in compostable cups when [the LGT] were saying that we didn't even want compostable cups, we just don't want any." – LGTM 1

These sentiments suggest that compostable use should be restricted to unavoidable situations with a focus of prioritising reusables. Additionally, the occasionally contradictory sentiments towards compostable alternatives (both a '*cop-out'* and *'step in the right direction'* - UCC-St) echo survey findings that individuals seem uncertain how to navigate or assess sustainability trade-offs. Additionally, there may be a lag between the emergence of alternatives to SUP and the waste infrastructure and education/ marketing needed for consumers to dispose of them properly:

"... we're introducing a system and we don't have a [waste] system in place to actually capture those [...] corn-starch bottles or whatever the case may be on the other end to recycle them. So, you know, that's stuff we need to be looking at and trying to tie down, okay." – WME

This issue must be considered if UCC is to remove SUP by 2023. Single-use compostable or biodegradable alternatives require suitable waste infrastructure which people know how to use. This is particularly relevant considering given that 52% of survey respondents believed compostable cups were recyclable.

Promisingly, SFCE attributed a fall in compostable cup use to an increase in keep-cup usage. This suggests that a tipping point in behaviour is being reached with keep-cup

use becoming more normalised amongst the UCC population. UCC could capitalise on keep-cups normalisation to transition from compostable to reusable alternatives more quickly. For instance, a full ban may be preceded by a transition period to inform people of the change and ensure supporting infrastructure is in place. Reusable alternatives will be discussed in more detail in the next section.

4.2.5.4.2. Reusable Alternatives

Interviewees generally discusses reusable alternatives associated with changes in infrastructure such as the installation of water fountains, crockery or washing systems (section 4.3.4, Infrastructure) or policy changes such as bans and discounts (section 4.3.5, Policy). Some reuse behaviours such as keep-cups were incentivised through discounts, in tandem with bans on disposable cups.

Crockery use and water fountains are being gradually expanded in UCC. These types of alternatives require infrastructure changes along with community engagement to ensure they are successful, as occurred in the library. The water stations provide a visual prompt to students to bring and use their own bottles, helping to establish and re-enforce a social norm around reusable bottles. Likewise, the ReCircle initiative aims to encourage returnable takeaway containers:

"... [ReCircle is] in the main restaurant now... Not a lot of uptake on it just yet. Again, as I said, people are happy to talk about things, but they don't always want to do it. So, it's a hard one, but like you know, it's just a journey really." – CE

CE acknowledges the frustrating challenge caused by the attitude-behaviour gap regarding sustainable action. As ReCircle is a new initiative that is not yet well-known

amongst students and staff, it may benefit from the use of social marketing to encourage its adoption. Other barriers to the adoption of reusables include perceived costs, issues with supply chains and availability of alternatives. These issues will each be discussed below.

4.3.5.5. Cost

Cost was a frequently mentioned barrier to the adoption of alternatives by UCC staff, and third-party employees and students.

"Cost and alternatives is a big thing […] when trying to reduce single-use plastic." – PE

In all cases, the cost of sustainable alternatives was seen as a barrier to their adoption by individuals and companies. In large organisations such as UCC, the decision-making process involves multiple people. If decision-makers do not prioritise sustainability, it is unlikely to be adopted given the perception of higher costs:

"That's the cost of banning plastic. 75,000 a year. So, I mean, my board of directors which is a commercial board are saying 'Where are you going to get that money from if you stop selling bottles of water?" – SFCE

The interplay between the perceived cost of eliminating plastic and pressure to act sustainably was clear across the interviews with third-party stakeholders. While willing to spend more on sustainable alternatives, the capacity to adopt sustainable alternatives was associated with the priorities of leaders within those companies. This suggests that leadership has the potential to accelerate or prevent the adoption of sustainable alternatives to SUP. In these cases, the narrative focused strongly on the

potential financial losses associated with sustainability rather than the potential benefits. This raises the question about how sustainability is perceived amongst stakeholders. Sustainability appears to be something that required either extra effort or sacrifice to achieve, such as seeking out alternatives and paying more. The caterers' focus on green credentials benefited them longer-term by attracting sustainability-focused tenders such as UCC catering. As such, businesses may invest in sustainability to benefit from associated brand enhancement e.g. UCC print management. However, some businesses are unwilling or unable to invest in systemic changes. Likewise, higher costs were a deterrent to individuals, especially to students:

"*I guess like the thing of like loose fruit and veg that's sometimes more expensive than like the plastic wrapped stuff. And I suppose then as a student, you […] kind of want the cheapest […and…] most convenient thing and that's usually plastic wrapped …*" – UCC-St

This suggests that cost is an important factor in how people decide about alternatives, especially those with limited finances such as students. Staff, students and third-party employees all perceived cost to be a major barrier especially as sustainable options were regarded as more expensive than the SUP alternatives. The price of loose versus packaged foods can vary between food retailers, as can whether packaged goods are cheaper (Dewdney 2018) making it difficult to assess whether more sustainable options are more costly. Misconceptions about the long-term cost and environmental impact of reusables alternatives to SUP abound:

"…I read an article […] that […] to make one of these metal flasks more […] unsustainable energy is used than involved in the making of over a thousand bottles." – SFCE

However, a stainless-steel flask used 50 times is more climate friendly than 50 plastic bottles, and used 500 times, outperforms plastic in all categories of a LCA (Goleman and Norris 2009). Similarly, reusables are more energy and cost efficient than disposables if used repeatedly (Ashby 2012, p.194; Newey 2018).

PE acknowledged that buying sustainable alternatives meant higher investment costs and "*you get the savings over the long term."*. Despite the less visible nature of investments in sustainable infrastructure, this was where sustainability's cost saving aspects were noted by PE and LGTM 1:

"We turned off the lights in the reading rooms […] in the big reading rooms during the summer. That saved 4000 euros" – LGTM 1

The library is an interesting example of successfully devolving the energy budget to the LGT. However, the devolved nature of the university can also pose problems if those making decisions are not interesting in choosing sustainability and there is not policy on SUP:

"There are alternatives available on the contract but then that's a departmental choice whether they want to actually make that greener choice themselves…" – PE

While, PE and LGTM 1 acknowledged the potential savings associated with improving sustainability, they said that cost remains a barrier. This may be due to an issue with how costs are framed. Generally, in the case of takeaway tea/coffee, reusable cups received a discounted price. However, behaviour is more likely to be motivated by definite losses due to inaction (e.g. plastic levy) than potential gains due to action (using reusables) (Häckel *et al.* 2017).

4.3.5.6. Availability of Alternatives

The second challenge regarding alternatives is that of availability. Interviewees' opinion regarding alternatives varied between and within interviews. In most instances, the availability and cost of alternatives were closely linked. While interviewees were generally aware of the alternatives on offer in UCC, the prices of such alternatives were a deterrent:

"I know there's loads of options on the shelves, but there is still like a monopoly of the plastic bottles. There's like say 100 plastic bottles on the shelves and then like 16 cans of water. It's just not like comparable. […] yeah that is another option, but when it's like twice the price for half the amount of liquid, […] just because it's kind of niche, like that doesn't do well. So I think like the businesses within UCC really need to co-operate with Green Campus and Green Forum and kind of become more realistic with like their prices that they're offering to students, because if they put them at that unaffordable reach, […], not on purpose but there's no need for them to be that high."
– SUR

The issue of availability is seen not just as the product being physically on the shelf, but also within the financial reach of the customer. In this case, SUR advocated a collaborative approach between the businesses and administration on campus to solve the twin issues of physical and fiscal availability of sustainable alternatives. SUR's comments echo the findings of Rettie et al. (2014) regarding companies using green credentials to charge more, and Grant (2007, in Rettie *et al.* 2012) where 'green' was seen as niche and expensive leading to 'greenophobia'.

From a retailer perspective, lack of consumer demand prevented a wholesale adoption of sustainable alternatives. For instance, available alternatives did not outsell their SUP counterparts in the SFC:

"We've glass bottles on our shelves and they're going out of date [...] because they don't want glass bottles. Students, if they're buying a bottle of water, they want a plastic bottle." – SFCE

This suggests that inertia remains for both retailers and consumers, with affordability limiting consumer uptake and the lack of demand deterring in alternatives in a cycle of reluctance. The persistence of such barriers (e.g. attitude-behaviour gap, costs and availability) suggest that incremental changes are unlikely to prompt wholesale adoption of sustainable option if more convenience, cheaper and more familiar SUP is available. Given that sustainable alternatives generally require a higher initial investment, the university and its third-party stakeholders will need to look at options for financing the transition away from SUP and making alternatives affordable. Policy instruments such as bans, incentives, levies and tenders can be used to prioritise the use of alternatives to SUP and reusables. However, such changes need to work alongside strategies to target the entrenched norms regarding SUP use and misconceptions about alternatives.

In the case of products without alternatives, there were three main solutions used by interviewees: avoidance, minimization and alternative forms of recycling.

The Biocafé used avoidance. In stocking the café, the staff removed products from sale if SUP-free alternatives could not be found. This option reduced the choices available to consumer and moved the responsibility for choosing SUP-free products

back to the café management. This option has merits by replacing plastic-wrapped goods with alternatives and avoiding SUP-wrapped goods dominating shelf space.

The second strategy used was SUP minimisation. The strategy was used by SFCE, CE, the LGT and in policy tenders. In catering this included replacing sachets, SUP cutlery and takeaway containers, packaging on goods and reducing SUP bottle use. The library switched to digital signage to reduce paper waste, and policy tenders contain provisions around packaging. This strategy has potential in areas where alternatives to SUP are available. While it does not eliminate waste completely, it may offer a transition step for those currently unable to remove certain SUP products. Additionally, committing to minimise SUP initially may make participants more willing to engage with a larger commitment such as a ban at a later stage. Previous studies on the use of commitments have shown that using a small initial request can improve the likelihood of participants engaging with a larger task later on (McKenzie-Mohr 2011, pp.45–47).

The final strategy noted was finding alternative waste streams for generally unrecycled goods such as chewing gum, crisp packets or old delft. This method was used by the library, UCC Environmental Society and SFC. The library installed a gum collection machine and facilitated a Terracycle crisp packet bin installed by the UCC Environmental Society. The crisp packaging example is interesting as it provided a new recycling infrastructure from a student-led bottom-up group rather than through top-down change. This demonstrates the potential of students to pioneer and drive improvements in campus sustainability, especially where staff are willing to encourage such initiatives. The SFC also engaged with students and staff to facilitate the donation and upcycling of unwanted goods.

4.3.5.7. Supply Chains

Suppliers have a role to play in shaping the future of SUP in UCC. On-campus stakeholders have used their buying power to leverage change such as the SFC delivery process and the Biocafé supply chain (section 4.3.5. Policy).

The third-party stakeholders spoke about enhanced supplier responsibility over the waste they generate:

"We'll just say for examples our […] vegetable suppliers. We had to say to them 'We don't want things wrapped. If you're bringing them in, bring away the crate again. So, we don't want it, or if you are bringing in plastic, you need to bring away the excess, we're not keeping it.'" – CE

Tacking SUP in the supply chain moves responsibility back towards the start of supply chains rather than towards the consumer. This approach required suppliers to accept more responsibility for waste they generate. Other market-based challenges included sourcing suitable alternatives to SUP and tackling the price disparity between SUP and more sustainable options.

"Because suppliers-, like, obviously [we] would deal with big companies and for hygiene and HACCP[5] *you know, they have to pack in certain ways and plastic or gas first, or different things. And they won't just change for one supplier like ourselves."* – CE

[5] HACCP: Hazard Analysis & Critical Control Points regulations regarding food handling

In these instances, there is an obligation on suppliers to ensure all goods are protected from damage or contamination. This is challenge that extends beyond the bounds of UCC but does directly impact the level of SUP used. In such occasions, there is a need for alternatives to SUP to provide protection to food in line with regulations while also reducing SUP use.

Within UCC, there are currently solutions to abide by regulations and provide a more sustainable product. For instance, the Biocafé worked with a local food supplier to source SUP-free cooked meats by using baking parchment and reusable containers. However, these SUP-free meats did cost more to source. This example shows there is capacity to work within existing regulations to provide a more sustainable, local product. Currently such changes can come at a premium and requires businesses to request suppliers use alternatives. However, this example does suggest there is scope for change within supply chains if other UCC suppliers were asked to minimise and substitute SUP in a similar manner. As discussed in section 4.3.5. (Policy) there is an opportunity to examine the sustainability of supply chains within UCC through policy or tenders to ensure that due consideration is given to minimizing SUP within supply chains as well as at the front of house. There are clearly challenges at all levels that will require leadership, time and collaboration between stakeholders to solve. The most pressing barrier remains financing sustainability and who should bear the cost of transitioning to more sustainable alternatives:

"There's nothing that would stop us putting in alternatives. Nothing. […] And […] we have them. Some of them are not financially viable […and] some we can sustain the cost of and some we can't. But there is a real cost to this, that somebody-. You know, 'somebody,' this inverted comma 'somebody' has to pay.

And inevitably, my view is the students that'll end up paying it...you know."

(sic) – SFCE

SFCE also highlighted the issue of a relatively finite market for reusables. Once the population has reusables which they use regularly, they should not need to buy more, apart from replacements if needed. While this is essentially the aim of reusables, this was seen as a threat to revenue streams and jobs which rely on the consumption of goods. Such comments suggest that the sale of goods has become wedded to the sale of containers for those goods. This highlights a serious issue with the current DSP which relies on an unsustainable level of continuous consumption and motivates pushback against measures meant to ensure long-term economic, social and environmental sustainability. One interviewee expressed concerns for jobs linked to continued consumption, raising the question of how to transition away from the DSP as justly as possible. This is not a barrier that requires one solution but may require a collaborative approach between stakeholders that combines sustainable alternatives with policy tools and changes to infrastructure. This will be discussed in further detail in Chapter 5.

Chapter 5.

Discussion

5.1. Introduction

This chapter discusses the research findings in the context of the wider literature and answers the following research questions:

1. How do structural and infrastructural interventions influence SUP behaviour in UCC?
2. How to promote and incentivise sustainability regarding SUP amongst the UCC stakeholders (students, staff and third parties associated with the university)?
3. What lessons can be learned from the UCC living lab for achieving sustainable behaviours in wider society?

These questions will be answered using a framework developed in response to the findings (fig. 28). In answering Q1, policy, tenders and infrastructure came to the fore. In answering Q2, education, social marketing and infrastructure changes including around alternatives featured strongly, along with aspects of nudge theory through choice architecture. In answering Q3, the role of leadership was emphasised, and the influence of the attitude-behaviour gap was explored in the context of UCC.

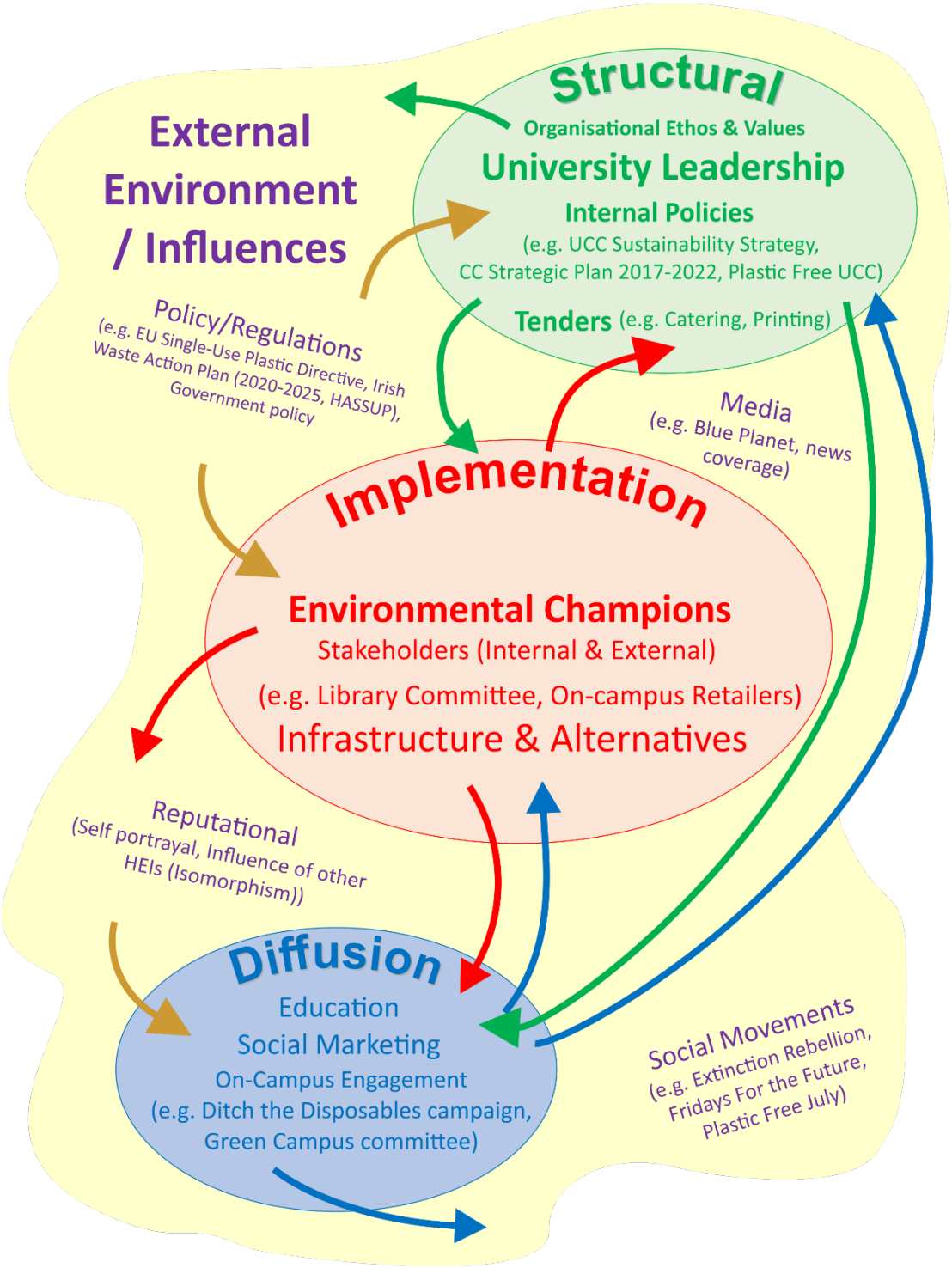


Figure 28: Framework of factors influencing sustainable behaviour in UCC. Arrows indicate direction of influence. Font size indicates relative importance of factors.

The above framework (fig. 28) was developed to illustrate the relationships noted within and between each category. The factors that influenced sustainable behaviour

in UCC were divided into 3 main internal categories along with a category of external influences. More influential factors were highlighted in larger font. The relationships between internal categories were iterative with factors in some categories strongly influencing others (e.g. policy and infrastructure). The terms structures, implementation and diffusion were chosen to reflect a top-down, middle-out and bottom up interaction between different levels. Structures relates to the governance structures within UCC. Implementation relates to how structural factors are integrated into the physical and social fabric of the university and the role that environmental champions play in driving improvements in structural sustainability and facilitating diffusion of pro-environmental behaviours at UCC. Diffusion refers to the lived and evolving campus culture which manifests itself in behavioural practice and in the 'bottom-up' influences that shape social norms around sustainable behaviour, such as peer to peer learning and engagement with sustainability initiatives. Finally, UCC and its community are influenced by external factors which interact with each level differently. For instance, the influence of rankings and regulations influenced the structural and implementation levels more than the diffusion level. Meanwhile media and social environmental movements influenced how some individuals in the survey and interviews learned about sustainability and adjusted their behaviour (e.g. with Blue Planet's plastic coverage).

Understanding sustainability and how we interact with it remains complex. While some factors such as policies, leadership, infrastructure and environmental champions emerged as particularly relevant in this research, other factors listed above can play an additive role in shaping environmental understanding and behaviour.

5.2. Summarising the Framework

UCC's commitment to sustainability is shaped by its sustainability-focused ethos, which feeds into its reputation as the world's first 'green flag' university, which motivates further sustainability. This reputation is enhanced by UCC's rankings across various sustainability metrics. Improving UCC's ranking also acted as a motivator for structural changes in policy (e.g. UCC sustainability strategy) and leadership, as SUR described:

"…I think also from a university standpoint it is a little bit about rankings and it is a little bit about like having the best research and being a leader in something…" – SUR

This is particularly relevant given the growing recognition that universities have a role to play in acting as sustainability-focused thought and action leaders (Alshuwaikhat and Abubakar 2008; Freidenfelds *et al.* 2018). UCC also directly influenced external stakeholders through increased focus on sustainability in tenders, which is discussed in section 5.3. These tenders attract organisations that echo UCC's sustainability ethos and facilitate infrastructure changes to enable and encourage behaviour change such as segregated bins, reduced plastics and more sustainable printing systems.

For such changes to occur, collaboration between environmental champions and leaders amongst various stakeholder groups (e.g. students, staff and third parties) was needed. For instance, improvements in library sustainability were driven by the LGT, and facilitated by the Buildings and Estates department, cleaning staff and student buy-in. The potential of committed staff to drive 'middle-out' change can be underestimated by the conventions of a 'top-down' and 'bottom-up' approach

(Brinkhurst *et al.* 2011; Akins *et al.* 2019). In UCC and elsewhere, middle-out environmental champions have influenced other implementation factors (sidewise), along with upstream structures and downstream behavioural diffusion (Parag and Janda 2014). This research furthers the case for the importance of environmental champions as 'middle-out' drivers of sustainability in HEIs.

This work also underlines the need for infrastructure to support and enable reusable use, which extends into policy and supply chain considerations. Infrastructure changes need to consider the future of waste to include waste facilities for compostable, biodegradable and recyclables, along with the national move towards deposit return schemes (Department of Communications, Climate Action and Environment, 2020). Similarly, there is a need for alternatives to SUP to be accessible, affordable and appealing to the UCC community. This issue borders the structures and implementation levels. On one hand, there is a need for policy supports such as preferential pricing for sustainable options, changes to infrastructure and marketing by placing alternatives more prominently and stakeholder and leadership buy-in to support and enable such changes to occur, which is discussed in section 5.3. On the other hand, there is a need for education and social marketing aimed at tackling the attitude-behaviour gap amongst consumers and emphasising the long-term savings associated with reusables to combat cost-based avoidance of alternatives, which is discussed in section 5.4. Finally, behaviours can be influenced by social context (e.g. friends and family) (Cherrier *et al.* 2012), increased environmental awareness (Mustikaningrum 2018; Gell 2019), or involvement in sustainability initiatives (e.g. LGT). In this research, involvement in sustainability initiatives/courses/events was

attributed to increased awareness or concern for five interviewees[6] and *ca.* 37% of survey respondents. Media coverage was a driver of sustainability amongst some interviews with *ca.* 4% survey respondents attributing environmental awareness to television and radio, *ca.* 63% to written media (books, magazines, newspapers) and *ca.* 90% to the internet, in comparison to *ca.* 43% that obtained environmental information from UCC sources. Respondents could and did choose multiple sources of information, however, it is interesting that the UCC does not feature more prominently either in the impact of on-campus events or as an information source. Therefore, there is scope for UCC to expand its role in driving sustainability by facilitating the diffusion of pro-environmental knowledge and behaviour amongst the UCC community.

The research questions of this study were:

1. How do structural and infrastructural interventions influence SUP behaviour in UCC?
2. How to promote and incentivise sustainability regarding SUP amongst the UCC stakeholders (students, staff and third parties associated with the university)?
3. What lessons can be learned from the UCC living lab for achieving sustainable behaviours in wider society?

In answering Q1, policy, tenders and infrastructure came to the fore. In answering Q2, education, social marketing and infrastructure changes including around alternatives featured strongly, along with aspects of nudge theory through choice architecture. In

[6] Of eight interviewees total

answering Q3, the role of leadership was emphasised, and the influence of the attitude-behaviour gap was explored in the context of UCC.

5.3. How do structural and infrastructural interventions influence SUP behaviour in UCC?

Recent years have seen the expansion of sustainability-related change beyond individual's behaviours and towards the systemic change required to achieve the progress needed towards sustainability (Shove 2010; Darnton and Evans 2013a; Trusts and Systemiq 2020). As such structural and infrastructural systems and their role in catalysing or inhibiting behaviour change must be considered (Kollmuss and Agyeman 2002; Msengi *et al.* 2019).

Structural and infrastructural interventions have a clear impact on SUP behaviours on campus. Structures refers to the policy and governance structures in place that impact on and/or influence SUP behaviours. Infrastructure refers to the built environment within UCC and how it influences behaviours. In answering this question, both the policy and infrastructures will be discussed.

5.3.1. Tenders: Policy Priority

Holistic integration of sustainability into HEIs requires sustainability policies (Ramísio *et al.* 2019) and is now a policy consideration in tenders at UCC. This sends a market signal to third parties (external stakeholders) regarding the importance of integrating sustainability meaningfully into their supply chain. Examples include the print management tender, Biocafé suppliers and the SFC's delivery system. These examples demonstrate the potential of organisations to generate and demonstrate demand for sustainability in a practical day-to-

day manner that can have spill-over benefits such as the wider adoption of compartmentalised delivery lorries by the SFC's supplier.

UCC's commitment to sustainability is shaped by its sustainability-focused ethos, which informs its sustainability strategy. This suggests that policy is a powerful tool for ensuring that sustainability considerations are to the fore regarding all aspects of university management from external contractors, supply chains, to the consideration of sustainability in the development and modification of infrastructure.

On a broader scale, sustainability commitments are being integrated into national and international policies to combat plastic pollution (O'Sullivan, 2018; Houses of the Oireachtais, 2019; Department of Communications, Climate Action and Environment, 2020) and curb carbon emissions (United Nations Framework on Climate Change 2020). These include policy tools such as national bans on certain SUPs in line with the EU's Plastic Directive (European Parliament and European Council 2019) and a waste recovery levy that aims to emulate the success of the Irish plastic bag levy (Anastasio and Nix 2016). The role of policy in underpinning sustainable infrastructure is seen in the Irish government's plans to introduce deposit and return schemes for plastic bottles and aluminium cans and restrict the flow of SUP onto the Irish market (Department of Communications 2020).

5.3.2. Policy Levers

Preferential Pricing

Preferential pricing is a policy tool that has been used widely in UCC and beyond to encourage reusable use (Buzalka 2015; Thomas and Pickard 2018). The reusable discounts offered by the catering contractors was associated with the tendering process and demonstrates the influence policy can have in shaping the behaviour of companies

and individuals. Preferential pricing in UCC currently consists of discounts for keep-cup use. However other approaches such as 'latte levies' have been successfully trialled elsewhere (Poortinga and Whitaker 2018) and showed that framing disposables as additional costs resulted in increased keep-cup use without an overall drop in drink sales. According to prospect theory, losses influences behaviour more than equivalent gains (Häckel *et al.* 2017). This is particularly relevant given 41% of survey respondents (Q13) and various interviewees cited cost as a deterrent to buying SUP-free options. Given this psychological bias towards loss aversion, levies could be a valuable policy tool for reframing disposables as a more costly option than reusables. As such, UCC could consider a SUP levy to help rebalance the perceptions around cost, while providing affordable alternatives. Learning from the plastic bag tax, the proceeds of the levy could be used as a green fund to subsidise reusables or student/staff welfare.

Bans

The library disposable cup ban was a successful policy-based intervention and was attributed with changes in behaviour beyond the library such as an increase in keep-cup sales, as referenced by SUR, and helping promote a new social norm through signage, enforcement and communication with library users:

LGTM 2: "*We patrolled outside as well a lot in the first few days or weeks, I think.*

[…]

LGTM 2*: And there's no real need to do that anymore. You'll see the odd person coming in with a paper cup. But usually they, you'd stop them then.*

LGTM 1*: They'd know they're not supposed to be doing it."*

This quote suggests that the ban on disposable cups is now widely known and embedded in the behaviour of library users. This report of widespread acceptance and support for the ban suggests that this approach could be a viable lever for removing other types of SUP from UCC. Widespread public support and petitions have driven policy changes around SUP bans globally, as occurred in Bali in 2019 (Goulopoulos and WHIMN 2019). Various SUP bans have also been adopted in more than 60 countries, especially towards SUP bags. The success of these bans has varied or are still unknown (fig. 29).



Figure 29: Impact of national bans and levies on plastic bag usage. Taken directly from UNEP (2018).

International examples show suitable alternatives, prior consultation and public awareness are important factors in introducing any plastic reduction strategies. Where bans were unsuccessful, enforcement of the bans and accessibility of affordable

alternatives were flagged as two of the issues that hampered sustainability efforts (UNEP 2018, p.65). These issues were flagged by interviewees as potential barriers reinforcing the need for accessible alternatives, policy enforcement and stakeholder buy-in. The reoccurrence of these barriers suggests a certain level of ubiquity in problems facing SUP elimination worldwide. The documentation of common barriers and ways they have been tackled in UCC expands the repertoire of tools which can be used to tackle sustainability globally.

Other challenges in tackling SUP use through a ban are ensuring that key stakeholders agree with such an intervention, which was not the case for SFCE. To some extent, there was a sense of shifting the blame amongst some of those interviewed, with contrasting views that the responsibility for change lies either with organisations and their leadership (suppling 'green' change in a top down approach)[7], or with the individual, who should have the self-efficacy to choose 'green' (demanding 'green' change in a bottom-up approach)[8]. Other interviewees showed a mix of these views, with some elements of top-down and bottom-up responsibility suggested.[9] The perception of responsibility is a challenge facing sustainability initiatives given the divided opinions of stakeholders regarding who should bear the responsibility to change. This is an active area of discussion in the literature regarding whether the focus should be on individual behaviour change or structural changes to enable and encourage collective behaviour change. Various papers have discussed the prevalence of attitude/knowledge or intention-behaviour gaps amongst individuals (Lorenzoni *et al.* 2007; Carrington *et al.* 2010; Hassan *et al.* 2016) along with a struggle to identify

[7] For example, the Library Green Team, SUR, UCC-St and CE aligned more strongly with this view. However, all interviewees had some variation in their perception of responsibility.
[8] For example, SFCE.
[9] For example, WME, PE.

a ‘green’ or ‘ethical’ consumer segment (McDonald *et al.* 2012; Carrigan 2017). Given prevalence of external barriers to individual change discussed in both the literature and in this research, it seems unwise to focus efforts to improve sustainability wholly on the individual. Rather there is a clear need to integrate sustainability into the structures and infrastructure of UCC in addition to programmes targeted at practice-based individual change. Without the facilities and policies that enable campus users to engage in sustainable practices, the university risks individuals becoming deterred from acting sustainably due to persistent barriers:

“…*Lack of carry space for food tub, Lack of ANY washing facilities, lack of cutlery*” – Survey Response 538

These barriers can be infrastructural as in this example, or socially constructed as explored by Cherrier, Szuba and Özçağlar-Toulouse through the concept of the ‘glass floor’ (2012). Structural changes such as the inclusion of sustainability into policy help deconstruct some of these barriers by entrenching sustainability in the daily workings and future considerations of the university. For instance, policy instruments such as bans or preferential price directly influence the choices of individuals and organisations on campus, thereby helping to establish new social norms. However, such instruments require stakeholder engagement and buy-in to implement.

As fig. 28 illustrates, policies act in a top down manner to shape infrastructure, external stakeholder behaviour through tenders, internal and external stakeholders’ behaviour through introducing new rules e.g. bans, and the sustainability strategy. However, this process is iterative with stakeholders, infrastructure and environmental champions feeding back into progress of sustainability policies.

Thus, there needs to be action at and coordination between all levels of governance to ensure that policies and infrastructures improve in tandem with efforts to improve sustainable behaviour. The potential of policy (Anastasio and Nix 2016; Brivio 2018; European Commission 2018; Press Association 2019) and infrastructure (Longo *et al.* 2015; Panter and Ogilvie 2015; Cass *et al.* 2018) to change behaviour is demonstrable in UCC and the wider society suggesting these aspects of sustainability need to be considered carefully going forward. This is particularly needed to avoid a '*blame the consumer'* type approach to sustainability that can discourage individuals who run into the 'glass floor' of social, structural and infrastructural barriers.

For change to happen, leadership in key areas such as catering, food outlets, waste management and policy as well as UCC's high-level governance would need to support such activities, as occurred within catering. Additionally, the reluctance towards adopting bans adds to the narrative around what tools are perceived as acceptable and by whom in encouraging sustainability. For instance, in UCC the reluctance to adopt a ban came from one food retail company and not another. However, both shared concerns about revenue loss and a lack of 'green' consumption. This raises the question of what drives different responses to the same action between the two companies. The ethos and leadership within an organisation appear to determine how likely that company is to engage with potentially costly actions such as bans. The influence of leadership will be discussed in more detail in section 5.5.1. (leadership).

5.3.3. Infrastructure

Infrastructure can either positively or negatively impact and influence the removal of SUP. Positive influences include the implementation of supporting infrastructure such as fountains which enable behaviour changes. Negative influences include the physical restrictions such as lack of space for infrastructure such as washing areas in restaurants. Other factors such as stakeholders, environmental champions and policy can each play a role in shaping how infrastructure influences behaviour as shown in fig. 28. As such, infrastructure acts as a confluence point between the influence of top- down, middle-out and bottom-up drivers of change.

Infrastructure can support and enable more sustainable behaviour (Longo *et al.* 2015; Panter and Ogilvie 2015; Rajapaksa *et al.* 2018). Examples of reusable infrastructure in UCC include reusable storage, washing, water use and waste separation. In each of these cases the provision of supporting infrastructure facilitated the move away from a reliance on SUP and disposable items by making more sustainable options more convenient and accessible than they had been previously. Such supporting infrastructure results from a mix of feedback from students (cup washers), collaboration with third-party service providers (crockery storage, waste segregation bins) and action on behalf of organisations to improve sustainability (water fountains). The most common reported usage frequency of reusable bottles, keep-cups, and water fountains respectively were ‘more than 5 times per week’ for approximately 72%, 65%, and 49% of survey respondents. These findings suggest that alternatives to SUP and the associated infrastructures are used relatively regularly by those surveyed. The most frequent usage frequency for plastic bottles and non-reusable paper cups was ‘none’ by 55% and 57% of respondents respectively, with the second highest responses

both being ‘1-2 times per week’ at 36% and 35% respectively. This finding suggests that keep-cup and reusable bottle use are outpacing disposables amongst those surveyed, with disposables used less frequently and potentially stemming from an ‘*on the go*’ convenience-centred mindset.

The need to holistically integrate infrastructure and behaviour changes has been noted previously (Creutzig *et al.* 2016). In UCC, progress has been made in facilitating sustainable behaviour through the intersection of infrastructure and policy changes such as the inclusion of sustainability into the university’s Strategic Plan 2017-2022 and the UCC Sustainability Strategy 2016. However focused consideration of how and where to implement reuse infrastructure would be beneficial. For instance, sustainable infrastructure require structural considerations of how such infrastructure can be included in current and future developments on campus e.g. space for back of house washing areas in catering, space for centralised print management machines and storage areas for crockery etc. These considerations can benefit from stakeholder engagement to pre-empt and avoid future infrastructure barriers.

To summarise, an organisation’s internal policies can shape an organisations progress and momentum towards increased sustainability. Various policy levers such as preferential pricing and bans have been used within and outside UCC to varying extents. Likewise, tenders can be used to signal to and incentivise increased sustainability amongst external companies, including in a business-to-business context. External policies such at national or international levels can also shape how organisations approach plastics and their alternatives (e.g. EU Plastics Directive or HASSUP). Policies can also influence the implementation of sustainability-focused infrastructure within UCC.

The sustainability-focused infrastructure can act as a visual prompt for changing behaviour e.g. recycling bins and fountains, as well as providing alternatives for those that are trying to behave sustainably. Sustainable infrastructure considerations should include all aspects of the reuse cycle (from use, to washing, storage and reuse) to make reusables a more attractive option going forward. Likewise, there is a need to identify and where possible remove barriers to sustainable infrastructure and alternatives to SUP in both front and back-of-house settings. This involves working with stakeholders to eliminate SUP along the supply chain rather than only at point of use.

5.4. How to promote and incentivise sustainability regarding single-use plastic among students, staff and third parties associated with the university?

There are various ways in which the transition away from SUP has been or could be promoted and encouraged amongst the UCC community. Promotion activities include social marketing campaigns and education as well as through the formation of social norms. Incentivising sustainability also involves reducing the barriers to more sustainable alternatives such as cost, availability or lack of infrastructure for reusables. Thus, incentives can overlap broadly with policy and infrastructure. For instance, incentives such as preferential pricing are facilitated and encouraged in policy and tenders, which require supporting infrastructure to allow individuals to engage in reuse behaviour e.g. reusable cups, cup washers etc. Prioritising sustainability in the business-to-business context can also promote and incentivise changes in the structure and sustainability of supply chains.

5.4.1. Choice Architecture (Policy & Infrastructure)

SUR suggested that social norms are shifting towards reusable bottles and keep-cups in UCC. Nudging can be used to further promote and incentivise this transition away from SUP. As discussed in Chapter 2, a nudge is a way to influence people's behaviour. Lehner, Mont and Heiskan suggest that changing infrastructure and default options are the most effective type of nudges (2016). Both types have been used in UCC to change the default options (e.g. bans) and the infrastructure (e.g. bins, fountains etc.). However, there is scope for more infrastructure-based interventions as described above.

Choice architecture and nudge theory can be used to promote passive sustainable behaviour (Verplanken and Wood 2006; Thaler and Sunstein 2008; Lehner *et al.* 2016) such as making sustainable alternatives more accessible than their SUP counterparts. Currently, the pervasiveness of plastic in supply chains and consumer products make searching for alternatives an active and sometimes time-consuming process, thus deterring those that have become habituated to or reliant on the convenience associated with SUP-packed goods. This is a challenge facing people regardless of pro-environmental values:

"*The biggest thing that bothers me is when you just like don't have an option, when you're literally running from one place to the other and you don't have time to prepare your meal, or you don't have time to […] go to the plastic free café because it's just too, a little bit too far. […] Because […] I'll grab something off the shelf and not really think twice about it. Em, but in my head then I'm like 'Oh if you changed what was on the shelf, when you're in those moments like you wouldn't have to think about it.*' – SUR

SUR's comments highlight the potential of editing the choice architecture to nudge people towards more sustainable options. Given the propensity of people to act automatically or based on habit rather that active thought (Verplanken and Wood 2006), changing the most accessible default options could help shape the unconscious behaviour of 'grab and go' consumers (Lehner *et al.* 2016). This could be done through banning, preferential pricing for sustainable options, and/or by making sustainable options more convenient than their SUP counterparts through product placement. Banning has already been discussed in section 5.3.2. Currently, discounts are offered in UCC for keep-cup use with disposable cup prices seen as the baseline. However, disincentivising disposable use may be a viable way of nudging those that do not use reusables to start using them. For instance, Poortinga and Whitaker demonstrated the potential within a HEI to reframe disposable cup as costly through a levy to harness human's loss aversion tendencies (Poortinga and Whitaker 2018). Similarly, the Irish Government plan to introduce a disposable cup levy and a ban on certain SUP items by July 2021 (Department of Communications, Climate Action and Environment, 2020). Regardless of whether discounts, choice editing, bans or levies are used, nudging has the potential to promote and incentivise a move away from SUP in UCC.

5.4.2. Social Marketing

Social marketing used the tools of conventional marketing to promote responsible behaviours or activities e.g. recycling. Social marketing tools were used in the LGT's 'Love Our Library' sustainability campaign. In that case, an initial social media (fig. 30) and on the ground campaign informed library users of the upcoming disposable cup ban and prominent signage enforced that message (fig. 31).



Figure 30: Online media post from Bool Library counting down time until the ban and new bins were installed. Source: UCC Library Facebook page



Figure 31: Signage and petition location in UCC library. Source: UCC library Facebook page

The library campaign also included elements of community-based social marketing as they used pledges as a form of commitment and used face-to-face conversations with students to facilitate social diffusion of the sustainability message. Pledges have

previously been used to encourage behaviour change in social marketing campaigns such energy usage (Pallak *et al.* 1980), handwashing (Hindustan Unilever Limited 2015), charitable donations (Cotterill *et al.* 2013), healthy eating (Raju *et al.* 2010) and deforestation prevention (Garrett *et al.* 2019).

The library cup ban was done in tandem with an online, on-campus and face-to-face social marketing campaign to inform and engage the UCC community with the process. The success of the campaign in promoting pro-environmental behaviours was evidenced by the engagement with the library's sustainability petition, proper use of the waste stations, compliance with the cup ban and the positive feedback from library users. This form of marketing was particularly useful as it gathered commitments from library users and demonstrated collective interest in improving sustainability through the number of pledge signatures. The 2,500 pledges collected then acted as a launch point forthe UCC Student Unions 'Ditch the Disposables' petition which brought the issue of plastic pollution to the wider campus community. This chain of actions from a pledge focused on one building to a wider petition looking at the entire campus demonstrates the potential of green champions such as the LGT to motivate and enable sustainable behaviours across UCC directly and indirectly. The potential of thought or action leaders to catalyse changes in their communities will be discussed further in section 5.5.1. Additionally, obtaining small commitments can increase the likelihood of later agreeing to larger commitments (McKenzie-Mohr 2011, pp.45–48).

5.4.3. Education

Education through teaching and training has a role to play promoting pro-environmental behaviour through increasing stakeholders' awareness of the issues with SUP and imparting practical knowledge about how to behave more sustainably. For instance, frequent areas of confusion in the survey and interviews included what was SUP, what items are actually recyclable, where to find supporting infrastructure (e.g. cup washers) and what individuals or organisations could do to limit their environmental impact in a practical and meaningful way. Similarly, there is a need to tackle pervasive misconceptions and confusion around how to navigate trade-offs in sustainable behaviour.

Policies like the Connected Curriculum along with a university-wide module on sustainability go some way towards bridging these divides. However, there remains a disconnect campus initiatives and the influence on students and staff. For instance, *ca*. 37% of survey respondents neither agreed nor disagreed that events/courses or activities on campus had increased their concern for the environment, with a further *ca.* 26% disagreeing with the statement (Q8). This suggests that the impact of sustainability efforts was not universal, with those whose concern has grown accounting for *ca.* 37% of the total respondents. Given the self-selecting nature of the respondents and responses to other questions regarding concern for and awareness of environmental issues, there appears to be a disconnect between the top-down actions being taken through the Connected Curriculum and the impact on survey respondents. Some interviewees called for grounded learning about pro-environmental behaviour that linked students to on-campus sustainability initiatives. These considerations could be looked at when designing curricula around the Connected Curriculum policy to

ensure students and staff can learn and practice sustainable behaviour on campus. For

UCC to act as a 'living lab' in this capacity, there is the potential for Green Campus to funnel information on where knowledge and infrastructure gaps exist to college leadership and curricula designers to tackle the evolving barriers to sustainable behaviour as they arise.

However, education is not *the* solution to tackling SUP use and encouraging sustainable behaviour. Rather, it is one tool amongst many. Reliance on education shifts the focus away from the needed holistic approach and instead focuses on individual responsibility:

"There is evidence that as more alternatives are put in place and more education is put in place that the students themselves will reduce it to the point...It's a challenge for our education and if we get our education right there won't be any necessary for a ban because people will have been educated out of using plastic." – SFCE

Despite this assertion, consumer-end education and information campaigns have not been particularly successful in triggering behaviour change (McKenzie-Mohr 2011, pp.3–5) nor do they tackle the issue of increasing SUP production. For instance, plastic production is projected to increase in the coming years and if current trends continue, will account for 20% of oil consumption by 2050 (UNEP 2018) and generate over 25,000Mt of waste (Jambeck *et al.* 2015). These issues cannot not be tackled by education alone and require major changes to supply chains.

Additionally, at an individual level, there remains persistent gaps between consumers' pro-environmental attitudes and their actual behaviour (Lorenzoni *et al.* 2007; Carrington *et al.* 2010). Improving the understanding of sustainability especially

practical knowledge e.g. how to recycle and more importantly reduce waste and addressing prevailing misconceptions are important. However, consumers do not act in isolation and are influenced by habit, social norms and family amongst other things when trying to act sustainably (Cherrier *et al.* 2012). Education can be part of the solution by improving knowledge around behaving sustainably and navigating trade-offs. However, other social, structural and infrastructural barriers must also be tackled if new sustainable norms are to be enabled and encouraged.

5.5. What lessons can be learned from the UCC living lab for achieving sustainable behaviours in wider society?

This section discusses how leadership, tipping points in awareness and the attitude-behaviour gap influenced stakeholders in UCC. It explores the impact of leadership on the integration sustainability into the structures, infrastructures and behaviours within a HEI. Finally, the attitude-behaviour gap is discussed in the context of a HEI. These issues are in many ways universal and understanding how UCC has navigated these topics could help others working towards organisational sustainability.

5.5.1. Leadership

Increased sustainability can be dependent on the backing of organisational leadership or environmental champions to drive change (Department for the Environment Food and Rurual Affairs 2009; Bezbatchenko 2010; Sroufe 2017). Such has been the case in UCC, where top-down leadership helped shape the approach taken to sustainability. Examples of how leadership influenced sustainability are listed below:

Leadership	**Quote**
Need for top-down support:	*"I suppose that's one of the reasons we're good at [sustainability], is because we've got a CEO who's behind it."* – CE "*[Our local, plastic-free poultry supplier] was happy to do what we wanted because he felt like-minded again. […] But then again, it's hard to...like, he's the owner of that company and he could see the value."* - CE *"I feel like the action now needs to be top-down by the university to its subsidiaries…"* – SUR *"And I suppose support from the top as well. You do, you need that, and we have that."* – LGTM 2 *"Ban plastic bottles. If the President just decided 'no, no more', or whoever. I don't know who takes that decision. Ban plastic bottles and have enough fountains around the place that there's, that people have to bring their own."* - LGTM 2 *"[The UCC Deputy President] is having a coffee morning [in a new student building…]. [The building's project manager] said, 'I really want to try and have the [building] paper cup free.' […] So, they are going to put it on the invite that you are going to have to bring your own cup."* – LGTM 1
Lack of leadership can inhibit action:	*"…. you go to a big company, you never get to see the owner, you get to see [someone] you talk to […] at the end of the phone, and they don't have that passion so...that's just the way it is."* – CE

Importance of sustainability leaders in driving change:	*"Our company charter says […] we must provide economic services. We will and we provide the other alternatives as well. They buy it, they buy it. And they don't, they don't. We can encourage them to do it, but we can't make them do it."* – SFCE *"[Sometimes at the Green Campus meetings] an idea will come up, and they'll think 'aw we'll get resistance' and I think 'No, well we shouldn't because at the end of the day, UCC are who they are. People want to come to UCC and they just need to know if you come to UCC, we are plastic free, we are...whatever we are."* – CE *"I suppose we had an ongoing issue with the student's union at the time, that summer, not wanting us to get rid of the paper cups. They were absolutely adamant that it wasn't a good idea."* – LGTM 1 *"That's the cost of banning plastic. €75,000 a year. So, I mean, my board of directors which is a commercial board are saying 'Where are you going to get that money from if you stop selling bottles of water?'"* – WME *"I suppose if [the library sustainability] committee was disbanded in the morning; nothing would be done…It might come from the Green Campus committee or from Buildings and Estates. But it's people really, I think isn't it...drive it?"*- LGTM 2

In this study, leaders motivated sustainable changes in some cases, while restricting them in others. Leaders promoted change by encouraging and supporting sustainability actions within their spheres of influence, such as emphasising sustainability along supply chains (e.g. Biocafé and SFC suppliers) and in on-campus activities (e.g. UCC Deputy President's event). Likewise, LGTM 2 highlighted the importance of sustainability champions in driving change and acting as leaders within their sphere of influence. Sustainability champions such as the LGT often focus their efforts on a single building e.g. the library or Biocafé. However, for systemic change to occur, leadership at an organisational level is needed and the expectation that top-down leadership can and should be taking major action to eliminate SUP was echoed by SUR, CE and LGTM 2 along with some survey respondents. Efforts to implement systemic changes include the implementation of the UCC Sustainability Strategy, the employment of a sustainability officer and the co-ordination of sustainability efforts by student, staff and third-party stakeholders through the Green Campus committee and Green Forum.

Stakeholders are driven by the ethos and leadership of their organisation (Metcalf and Benn 2013; Blok *et al.* 2015; Akins *et al.* 2019). Thus, without approval or support from organisational leadership, the engagement of these stakeholders was more likely to be limited as SFCE comments suggest. However, these views were not rigid or all encompassing. Rather they guided cost-based decisions. For instance, the SFC financed the installation of six filtered water fountains at a cost of €4,500 showing they are making investments in infrastructure to support reuse. However, the removal of plastic bottles from sale was a major sticking point for the board of the SFC given a potential loss of €75,000 in plastic bottle sales annually and the implications for their employee's jobs.

While the potential of leaders to shape an organisation's willingness to change was particularly notable in the discourse from SFCE and CE, it was also present elsewhere. For instance, CE pointed to a reluctance at Green Campus meetings to engage with new ideas for fear of resistance. This echoes the initial backlash worries of the library staff and PE towards actions taken. However, on both cases, they experienced a willingness to change from the UCC population. Notably, in the case of the library's cup ban, initial resistance came from the student's union, despite widespread acceptance of the ban from students when it came into effect. This suggests that leaders' reluctance to engage with sustainability actions may amount to a structural barrier to individual behaviour change, as they can prevent major changes to policies, while in turn influence social norms. This highlights the importance of proactive sustainability-focused leadership can help ensure systemic, long-term changes are integrated into how an organisation runs as found by Ávila et al. (2017).

5.5.2. Willingness to Change

The Library and Procurement employees suggested there was a willingness for and positive response to sustainability initiatives run in UCC:

"…I was really surprised actually at how ready people were to make that change [to centralised printing]. I thought we'd get an awful lot of resistance, but it's been the opposite which is really encouraging…" – Procurement employee (about the sustainable print policy)

"There's a lot people that are really happy that we're doing it...in the library. They're really encouraging, and they want it to continue." – LGTM 1

This suggests that there is a willingness to change in UCC, as was suggested by the sense of responsibility, concern, and awareness reported by survey respondents. When these responses are considered in the context of UCC's ambition to be SUP free by 2023, it suggests that there is momentum behind sustainability movements in UCC to do more and that a tipping point in awareness and acceptance of sustainability has been reached. However, an attitude-behaviour gap remains.

As such, there is also a sense that the UCC community are happy to follow improvements in sustainability but are reliant on others like environmental champions to drive that change. For instance, practical changes appear to be driven predominantly by a top-down and middle-out approach through the efforts of leaders harnessing the public momentum towards sustainability and channelling it into tangible results (e.g. disposable cup ban, Biocafé, fountains, cup washers). These findings highlight the need for university leadership to advocate for and actively support sustainability efforts, especially the work of existing and emerging environmental champions, rather than relying on a 'bottom-up' approach.

To harness this momentum, barriers to sustainable behaviour must be removed. This is already being done in a piecemeal manner in UCC through replacing cutlery, crockery and adding alternatives. Similarly, SUP is tackled in a piecemeal matter in the area of policy. SUP management comes under the remit of the UCC Sustainability Strategy (2016) in the area of waste management, where the focus is on the reduction followed by recycling. As this is a strategic goal of the university, there is a need for top-down leadership to support and enable this transition away from SUP. Support can include financial backing (e.g. Biocafé), social (e.g. encouraging more involvement and modelling sustainable behaviour), structural (e.g. advocating for sustainable

policies and practices, allocating time for sustainability within work hours) or promotional support (public backing). Communication with the stakeholders or champions involved can isolate what type of support is needed in each case.

This requires university leadership to support initiatives and stakeholders involved in removing SUP from UCC and for this support to be communicated to the wider community. Currently, most of those surveyed highlighted barriers in behaving sustainably in the area of food consumption. UCC's most notable initiative focused on reducing this form of waste was the Biocafé. However, other types of reductions were happening elsewhere on campus including the replacement of individual condiment sachets with larger containers or the provision of fountains. These actions do play a role in reducing SUP or single-use alternatives.

Eliminating SUP from the supply chains remains a challenge for stakeholders. For instance, some larger companies seem resistant to change for perceived small demand:

"*...some of the companies were willing to work [with us] because they could, because they were small enough to do it. But the really big companies can't kind of do it, because they have so [many] procedures in place*" – CE

Some larger companies were willing to trial new innovations with stakeholders and expand them if they are successful (e.g. SFC compartmentalised delivery trucks). Some small suppliers were willing to change based on shared values (e.g. Biocafé local meat supplier) while others didn't and so were changed (e.g. Biocafé bread supplier). Where suppliers are resistant to changes, the responsibility falls on organisational leadership to choose whether to seek alternative suppliers at the potential risk of higher costs or less convenience.

Another challenge facing stakeholders is how to increase their sustainability without damaging their income. This is an understandable fear for those reliant on such industries for employment. However, it is noteworthy that in the study regarding the 'levy' on disposables, overall hot drink sales did not drop but there was a rise in keep-cup use (Poortinga and Whitaker 2018). This suggests that such fears may not become the reality. The study mentioned took place with UK businesses and HEIs. It suggests there is potential for such a study in UCC, to investigate and allay some of these fears. Similarly, the Biocafé is an example of trialling new forms of SUP-free consumption within UCC, without requiring drastic changes to other caterer-managed restaurants on-campus. The lessons learned in the Biocafé could be used in other areas of campus, including learning from the current limitations of upscaling such a model:

"...we will consistently move on to the next restaurant and do a bit. We'll do bits in them all, as much as we can. But could we have all Bio's? Probably not. It just wouldn't work because of... […] ...when I look in the main restaurant now. The footfall there is huge. To even police that like, people will still bring in plastic. So, it won't be plastic free if they're bringing in plastic." – CE

There needs to be a willingness to change and embrace sustainability for changes to occur amongst stakeholders. However, this research suggests that attitude-behaviour gap remains in UCC. As such, there is a need for leaders to harness the willingness to change to drive systemic changes.

5.5.3. Attitude-Behaviour Gap

This research suggests that a gap between sustainability-focused knowledge/attitude and behaviour was present in UCC even amongst those that were aware of it. While

those who were interviewed were informed and engaged with sustainability, they still struggled to reduce SUP completely. Such findings add to the literature on green consumption and reaffirm the need to look beyond individual behaviour change and towards paradigmatic change (Lorenzoni *et al.* 2007; Young *et al.* 2010; Rettie *et al.* 2012; Carrigan 2017). In some cases, despite strong pro-environmental values and actions, interviewees still highlighted barriers to the complete removal of SUP. Similarly, in the literature, there are examples of self-described ethical consumers struggling to act in a pro-environmental way across all contexts (McDonald *et al.* 2012). It is understandable for individuals to change their behaviour in response to their social and environmental context and being unable to completely align behaviour to values does not negate the pro-environmental actions taken by those individuals. However, it does suggest that providing information or supporting pro-environmental attitudes alone are not enough to consistently ensure pro-environmental behaviour. Similarly, sustainability considerations amongst those surveyed were highest in the area of recycling compared to waste producing activities. As such, there is a need to understand and remove the barriers preventing people from acting on their pro-environmental values across various contexts, as explored through the 'glass floor' concept (Cherrier *et al.* 2012).

Involvement in sustainability initiatives did prompt changes in behaviour amongst some of those interviewed. This was seen in the comments of the library and catering interviewees who found their efforts to improve the sustainability of their workplaces resulted in increased personal environmental awareness and action. These examples suggest an iterative relationship between behaviours and actions in line with the findings of Sussman and Gifford (2019). In the library, the provision of segregated bins, twinned with the sustainability pledge and disposable cup ban increased the

recycling rates which suggests that promoting pro-environmental norms has improved the pro-environmental behaviour of library users. This has implications for how UCC can engage its staff, students, contractors and visitors in this and future sustainability projects. Once students have been mobilised to action (e.g. signing a petition), it can be difficult to maintain the same momentum in the wider population as they now see that responsibility shifted to the university itself:

"…obviously there was a lot of momentum last year when the petition was set up […] but once the petition's signed, […] it's hard to get students to remain I suppose interested in what's going on, because the university have agreed to it so like, what else can I do?" – SU representative

It appears that the perception of responsibility and its link to self-efficacy are dampened slightly when the responsibility moved away from the individual. This can be beneficial for individuals that feel they are carrying too much of the burden of sustainable behaviour. It also speaks to a perceived lack of self-efficacy amongst students towards sustainability issues beyond signing petitions. The social cognitive theory highlights the importance of perceived self-efficacy in shaping behaviour and how much effort is put towards goals (Bandura 2000) If lack of self-efficacy is an issue in the wider UCC community, it may contribute to a lack of on-the-ground engagement with sustainability initiatives.

The perception that large organisations are either unwilling to change or only take superficial sustainable actions (e.g. greenwashing) speaks to the literature regarding consumers (lack of) 'green trust' (Brennan and Binney 2008; Chen and Chang 2013). This research suggests clear communication between organisations and individuals is needed to build trust and transparency into sustainability initiatives. Sustainable

procurement criteria are part of the solution, with respondents and interviewees recognising the potential of UCC and its associated organisations to drive change through lobbying and creating market demand for sustainability. However, it remains clear that there is a need for systemic changes at all levels and that UCC and associated third parties cannot rely on 'mythical' green consumers to drive down SUP consumption. Rather, the persistent evidence of the attitude-behaviour gap highlights the need for holistic changes to stem the flow of SUP into UCC while normalising and facilitating a reuse and waste avoidance culture.

5.6. Conclusion

This chapter discussed the key findings of this research through the lens of three main research questions. In answering those research questions, the role of structural and infrastructural changes in influencing sustainable behaviour was discussed through the lens of policy, tender and infrastructure. Various ways to promote and incentivise sustainability towards SUP were highlighted including through choice architecture, social marketing and education. Finally, the importance of leadership, a willingness to change and the attitude-behaviour gap in facilitating progress towards increased sustainability were expanded upon to help inform UCC and hopefully others on their journey away from SUP.

Chapter 6.

Conclusion

6.1. Introduction

The aim of this thesis was to explore the societal and marketing levels involved in achieving a SUP-free UCC by 2023. The aim was achieved through analysis of survey and interview data gathered from the UCC community. The findings were discussed in the context of three research questions which examined how structures and infrastructure influence behaviour, how sustainable behaviour can be encouraged and how the lessons learned in pursuing sustainability in UCC could be applied in a wider context.

This research affirms the importance of stakeholder engagement (Brusca *et al.* 2018), committed and supporting leadership (Ávila *et al.* 2017), environmental champions (Fell *et al.* 2009) and sustainability-focused policies (Alshuwaikhat and Abubakar 2008) in precipitating change within UCC and along its supply chains. It highlights the potential for middle-out actors to catalyse changes (Akins *et al.* 2019) in behaviour at individual and structural levels.

The research also highlights an attitude-behaviour gap amongst those interviewed and surveyed. This adds to the literature on this phenomenon (Carrington *et al.* 2010; Cherrier *et al.* 2012; Hassan *et al.* 2016) and highlights the danger in assuming raising environmental awareness is enough to trigger and maintain behaviour change without changing the underlying social norms, structures and infrastructure to prioritise sustainability. Financial barriers to accessing sustainable alternatives to SUP strongly influenced both individuals and organisations, with a reliance on SUP associated with perceived convenience and cost, regardless of long-term savings potential of alternatives. The barriers created by (lack of) infrastructure also highlight the need for

sustainability to be fully integrated into the planning and development of the built environment (built-in), rather than added later (built-on) (Disterheft *et al.* 2015).

In UCC there is a need for a significant, sustained effort from all levels, particularly those in leadership roles to tackle plastic as far up the supply chain as possible, rather than focusing on its end-of-life as a waste product. As such UCC has the responsibility to look at how sustainability can be embedded holistically into the structures and norms within the university to ensure continued long-term improvement in this and other sustainability challenges.

6.2. Overview of key findings

1. **Leadership:** Support from top-down leadership is important for sustainability initiatives. Such support includes engaging with sustainability initiatives (e.g. reusable cup coffee mornings), financial backing (e.g. catering CEO), public support (e.g. signing the Ditch the Disposables petition) and actions to embed sustainability as a core pillar of the university (e.g. Sustainability strategy) (see section 5.5.1).
2. **Environmental champions:** Environmental champions such as the LGT played a key role in catalysing change in UCC. Such individuals frequently worked as 'middle-out' actors that instigated policy and infrastructure changes that encouraged new norms within their zone of influence (e.g. Biocafé and library). While the direct authority of these champions was usually restricted to or focused on a small space, their actions were associated with pro-environmental spill-overs in wider policy and behaviour, encouraging top-down (e.g. discounts for reusables) and bottom-up changes (e.g. students/staff signing the Ditch the Disposables petition).

3. **Sustainable supply chains:** Given the evidence of the attitude-behaviour gap there is a need to move the responsibility for making sustainable choices beyond individuals. As such, there is a need to explore other ways of removing SUP, such as re-evaluating supply chains to prioritise and incentivise sustainability. UCC and its subsidiaries have taken steps in this area through tenders and communication with suppliers. However, some changes have been resisted by large suppliers while supported by smaller suppliers. These findings highlight a potential area of action for UCC regarding how it uses its purchasing and political power to ensure that large suppliers are accountable for their environmental impacts and that sustainability considerations are central to the tendering process. The resistance of some suppliers to change was linked to the disconnect between their leadership and company actions further highlighting the importance of active and engaged leaders in driving systemic changes in organisations.
4. **Availability of alternatives:** Given the entrenchment of SUP in habitual behaviour, UCC could encourage its community to behave sustainably by ensuring alternatives to SUP are available and affordable, with particular focus on reusables. Placing alternatives to SUP more conveniently may help the 'grab and go' consumers to grab more sustainable options. Ultimately, changing what goods are available and acceptable may restrict the flow of SUP into UCC, which includes using policy levers to remove SUP and enforce such restrictions. However, to change what's on the shelves, stakeholder co-operation is essential.
5. **Attitude-behaviour gap:** A clear attitude-behaviour gap was found in UCC. Additionally, surveys and interviews suggest a lack of practical knowledge of how to engage in sustainable behaviour e.g. waste separation and what is and isn't single-use plastic. There was a sense of confusion about how to navigate trade-offs in sustainable behaviour. This suggests there is a need for education and marketing on campus that engages people with practical sustainability, rather than providing general sustainability-focused information. Social marketing and education were useful tools

in informing and engaging with the UCC community. However, information-based campaigns can have limited lasting success (Howarth and Butler 2004; McKenzie- Mohr 2011, pp.88–89), and be over-relied on to trigger behaviour change (Axon *et al.* 2018). As such, while a useful tool in engaging with and informing the UCC community, they do not negate the need for systemic changes.

6.3. Recommendations

1. **Strengthen and embed the commitment about SUP into the general functioning of the university**, which can inform and guide future policies and tenders. Such a policy could include provisions for preferential pricing for sustainable alternatives and levies on non-essential SUPs (e.g. alternatives available), prioritising systemic sustainability considerations in tenders and development plans to minimise waste production and provide appropriate infrastructure to facilitate waste separation. Such considerations need to extend into the supply chains (e.g. goods/service delivery and packaging).
2. **Ensure that stakeholders are involved in the journey** to remove SUP and their sustainability efforts are recognized. Additionally, ensure stakeholder feedback is used to inform policy creation and enforcement, as they have important insights into consumer behaviour and barriers to SUP removal. Decide a timeline and a specific date from which targeted SUP will not be allowed in consultation with stakeholders. Consider aligning a SUP-free transition to the start of a new academic term/ semester to harness the potential of such times to facilitate behaviour change.
3. **Ensure that SUP-related policies are enforce**d, for instance levies or bans, to allow the habit of reusable use to become established amongst those not currently using them frequently (e.g. in the library and Biocafé).

4. **Introduce infrastructure that enables reusable use in both front-of-house and back-of-house settings**, particularly in areas where disposables are currently the most viable option, e.g. catering and reusable washing facilities. Such facilities include washing and storage facilities for reusables.
5. **Support sustainability champions**, as they can drive middle-out changes within UCC. Such supports can be financial (e.g. for financing initiatives and marketing/ signage), knowledge sharing (e.g. energy talks with library staff on how to improve efficiency) or human resources (e.g. extra time to focus on improving sustainability initiatives). Additionally, facilitating connections between current and potential champions such as peer-to-peer (SUR speaking to their friends), mentor to mentee (e.g. Energy manager to library staff) or manager to staff (e.g. catering CEO to CE).
6. Consider integrating practical **sustainability education** into existing courses as part of the connected curriculum. Aim to improve practical environmental literacy towards new and existing materials (e.g. single-use plastics, bioplastics, compostables, etc.), waste segregation rules and product labelling to tackle the gap in practical knowledge suggested by the survey and interview findings.
7. If single-use items remain on campus in some capacity due to overriding issues, such as hygiene concerns during the COVID-19 pandemic, **ensure the options used have the least environmental impact possible** and there are appropriate bins widely available for their correct disposal including compost and liquid bins.
8. **Strong support from leadership** is key to ensuring the goal of removing SUP is achieved in the university. As such, leaders need to encourage efforts to improve long- term sustainability through both policy and practice/implementation even if they are initially more costly, as occurred with the catering CEO. Additionally, the values and actions of an organisation leaders influence the attitude of staff, so it is important that leaders model the behaviour they want others to adopt (e.g. then UCC Deputy President running a reusable cup only coffee morning).

6.4. Limitations of this Research

Acknowledging the limitations of research done is important in drawing conclusions from the data collected. As such, this section outlines limitations of this research.

Surveys are limited by factors such as the inability to follow-up with respondents, uncertainty over whether questions are interpreted the same way by all respondents (Saunders *et al.* 2016) and the potential for social desirability bias (Fisher and Katz 2000; Kreuter *et al.* 2008). The interpretation issue was highlighted in section 4.2.2.2. Given that the survey was voluntary and offered no reward, participants were likely interested in sustainability prior to taking part, especially given the high levels of concern reported. This may have biased the results towards pro-environmental responses.

Another limitation relates to researcher bias. While the researcher did not intentionally influence interviewees, there was the potential for the unconscious reactions that may have swayed the interviewees. Likewise, interviewee's knowledge of aim of this research (to inform the removal of SUP) may have influenced how they presented their experiences. Regarding data analysis and interpretation, given the interpretivist stance taken in this research, a less rigid observance of objectivity was not a weakness but rather part of the research process (Hammond and Wellington 2012; Ryan 2018). However, such a stance means that other researchers may interpret the data differently and draw differing conclusions.

Another limit of this research is the time scale. This research took place over the course of one year, during which the COVID-19 pandemic removed assess to the UCC campus, making further data collection or on-campus actions unfeasible. As such,

while this research is aligned with action research, in that it is research informed by action and with the purpose of informing further action in the context of the larger project to remove SUP from UCC, the potential for action during the duration of the thesis was severely restricted.

This research offers a snapshot of behaviours and attitudes within UCC at a particular time, pre-COVID-19. However, the major changes brought about by the pandemic mean that this snapshot is unlikely to reflect the 'new normal' in which UCC and its community now operate.

Finally, the scope of the research focused on those considered key stakeholders in the Plastic-free UCC agenda by the researcher and supervisory team. However, other key stakeholders such as university leaders were not interviewed so there are potentially important voices missing from this research. However, given the timescale and circumstances, the researcher considers the findings as a valuable contribution to UCC's sustainability journey.

6.5. Areas for Future Research

The findings of this thesis have inevitably raised future research questions that could be addressed to further the plastic-free agenda. The following are some areas suggested for future research:

- How to engage and motivate members of the UCC community to serve as environmental champions?
- What supports are needed to sustain efforts of existing environmental champions in UCC?
- What communication strategies are needed to effectively engage the entire UCC community to action - ensuring consistent pro-environmental behaviours thus bridging the attitude-behaviour gap?
- How can UCC further engage with suppliers to improve the systemic changes in supply chains, minimising the need for individuals to actively seek out sustainable alternatives?

6.6. Chapter Conclusion

This thesis explored how societal and marketing levers can and have been used in UCC to leverage sustainable behaviour and facilitate the transition to a SUP-free UCC. The findings of this research highlight the importance of identifying barriers to sustainability at a structural and infrastructural level while also understanding the behavioural barriers at an individual level. The findings highlight the importance of leadership both from organisational leaders and environmental champions in driving systemic change through structural (e.g. policies and tenders) and infrastructural changes (e.g. reuse infrastructure such as fountains and washing/ storage space). Additionally, it reaffirms the presence of an attitude-behaviour gap within UCC, which highlights the futility of relying primarily on individuals to drive changes within a DSP which prioritises unsustainable consumption. To facilitate a paradigmatic shift away from the DSP, reuse must be prioritised over single-use and supporting infrastructure and messaging put in place to engage stakeholders in such a transition. Stakeholder involvement remains important as without their buy-in, such initiatives are unlikely to succeed, and it is important that stakeholders feel valued and their sustainability efforts are recognised. Leaders and decision makers in UCC and its subsidiaries need to cooperate to deliver the goal of a SUP-free UCC by 2023 by looking at the issues holistically and enacting systemic change for lasting change.

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Appendices

Appendix 1. Example of Interview Consent Form

Are you over 18 years old? Yes☐ No☐

I .....agree to participate in Aoife Hughes' research study.

The purpose and nature of the study has been explained to me in writing.
I am participating voluntarily.
I give permission for my interview with Aoife Hughes to be audio-recorded.
I understand that I can withdraw from the study, without repercussions, at any time, whether before it starts or while I am participating.
I understand that I can withdraw permission to use the data within two weeks of the interview, in which case the material will be deleted.
I understand that anonymity will be ensured in the write-up by disguising my identity.
I understand that disguised extracts from my interview may be quoted in the thesis and any subsequent publications if I give permission below:
(Please tick one box:)

I agree to quotation/publication of extracts from my interview ☐

I do not agree to quotation/publication of extracts from my interview ☐

Signed: ……. Date: ……..

PRINT NAME: …….

Appendix 2. Example of Survey information page and consent form

Survey Information page

Thank you for considering participating in this research project. The purpose of this document is to explain to you what the work is about and what your participation would involve, to enable you to make an informed choice. Participants in this study must be over 18 years old.

What is the study about?

The purpose of this study is to understand how students and staff at UCC use single-use plastic and what are the main challenges in making UCC single-use plastic free by 2023. Should you choose to participate, you will be asked to complete a survey which will include items on plastic use, sustainability awareness and sustainable behaviours.

Do I have to take part?

Participation in this study is completely voluntary. There is no obligation to participate, and should you choose to do so you can refuse to answer specific questions or decide to withdraw from the study. You maintain the right to withdraw from the study at any stage up to the point of data submission. At this point your data will be collated with that of other participants and can no longer be retracted.

Will my data be linked back to me?

All information you provide will be confidential and your anonymity will be protected throughout the study. IP addresses will not be collected at any point, meaning the data you provide cannot be traced back to you.

Where will my data be stored?

The anonymous data will be stored on the University College Cork supplied OneDrive for Business and subsequently on the UCC server. The data will be stored for at least 10 years. The anonymous information you provide may contribute to a research master's thesis, a roadmap to eliminating single-use plastics from UCC, research publications and/or conference presentations. It may also be used in internal or external communications regarding UCC's journey to becoming Plastic Free.

This study has obtained ethical approval from the UCC Social Research Ethics Committee.

If you have any queries about this research, you can contact me at:

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If you agree to take part in this study, please complete the consent form in the next section

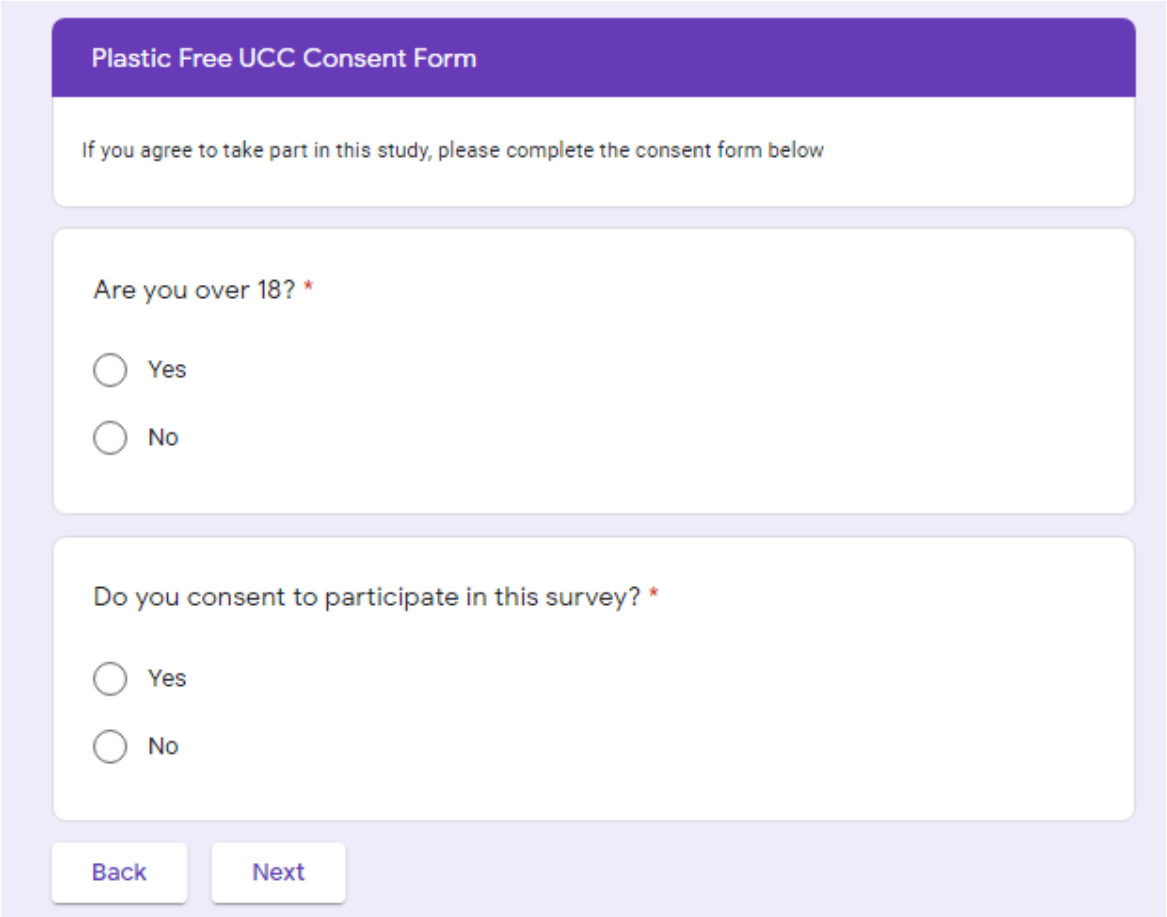


Figure 32: Survey consent questions as they appeared on Google Forms

Appendix 3. Survey Questions

1	Are you:	Undergraduate Student	Post-graduate student	Permanent staff member	Contract staff member
2	Please state your disciplinary background				
	Natural/ Biological Sciences			Business	
	Physical Sciences			Law	
	Chemical Sciences			Medicine and Health	
	Engineering			Social Sciences	
	Food Science			Arts	
	Other (Please State)				
3	Do you feel environmental problems are;	An urgent problem	A problem for the future	Not a problem	Don't know
4	The so-called "ecological crisis" facing humankind has been greatly exaggerated	True	False		

5	How aware are you of the following sustainability initiatives at UCC?	Not aware	Aware, but don't know what it means	Aware and know some details of what is involved	Aware, know what is involved	Actively involved
	a. Green Campus					
	b. Love Our Library					
	c. Single-use plastic free UCC					
	d. Savers Saves Scheme					
	e. Plastic-free Biocafé					
	f. Farm for Fork					
6	I fully understand the meaning of the term “sustainability”.	Strongly Disagree	Disagree	Neither Agree nor Disagree	Agree	Strongly Agree

7	I actively consider sustainability when I make choices regarding:	Never	Occasionally	Often	Always	
	Buying food					
	Dealing with my rubbish					
	Using energy					
	Transport options					
	Buying clothes					
	Water					
8	My concern towards environmental issues has grown due to the events, activities and/or courses offered by my campus.	Strongly Disagree	Disagree	Neither Agree nor Disagree	Agree	Strongly Agree

9	I am aware of the issues surrounding using single-use plastic	Not aware	Aware, but don't know what it means	Aware and know some details of what is involved	Aware, know what is involved	Actively involved in plastic reduction projects
10	I used the same amount of plastic this year as the year before	Strongly Disagree	Disagree	Neither Agree nor Disagree	Agree	Strongly Agree
	In the last week I actively avoided buying single-use plastic items or items in single-use plastic	Never	Occasionally	Often	Always	
12	How regularly would you use each of the following	Never	1-2 times per week	3-5 times per week	More than 5 times per week	
	Plastic straws					
	Plastic bottle					
	Non-reusable paper cup					

	Plastic food wrapping e.g. cling film				
	Plastic wrapped food				
	Reusable bottle				
	Reusable coffee/ tea mug				
	Reusable lunchboxes				
	Reusable straws				
	Water fountains				
13	What are the main issues encountered in buying items without single-use plastic				
	Too hard to find				
	Too expensive				
	Poorer quality				
	Poor choice				
	Social stigma				
	Other*				

	*Please describe					
14	It is better to prevent waste than to recycle	True	False			
15	I know what the correct bin for each type of waste is, particularly for types of plastic	Strongly Disagree	Disagree	Neither Agree nor Disagree	Agree	Strongly Agree
16	I use the correct bins when on campus e.g. recycling, compost, general waste	Never	Occasionally	Often	Always	
17	Answer true or false to the following questions:					
	Soft plastic is widely recyclable in Ireland e.g. plastic packaging around fruit	True	False			
	Hard plastic is widely recyclable in Ireland e.g. water bottles	True	False			
	Paper tea/ coffee cups are widely recyclable	True	False			

	Compostable cups are widely recyclable		True	False		
18	I believe that living more sustainably is my responsibility	Strongly Disagree	Disagree	Neither Agree nor Disagree	Agree	Strongly Agree
19	How do you hear/find out about environmental issues?	Newspapers/ Magazine/ Books	Internet	Family/ Friends	UCC sources	Other
	If other, please state					

Appendix 4. Sample Interview Transcript

Interview with SUR: 2020-02-25

SUR: Student Union Representative I: Interviewer

I: #00:00:02-0# Alright so [...] the first question I have is could you tell me a bit about your role in the university and your experience with any sustainability initiatives so far. #00:00:10-8#

SUR: #00:00:10-8# Yes, I can. [...] so my role within the university [...is as a representative] for the student's union. And I suppose where my job interlinks with sustainability would do a lot with [...] Green Campus and Green Forum.[...] so I'm a co-chair of Green Campus with [the Environmental Society Chairperson] and we try to work on the environmental issues, sustainability issues that students want to work on.[...] because a big thing about it is obviously that it is student-led. [...] and then also by proxy to that membership, I also sit on Green Forum, which is the staff-based Green Campus and they kind-of look at the longer plan for the university, like the strategic plan, the rankings, what we can do better, what's working well in other colleges that we can kind-of take inspiration from. [...] and then also I suppose, just on a more union-based level, [...] I kind-of try to ensure that any of the campaigns we run, that are run, they're run more environmentally friendly than previously.[...] because they used to use the cling film and wrap them around the trees and stuff, but that's all been banned. So, we're trying to make sure that any kind-of materials that we use, there's a way to reuse them in the future. [...] it's minimal waste that we're producing, or that

they can be given away or donated.[...] like if we, I don't know, that any kind-of blankets or stuff that we could use, we could bring to a charity shop or we could give to a hostel, things like that.[...] what else, I think that's my sustainability...Oh yes, oh yes. I also sit on-. This is not a thing, sorry. It's kind-of proxy to Green Campus as well. But we also sit on, three members of the student's union sit on the student facilities and services board, board of directors. And this, what we've been trying to do-, because it's including the [SFC]. [...] and we've been trying to get loads of the plastic bottles out of the student centre.[...] so we're trying-, ourselves, between the [SFC] and [the catering contractors] who are like the Main Rest and everything like that, they've both agreed that they will get rid of their plastic once the other one does. So if they both agree to it, we can get all the plastic out of the campus, so UCC can by plastic free by 2023.[...] but if one won't budge, the other won't, kind-of a job.[...] so we've been trying to think of ways as board members to kind-of bring up proposals[...] for them to take on board so that-. Kind-of, at the moment we're after getting like the biodegradable bottles in, [...] that's just one step. So, we're kind of hoping that if we tackle it, bit by bit, that we'll change it. And then, also to kind of-. A lot of the issues we've been having with that is that manufacturers are making the plastic bottles and they're saying the it's not, it's no cheaper to do it with the cans or other recyclable materials. [...] but our kind-of perspective is that if we're demanding it, if we're showing that we're not going to have the plastic in it, then maybe manufacturers and companies will like change their opinions. So that's kind-of, I suppose what we've been doing on sustainability…I have. Yeah, okay, there we go. (SUR laughs) #00:03:16-2#

I: #00:03:16-2# Mmh, great. And what would you feel your role would be in the vision of UCC becoming plastic free? #00:03:23-6#

SUR: #00:03:23-6#[...] I suppose my role, both kind-of informationy-led, like why it's important. [...] I suppose getting the momentum up, back again every year. Because obviously there was a lot of momentum last year when the petition was set up.[...] but once the petition's signed, it's very like, it's hard to get students to remain I suppose interested in what's going on, because the university have agreed to it so like, what else can I do. So I suppose keeping it on the agenda and making sure that no matter what meeting you're going into, if there's plastic bottles everywhere or if there's, like if there's very simple ways of getting rid of it so UCC can become plastic free that you call it out and you point it out. [...] so I think it's both based within telling staff it is important that we've all signed on to this agreement. The Deputy President and the President had. But getting them to actually getting them to actually change their,their ways I suppose is like, one of my roles [...] throughout discussions and through meetings and stuff like that.[...] but also definitely keeping the students active on like, don't use the plastic, ditch the plastic and all that. So, yeah. #00:04:24-1#

I: #00:04:24-1# And what would you say is the main driver, the main motivator in pushing the plastic free agenda in your opinion? #00:04:32-0#

SUR: #00:04:32-0# I think the main motivator at the moment is definitely the environment.[...] and also people trying to do better for the environment, because we saw the turnout for the strike for Friday.[...] and it's something that's kind of capturing a lot of people whereas it used to be just like kind of environmental activists. I think its kind of filtering down to just the ordinary person just sitting at home, not really thinking. Now it's constantly kind of in their mind and in[...] it's like everywhere. It's like use the carton or use the, the can. Like, stop using the plastic because they're seeing, they're seeing the harm on animals and I think that's a big think as well, not just like the fact like oh the global warming and everything. But the fact that they see damage to like turtles and […] seals and all the kind of marine life as well. I think that's a big kind-of kick as well to ditch the plastic. #00:05:17-9#

I: #00:05:17-9# Okay. And would that-, where would that translate to in terms of the university? That the...So the environment as a motivator in general, but do you think that is the specific motivator for within the university itself? #00:05:37-1#

SUR: #00:05:37-1#[...] like within the university I think it's, I think yeah they're very conscious that they want to leave a good impact on the environment and obviously with all the trees that are here and stuff, it's obviously part of the heritage of UCC. But I think also from a university standpoint it is a little bit about rankings and it is a little bit about like having the best research and being a leader in something, which isn't a bad thing either because if you're being seen as a leader, then hopefully everyone else can get on board and I think that really is kind of the key focus from the university

side. Is that […] if you can see what you can do when you want to change, maybe others will. But then it will also kind of give them like a good push to other colleges being like we're actually really good at this, you should come here (Laughter). So, it's kind of I think it's a bit of both. Of like they want to do good but also by doing good it's good for them, publicity wise. Sorry (SUR laughs), #00:06:29-4#

I: #00:06:29-4# [No, you're alright] #00:06:29-3#

SUR: #00:06:29-3# calling them out now (SUR laughs). #00:06:31-2#

I: #00:06:31-2# And what would you say are the main challenges in becoming a single-use plastic free university? #00:06:38-1#

SUR: #00:06:38-1#[...] I think the biggest issue at the moment is plastic that comes in from like external sources. [...] so say, I used to work in the [shop on campus]. And every day we used to get deliveries say from [the supplier], and their crates if they weren't fixed or if they were broken, used to be wrapped head to bottom in plast-, in in like cling film. Like heavy duty cling film. So, and there could be 3 or 4 crates wrapped in it. So, every day that was coming into us from one shop below. [...] that's a really big issue. [...] I feel like because there's not enough substitutes I think as well in terms of commercial. [...] for actual products. That could be an issue as well. Like

even simple things like pens are all, all single use plastic. [...] like just very, very small things that people mightn't thing about make up an enormous amount that you have to search for alternatives. So, I think that's the biggest overall problem. Because everyone does seem to be fairly on board and […] kind of wants it to happen. But it just kind of making it a reality [...] I think will be the toughest thing to achieve and finding those alternative sources. #00:07:48-7#

I: #00:07:48-7# And would you find that-, would you use much single-use plastic on campus? Would you encounter much of it? #00:07:56-3#

SUR: #00:07:56-3#[...] I try not to use much of it on campus.[...] obviously there's bits that you have to do.[...] like when I run the student community support, we give out water to students who might like, in need of hydration, who could be a little bit intoxicated and just need a bit of a revival. And unfortunately for that we have to use the bottles because there's no way that we can have like loads of stations with cups and […] sing-, reusable bottles because like, we just, the cost would just be-, would bankrupt us.[...] so...sorry what was the question again? #00:08:29-0#

I: #00:08:29-0# Em-. #00:08:29-9#

SUR: #00:08:29-9# How do I encounter it? Sorry, yeah. [...] but the most amount I actually interact with it or see it at all would be with, with food and in, in shops. But then luckily enough, with the installation of the fountains and the whole like ban the disposable cups in the library as well, like I have seen less of it in my last two years than I did in first year of college. So, I do see it changing. I still see it in places but it's definitely not as widespread as it used to be. I don't think. #00:08:58-4#

I: #00:08:58-4# And so the most frequent type of plastic that you would encounter would be...? #00:09:03-6#

SUR: #00:09:03-6#[...] the like soft, kind of, what's it called. The ones for the cartons for food and do you know the ones that are on like the sandwich wrappers, those and then bottles. There like the three mai-, and actually as well as that, like cutlery. #00:09:19-1#

I: #00:09:19-1# Mmh. #00:09:19-7#

SUR: #00:09:19-7# There's a lot of plastic cutlery. Em, so they'd be like the four I can think of at the moment-, and cling film. There's a lot of cling film everywhere still, but yes. #00:09:27-3#

I: #00:09:27-3# Mmh-hmm. And what do you think the most effective thing that UCC has done or is in the process of doing to encourage students to avoid single-use plastics? #00:09:38-3#

SUR: #00:09:38-3# I think. I think I mentioned already but definitely the library campaign about not being able to bring in disposable cups into the library. That's been like, phenomenal. [...] and also then the water fountains. Because if people see the water fountains, they're, they're using them. Like they are being used.[...] and we've even been told by the [SFC] that there has been a decrease in sales of water bottles since the fountains have been installed as well.[...] so those two initiatives, I think, they're very simple but they've worked very, very well, I think with the student population. #00:10:09-5#

I: #00:10:09-5# Mmh-hmm. And in your role as a student council member, would you encounter any specific challenges towards[...] single-use plastic-free UCC? #00:10:20-7#

SUR: #00:10:20-7#[...] in terms of like student council, #00:10:23-4#

I: #00:10:23-4# [Yeah] #00:10:24-0#

SUR: #00:10:24-0# like do-, like is there much objection to it? #00:10:25-7#

I: #00:10:25-7# No, more so, [...] in your role as a student council member is there any specific challenges that you would encounter that let's say a general student wouldn't? #00:10:36-9#

SUR: #00:10:36-9# Oh, em...I, mainly, I, not a whole lot, I don't think. I feel like it will become more of a thing if there's like deliveries coming in and stuff. [...] once again, like if there's external things coming in, [...] there will be plastic on some of them. But in the role, we tend to do a lot of things online. We try our best to try and do things plastic free as well, where possible. So, I think it's a little bit similar to kind of a lot of the mindsets that the general student would have. There's nothing that's actually shouting out at me saying, 'Oh you do encounter this the whole time'. But yeah, no, if I think of anything, I'll let you know but I can't think of anything at the moment. #00:11:23-3#

I: #00:11:23-3# And, do you think that the recycling and waste facilities on campus[...] influence single-use free-, or single-use plastic behaviour? #00:11:35-7#

SUR: #00:11:35-7# Do I? Yeah, potentially. There are, there are good I suppose recycling [...] facilities on campus, some of them. I think there needs to be more. But

I also think that do you know the way there's the bottle recycling bank in the student centre. I think that's great because obviously that gets people to recycle. But like, it's only in a corner and it's all, so then trying to get people to put through their single-use plastic bottles back through, again and again.[...] so I feel like if there's less emphasis, if there's more emphasis put on like getting your reusable bottle and using it, rather than em...like no-. Recycling is good like, you know what I mean, but like and I know it's unavoidable, but there's, there's a balance between constantly being like, 'oh these bottles are, are recyclable, just recycle them' then pushing the agenda of like, but every single bottle you use, if you use one bottle per day, that's 365 or 366 bottles that you've encountered. And I don't know if that message is being pushed clearly enough with the recycling facilities. I think if there was like a case where there could be, either the biodegradable bottles and the cans, if there's like a specific place for those to go. Because I know a lot of the waste is all mixed up together and some of the[...] compostable[...] bottles and cups need to go to be treated separately. Not a lot of people know that, so they just throw them into the recycling. [...] so I feel like there can be changes that were made that could push the single-use or anti-single-use agenda more. I think there's good initiates behind it, but I just think it just needs to progress a bit to the next level. #00:13:17-0#

I: #00:13:17-0# And how would you-, would you have any suggestions for how that could be done? #00:13:21-5#

SUR: #00:13:21-5# I think like a massive information campaign needs to be done about it. There needs to be, I think, so you need a lot of co-operation between the companies[...] that are affiliated with UCC. And I think there needs to be[...] more, more like-. I know there's loads of options on the shelves, but there is still like a monopoly of the plastic bottles. There's like say 100 plastic bottles on the shelves and then like 16 cans of water. It's just not like comparable. [...] because yeah that is another option, but when it's like twice the price for half the amount of liquid, [...] just because it's kind of niche, like that doesn't do well. So I think like the businesses within UCC really need to co-operate with Green Campus and Green Forum and kind of become more realistic with like their prices that they're offering to students, because if they put them at that unaffordable reach, just on like, not on purpose but there's no need for them to be that high. Once they make a profit on what they're getting, there's no need for it to be double or triple what the sale cost is. [...] so I think that needs to be done. An information campaign to students at least once a year, [...] will need to be done until 2023. And then even, I don't know, some kind of sub-committee set up within UCC itself working towards[...] single-use, single-use plastic free university. Yes, that's a long, long title there. (B laughs). #00:14:44-7#

I: #00:14:44-7# And in terms of the information campaign, what would you think is the most effective method of reaching students? Would it be coming from the college, the SU, where, where do you think would be the best way to- #00:15:01-1#

SUR: #00:15:01-1# [to do it.] #00:15:02-0#

I: #00:15:02-0# to-, yeah. #00:15:02-4#

SUR: #00:15:02-4# [...] I think a real collaborative approach. So, I think it would be good to have a joint week between people in the university and the students and then-. I feel like before when we've done things together, they've like, like the climate strike back in September. That had an amazing turnout. So, I think if it could be collaborative between staff and students, [...] that would be amazing. And then kind of like a mixture, like talks, presentations and also like eh, eh, an online campaign with lots of pictures and imagery, and things like that. I think if you kind of combine the facts with like the art and the emotion. That's I think how you'll capture like the hearts of everyone.[...] and if it's being kind of advertised and promoted by both bodies then you'll get like, I don't know, I feel like the more bodies that support it and that kind of poroll at your wave the more likely you'll be able, like sit in your brain, you'll be like actually I want to get involved in that.[...] because sometimes if […] it's just from the university, if it's just from us, people kind of like toss it off, be like 'aw it's just another one of those weeks, or that's just another event that's on.' But I feel like a very directed aimed approach at students[...] and staff because they're also contributors on campus I suppose as well. [...] I think that would be like a really good way forward to move it on. #00:16:16-9#

I: #00:16:16-9# Mmh-hmm. And what would you say are the main challenges you as a, as a person within the UCC population has in avoiding single-use plastic on campus? #00:16:35-4#

SUR: #00:16:35-4# [...] I think sometimes it's just like...The biggest thing that bothers me is when you just like don't have an option, when you're literally running from one place to the other and you don't have time to prepare your meal, or you don't have time to like[...] go to the plastic free café because it's just too, a little bit too far.[...] because obviously it can be quite hectic whether you're a student, staff member or like in the union. So kind of the grab and go kind of em...I'm always talking about the shops but yeah the grab and go mentality of like 'I need to run from this meeting to that meeting, and then I have to go into town or something later.' I think that's the thing that challenges me the most. Because I'll just, I'll grab something off the shelf and not really think twice about it.[...] but in my head then I'm like 'oh if you changed what was on the shelf, when you're in those moments like you wouldn't haveto think about it.' Now it's not-, I do think it's important that you do think about your choices obviously, we should. But I think eliminating a bit of that choice could go a very, very long way. [...] yeah. #00:17:36-3#

I: #00:17:36-3# And would you have much involvement with other sustainability initiatives on campus? Other than the Green Forum and Green Campus? #00:17:47-2#

SUR: #00:17:47-2# Emmm, no, I don't think so. Unless I'm like missing-. Now the union does, but I personally wouldn't. Like [one of the council members] would work alongside the library a lot. So she'd be involved in, in their campaigns in the library and like their updates and stuff like that.[...] but apart from the generic like, the things that we do within those, the green forum and green campus, I wouldn't have a lot of reach. I suppose that would be kind of more the envirosoc would do an awful lot more on that front than I'd be able to get to. #00:18:22-3#

I: #00:18:22-3# And would, would you be aware of many of the other initiatives on campus outside those within your remit? #00:18:28-4#

SUR: #00:18:28-4#[...] I'd be aware of some of the environmental ones. I'm not sure much about […] any of the other like plastic, if there's any plastic free one's on campus at the moment. #00:18:36-5#

I: #00:18:36-5# Hmm. And do you have any suggestions for things the college could do to eliminate single-use plastics? #00:18:44-5#

SUR: #00:18:44-5# [...] I feel like making it...I don't know how possible it would be but making it a part of their procurement contracts with people [...] I think would be like a great first step. Because that means, kind of eliminates any of the external [...]

issues. Because if you have in your contract that we're not taking plastics and [...] you have to ensure that any kind of cutlery you have, any packaging that you have in your area has to be[...] no plastic has-, is involved in it. I feel like if that was part of contracts, well then that would change a lot of like the commercial side of things.[...] I also think there's a massive amount that could be done in terms of lobbying.[...] I think, it was on the article I saw this morning that micro-beads are now illegal or banned in Ireland. Do you know like in exfoliators […]? They're gone now. [...] because obviously they were like loads of tiny little plastics floating around the ocean and stuff. So, I think like there's still a lot of lobbying that could be done for companies in general to ban. I think the university could have a lot-, a very big say in that if they decided to that they wanted to put like driving force behind it.[...] and I suppose just kind of holding themselves to account by 2023[...] for the plastic. Like, whether that is setting up a committee or whether is that like doing-, collaborating with the student's union, and the students and Green Forum and Campus. Where there is a massive collaboration between everyone, [...] holding themselves to account, that they need-. This is, should be on every agenda, everyone's agenda. Because 2023 is only three years away now. [...] and it will come up soon and then it could be-. It could happen and everyone will be like 'oh we signed that petition but we kind of forgot to do the work behind it.'[...] there needs to be dedicated time I think by the university behind this as well. It's all well and good for, for me to walk into a meeting and be like 'you shouldn't have plastic on your shelves.'[...] but they're going to be like but it's grand like. They're going to be like 'well you're only 21, you're only here for a year. I only have to put up with you until the end of June.' Whereas if it was coming like top down from a real like, 'We're giving this money. We're giving you-, we're allowing you to

sell to our students blaa, blaa blaa. You have to do this; you have to get rid of it.' And kind of don't give people a choice. #00:20:54-8#

I: #00:20:54-8# Mmh. #00:20:55-3#

SUR: #00:20:55-3# If they're being like hard-line 'but we need the plastic, but we need the plastic.'[...] top down approach. Bottom, like this whole movement was bottom up but I feel like the action now needs to be top down by the university to its subsidiaries and stuff. #00:21:10-5#

I: #00:21:10-5# […]. Yeah, is there anything else you would like to add or clarify? Or anything that we haven't touched on that you think is an important point that would be relevant? #00:21:27-2#

SUR: #00:21:27-2# Hmm. I don't know. I think another thing-. Just off the bat, I know you were talking about recycling. It's probably not as relevant to anything you're saying[...] there. But I just, I remember having a discussion with people about the differences in plastics and I feel like even, it could be good. God knows when, maybe next year, whoever takes over this, [...] to even do a simple information campaign about what is single plastic. What is single-use plastic? [...] what plastic can be recycled; what plastic can't be recycled. Like, what things to look out for. I feel like

that would go a long way. Because if people are start seeing all-. Because I know people who like throw away so much plastic that I know isn't recyclable. Because they'd be saying it to me. I'm like 'Oh no, no, no, you can't, actually can't throw that away.'[...] and if they see then the amount that they can't recycle,[...] I feel like that could push people as well into kind of, delving for more plastic free outlook and like in shops and just in[...] just in life in general.[...] because it's-. And everyone just looks at plastic with like 'oh sure you can recycle it.' And then I remember like an influencer went to like a, the Repak recycling centre and they were showing her. She videoed it all. They were showing her all the plastics that were put in the recycling bins that actually had to be sent off then to just the dumping site. And it was like shocking the amount, even stuff I didn't know at the time. [...] so I feel like something like that could go a long way in driving the single-use plastic free initiative forwards as well. That's all I can think of. #00:22:54-3#

I: #00:22:54-3# That's great. I think we've touched on all the points that I wanted to go through, and most of the challenges. I don't know if you'd have any other ideas of[...] kind of levers that could be used to swing eh, or to alter people's behaviour towards single-use plastic? #00:23:18-5#

SUR: #00:23:18-5# Yeah, see I always ask this question. I'm always like 'Oh, do you change like society to change people or do you change people to change society?' It's like the chicken and the egg. It always like wrecked my head.[...] but for this, I'm going to say a combination of both.[...] I'm going to say try and change people's minds by

like real information, fact[...] like I say, a bit of emotion as well. Like, that can never go wrong. You can say 'oh it kills animals or like it hurts them' and like that's kindof, it's a little bit far, and then you show them a picture of like a seal with fishing ropes like tangled around their neck and like people are going to be sad about it.[...] another video I saw the other day. I don't look at nice things on the internet.[...] but like, I feel like that would go a long way[...] just constantly informing them.[...] I think, it was talked in one of the Green Forum meetings about a connected curriculum where sustainability, there's some kind of module relating to the degree you're studying about the environment or sustainability and how that effects that job. Or, [...] how it could help that job. I think getting that into[...] people's courses would be phenomenal in changing minds and educating them. I think a lot of the things I've learned were because I did quite specific modules in Geography that were based around[...] this is not to do with food but in the environment in general.[...] like sustainability,[...] there was one on food geography and waste. And that just got me think about like my own waste and what I produce as just myself as a person.[...] so I feel like if something like that was incorporated into like every single degree, like, there would be much more like thinking going on behind it instead of like deniers and 'oh sure it's just one this, or it's just one that. It doesn't really matter.'[...] so I think that will, that will definitely help. Then also having the changes happening on campus and like being advertised like thrown at people in advertising. [...] the two of them linked together I think could create like a really, really good change overall. #00:25:13-8#

I: #00:25:13-8# Great. #00:25:13-9#

SUR: #00:25:13-9# Yeah, they're my levers. #00:25:14-8#

I: #00:25:14-8# That's fantastic, thank you very much. I think that's all of the questions that I kind of had. [...] I'll just pop off the recorder.

End of Transcript