BIRMINGHAM CUP

Our Planet, Our Future

Final Stage Submission

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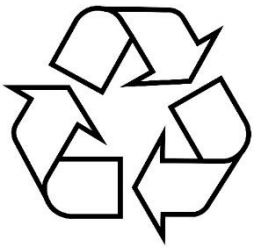
The Problem

In the UK, we use 2.5 billion disposable coffee cups every year[1], resulting in 150,000 tonnes of CO_2eq annual emissions[2]. Although they are technically recyclable, fewer than 1 in 400 are recycled[1]. This is due to the mixed materials used to make them; the standard paper cup requires a thin plastic lining to be watertight, but the paper and plastic are difficult to separate and so require special processing. As a result, coffee cups need to be collected separately from mixed recycling. Customers typically have to return their cups to the point of purchase – eliminating the convenience of a takeaway cup.



The Mobius recycling symbol

To make the problem worse, manufacturers can print the Mobius recycling symbol on the cups – indicating they are capable of being recycled. This confusing labelling leads to 90% of customers contaminating mixed recycling bins[3], which increases the cost of filtering and reduces overall recycling rates.

Aside from issues of recycling, 500,000 cups are littered every day in the UK, contaminating ecosystems for decades[4] whilst normalising and encouraging more littering[1].

[1] https://publications.parliament.uk/pa/cm201719/cmselect/cmenvaud/657/65702.htm
[2] https://www.frugalpac.com/new-coffee-cup-study-reveals/
[3] http://www.mintel.com/press-centre/food-and-drink/uk-coffee-shop-sales-enjoy-a-growth-high
[4] https://www.theguardian.com/lifeandstyle/2016/oct/05/uks-billions-of-takeaway-cups-could-each-take-30-years-to-break-down

Existing solutions

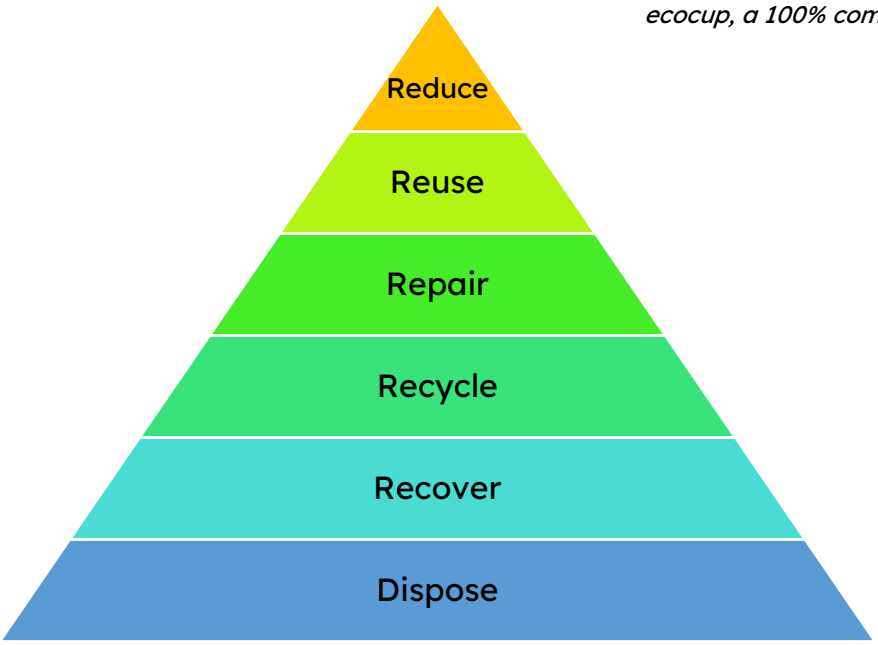
Better single-use cups

Some manufacturers claim that improving the recycling rate is an effective solution[1]. Others have proposed different designs, which would allow the plastic lining to be separated from the paper in traditional recycling facilities, or using biodegradable plastics so the cups can be industrially composted.

Frugalpac, which does not require special processing

All of these approaches are flawed as they do nothing to address the littering issue or high emissions that are unavoidable with single-use products. Using the waste hierarchy as a guide, the best choice for the environment – aside from drinking less coffee – is to reuse cups.

ecocup, a 100% compostable cup



The waste hierarchy. Environmental impact increases from top to bottom

Reusable cups

Customer-owned reusable cups are becoming a popular alternative to paper cups. They can be incentivised with modest price differences, but the framing of the incentive has a large impact; if drinks in reusable cups are discounted, 1% of customers will switch, but if a charge of the same value is added to drinks in single-use cups, the uptake can exceed 30%[5].

An Eco to Go reusable cup made of rice husks

Reusables are not perfect. When a customer forgets their cup, they are more likely to use a disposable cup for convenience than buy another reusable. To use the cup more than once a day, the customer needs to be able to clean it, which can be inconvenient or impossible in a workplace. The pandemic has resulted in diminished public confidence about the hygiene of reusables (despite reassurance from experts[6]), and even at the height of engagement, more than 60% of customers do not use them. Reusables are likely to be part of the solution, but not a complete solution.

[5] https://issuu.com/hubbubuk/docs/hubbub_starbucks_coffee_cup_charge_

[6] https://storage.googleapis.com/planet4-international-stateless/2020/06/9592036c-health-expert-statement_125.pdf

My Vision

I was an undergraduate student at the University of Warwick and used the Warwick Cup scheme during its initial trial in early 2020. I am now a PhD student at the University of Birmingham, and I think the campus is perfectly suited for a cup return scheme, Birmingham Cup. My aim is to establish a trial in the Vale student village ready to begin in September 2021, rolling out to the whole campus by the end of the 2021/22 academic year, with the possibility to expand to local cafés and businesses in Selly Oak. I want to eliminate single-use cups from the University of Birmingham within two years, resulting in more than 50 tonnes CO_2eq and 500,000 litres of water saved every year along with many local environmental benefits.

The Vale student village, University of Birmingham Edgbaston campus

University of Birmingham

The University of Birmingham has more than 35,000 students and 7,000 staff. There are more than 30 food and drink outlets on campus, including several in the Vale student village, and many more in the nearby Selly Oak. The Meal Plan allows students to pay for food and drink with their ID cards with a 10% discount, prepaid as part of their accommodation contract or separately on a termly basis.

University of Birmingham Eco to Go cups

In 2017, 885,840 single-use cups were used on campus. To reduce its environmental impact, the university launched Eco to Go cups, a branded reusable cup initiative, following the success of a reusable food box available in food outlets in the Vale. The cups were sold for £3.50, and a 10p charge was added to all drinks sold in single-use cups. 5,000 reusable cups were initially ordered, which sold out within 15 weeks. By the end of the first term with the scheme in place, 33% of all drinks sold on campus were in reusable cups[7].

[7] https://fsg-tableware.com/archives/case-studies/university-of-birminghams

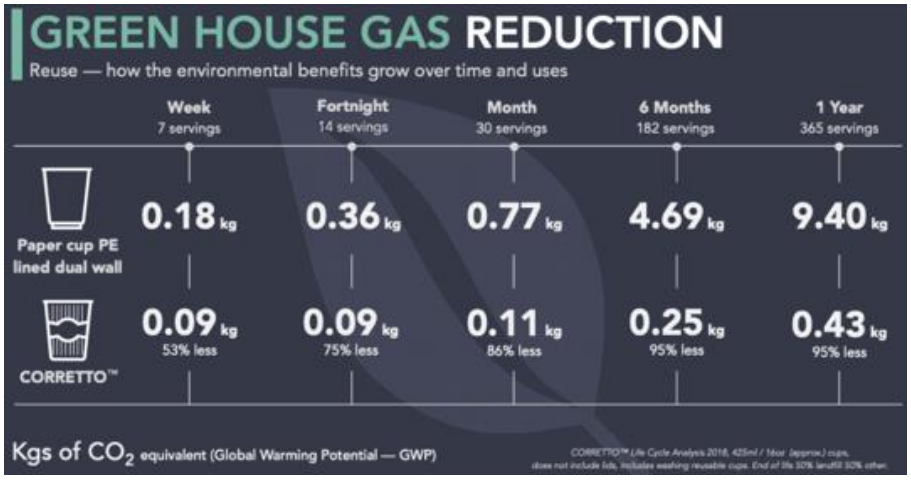
Proposed solution

Cup return scheme

Corretto™ cups used by Warwick Cup

Drinks are served in polypropylene cups at no extra charge (like a reusable). Customers can take their drink out of the café, then drop off their cup at one of many collection points around campus. Every day, cups are collected by volunteers and returned to cafes to be cleaned in dishwashers. The cups are ready to be used again and are designed to go through this cycle at least 1000 times. Once they are worn out or damaged, they can be easily recycled or even reformed into new cups.

- There is no inconvenience of returning the cup to the point of purchase
- There is no hygiene concern as they are cleaned in dishwashers
- Over their lifetime the cups result in a 96% reduction in emissions compared to paper cups
- After 10 uses they are cheaper per drink than paper cups, including cleaning costs.



A life cycle analysis by Corretto™, comparing carbon emissions of their product with a standard paper cup

There are many cup return schemes running around the world, with lots of different approaches to incentivising customers to return their cup and not simply keep it for use as a standard reusable:

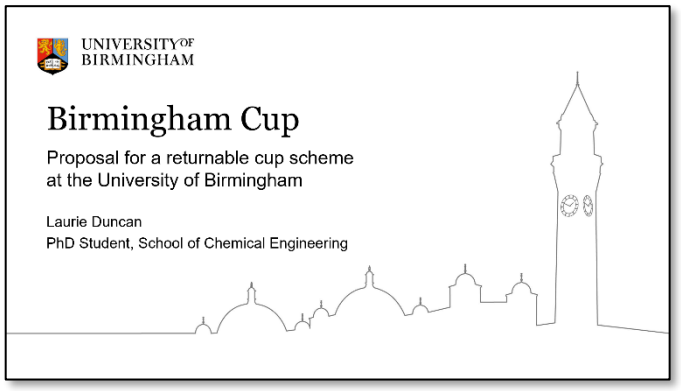
- Warwick Cup do not use a financial incentive, but strategically chose popular locations for collection points
- Shrewsbury Cup requires a £1 deposit, which is refunded when the cup is returned to any local participating business
- BorrowCup in Monash, Australia uses QR codes to track cups as they are taken out and returned, with a $1 deposit refunded once they are scanned back in at the cleaning facility
- FSG Tableware are trialling RFID chips embedded in reusable cups paired with smart bins that can detect the return of a cup

A BorrowCup collection point in Monash, Australia

Shrewsbury Cup use a £1 deposit model

Progress so far

I gave a presentation at Plastic-Free UoB's Student Sustainability Symposium in November 2020, setting out my vision for a cup return scheme, using Warwick Cup as a case study. I asked any attendees who were willing to join me in a group call to discuss the proposal in more detail. One of those volunteers introduced me to the university's Sustainability Manager and the Guild's Ethical and Environmental Officer.



My presentation to the Symposium and university staff

I met with the Ethical and Environmental Officer, who was fully supportive of the proposal and offered to help in any way he could, including a campus tour to identify potential collection points. The Sustainability Manager agreed to arrange a meeting in December with me and senior representatives from key departments – Environmental Services, Catering, Retail and Estates.

Before the meeting, I ran a survey to support my argument. Hoping for at most 100 responses, I received 485 within a week, with overwhelmingly positive feedback coming from undergraduates, postgraduates, staff, alumni, and local residents alike. The results are summarised in the next section.

The meeting was very productive. The staff were all broadly in favour of a trial cup return scheme, but had concerns about low cup return rates, maintenance of outdoor bin infrastructure, and the logistics of returning cups to cafés. We agreed to meet again in early 2021, but due to the latest

national lockdown restrictions we have postponed until all students are allowed to return to study on campus.

The survey brought the project to the attention of several people:

- A founder of Warwick Cup. We met to discuss the difficulties brought up in the university staff meeting, and how they had dealt with similar problems in a similar university setting.
- A writer for the national student newspaper The Tab, who asked if I would send a press release. The article was published in December[8].
- The founders of Shrewsbury Cup, the first and largest cup return scheme in the UK. We met to discuss how their business model has changed during the pandemic, and new innovations they were trialling to improve the cup return rate.
- A member of staff at FSG Tableware – the supplier of the university's Eco to Go cups and Shrewsbury Cup's Corretto™ cups. They were keen to support the project and provided useful contacts from the Vale village catering team, where they thought a trial would be best situated.

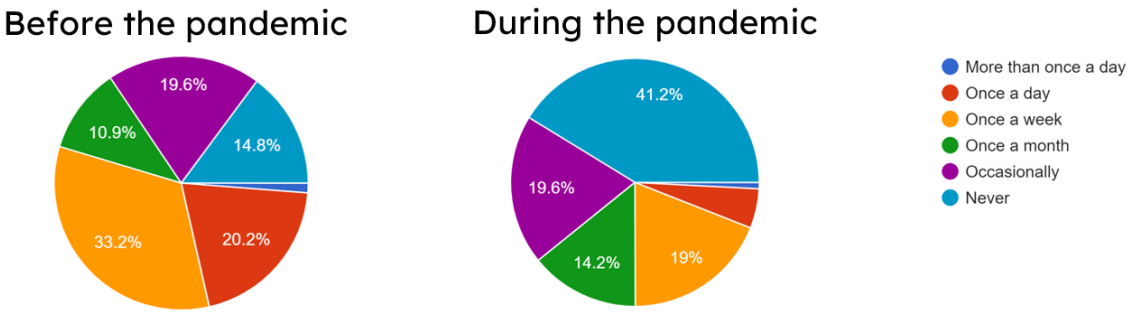
Since the meeting, I have designed some initial branding (see front cover), created email and social media accounts, and started designing a Wordpress website.

[8] https://thetab.com/uk/birmingham/2020/12/15/uob-students-are-organising-a-reusable-cup-scheme-trial-47351

Survey results

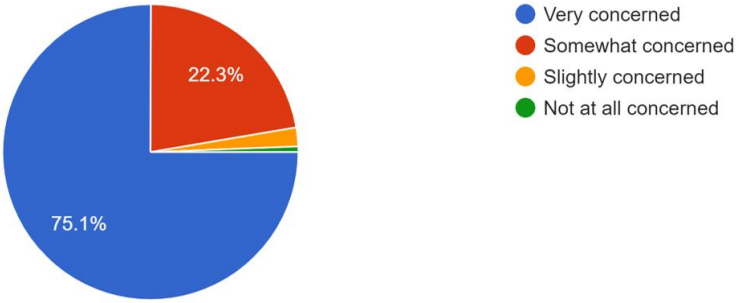
I surveyed 426 undergraduates, 45 postgraduates, 6 members of staff, 5 alumni, 2 local residents, and 1 FSG Tableware member of staff over five days in December 2020. Only 14% were members of Birmingham Energy Society, Green Students or Plastic-Free UoB, so the sample was not completed entirely by people with existing interest in sustainability.

How often do you buy a drink from a campus café?



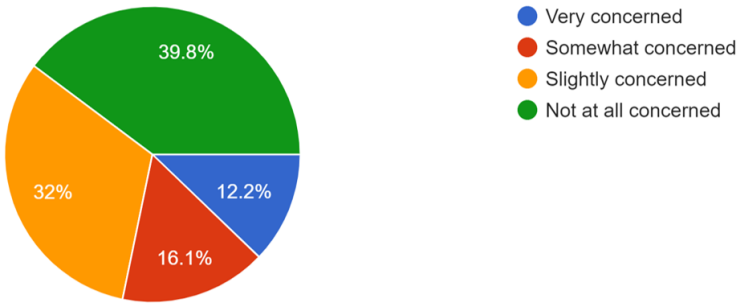
Unsurprisingly, the number of people regularly buying drinks has reduced during the pandemic; those buying drinks at least once a day has decreased by 50%. But before restrictions, 104 of the respondents were buying at least one drink per day.

How concerned are you about the environmental impact of single-use cups sold at the University of Birmingham?



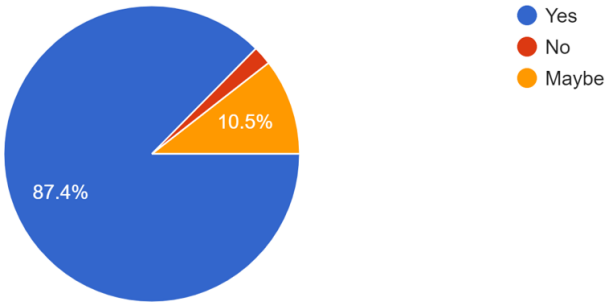
Only 3 respondents were not at all concerned about the environmental impact of single-use cups, with 3 in 4 very concerned.

How concerned are you about the hygiene of reusable cups?



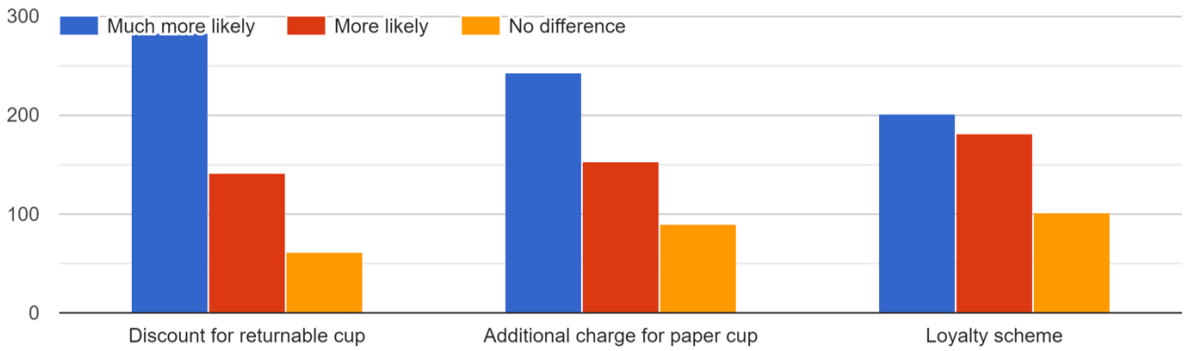
The hygiene concerns about reusable cups were low, considering that the university cafés were not accepting any at the time. Nonetheless, 60% of people had at least slight concerns.

Would you use a scheme similar to Warwick Cup at the University of Birmingham?



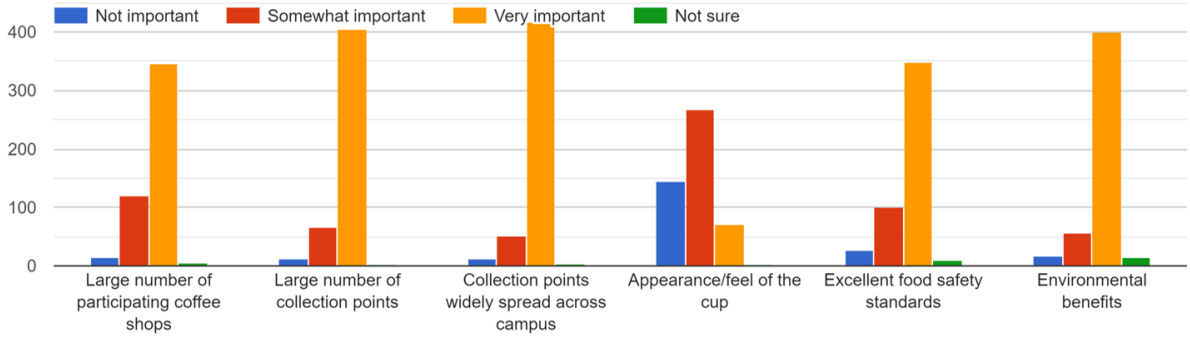
After a brief description of the Warwick Cup scheme, the vast majority of people were in favour. Of the 10 that said they would not use such a scheme, 8 said they would continue to use their own reusables, and one seemed to be an error, as they later said they would use both options.

Would you be more likely to use the scheme if there were a financial incentive?



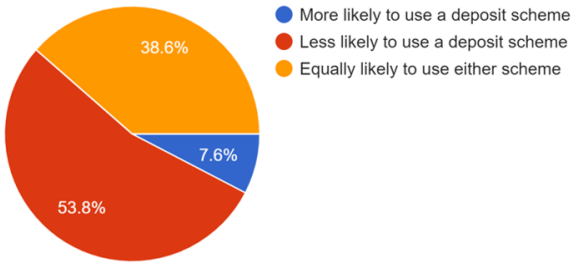
The response to the financial incentives question contradicted existing evidence mentioned earlier. This may be due to the single-use charge being normalised, as it has been in place in university cafés for some time now with the Eco to Go scheme.

How important do you think each of the following are in making a returnable cup scheme successful?

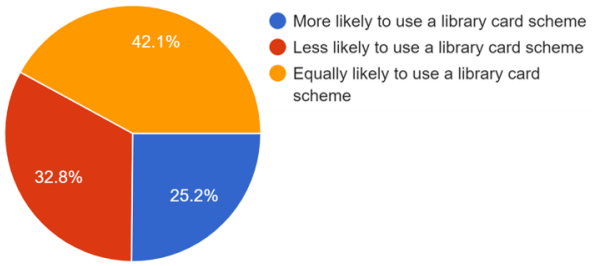


The most important criteria for success were environmental benefits (aligning with the concerns found in the second question), a large number of collection points and, most of all, widely spread collection points – suggesting it was crucial not to lose the convenience of single-use cups.

Shrewsbury Cup (£1 deposit, refunded when cup is returned)



Library card scheme (cup borrowed on a university card, fined if not returned)



When asked to compare Warwick's free-to-use scheme with a deposit scheme, the majority said they were less likely to use it, possibly due to the appearance of increased drink prices. More were in favour of a borrowing scheme like Monash's BorrowCup, possibly because of the convenience and integration with the Meal Plan on ID/library cards.

Key issues

Collection points

In the staff meeting, the Environmental Services representative expressed concerns about recycling or general waste being left in cup collection bins by mistake. Warwick Cup experienced this initially, but they assured me it was a minor issue that was solved with clear signage and by placing collection points with clusters of mixed recycling and general waste bins.
There were also concerns about outdoor bins being exposed to the elements. Whereas Warwick Cup were able to use outdoor bins that had been in storage free of charge, there are no such spare bins in Birmingham. Given the enormous upfront costs that would be required for sufficient coverage of campus, I decided to start with exclusively indoor collection points, which will be described in more detail in the next section.

Cup return rate

The staff wanted to know what could be done if the trial resulted in a poor return rate – which would prevent full rollout. In discussions with Shrewsbury Cup and FSG, I realised there was a critical balance to strike between technology, cost, simplicity for customers and simplicity for café staff:

- £1 deposits are simple for customers, but require all collection points to have contactless payment points (cash is unfeasible and unhygienic during the pandemic)
- QR codes are simple for customers but expensive to print on to cups
- Electronic bins are a fantastic use of technology, but they are too expensive for a trial

Given the existing Meal Plan technology in student and staff ID cards, and the enthusiastic support for the project found in the survey, I am proposing the following process:

1. Customers buy a drink in a Birmingham Cup using their ID card. It is possible to log a cup to their account using the existing EPOS system.
2. Customers return their cup to a collection point. These will be at staffed locations, e.g. cafés, porter's lodges, receptions, and academic department offices. Customers scan their ID card with a contactless or swipe card reader to register a cup return and leave their cup in a drop box.

A University of Birmingham ID card, fitted with RFID technology

This is inexpensive, as many of these locations already have ID card scanners, and new ones would be affordable. As the cups are not uniquely identified, the return process is simple, and it would be possible to return multiple cups at once, even with multiple cards (for example, one person could return all the cups for a group of friends in one go). Staff presence will improve compliance and means any issues with the technology can be reported quickly without the customer having to go to great lengths to register the cup as returned. The staff are not brought away from their work to go through a lengthy process every time a cup is returned – an important aspect for café staff with long queues of customers waiting.

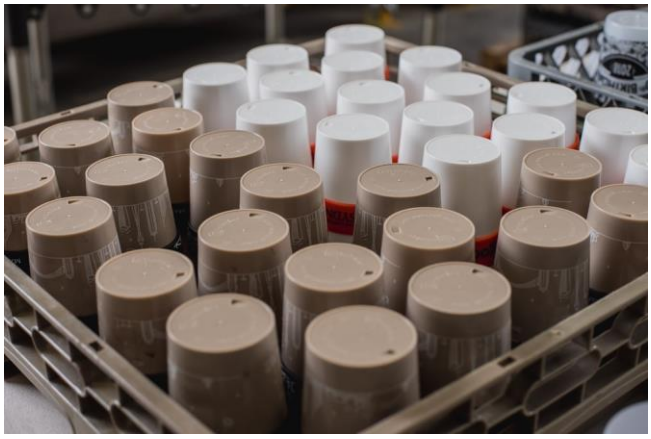
Any accounts with cups not returned by the end of each term would be charged, using the same system as overdue library loans.

Distribution and cleaning

Unlike at Warwick, all university-owned cafés at Birmingham have their own dishwashers. This could make distribution simpler, as volunteers could be

organised to take cup drop boxes to their nearest café when full to be cleaned and reused.

One concern raised was the drying time for the polypropylene cups, as the Catering representative mentioned that some plastics did not fully dry in their dishwashers. We agreed to run tests once the first cups had been purchased, and if there was an issue with drying, we would use the larger commercial dishwashers in the Staff House conference facilities instead, with daily collections of used cups taken to be washed and separate trips to take the cups back to cafés. I am very confident that there are enough students willing to volunteer to make these trips; for many; it would often be en route to lectures from their accommodation or vice versa.



A batch of cleaned reusable cups at the University of Sydney

Plan for trial

If I were to receive the £1000 prize, I would do the following to set up a trial in time for the start of the 2021/22 academic year:

Spring 2021
Launch social media and website
Decide on 10 initial collection points with Vale Estates and Catering teams, with input from students via a survey
Agree cup design with university staff
Summer 2021
Develop collection point card readers with Retail staff and students from Engineering Society over the spring
Purchase 480 Corretto™ cups with Birmingham Cup branding
Test runs while café usage is low out of term time
Autumn 2021
Recruit student volunteers to run collections
Train staff at collection points
Train café staff to promote the scheme and clean the cups
Publicise the launch of the scheme with targeted online advertising and campus events
Collect data to monitor the movement of cups, demand at cafés and any technical issues
Winter 2021
Report back to the university staff with a summary of trial results

If the trial is successful, wider rollout could include future developments such as:

- A Birmingham Cup app (or integration with the Meal Plan app) to see how many cups are currently withdrawn on an account, reminders to return cups before deadlines, tracking of personal carbon savings and fault reporting
- The option to use a contactless payment for guests/local residents without ID cards
- Expansion to cafés in Selly Oak, as well as any businesses to run more collection points
- Partnership with other universities in Birmingham and across the West Midlands to introduce more cup return schemes

Budget

5x batches of 96 Corretto cups (£172.80) + cup branding (£148.80)	£321.60
Development of collection point technology	£400
Signage and display stands	£200
Online targeted advertising	£42.40
1 year website hosting	£36
Total	**£1000**

Why Birmingham Cup?

If full rollout can be achieved, eliminating single-use cups from the University of Birmingham campus, we would save more than 50 tonnes CO_2eq and 500,000 litres of water every year that go into producing paper cups. As well as this, there would be environmental benefits – a financial incentive to return cups will reduce littering, and with cups cycling through at least 1000 uses they will stay out of recycling and general waste streams, increasing bin capacity to leave the campus tidier and cleaner.

I am vey passionate about tackling climate change. My PhD focuses on the role of local authorities in dealing with the climate crisis, and a theme that often appears is the importance of local action in ensuring the transition to sustainable economy is a just one. Action taken at a local level, that informs and involves people in decarbonisation is a much more effective way of becoming more sustainable than a top-down enforcement approach. This project can create a sense of community in which all University of Birmingham students and staff can feel they are doing their bit to help our planet.

Coffee cups are very commonplace in universities, and having such a visible sustainability measure will be helpful in getting people to stop and think about other sustainability issues – perhaps opting for plant milk in their coffee, or having a vegetarian option for their lunch.

Many partnerships can be formed with other organisations, such as NextLoopp, who are developing a business model which leases polypropylene instead of selling it. This ensures the circular economy of plastic is a more closed system, further reducing lifecycle emissions. Warwick Cup are interested to see if our unique collection process improves return rates and are keen to collaborate on new innovations in the future – including outreach to other university campuses.