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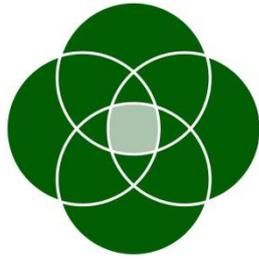
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Evaluation of the Change in Parking Policy on Frenchay Campus

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Executive Summary

In 2013 UWE implemented a radical change in parking policy at Frenchay campus, removing the right to park from undergraduates living in an 'Exclusion Zone' (with a few exceptions) covering the areas where most students live. The change was applied to undergraduates who started after September 2013. This meant that 2015 offered the last opportunity to survey a cohort of third years with a right to park on campus, in order to compare their travel behaviour with the next cohort, most of whom would not be allowed to park on campus.

Early in 2015, the Facilities Service agreed to fund the Centre for Transport and Society to survey two matched cohorts of third year students to assess the impact of the parking policy change. The study aimed to evaluate the impact of the changes on the mode of travel to campus and also on car ownership, travel for other purposes and overspill parking. 507 students completed the survey in 2015 and 420 in 2016. To assess the pattern of overspill parking separate observations were made during 2016 of vehicles parked on surrounding streets and in the B&Q car park. The key findings were:

- 24% of those who started after September 2013 drove to campus on the day of the survey, compared to 33% of those who started before September 2013.
- 44% of those who started after September 2013 took the bus to campus on the day of the survey, compared to 28% of those who started before September 2013.
- Unexpectedly however, the overall proportion driving to campus rose from 28% in 2015 to 30% in 2016.
- This apparent discrepancy is partly explained by a larger proportion of mature students, aged over 26, in 2016.
- The transition between cohorts was not as abrupt as we had expected: 24% of those surveyed in 2015 started after September 2013, compared to 67% in 2016.
- Partly because of this, the proportion with parking permits fell but not dramatically, from 19% to 13%.
- Previous policies had already reduced driving by 2015; in a 2010 survey (of Frenchay students studying only built environment subjects) 50% drove to campus.
- Only 25% of those who lived within the Exclusion Zone and started before September 2013 held a permit in 2015, even though they were entitled to one.
- Other possible explanations for the increase in driving in 2016 included:
 - An 8% fall in the price of unleaded petrol, which contributed to a national increase in car traffic.
 - The new student car parks opened in 2016 were more conveniently located than the old visitor car park, which closed in 2016.
 - The removal of parking from some students may have freed up space on the surrounding roads for others to take their place.
- The change in parking policy caused a gender differential for the first time; females starting after September 2013 drove less than males.
- 73% of students who drove to campus in 2016 parked on campus, 10% parked on streets and 16% parked elsewhere.
- 12 students admitted to parking on campus without a permit.
- Around 100 cars parked on surrounding streets and 70 in the B&Q car park could be attributed to overspill parking from UWE (in the Spring term).
- Rates of cycling to Frenchay campus remain low and have not increased; UWE should consider offering matched funding to prompt the authorities to improve the incomplete networks of cycle routes to Frenchay campus.

1. Aims of the Study

In 2013 UWE implemented a radical change in parking policy at Frenchay campus, removing the right to park from undergraduates living in an 'Exclusion Zone' (with a few exceptions) covering the areas where most students live. The change was applied to undergraduates who started after September 2013. This meant that 2015 offered the last opportunity to survey a cohort of third years with a right to park on campus, in order to compare their travel behaviour with the next cohort, most of whom would not be allowed to park on campus.

Early in 2015, the Facilities Service agreed to fund the Centre for Transport and Society to survey two matched cohorts of third year students to assess the impact of the parking policy change. The study aimed to evaluate four types of impact:

- Travel to campus
- Car ownership
- Travel for other purposes
- Overspill parking

Qualitative impacts on the student experience of travel to the campus were specifically excluded from the study. Facilities were planning a separate student consultation on those issues, and it was agreed to avoid them in this study, to minimise the risk of 'policy response bias'¹ affecting the answers to purely factual questions.

2. The Policy Change in Context

In 2006 UWE hired its first Travel Planner, charged with developing and implementing a strategy to reduce travel to the campus by single occupancy vehicles. A Travel Plan was published in 2008 and updated in 2012. The principal objective in the early years was to improve the quality and frequency of the bus services. From 2007 until 2014 UWE managed a network of tendered bus services, operated by Wessex, with a low flat-rate fare (£3 a day for most of that time). This increased patronage and eventually stimulated competition from First Group the main bus operator in Bristol, which now competes with Wessex on a commercial basis.

Measures to increase the cost and reduce the availability of parking were implemented later, following lengthy discussions with the trade unions and student union. An annual charge of £79 per annum was introduced in 2008 for staff and students, accompanied by a small daily payment. The biggest changes were implemented between 2013 and 2015. The cost of staff parking permits was gradually increased from 0.3% to 0.45% of salary. Student parking permits were increased from £106 to £119 per annum or alternatively a daily charge, which was increased from 75p to £3. An 'Exclusion Zone' was introduced covering the areas of northern and central Bristol, where most students live (see Figure 1). Undergraduates who started at UWE after September 2013 became ineligible for parking permits (annual or daily) if they lived within the Exclusion Zone during term time. Exceptions could be made for students with disabilities or childcare commitments. Students who live on the campus are not allowed to park there.

Until early 2016 visitor parking was available at £5 per day. Although students living within the Exclusion Zone were not supposed to use the visitor car park, there was no effective system of enforcement. The capacity of the Frenchay car parks was not a direct constraint; it was always possible to park somewhere. Early in 2016 the main visitor car park closed and students without permits were no longer allowed to park anywhere on the campus,

although Facilities were unable to legally enforce the parking tickets which they sometimes administered. (That situation changed after the surveys described below were completed, when UWE became registered with the British Parking Association.)

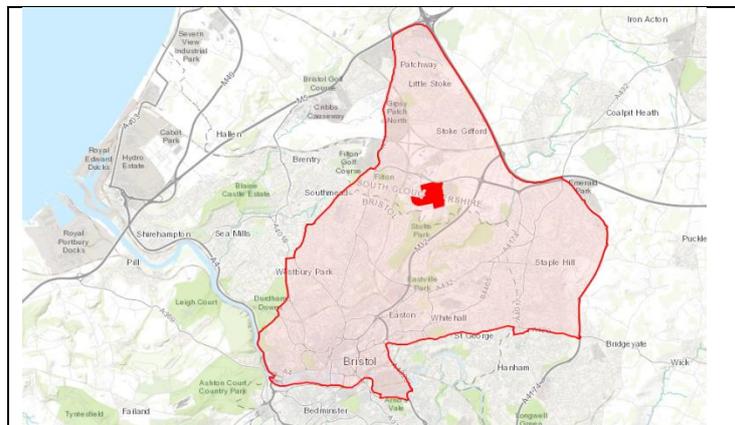


Figure 1: Frenchay Campus (shaded darker) and the parking permit Exclusion Zone

Frenchay campus is surrounded by residential streets and some retail sites with large car parks. Overspill parking by students (and a few staff) has caused some tension with surrounding residents. UWE has responded by supporting, and in one case helping to finance, the extension of parking controls on surrounding streets, a process which is still continuing. It is still possible to park on some surrounding streets and in the free car parks of some retail outlets, although B&Q, the one closest to the campus described below, has since closed down. UWE asks students and staff not to park on surrounding streets but neither UWE nor the residents have any legal right to prevent parking on uncontrolled streets.

The combined impact of these changes on the modal share of travel to Frenchay Campus is shown in Table 1, as measured through cordon count surveys. The cordon counts were conducted on single days in November on the years shown. In the first two years everyone entering on foot was recorded as 'Walk'. In the last two years pedestrians were asked whether they had travelled by car and parked elsewhere, shown as 'Park and Walk' above. The cordon counts did not differentiate between staff and students.

	2012	2013	2014	2015	Change v 2012
Car on own	39.8%	37.2%	27.9%	26.9%	-12.9%
Park & Walk	N/A	N/A	2.1%	4.5%	+4.5%
Car share	16.2%	13.0%	16.9%	14.2%	-1.9%
Bus	25.8%	31.4%	32.3%	33.2%	+7.3%
Walk	10.3%	10.7%	12.6%	15.6%	+5.3%
Cycle	6.4%	5.7%	6.5%	4.0%	-2.4%
Rail	0.8%	1.4%	0.9%	0.8%	0.0%
Motorcycle/moped	0.6%	0.7%	0.8%	0.8%	+0.1%
Sample size	6471	6559	6313	6136	

Table 1: Cordon Counts Conducted at the Entries to Frenchay Campus

Table 1 shows a clear pattern of modal shift from driving towards bus travel and walking, with the biggest shift occurring between 2013 and 2014. Reported levels of cycling have fluctuated over time possibly due to daily weather variations, but neither the cordon counts nor the surveys reported below show any evidence of growth in cycling to campus, which remains low. By comparison, the University of Bristol's travel survey reported a 8% modal share of cycling to their campuses,² which are more central but are also situated in more challenging terrain without the traffic-free routes that serve Frenchay. Amongst more suburban comparators, the University of Bournemouth reported a 9% share³ and the University of Reading 11%.⁴ Section 7 will return to this issue in the conclusions.

Some campus-wide surveys were conducted before 2012 but their sampling methods made them susceptible to self-selection bias. Surveys between 2005 and 2007 appeared to show a dramatic fall in driving to the campus,⁵ which was not reflected in empty car parking spaces. The Travel Planner began to suspect that drivers were less likely to complete the surveys than people who travelled by other means, and that this self-selection bias was strengthening as students and staff became more aware of UWE's sustainable transport objectives. This led him to abandon the surveys in favour of cordon counts, which aimed to capture everyone arriving at the campuses on the chosen mornings.

A smaller-scale study using similar methods to the ones described below was conducted in 2010 amongst a subset of 305 undergraduates studying built environment subjects.⁶ 50% stated that they normally drove to the campus with 7% as passengers, suggesting that the modal shift had already begun before the cordon counts shown in Table 1. Car availability during term time (66%) and during the holidays (83%) was also considerably higher than reported in 2015 (Table 4 above).

Initial concerns about the possible impact of removing parking on applications for undergraduate courses were not confirmed; applications rose by 5% in the year following the change of policy and remained at a similar level for the following two years.

3. Methods

To measure the travel behaviour impacts of the policy change the last cohort of third year undergraduates who had the right to park on campus were surveyed in March and April of 2015, followed by an equivalent cohort in 2016, most of whom would not have that right. We aimed to survey students in each of the departments represented on Frenchay campus and to repeat the survey at roughly the same time in the Spring term of the following year with students studying the same modules. Modules were selected that were planned to run in the same way in the two years with no significant changes expected to alter the characteristics of the students studying them. Ten of the eleven departments represented on Frenchay Campus agreed to participate.

Surveys based on voluntary participation and self-reported evidence of past behaviour are vulnerable to various forms of bias,¹ which we took several steps to avoid. The questionnaires were distributed at the beginning of lectures with students given a few minutes to complete them before returning them to a researcher, the lecturer or a box on the way out. Those who did not wish to participate were asked to return the form uncompleted. This technique was piloted in the earlier study⁶ and observed to achieve response rates close to 100%. Anonymity was emphasised and the questions were carefully worded to elicit key information about parking without asking anyone to directly reveal behaviour that the university might disapprove of.

This method did impose some limitations; as time was limited, the questionnaires were designed for ease of rapid completion. This limited the range of data collected, which was not sufficient to build a complete explanatory model of modal choice. The intention was to compare two matched samples for 2015 and 2016, assuming that the only significant change between the two waves would be the eligibility for a parking permit. When the data was analysed that assumption was not entirely satisfied, as explained below.

In order to assess the pattern of overspill parking separate observations were made during 2016 of vehicles parked on surrounding streets and in the B&Q car park. Two observations were made during term time and one during the holidays when very few students were attending the campus.

4. Survey Findings

507 students completed the survey in 2015 and 420 in 2016. The questionnaires asked about the mode of travel to the campus on that day, the 'normal' mode of travel to the campus and the mode used on the last trip made anywhere for any purpose except travel to campus. Table 2 shows the mode of travel to campus on the day of the survey, excluding the 6% who lived on the campus.

The modal shift towards car driving, mainly at the expense of bus travel, was unexpected. The modal shares of 'normal travel to campus' were similar and the last trip for other purposes showed an even larger (+7%) increase in driving.

Survey Year:	2015	2016	Change ¹
Driver	27.9%	30.4%	+2.4%
Passenger	9.4%	10.4%	+1.0%
Bus	38.4%	34.8%	-3.6%
Walk	15.7%	14.5%	-1.2%
Cycle	5.5%	5.7%	+0.3%
Train	1.5%	2.3%	+0.8%
Motorbike	1.3%	1.6%	+0.2%
Other	0.2%	0.3%	+0.1%
Valid completions	458	385	

Table 2: Mode of Travel to Campus on the Day of the Survey

Table 3 shows the same measure of modal share but differentiated by the start date of the student, with data from both waves of the survey combined. Most students who started after September 2013 would be ineligible for a parking permit so would be expected to drive less. Dividing the data in that way shows the expected modal shift away from car driving. The mode share of driving for the 'last trip for another purpose' also fell, by a more modest 4%.

Start Date of Student:	Before Sept 13	After Sept 13	Change ¹
Driver	33.0%	23.8%	-9.2%
Passenger	10.5%	8.6%	-1.8%

¹ All percentages are shown as a proportion of the valid answers to that question (excluding missing data). "Change" refers to absolute change in the percentages of all the valid responses i.e. "change in percentage points" not "percentage change".

Bus	31.6%	44.0%	12.5%
Walk	15.9%	14.0%	-1.9%
Cycle	6.0%	5.1%	-1.0%
Train	1.2%	3.0%	+1.8%
Motorbike	1.6%	1.2%	-0.4%
Other	.2%	.3%	+0.1%
Valid completions	497	336	

Table 3: Mode of Travel to Campus on the Day of the Survey, by Start Date of Student

Thus Table 2 and Table 3 appeared at first sight to be giving two contradictory messages; the former suggested that the policy change had failed to reduce driving to campus, whereas the latter suggested that it had succeeded. To explore the reasons for this apparent contradiction we first examined the characteristics of the samples, by wave and by start date, and then performed a series of binary logistic regressions with different measures of driving, car availability and licence-holding as the dependent variables.

Table 4 shows the characteristics of the two waves of the sample. The progression of cohorts by start-date did not occur as abruptly as we had anticipated. The 2015 wave included 24% of students who started after September 2013; by 2016 this had increased to 67% but there remained a substantial minority who started before that date and therefore remained eligible under the previous rules. This would be expected to dilute but not negate the impacts of the policy change.

Survey Date:	2015 Wave		2016 Wave		Change
Started after Sept 2013	120	24.0%	277	66.7%	+42.7%
Parking permit holder	116	24.1%	89	22.1%	-2.0%
Gender - female	229	45.8%	183	44.1%	-1.7%
Aged over 26	29	5.8%	34	8.2%	+2.4%
Living in Exclusion Zone	395	85.5%	315	82.5%	-3.0%
Living on campus	34	6.7%	25	6.0%	-0.8%
Full licence holder	365	72.1%	311	74.4%	+2.3%
Car available in term	223	45.0%	209	51.1%	+6.1%
Car available in holidays	305	63.7%	265	65.8%	+2.1%

Table 4: Characteristics of the two Samples by Wave

The proportion of permit holders fell only marginally between the two dates. Only 19% of those students living within the Exclusion Zone had a permit in the 2015 wave; this fell to 13% in the 2016 wave; these would mainly be students with disabilities or child care responsibilities, although they might also include some who had transferred from other campuses (permits are not transferrable between campuses but some students have wittingly or unwittingly parked with invalid permits at Frenchay). Car availability and licence-holding also rose between the two years, consistent with the increased driving shown in Table 2. Mature students aged over 26 were more likely to drive; their increased proportion in 2016 would explain part of the increased driving.

A series of cross-tabulations showed that the increase in driving between the two waves applied to all of the following sub-categories: by start date, by permit-holding and by

location inside or outside the Exclusion Zone. One exception was gender. In 2015 there was no difference in the rate of driving by gender but by 2016 a substantial gap had opened up; 36% of men and just 23% of women drove to the campus. This will be further analysed below.

Table 5 shows the same information differentiated by start date (with both waves combined). The proportions of licence-holding and car availability were both lower amongst those who started after the change in policy. A higher proportion of females would partly explain the lower rate of driving amongst those who started after September 2013. More of that group were also living on campus although that would not influence the modal shares in Table 3, from which on-campus students were excluded.

Start Date of Student:	Before Sept 2013		After Sept 2013		Change
Parking permit holder	149	30.0%	56	14.6%	-15.4%
Gender - female	209	40.6%	201	50.9%	10.3%
Aged over 26	41	7.9%	21	5.3%	-2.6%
Living in Exclusion Zone	383	82.7%	319	86.0%	+3.3%
Living on campus	6	1.2%	52	13.1%	+11.9%
Full licence holder	401	77.6%	268	67.7%	-9.9%
Car available in term	280	54.8%	150	38.7%	-16.1%
Car available in holidays	363	72.9%	203	53.7%	-19.2%

Table 5: Characteristics of the Samples by Start Date of Student

We also performed a series of regression analyses (see Appendix 2), which essentially confirmed the above observations: that starting after September 2013 was associated with less driving to campus, less driving for other purposes, lower car ownership and lower licence-holding. On the other hand, other factors, not captured by the survey, were causing more driving in 2016 than in 2015.

Table 6 shows where those who drove to campus parked. The proportion parking on campus did not fall as far as might have been expected. Of the 94 students who parked on campus in 2016 12 of them had no permit, so were admitting to breaking the rules. The proportion of missing data in that question was around 20% in both surveys, suggesting no greater concealment of behaviour between the two waves.

	2015 Wave		2016 Wave		Change
Parked on campus	103	75.2%	94	73.4%	-1.7%
Parked on street	20	14.6%	13	10.2%	-4.4%
Parked elsewhere	14	10.2%	21	16.4%	6.2%

Table 6: Parking Locations

5. Evidence of Overspill Parking (see Appendix 3 for more detail)

Three observations were made in 2016 of Stoke Park, part of Cheswick Village and the car park of B&Q, where students were known to park. Two observations were made at around the same time as the 2016 survey during the Spring term and a third observation was made early in the summer vacation, when the vast majority of students had departed.

The parking capacity of the streets was estimated ignoring illegal parking, of which a few examples were observed. The capacity of the relevant section of the B&Q car park was also estimated separately. In the B&Q car park vehicles were parked in two separate areas; the southern area was furthest from the store and closest to the pedestrian exit leading to the ring-road and the campus. Another cluster of vehicles was observed closer to the store with empty spaces in between; thus it was fairly easy to identify vehicles which seemed likely to belong to UWE students. Notices threatened fines of £90 for unauthorised parking but there was no evidence of verification or enforcement.

Table 7 shows the results of these observations. Note that the area of search was not comprehensive (some people were believed to park further afield). Although precise attribution cannot be made it shows clear evidence of overspill parking.

	Term Time		Vacation		Change	
	Average Count	Capacity Occupied	Count	Capacity Occupied	Count	Capacity Occupied
Housing Estates	263	78%	155	46%	-108	-32%
B&Q (south area)	70	71%	N/A Closed down		N/A	N/A

Table 7 Observational Surveys of Overspill Parking Around the Campus

Another concern expressed before the introduction of the new parking policy was whether the Exclusion Zone would encourage students to live further away in order to obtain the right to park. There was no evidence of that in the survey findings; with on-campus students removed, there was no statistically significant difference in the proportions inside or outside the Zone (identified by postcode, which was completed by over 90% of respondents in both waves). The Travel Planner told us that in a few instances students had attempted to give a false address outside the Zone in order to obtain a permit. Where a student moves from inside the Zone and wishes to apply for a permit evidence such as a utility bill is required to confirm a new address outside the Zone. The Travel Planner believed these methods had closed that loophole; the survey results would not necessarily confirm this, as the postcode on the questionnaire might differ from the one given to the university.

6. Analysis

The combination of measures implemented at Frenchay campus since 2006 had clearly achieved substantial modal shift even before the removal of the right to park from most undergraduates. Only 25% of those who lived within the Exclusion Zone and started before September 2013 held a permit in 2015, even though they were entitled to one.

The lower levels of driving to the campus amongst those who started after that date suggests that removing the right to park at Frenchay campus did reduce driving to it.

Licence-holding, car availability and travel to other destinations for other purposes were all

substantially lower amongst those who started after the change in policy. The change in policy did not appear to exacerbate overspill parking. Partly because of the tightening controls, on-street parking reduced between 2015 and 2016, although there was an increase in the 'elsewhere' category, including retail car parks.

The survey findings raise two questions which cannot be directly answered by the data collected:

- Why was there modal shift towards car driving between 2015 and 2016, and:
- Why did a gender gap appear in the modal shares of the second wave?

Broader national trends are relevant to the first question. After several years of decline, national traffic volumes began to rise after 2013, with a 1.5% increase between 2015 and 2016⁷ Bus patronage fell by 2.6% over the same year.⁸ One reason for these changes has been the falling price of fuel; in the three years to March 2016 the average price of unleaded petrol fell by 26% with an 8% fall between the two waves of the survey.⁹ The lower incomes of students are likely to make their travel decisions more price-sensitive than the general population.

Given the congestion surrounding the campus the removal of parking rights from some students might have freed up road space for others to take their place. Most of those others would come from the minority entitled to parking permits, including those who started before September 2013. Discussions with the Travel Planner identified one other factor which may have encouraged more driving in 2016. When the main visitor car park closed, additional car parks were made available to students with permits (and a few who were breaking the rules). These were in more convenient locations (e.g. car park shown on the cover photograph, next to the Exhibition Centre) than the old visitor car park, which was on the opposite side of Coldharbour Lane.

In addressing the question about gender, it may be noted that the 2010 survey also found no gender difference in the modal share of driving to campus;⁶ the change occurred between 2015 and 2016. Combining both waves 18% of males without a parking permit drove to the campus compared to just 8% of females. Females who drove were more likely to park on-campus (86%) than males who drove (66%). This suggests one reason why the change in policy (and the closure of the visitors' car park) influenced females more than males. The Travel Planner indicated that most of the cases of unauthorised parking they have encountered on campus have involved male students. It seems likely therefore that the policy to remove parking rights on campus provoked avoidance strategies amongst more males than females.

Splitting the data by wave revealed that in 2016 females also had lower car availability, fewer licences and made fewer trips to other destinations than males, whereas in 2015 there were no statistically significant differences. Similarly females who started after September 2013 had lower car availability, fewer licences and made fewer trips to other destinations than males, whereas there were no significant gender differences between those who started before that date. This confirmed the more general observation that factors influencing travel to the campus (including the change in parking policy) also influenced those wider measures of travel behaviour.

7. Conclusions and Recommendations

This study suggests that the decision to remove parking rights from most undergraduates

did reduce driving to Frenchay campus, but not by as much as might have been expected, mainly because earlier measures had already reduced driving amongst the majority of students who live in the Exclusion Zone. Parking controls and charges were part of those earlier measures, so the study supports the findings of many others that parking restraint is an essential element of any strategy to achieve modal shift and reduce traffic impacts around a major destination.

The removal of parking rights on campus also influenced students' car ownership, licence-holding and broader travel behaviour, helping to reduce traffic-generation and parking pressure across the city as a whole. Concerns that a parking exclusion zone might provide an incentive for people to live further away were not borne out by this study, although there had been a few instances of students attempting to give false addresses. However, the increase in driving observed in 2016 may be evidence of an unintended consequence; where parking opportunities are reduced but road capacity is maintained, freed-up road space may be filled by additional drivers. The falling price of fuel was also believed to have encouraged more driving in 2016.

The change in parking policy influenced females more than males, who were more likely to circumvent the restrictions. Earlier measures, increasing the cost of parking and improving the bus service influenced male and female students alike. The gender differential only appeared after the right to park on campus was removed from most students. Parking constraints at major destinations usually cause some overspill parking on surrounding streets or other sites nearby, although the scale of overspill parking may be exaggerated. At Frenchay, the increase in students travelling by other modes far outnumbered those who parked on streets or sites surrounding the campus. When evaluated against its transport objectives the policy may therefore be judged a success, although it has been implemented in national circumstances which are not particularly helpful for organisations trying to limit the traffic impacts of their activities.

A small minority of students are clearly motivated to circumvent the rules that restrict parking on campus. The 12 who admitted to parking on campus without a permit represented around 3% of the 2016 sample. Enforcement action will clearly be required to maintain fairness and prevent that proportion growing any larger. The issue of on-street parking is more difficult to address. That problem can only be solved by on-street controls and local authority enforcement; UWE is no different from any other large trip-attracting destination in that respect.

Whilst the rising levels of walking to Frenchay campus (since 2012) are a positive development, stubbornly low levels of cycling remain a matter of concern. Over-reliance on buses to achieve further modal shift could create resilience risks (as evidenced by the road closures which occurred after the end of this research in 2016).

Some useful improvements were made to the main cycle route between the city centre and Frenchay during the Cycling City programme between 2008 and 2011, and there is some evidence that these measures did make a city-wide difference,¹⁰ but little has changed since then. UWE has put some investment into cycle parking and various small-scale behaviour change initiatives but these have not made any perceptible difference to rates of cycling. A report was produced in 2014 by John Grimshaw, the former Chief Executive of Sustrans, who was advising South Gloucestershire District Council on possible improvements to cycle routes in the area. Some of its recommendations concern access into and through the campus, which UWE has plans to implement, but the most important improvements would

depend on the two councils and/or the new Combined Authority. UWE has decided in the past to contribute funds to prompt or facilitate action by highway authorities, on the overspill parking issue, for example. This should now be considered to improve the incomplete network of cycle routes leading to Frenchay campus from those areas where many students live.

This study has not sought the views of students on how easy or difficult it is to travel to Frenchay Campus by different modes, or whether any further changes should be made to make that easier. Those issues should be considered separately, although communication with students should make clear the imperative, for practical as well as sustainability reasons, to constrain car-borne traffic heading to and from Frenchay campus.

¹ See: Melia, S. (2015) Randomised Controlled Trials, Evidence Hierarchies and Smarter Choices. *World Transport Policy & Practice*, 21 (2). pp. 64-71. ISSN 1352-7614 Available from: <http://eprints.uwe.ac.uk/27409>

² University of Bristol (2016) Transport Plan, Travel Surveys. [online]. <http://www.bristol.ac.uk/transportplan/surveys/#student> [Accessed December 2016]

³ University of Bournemouth (2013) Travel Plan 2013 – 2018 [online]. www1.bournemouth.ac.uk/sites/default/files/asset/document/travel-plan.pdf [Accessed December 2016]

⁴ University of Reading (2016) Travel Survey 2016 [online]. www.reading.ac.uk/web/files/cleanandgreen/Travel_Survey_2016_report_webv1.pdf [Accessed December 2016]

⁵ UWE (2008) The UWE Travel Plan. Presentation to Bristol Travelplace Network by Steve Ward, Travel Planner, December 11th [online]. <http://imp.uwe.ac.uk> [Accessed July 2016]

⁶ Melia, S. (2011) Students Car use and its Effect on Environmental Attitudes [online]. <http://eprints.uwe.ac.uk/14424/>: University of the West of England.

⁷ DfT, (2016b) *Provisional Road Estimates Great Britain: July 2015 to June 2016* [online]. www.gov.uk: Department for Transport. [Accessed October 2016].

⁸ DfT, (2016a) *Annual Bus Statistics, England 2015/16* [online]. www.gov.uk: Department for Transport. [Accessed October 2016].

⁹ BEIS, (2016) *Typical Retail Prices of Petroleum Products and a Crude Oil Price Index* [online]. www.gov.uk: Department of Business, Energy and Industrial Strategy. [Accessed October 2016].

¹⁰ Melia (2013) No sign of Smart Travel Towns in Census. *Local Transport Today*, April 19th [online]. www.stevemelia.co.uk/census.html



Student Travel Survey

This research project aims to capture a snapshot of how students currently travel to Frenchay campus and for other purposes. It also asks where students live, whether they own vehicles and if so, where they park. We conducted the same survey last year and are aiming to compare the two. Participation is **voluntary** and **anonymous**. If you do not wish to participate, please return the form uncompleted.

Where do you live during term time?

On campus	
In purpose-built student accommodation off-campus	
Elsewhere	
If elsewhere, please enter your postcode (as much as you can remember):	

How do you travel to Frenchay campus?

	Your MAIN mode		
	Today (ONE tick per column)	Normally (ONE tick per column)	Occasionally (you may tick more than 1)
Walk			
Bus			
Car as a driver			
Car as a passenger			
Train			
Motorcycle, scooter or moped			
Cycle			
Other (please describe)			

If you drive to campus, where do you park? (leave blank if not applicable)

	Today	Normally
In one of the UWE car parks		
On the street		
Elsewhere		

How did you travel on the last trip you made anywhere for any purpose EXCEPT travel to campus?

The MAIN mode for your trip:	(ONE tick)
Walk	
Bus	
Car as a driver	
Car as a passenger	
Train	
Motorcycle, scooter or moped	
Cycle	
Other (please describe)	

Do you have a driving licence?

Full licence	
Provisional licence	
No	

Do you normally have use of a car or van (for you to drive) during term time?

Yes – for my sole use	
Yes – shared with someone else	
No	

If so, where do you normally park it overnight?

On the street	
Off the street, at my home	
Off the street, elsewhere	

Do you live in a residents parking zone?

Yes	
No	
Don't know	

Do you have a resident's parking permit?

Yes	
No	

Do you normally have use of a car or van (for you to drive) during the holidays?

Yes – for my sole use	
Yes – shared with family or friends	
No	

Are you based at Frenchay Campus?

Yes	
No – I am based at one of the other campuses	

Do you have a parking permit for Frenchay campus?

Yes	
No	

Are you:

Male	
Female	

How old are you?

Under 22	
22 – 25	
Over 26	

When did you start at UWE?

Before August 30 th 2013	
After September 1 st 2013	

Please Tick

I **agree** for my data to be used in the study. I realise that it will be anonymous so my data will not be identifiable once it has been submitted.

(If you prefer not to participate, please return the form blank or crossed out)

Thank you for your help.

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Appendix 2 - Regression Analysis

Seven binary logistic regressions were conducted to identify factors associated with the various measures of travel behaviour captured by the survey. Table 8 below shows the result of each model, with the seven dependent variables listed in the first column. In each case the independent variables included the four binary variables listed in the first row plus gender and age (over 26), neither of which was statistically significant in any of the regressions. The models were able to correctly predict between 63% and 78% of the outcomes, which represents a reasonable fit for models with a limited range of variables. These outputs confirm that the change in policy was associated with lower probabilities of driving, car availability and licence-holding and with higher probabilities of public transport use. The Odds Ratio for 'Driving Today' implies that a start date after September 2013 halved the probability of driving to campus. On the other hand, other factors, not measured in this survey, were causing higher rates of driving and lower rates of public transport use in 2016 compared to 2015.

Independent Variables:	After Sept 13		2016 Wave		Exclusion Zone		Living On Campus	
Dependent Variable:	Odds Ratio	ρ	Odds Ratio	ρ	Odds Ratio	ρ	Odds Ratio	ρ
Drive to campus today	0.502	0.001	1.519	0.036	0.135	<0.001	0.000	0.997
Public Transport today	1.767	<0.001	0.653	0.017	2.976	<0.001	0.075	<0.001
Normally drive to campus	0.508	0.001	1.749	0.005	0.136	<0.001	0.000	0.997
Last trip: driven	0.640	0.017	1.610	0.009	0.237	<0.001	0.055	0.004
Car available in term	0.410	<0.001	1.733	0.002	0.238	<0.001	0.098	0.001
Car available in holidays	0.377	<0.001	1.679	0.004	0.312	<0.001	0.527	0.042
Licence-holding	0.655	0.025	1.292	0.162	0.455	.004	0.532	0.034

Table 8 Binary Logistic Regression Outputs

Appendix 3 – Parking Survey

Introduction

This appendix reports the results of the off campus parking survey. The purpose of the survey was to measure the level of on-street and unauthorised parking around Frenchay campus during and outside of the UWE teaching term. Higher levels of off campus parking during the UWE teaching term could be attributed to students attending the Frenchay campus.

Parking Survey Method

Parking surveys were undertaken during the second teaching semester of academic year 2015/16 (in April 2016) and during the subsequent student vacation, in June 2016.

The parking survey involved a count of the number of vehicles parked during the middle of the day (12-2pm), at the three off campus locations identified in Table 9 and Figure 7. These locations are known to be used by students driving to the Frenchay Campus, based on communications from local residents and anecdotal evidence of the increased use of the B&Q customer car park during teaching terms.

Table 9: Survey locations and times

Location	Term time surveys	Vacation surveys
B&Q car park	Tuesday 12 th April Tuesday 19 th April	Tuesday 28 th June
Cheswick Village, on street	Thursday 7 th April Tuesday 12 th April	Wednesday 29 th June
Stoke Park, on street	Tuesday 12 th April Tuesday 19 th April	Thursday 23 rd June

Results

a. B&Q car park

B&Q car park is located across the A4174 Filton Road, a 300m walk from UWE's northern pedestrian entrance. At the time of the survey, the car park was advertised as being restricted to B&Q customers, with a three hour maximum stay. B&Q stated that parking violations would incur fines of up to £90.

The car park provided significantly more spaces than were required by the store. It was clearly divided into two distinct northern and southern sections. Customers parked in the northern half of the car park, closest to the store entrance. Vehicles parked in the southern half of the car park were very likely to be associated with people using other nearby trip attractors across the A4174, including UWE, given that there were many alternative spaces available closer to the store entrance (see Figure 2).



Fully parked southern section of the car park



Reducing parking demand towards the store

Figure 2: Change in parking demand from the southern to northern sections of the B&Q car park

The parking survey measured parking supply and demand in what was deemed to be the southern half of the car park. Other vehicles were expected to be associated with the store. The results of the parking count are summarised in Table 10:

Table 10: B&Q Car Park Parking Occupancy

Survey Date	Parked vehicles	Occupancy*
12 th April (During term)	69	70%
19 th April (During term)	71	72%
28 th June (Vacation)	0	0%
Supply	98 spaces	

*Occupancy of the Southern section

During term time, it was observed that the southern half of the car park was nearly **three quarters occupied** on both survey days. Hence it would appear that the parking restrictions were not being regularly enforced. The B&Q store had closed by the time of the 'vacation' survey and the car park had been turned over to construction. Hence it was no longer available for parking.

b. Stoke Park Housing Area

Stoke Park is an area of modern housing located approximately 350m from UWE's southernmost pedestrian entrance, adjacent to the Grade II listed Stoke Park estate. This is a protected area of green space and woodland. The housing area is accessed via Stoke Lane which runs parallel to UWE's eastern perimeter.

A great deal of the on street parking in the housing area is restricted, either through double or single yellow lines which restrict parking between 10am and 4pm (Figure 3). These areas are regularly patrolled by local authority parking enforcement officers. The restrictions were implemented following complaints by residents about overspill parking by UWE students.



Figure 3: Parking restrictions in the Stoke Park housing estate

The housing area has retained several unrestricted on-street sections for parking and a small number of designated parking bays for visitors to the Stoke Park estate. Following observations taken during the survey, it was estimated that there is capacity for up to 150 legally parked vehicles during the day.

The majority of the easily accessible spaces (over 80% of the total available space) were observed to be occupied during the two term time survey days. Outside of term, parking had reduced to just under 50% of the total available space (i.e. around 50 fewer cars were parked in the estate - Table 11).

Table 11: Stoke Park Parking Occupancy

Survey Date	Parked vehicles	Occupancy
12 th April (During term)	126	84%
19 th April (During term)	122	81%
29 th June (Vacation)	73	49%
Supply	150 spaces	

c. Cheswick Village and Lockleaze

Cheswick Village is a newer housing development, currently nearing completion. There has been a history of overspill parking by students since the early days of this development. This has been addressed by an ad hoc array of differing parking restrictions including yellow lines (Figure 4) and some residents parking signs (Figure 5) although parking on most of the streets remains uncontrolled. South Gloucestershire Council are currently consulting on proposals to introduce waiting restrictions in this area.²

² See: https://consultations.southglos.gov.uk/consult.ti/The_Bowery_WR_Part2/consultationHome



Figure 4, Platts Wood, Cheswick Village



Figure 5 Little Stony Leas Cheswick Village

The streets in this area include a mixture of conventional on-street parking, parking bays some of which are designated for particular properties and others which are unmarked (e.g. Figure 4). In addition, there is also a considerable quantity of off-street parking on driveways and in semi-private courtyards.

The parking survey in Cheswick Village focussed on the streets closest to the southwestern entrance to Frenchay campus plus one other street, Hermitage Wood Road, which has been the source of residents' complaints in the past. In addition, the northern section of Romney Avenue in Lockleaze (between the youth centre and the primary school) was also surveyed because this provides a convenient walking route to Frenchay campus avoiding some road congestion for people driving from the South or Southwest.

The survey noted vehicles parked in four categories:

- On-street
- In unmarked bays
- In reserved bays
- Illegally parked.

Private parking off-street and in courtyards was not recorded. The illegal parking was mainly pavement parking³ as shown in Figure 6; one example of parking across a driveway was also noted.

Table 12 shows the total occupancy on each of the survey days. A significant reduction in parking outside of the UWE teaching term is evident (in the region of 50 to 70 fewer vehicles).

Table 12: Cheswick Village Parking Occupancy

Survey Date	Parked vehicles	Illegally parked	Occupancy
7 th April (During term)	125	6	63%
12 th April (During term)	153	13	77%
23 rd June (Vacation)	82	2	41%
Supply	200 spaces		

³ Technically, driving on the pavement is the offence, not parking on the pavement, hence enforcement rests with the police rather than council-employed traffic wardens.



Figure 6 Pavement parking in Cheswick Village

Concluding summary

Overall, the parking survey provides evidence of a significant degree of off-campus parking during UWE teaching terms – Over three quarters of available off-campus parking supply was found to be parked during term time. This reduced to just 36% of available space during student vacations (a reduction of around 180 parked vehicles – see Table 13). This indicates that additional measure to restrict on-street parking in local residential areas would be beneficial in terms of reinforcing UWE’s on campus parking policy.

Table 13: Overall change in parking

Survey location	Term Time		Vacation		Change	
	Count	Occupancy	Count	Occupancy	Count	Occupancy
Housing Estates	263	78%	155	46%	-108	-32%
Retail Outlet	70	71%	0	0	-70	-71%
Total	333	77%	155	36%	-178	-41%



Figure 7: Off campus parking locations