

## **A STUDY OF TRAVEL PATTERNS TO NUI GALWAY: LESSONS FOR SMARTER TRAVEL IN THIRD LEVEL INSTITUTIONS**

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### **Abstract**

Cycling is undergoing a renaissance in Ireland. In 2011, the modal share of cycling increased for the first time since the 1980s. Smarter Travel policy has set a target to increase cycling to 10% of all trips by 2020. Third Level Institutions - due to their size, centralised organisation, ease of communication with a wide range of demographic profiles, age profile, educating role and proximity to cities and suburbs - are ideally placed to promote Smarter Travel, particularly cycling. However, in NUI Galway, for example, around 30% of students and 70% of staff still drive to campus.

More than 2000 people cycle to NUI Galway daily and it is envisaged this figure will rise to over 3000 cyclists by 2014. To ensure that this target is achieved and facilitated, adequate infrastructure and services are required. Campus travel patterns are influenced by both on-campus and off-campus infrastructure provision. In Galway City, a range of cycle friendly infrastructure has been built or improved in the past year. This includes the provision of raised cycle lanes on some of the major roads leading from the east and west to NUI Galway. Furthermore, a cycle and pedestrian bridge combined with a greenway running through campus will ensure that NUI Galway is served by cycling infrastructure from four directions.

Using an in-depth online survey of over 2,000 responses, the distance travelled, travel mode used, and time taken for staff, undergraduate students and postgraduate students to get to campus are analysed. This survey has been combined with up-to-date traffic counts as well as previous surveys to assess the travel patterns to NUI Galway over the past seven years. The motivations of each modal choice have been investigated as well as the effect of various issues (such as weather) on modal choice. The research also investigates potential motivators to shift transport mode. The paper establishes an accurate baseline of travel to NUI Galway from which future developments at NUI Galway and other TLIs can be measured. The paper further proposes the use of TLIs as testing grounds for future smarter travel developments.

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1. Introduction

Irish transport is not sustainable. Although there were 200,000 fewer commuters in 2011 compared to 2006 (due to an increase in unemployment), there are just 13,000 fewer drivers and the modal share of driving a car increased from 61.5% to 65.5%. There can be extensive health, economic and environmental consequences of this unsustainable transport [1]. In this time, cycling rose from 2.1% to 2.4%, an increase of 3,000 cyclists [2]. This is the first, albeit marginal, increase in cycling since the 1980s.

Travel to Third Level Institutions (TLIs) in Ireland has also become increasingly unsustainable over the last 25 years (see Figure 1). The modal share of driving a car has almost tripled to 38% since 1986, while cycling has fallen by 83% to 4.6%. Such is the extent of the decline in cycling that, although numbers attending third level have increased fourfold in this time, overall numbers cycling have fallen by over 3,000 [2]. This data includes all students aged 19 years and over attending all TLIs.

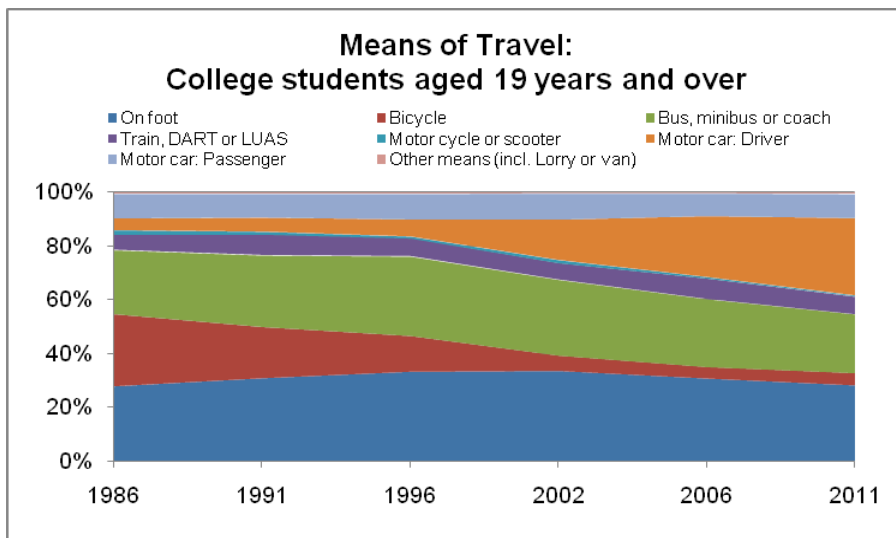


Figure 1 – Modal share of travel to third level education [1]

NUI Galway is one of seven universities in the Republic of Ireland and the only university in Connacht. The campus covers an area of 102 ha along the River Corrib, less than 1 km from Galway City Centre (Figure 2). The student and staff populations are approximately 17,000 and 2,000 respectively. University Hospital Galway (UHG) is located on the opposite side of the Newcastle Road, close to the main university campus.

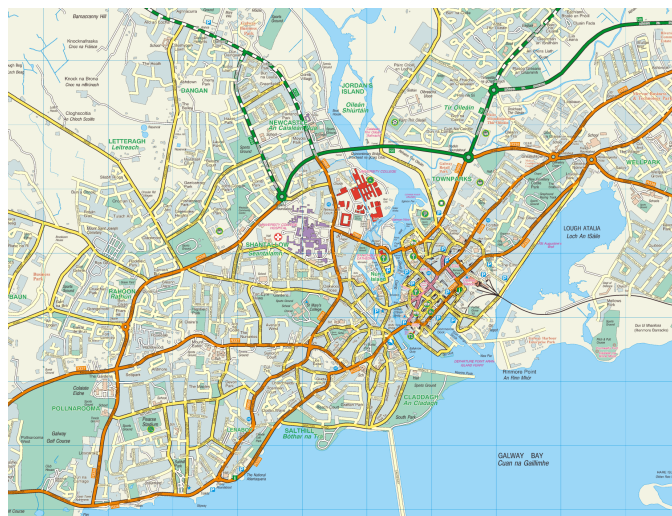


Figure 2 – Galway City Centre, NUI Galway (red) and UHG (purple) (OSI)

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This paper examines travel to NUI Galway based on a survey of approximately 2,000 responses and two traffic counts. Modal share of travel to the university has been determined and motivations of modal choice and awareness of facilities examined.

The research establishes an accurate baseline of travel to NUI Galway from which future developments at NUI Galway and other TLIs can be measured. The paper further proposes the use of TLIs as testing grounds for future smarter travel developments.

## **2. Literature Review**

The importance of a shift to sustainable transport in Ireland is well established, and Smarter Travel has become a feature of government policy [1]. TLIs are ideally placed to promote smarter travel, particularly cycling. This is due to the young student demographic, with restricted budgets, and the open-minded (and environmentally aware), often international staff [3]. Balsas (2004) suggested that it is universities' pro-active educational milieu that enables successful communication of sustainability. Furthermore, large campus populations and proximity to cities offer a prime market for sustainable transport; centralised structure allows effective communication in this regard. TLIs also present some unique challenges to transport planning: irregular schedules, continual movement throughout the day and a mixed campus population [4].

Although the role of the TLI in academic education is clear, the role in social education is less clear. Students, while attending their TLI, may develop a travel and environmental awareness (or lack thereof) which remains with them for the rest of their lives. This trend has been realised and incorporated in the Green Schools and Green Campus programmes, which encourage embedding of environmental issues in curriculum [5]. Finally, TLIs are often self-contained and represent potential testing grounds for alternative transport strategies. In this regard, this study is relevant not only to TLIs, but to all educational institutions, hospitals, industrial estates and office complexes [4].

To promote an uptake of sustainable transport modes, walking, cycling and public transport can be incentivised (the carrot) and commuting using a car can be decentivised (the stick). In many cases these approaches will be combined. This can be illustrated in the issue of car parking - an issue in almost all TLI campuses in Ireland. Where the cost of car parking is subsidised, it may undermine efforts to increase sustainable transport to the TLI [6]. Furthermore on-street parking near TLIs can undermine parking restrictions on campus [6] and cause problems for local residents.

Previous travel surveys have informed mobility management / travel plans at NUI Galway [7,8]. These plans have noted that the main reasons for car usage included (i) it was the quickest mode and (ii) that there was no alternative; though 73% staff and 67% students would be willing to change mode if improvements were made to alternative modes [8]. Recorded and targeted modal share at NUI Galway is presented in Table 1. Significant improvements to sustainable transport infrastructure and facilities are planned in NUI Galway in the coming years (some have been implemented recently). These include: a pedestrian bridge, a greenway, secure bicycle parking, bicycle hire schemes, shower and locker facilities and a Park & Ride facility. Combination with raised cycle lanes constructed by Galway City Council means that NUI Galway is served by cycling infrastructure from four directions. This is complemented by softer measures such as: cycle to work schemes, tax saver pass schemes and health promotions [8].

Nationally, travel to work, school and college is measured in a census every five years by the Central Statistics Office (CSO) [2,9]. This data is supplemented by the National Travel Survey [10]. Table 2 outlines the modal share of TLIs and national commuting and the average distance travelled by each mode for all journeys nationally.

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Table 1 – Recorded and targeted percentage modal share to NUI Galway [7,8]

	Staff			Students		
	2005	2010	2014	2005	2010	2014
<b>Cycle</b>	7	10	14	12	15	17
<b>Walk</b>	10	8	10	55	45	46
<b>Bus</b>	4	2	8	7	7	10
<b>Train</b>	1	1	1	1	1	1
<b>Car (own)</b>	63	63	47	15	23	14
<b>Car (others)</b>	15	16	20	10	9	12

Table 2 – Modal share and average distance travelled to all TLIs and commuting nationally [9,10]

	Modal Share		Average distance travelled (km)
	TLIs	National	National
<b>Cycle</b>	5	2	5
<b>Walk</b>	28	10	2
<b>Bus</b>	22	6	14
<b>Train</b>	6	3	26
<b>Car (own)</b>	30 <sup>a</sup>	74 <sup>a</sup>	14
<b>Car (others)</b>	9 <sup>b</sup>	4 <sup>b</sup>	18

a – includes motor cycle, van and other

b – motor car: passenger

### 3. Methodology

A 33-question survey was compiled in *Survey Monkey* and circulated to all staff and students via email. 2,270 responses were received – a response rate of over 10%. The following topics were covered in questions:

- Mode of travel
- Distance travelled
- Travel time
- Influence of weather
- Motivations for choosing mode
- Awareness and usage of facilities
- Preferred improvements

Respondents were also asked a series of demographic questions, including their status as a staff member, undergraduate student or postgraduate student.

In conjunction with the above survey, manual traffic counts of trips to NUI Galway were undertaken on the morning of a wet day (1.9 mm rainfall, 25<sup>th</sup> January 2012) and on a dry day (0 mm rainfall, 14<sup>th</sup> March 2012) from 8 - 9.30am. Entrances and exits from the campus were monitored manually during the above periods.

### 4. Results and discussion

For comparison of results, registered student numbers and approximate staff numbers are given in Table 3. It was observed that just over 25% of all staff responded whereas less than 10% of undergraduate students responded. This has marginally skewed the proportional makeup of respondents; however, the survey respondents are still generally in line with the campus population. Figure 3 shows the modal share of travel to NUI Galway based on the total survey results.

Table 3 – Campus population [11] and survey respondents.

	Campus population	%	Survey respondents	%
Staff (approx)	2200	11	516	23
Undergraduate	13661	71	1287	57
Postgraduate	3412	18	467	21
<b>Total</b>	<b>19273</b>		<b>2270</b>	

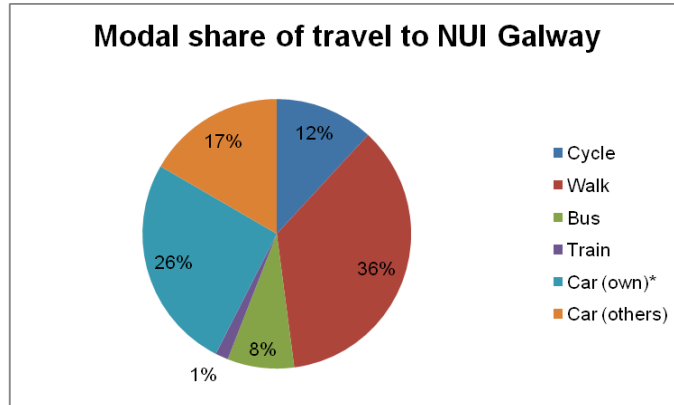


Figure 3 – Modal share of travel to NUI Galway by all respondents

Mode of travel to campus and distance travelled to campus for staff, undergraduates and postgraduates and is presented Tables 4-6. Using the percentage modal share of cycling for undergraduates, postgraduates and staff, it was calculated that there are approximately 2000 cyclists at NUI Galway. If the targets outlined in Table 1 are met, these numbers will increase to over 3200 by 2014.

Staff members tend to live farther away from campus than students – only 12% live within 2 km and 38% within 5 km. Nevertheless, this is closer than the national average, where 30% commute less than 5 km and the average distance travelled to work is 15.82 km. These results show a high level of car use: 69% of staff drive a car to campus, the majority of which is single-occupancy, and this is higher than the national average of 63%. Within 5 km, more members of staff walk or cycle than drive. Bus usage remains low – less than 4%. Save long distance cycling, this lack of bus use results in the high modal share for the car.

Table 4 – Percentage staff by mode and distance travelled

	Cycle	Walk	Bus	Train	Car (own)*	Car (others)	Total
< 1 km	0.7	2.5	0	0	0	0	3.2
1 - 2 km	2.7	4.3	0	0	1.3	0.5	8.8
2 - 5 km	7.9	4.1	1.4	0	6.6	5.5	25.5
5 - 10 km	2.3	0.7	0.7	0	11.5	5.9	20.9
10 - 20 km	0.7	0	0	0.2	11.3	6.0	18.2
> 20 km	0	0	1.9	1.4	12.3	7.7	23.4
<i>Total, i.e. Modal share</i>	14.2	11.5	3.9	1.6	43.2	25.6	100

Undergraduate students tend to live close to the university – not only in the official student accommodation, but also in the Newcastle area of Galway City. 50% of undergraduates live within 2km and 70% within 5 km of the campus – this is reflected in the large walking modal share. Cycling, at 8.4%, is low compared to that for staff (14.2%) and may be due to the lack of awareness of facilities and a generation gap. Low levels of car use may be a consequence of restricted budgets and proximity to campus.

Table 5 – Percentage undergraduate students by mode and distance travelled

	Cycle	Walk	Bus	Train	Car (own)*	Car (others)	Total
< 1 km	1.2	21.9	0.1	0	0.4	0	23.6
1 - 2 km	3.9	20.9	0.7	0	0.8	0.3	26.7
2 - 5 km	2.6	10.7	1.4	0	2.9	2.2	19.7
5 - 10 km	0.5	1.9	1.4	0	2.2	1.9	7.9
10 - 20 km	0.3	0.2	1.3	0.1	2.7	2.4	6.9
> 20 km	0	0.7	3.4	1.1	5.5	4.3	15.1
Total, i.e. Modal share	8.4	56.4	8.3	1.1	14.6	11.3	100

Postgraduate students live slightly farther away than undergraduates: 40% live within 2 km and 64% within 5 km. Postgraduates drive and cycle more than undergraduates and walk far less, which could be attributed to greater distance travelled and greater disposable income.

Table 6 – Percentage postgraduate students by mode and distance travelled

	Cycle	Walk	Bus	Train	Car (own)*	Car (others)	Total
< 1 km	1.8	11.8	0	0	0.0	0	13.6
1 - 2 km	6.5	14.1	0	0	1.6	0.9	23.1
2 - 5 km	7.3	8.8	2.0	0	5.2	3.4	26.6
5 - 10 km	1.0	2.0	0.8	0	5.6	3.1	12.6
10 - 20 km	0	0.3	0.7	0	5.0	2.1	8.0
> 20 km	0	0	3.9	2.3	7.4	2.6	16.1
Total, i.e. Modal share	16.6	36.9	7.2	1.9	24.9	12.5	100

The results of the traffic counts carried out on 25<sup>th</sup> January 2012 (1.9mm rainfall) and 14<sup>th</sup> March 2012 (0mm rainfall) are presented in Table 7. It should be noted that on the wet day, there was a 5% increase in driving, comprised of a 2% drop in cycling and a 3% drop in walking – marginal shifts. This is confirmed by the survey: when asked whether weather influenced mode of transport, 69% responded 'No'. Therefore, weather is not a major factor in determining mode of travel to NUI Galway. This may be due to acclimatisation of Galway students to adverse weather (cold temperatures, rainfall etc.) and the lack of travel alternatives. To ascertain whether weather is a determinant for mode choice nationally, studies of travel to other TLIs with varied weather conditions are required.

Table 7 – Traffic count results: modal share

	Cycle	Walk	Bus	Train	Car (own)*	Car (others)
25th Jan (wet)	6	56	4	n/a	28	6
14th Mar (dry)	8	59	4	n/a	23	6

Table 8 shows the time taken according to mode and distance travelled. These figures are approximate as only four options were presented in the survey: <5, 5-12, 12-20, >20 minutes. Also included, for comparison, are the journey times for all TLIs. These results show that within the time and distance ranges given, cycling is as fast as driving. The average distance travelled by bicycle is 5 km and that of walking is 2 km. Therefore, in the 5-10 km range, cycling trips are more likely to be at the shorter end of the scale, which may explain the 12-20 minute time taken. Some of the reasons for comparable journey times for cycling and driving are congestion and shortcuts available to cyclists.

Table 8 – Time taken (minutes) to travel to campus by mode and distance travelled

	Cycle	Walk	Bus	Train	Car (own)*	Car (others)
< 1 km	<5	5-12	5-12	5-12	<5	<5
1 - 2 km	5-12	12-20	5-12	5-12	5-12	5-12
2 - 5 km	5-12	>20	5-12	5-12	5-12	5-12
5 - 10 km	12-20	>20	>20	>20	12-20	12-20
10 - 20 km	>20	>20	>20	>20	>20	>20
> 20 km	>20	n/a	>20	>20	>20	>20
<b>Average</b>	5-12	12-20	20+	20+	12+	12+
<b>TLIs [2]</b>	19	16	46	52	33	27

\*Car (own) includes motorbike and Park & Ride

NUI Galway provides facilities to encourage smarter travel, including: bicycle parking, lockers shower/changing facilities. Respondents were asked whether they were aware of these facilities by answering 'yes' or 'no' and the results are presented in Table 9. The campus population is generally aware of bicycle parking, most likely due to the visible nature of the facilities. Staff are far less aware of lockers than students are; this may be because most lockers are provided by the Students' Union for students only and staff may use office space. Staff members tend to be more aware of shower and changing facilities than students. These facilities exist in the newer buildings on campus (Cairnes, Moyola, Engineering) and the Quadrangle. Furthermore, 85% cyclists have never used the shower/changing facilities. These figures show that publicity of these facilities is required.

Table 9 – Awareness of on-campus facilities

	Bicycle Parking	Lockers	Shower / Changing Facilities
<b>Staff</b>	93.4%	51.2%	63.6%
<b>Undergraduate</b>	96.1%	89.4%	41.9%
<b>Postgraduate</b>	96.1%	79.8%	55%

Respondents who chose cycling as their main mode of transport were asked to rank the reasons why they cycle to campus, shown in Table 10. There is a noticeable difference between staff and student cyclists when it comes to motivations for choosing cycling as the main mode for travel to campus: students ranked 'fastest journey time' as the most important factor, while staff chose 'fitness'. This confirms the results for time taken to travel to campus, but is also a reflection of the fact that students live closer to campus. Staff may have greater fitness concerns and therefore ranked 'fitness' higher than students. The second most important factor for students was that cycling is their 'cheapest option', this was less significant for staff who have less restricted budgets. Environmental considerations and ongoing improvements to infrastructure were considered the least important motivators to staff and students (of the options provided in the survey).

Table 10 – Ranked reasons for choosing cycling (1 = 1<sup>st</sup> etc.)

	Staff	Undergraduate	Postgraduate
<b>Fastest journey time</b>	2	1	1
<b>Cheapest option</b>	4	2	2
<b>Fitness</b>	1	3	3
<b>Environmental</b>	3	5	4
<b>Lack of an alternative</b>	5	4	5

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<b>Improvements to cycling infrastructure</b>	6	6	6
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Respondents who did not choose walking or cycling as their main mode of transport were asked to rank the measures that would encourage them to cycle to campus. Table 11 shows the average rankings for staff, undergraduate (UG) and postgraduate (PG). Improvements to cycling routes and to road safety are the most important motivators to further encourage staff and students to cycle. Furthermore, better awareness of cyclists by road users was also ranked highly. The provision of cycle paths on-campus was not considered very important by both staff and students. These rankings show the importance of safety of off-campus routes, whether on-road or off-road, and that the real challenges start outside the campus, a point previously noted by [4]. Other measures relating to bicycle parking and storage were ranked lower than route improvements.

*Table 11 – Ranked measures to encourage cycling (1 = 1<sup>st</sup> etc.)*

	Staff	UG	PG
<b>Improvements to road safety</b>	2	1	1
<b>Improvements to cycle routes</b>	1	2	2
<b>Provision of secure bicycle storage</b>	3	4	3
<b>Promote better awareness of cyclists among road users</b>	5	3	4
<b>Improved cycle changing facilities and lockers</b>	4	6	5
<b>Covered bicycle parking facilities</b>	6	5	6
<b>Cycle paths within campus</b>	7	7	7
<b>Secure storage available at your residence</b>	8	8	8

## 5. Conclusion

An extensive survey, accompanied by a literature review, was carried out and identified the modal share of travel to NUI Galway, analysed this travel and engaged students and staff on potential measures for improvement. It was found that students and staff live far closer to campus than the national average, particularly undergraduates the majority of which live within 2 km. Almost 70% staff, 26% undergraduates and 37% postgraduates use a car to get to campus, whether as a driver or passenger. It was established that 20-30% of these car users live within 5 km of campus – a reasonable cycling distance. Cycling on campus was found to be far higher than the national average of 2.4%. Postgraduates are the most avid cyclists, with a modal share of 16.6%. Further work is required to determine the reasons for the relatively low bus usage, which makes up 22% of travel for students in all TLIs, but just 7-8% for NUI Galway students.

By analysing the time taken for journeys to campus and the effect of weather, favourable results for active travel were revealed. Cycling was found to be as quick as driving in distances of 5 km or less and weather was found to have a negligible effect on walking and cycling. When the awareness of smarter travel facilities on campus was questioned, it was found that students and staff are quite aware of the visually prominent facilities such as bicycle parking, but less aware of showering and changing facilities. The main reasons for cycling to campus vary according to demographic. For students, fastest journey time is paramount, while for staff, fitness is more important. Finally, to encourage cycling, the most important measures are improvements to cycling routes and to road safety – a well established result.

It is envisaged that this research may be used as a baseline from which to measure future progress in the area of smarter travel at NUI Galway and, indeed used as recommendations for such future progress. Furthermore, the results can be used to benchmark NUI Galway against other TLIs nationally. Finally, the research recommends the use of TLIs, given some of their unique characteristics, as testing grounds for future smarter travel developments.

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