UBC Year 2000 Transportation Survey

Dr. Ken Denike and Mr. Andrew Murphy, Department of Geography, U.B.C. October 18th, 2000.

1   Introduction

1. The 2000 electronic survey of faculty, staff and students was conducted as part of a comprehensive data collection program arising from a commitment made in the UBC Official Community Plan and a GVRD Memorandum of Understanding. A wealth of potentially useful data was collected, analyzed and projected, material that will impact on long and mid-range planning for the university and its community. This was the second such survey and provides a comparison with a detailed UBC Transportation Survey in 1998 which provides a benchmark.

2. Two areas are highlighted here in which the data speaks clearly to issues that are now before the university--or its constituents--and which require more immediate consideration.

   These include:

   - The question of whether a UTREK card should be offered, and more precisely, whether it should be compulsory or not.

   - Secondly, the review of commuting patterns--for staff, faculty, and students--revealed by this study. That has a number of implications both for attracting and retaining faculty as well as for more general service delivery.

3. The data used to answer a question posed by Trek and considered by the Board in 2000 on whether to change class start times from 8:30 a.m. to 8 a.m. The effect of this on transit, and more generally, on student schedules was answered.

1.1   Benchmark -- Travel Volume

The current pattern of commuters to UBC by mode, projected from responses to question 3 for the entire campus is:

Mode	Faculty	Staff	Student	Total
Drive only	694	1479	8163	10336
Carpool only	207	548	2846	3601
Transit only	267	887	7351	8505
Drive and Carpool	174	181	3732	4087
Drive and Transit	155	174	1756	2085
Carpool & Transit	85	215	2059	2359
Drive, Carpool & Transit	21	76	1863	1960
Total	1603	3560	27770	32933

In 1998, the UBC survey provided a first step towards establishing a benchmark for ongoing consultation with GVRD. The focus was on person trips in peak direction during morning commute with a secondary interest in characteristics of travel demand at UBC and preliminary reading of support for a U-Trek pass. During a typical weekday commute 42% of trips were in single occupancy vehicles, with 33% in carpools, and 20% by transit. While very useful for gauging the overall level of traffic flow, a second step was taken in 2000 towards meeting transportation demand management issues embedded in the GVRD letter of understanding. Details of commuting patterns and travel behaviour associated with the significant number of commuters who regularly rely on more than a single mode was emphasized. Yet even recognizing the varied travel behaviour of the community the dominant mode for commuters is to only drive, 31.4%, with a minority of commuters, 44%, not driving at one time or other to UBC. In comparison with 1998, overall travel has increased only slightly with commuters relying more on transit and less on carpooling. While easy to make the connection between increased transit usage and a close to thirty percent improvement in transit service single occupant vehicles still dominate and the apparent switch may well reflect a negative attitude to carpooling when suitable substitutes are available. The question of whether carpooling is an inferior good needs to be addressed in future research.

1.2   UTREK

The issue explored is possible support for a transit card.

Questions 19 to 23 concerned the proposed U-Trek card, which would be mandatory for students and optional for faculty and staff.

- Question 21 asked the probability that a U-Trek card would be bought if it cost $25 for students and $45 for faculty and staff. All respondents were considered.

- Faculty support was poor, with only 25.2% showing some interest in purchase. Staff was more interested, at 39.3%, while students gave the most support at 54.3%.

- The level of undecided was quite high for all, ranging from 18.1% for students to 29.8% for staff.

Questions 22 and 23 were targeted at students only. With a mandatory U-Trek card, a slim majority of the student body was against the proposal. Once the card was made optional, support was much stronger, almost 75% for.

Q22/23: Student Support for U-TREK Card

	Mandatory	With Opt-Out
No	54.2	25.6
Yes	45.8	74.4
Total Response	35509	35509

This pattern is pretty stable across student years, with the most favourable support for either option coming from first years (48% for the mandatory card, and 81% for the optional card), and the least from second years (45% and 70% respectively).

What I draw from this is that those people driving and faced with parking charges would be reluctant to support a mandatory transit. They would, however, support it if there were a reduced rate for them, or an op-out.

This bears upon either the success or failure of a UTREK experiment and, depending on the option chosen the cost of the card by volume.
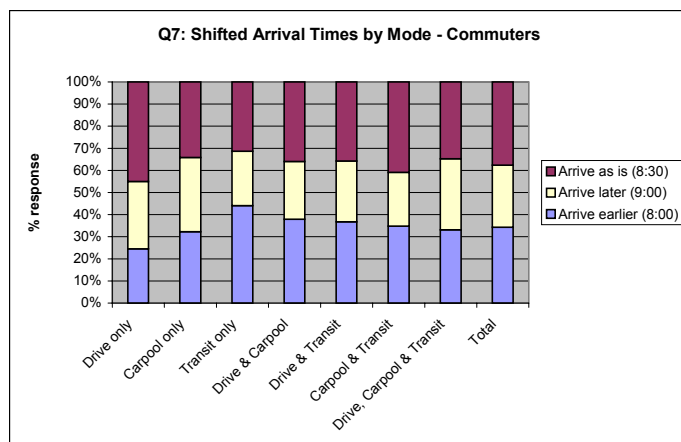
Possible changes in transit use that would accompany a proposed business plan implementing a UTREK card are explored in the appendix.

1.3 Start Time

The question at the time of the survey was whether to change the university class schedule time from 8:30 to 8 a.m. The advantage of doing this would be to increase transit service to the UBC area by TRANSLINK. It would save up to $1 million through a more efficient allocation of stock were we to make this move, and some of those monies would be available to increase our service during maximum inflow period.

Q6: Preferred Start Times by Type - Commuters
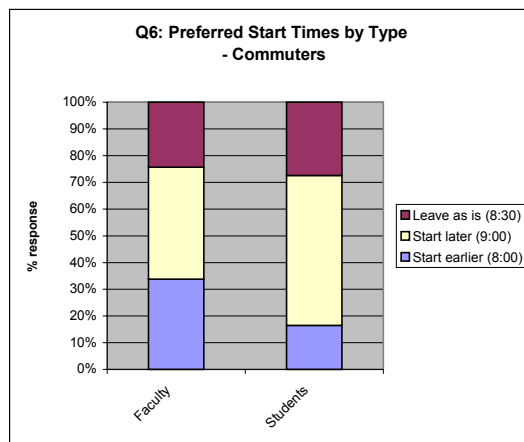
In terms of preferred time, about 30 % of faculty would prefer to start earlier. Only 20% of students would prefer the earlier start, however. But if the time is shifted and break it down by modes, about 40% of transit-only users would in fact come earlier. This means, in effect, that people would use the classes open in the earlier start and that the efficiencies that would result are likely to be realized without upsetting the schedule or making it difficult for students or faculty to attend first-classes.

Q7: Shifted Arrival Times by Mode - Commuters

Legend:
- Arrive as is (8:30)
- Arrive later (9:00)
- Arrive earlier (8:00)

Based partially on these survey results, UBC Senate approved a change to start times for first-classes from 8:30 a.m. to 8:00 a.m.

1.4 Spatial Distribution

Of the 41 thousand who comprise the university community 64% reside in Vancouver or on campus. The most common residential areas for faculty are the Dunbar-Shaughnessay area, East Kits to Cambie and northern Cambie to Boundary, and Campus. For staff the most common areas are East Kits to Cambie, northern Cambie to Boundary, and Richmond. For students Campus predominates, followed by East Kits to Cambie, northern Cambie to Boundary and Richmond.

In comparison with 1998 survey results there has been a slight shift in catchment area presumably resulting from improvement in transit service, most notably the better connection between SkyTrain line and UBC afforded by the 99B-Line.

2 Methods

2.1 Data Collection

The survey was made available to students, staff and faculty via a website address in March 2000, with an email request for participation sent to all with a UBC-based email account. The website was also publicized for those without a UBC email account (primarily students) although the efficacy of this is uncertain.

Responses from participants were received by a ColdFusion-based web interface hosted by Communicopea, and stored in an Access database. There was some confusion as to coding, since the questionnaire uploaded onto the website was slightly different from the last-circulated draft, and no coding sheet was made available to the analysts. Question numbering also differed from the questionnaire sheet available for printout on the website and that online, largely due to information pages (questions 19-23 on the website and in the data file were listed as 18-22 on the document; questions 25-36 were listed as 23-34 in the document; the website/datafile question numbering is used here).

One question in the Optional questions section (question B – see the Optional report) had an error in either capture in ColdFusion or transmission to Access, and information after sub-question F were not

recorded (working late, taking public transit, waiting for Security Bus) for either Day or Night. The Optional questions had a much lower participation rate than the required set, and have not been re-weighted for this (see Weighting below).

2.2   Response and Weighting

Survey responses were verified to provide suitable data for processing. Two types of biases were accommodated through weighting:

1. **Those arising from using the medium of the Internet that reasonably result in different response rates.**

2. **Differences in responses associated with mode use sufficiently large not to be associated with the survey being conducted on the Internet.**

What follows is an assessment of the strategic implications of responses rather than just a statistical summary.

5,686 total responses were recorded of these, 2040 had only partial information, reasons for which include giving up, losing connection, or refusing to answer critical questions. These critical questions were used to weight the sample to match key attributes of the university population: faculty/ staff/ student ratios, faculty, part/full-time status, gender, off/on-campus ratio. Mode split of survey responses was standardised (person trips were matched to a detailed on-the-ground set of cross-screen counts, Characteristics of Travel To/From the University of British Columbia, November 30th, 1999). The off/on-campus variable was used as a key analysis variable, splitting the dataset into "commuters" (those who do live off-campus) and "on-campus". For most results it is commuters who are targeted, otherwise it is all respondents being considered.

The responses to each of these critical questions were compared to known university profiles and given an individual weight to increase or decrease influence on the total sample. Each of these individual weights was cross-multiplied to determine a final weight that is a close approximation to the overall university profile. Examples of this process are reproduced below for faculty/staff/student ratios and gender:

Primary Reason for being at UBC

	Unweighted Frequency	Unweighted Percent	Weighted Frequency	Weighted Percent
Faculty	204	5.6	1882	4.6
Staff	513	14.1	3739	9.1
Student	2929	80.3	35509	86.3
Total	3646	100.0	41130	100.0

Gender

	Unweighted Frequency	Unweighted Percent	Weighted Frequency	Weighted Percent
Male	1555	42.6	18012	43.8
Female	2091	57.4	23118	56.2
Total	3646	100.0	41130	100.0

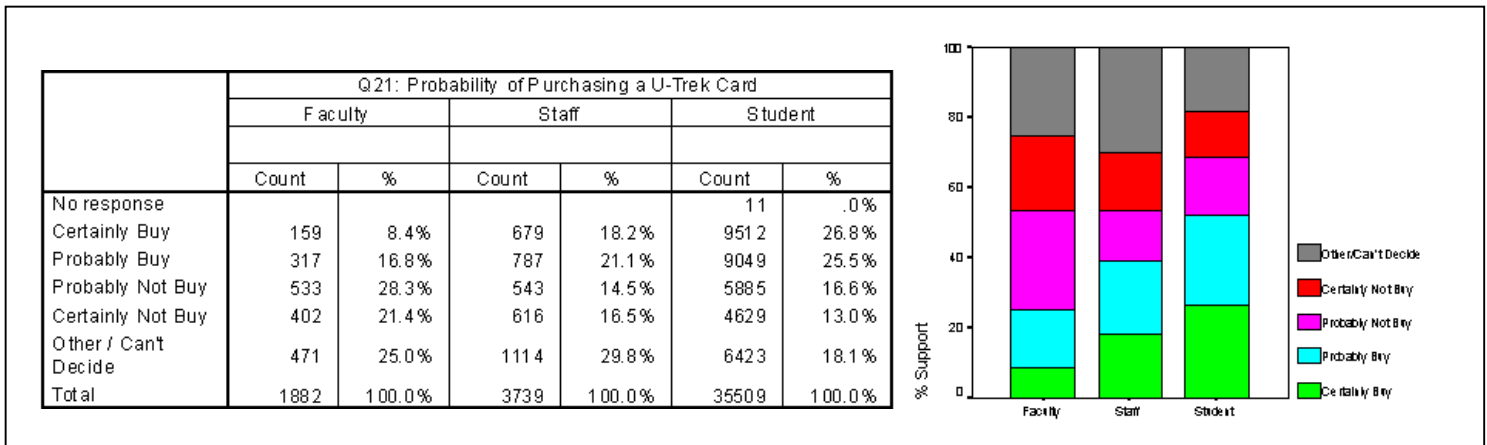Ideally the final weight would be produced on an as-needed basis. Thus if the question called for simulating the typical level of activity on campus during the day, participation by individuals not commuting daily to campus would need to be adjusted for in the final weight. This was not done for this iteration of results but will be when analyzing transportation management options in the future.
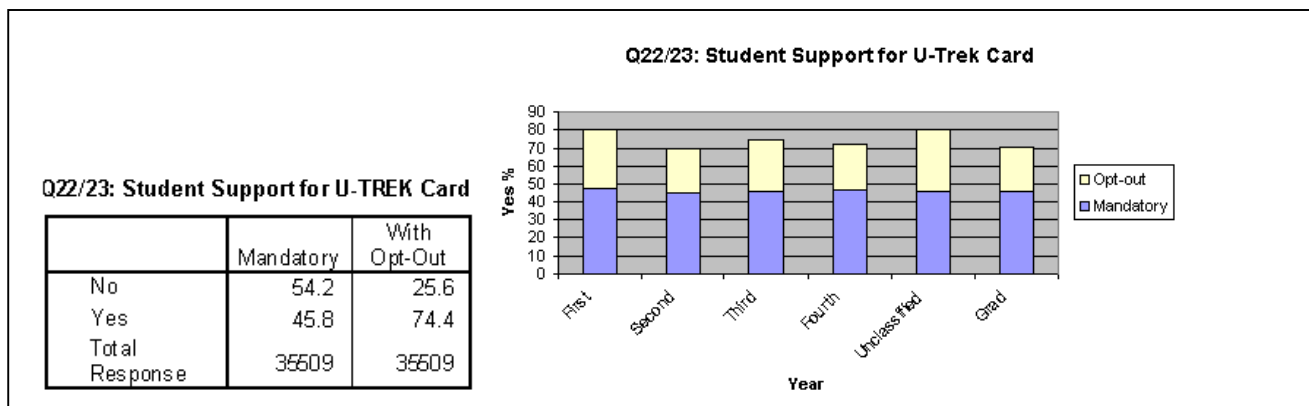
3 Key Results

3.1 U-Trek Card

Questions 19 to 23 concerned the proposed U-Trek card, which would be mandatory for students and optional for faculty and staff.

Question 21 asked the probability that a U-Trek card would be bought if it cost $25 for students and $45 for faculty and staff. All respondents were considered.

| | Q21: Probability of Purchasing a U-Trek Card | | | | | |
| | Faculty | | Staff | | Student | |
	Count	%	Count	%	Count	%
No response					11	.0%
Certainly Buy	159	8.4%	679	18.2%	9512	26.8%
Probably Buy	317	16.8%	787	21.1%	9049	25.5%
Probably Not Buy	533	28.3%	543	14.5%	5885	16.6%
Certainly Not Buy	402	21.4%	616	16.5%	4629	13.0%
Other / Can't Decide	471	25.0%	1114	29.8%	6423	18.1%
Total	1882	100.0%	3739	100.0%	35509	100.0%

Faculty support was poor, with only 25.2% showing some interest in purchase. Staff was more interested, at 39.3%, while students gave the most support at 54.3%. The level of undecided was quite high for all, ranging from 18.1% for students to 29.8% for staff.

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Question 19 asked the attractiveness of proposed features of the U-Trek card, on a scale from 1 (not at all attractive) to 5 (extremely attractive). There was not much variation in results, with only one feature receiving consistently high marks: unlimited transit use, with reduced parking prices the next favoured:
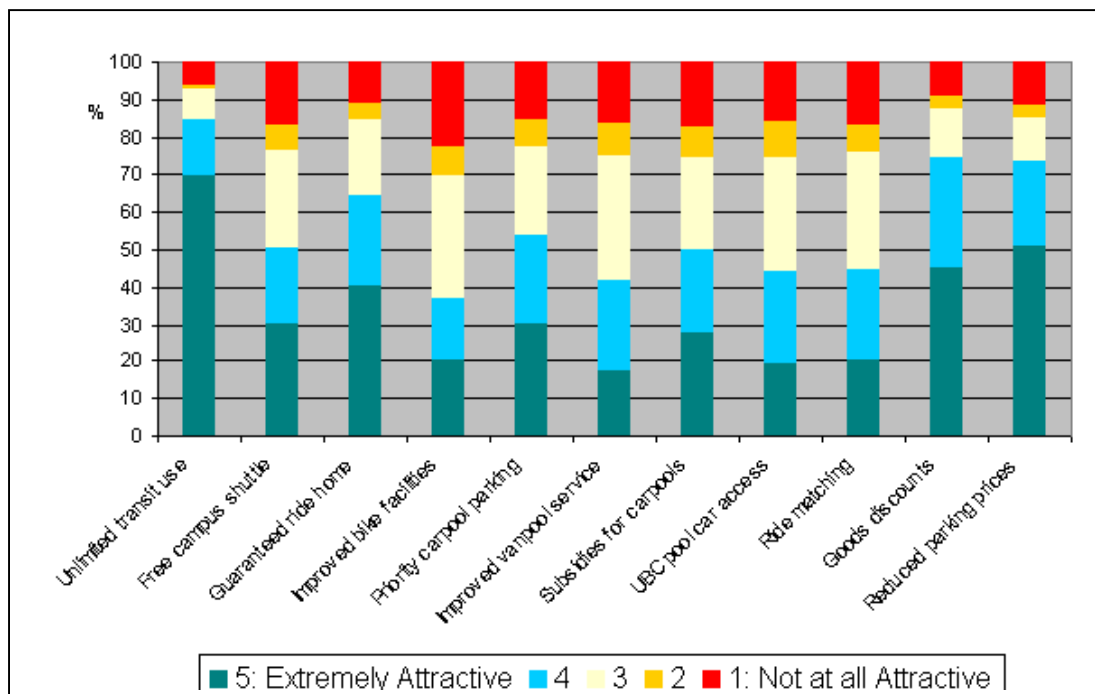
This question was re-analyzed for commuting students only, breaking down the median into its component parts. Support generally increased slightly, notably for parking prices and the campus shuttle.

Question 20 asked for the number of expected extra trips per week on transit that would be made with a U-Trek card. The data represented below are for commuters. Over 80,000 extra transit trips per week are planned, of which student transit commuters comprise 87 percent. The majority of respondents (17,843 of the weighted sample) plan no extra trips at all; just over 6 percent plan between 10 and 19 extra trips, which correspond to a total of 23,664 extra trips per week for this group.

Trips	No. Extra Transit Trips				% of Respondents			
	Faculty	Staff	Students	Total	Faculty	Staff	Students	Total
0 (# resp)	911	2,231	14,701	17,843	54.4	61.1	50.1	51.5
1-9	2,759	4,709	46,173	53,641	41.8	33.9	42.7	41.8
10-19	492	1,826	21,346	23,664	2.9	4.7	6.7	6.3
20-30	300	235	2,790	3,325	0.9	0.3	0.5	0.5
Total	3,551	6,770	70,309	80,630	100	100	100	100
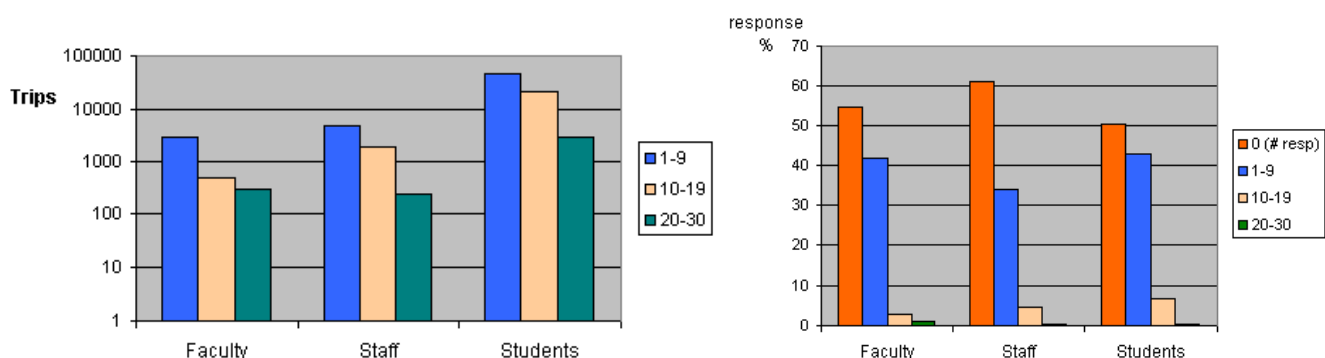
This compares to the 98,159 trips currently made by transit (Q3), the second-most common mode after driving alone. Students comprise 88 percent of these current transit trips.

When converted to per-person averages the large number of 0 extra trips skews the mean downward to 2.33 for all commuters (Q20). Excluding the 0 responses generates a mean of 4.8 extra transit trips per week per person, marginally higher for students and lowest for faculty.

This compares to the average 6.36 transit trips currently made per week (Mon to Fri only), also excluding 0 trips.

Q20: Extra Transit Trips with U-Trek Card

	Faculty	Staff	Students	All Commuters
Mean	2.12	1.86	2.40	2.33
Non-0 Mean	4.65	4.77	4.81	4.80

Q3: Mean Trips per commuter, Mon-Fri, any reason by Mode

Mode	Faculty	Staff	Students	All
Drive	6.90	7.54	6.45	6.59
Carpool	5.75	7.10	5.08	5.26
Transit	**5.10**	**6.76**	**6.37**	**6.36**
Bike	6.27	5.42	4.95	5.14
Walk	2.91	3.05	3.81	3.68
Motorbike	.	10.00	1.67	2.48
Other	4.98	5.29	5.57	5.51

Q3: Commuter Trips Mon-Fri, any reason by Mode

Mode	Faculty	Staff	Students	All
Drive	7,654	15,169	105,918	128,741
Carpool	3,263	7,384	60,812	71,459
Transit	**2,810**	**9,210**	**86,139**	**98,159**
Bike	1,585	1,267	9,165	12,017
Walk	219	357	3,878	4,454
Motorbike	0	279	427	706
Other	126	796	4,785	5,707
Total	**15,657**	**34,462**	**271,124**	**321,243**

3.2 Changing Class Start Times

Question 6 asked faculty, staff and students when they would **prefer** to start classes: earlier, at 8am; later, at 9am, or as-is at 8:30am. Question 7 asked whether a changed class start time (either earlier or later) would actually **shift** their arrival times.

Staff indicated 100 percent agreement with leaving the class start time at 8:30am, perhaps reflecting an inability to answer anything else either due to questionnaire design or jobs being insensitive to class times. Staff is therefore excluded from the data for both questions 6 and 7 below.

For the purposes of room planning, all respondents must be considered. Of faculty and students, faculty were split 50-50 for earlier or later starts, while students clearly preferred a later start. When faced with a shifted start time, both faculty and students suggest they would arrive earlier. This may reflect a resignation on students' part to earlier start times being a "done deal". Faculty do not expect to change their behaviour much in the face of a changed start time, reflecting either that they expect someone else to teach the early classes or that in the case of later classes they will have a half-hour extra preparation time.
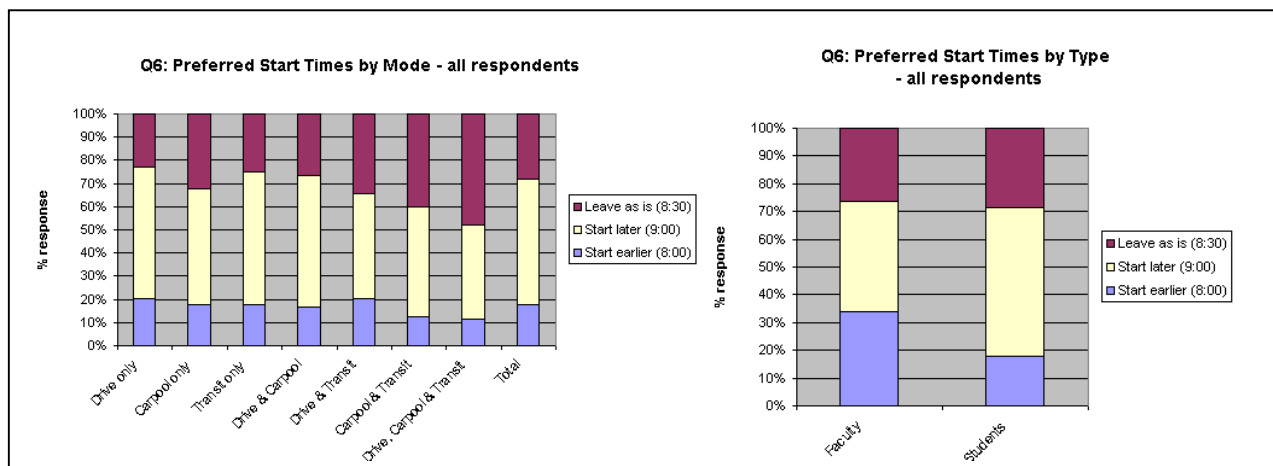
When analyzed by transportation mode[1] (excluding staff), those who carpool at least some of the time express a stronger preference for start times to remain as-is, while there is little difference between transit users and sole-drivers. Respondents across all mode types are less likely to arrive later when faced with a shifted time, either arriving earlier or keeping their schedule constant.

Analyzing implications for transportation planning means restricting the respondent population to commuters only, but this did not lead to any significant changes in response (for particulars, see the table).
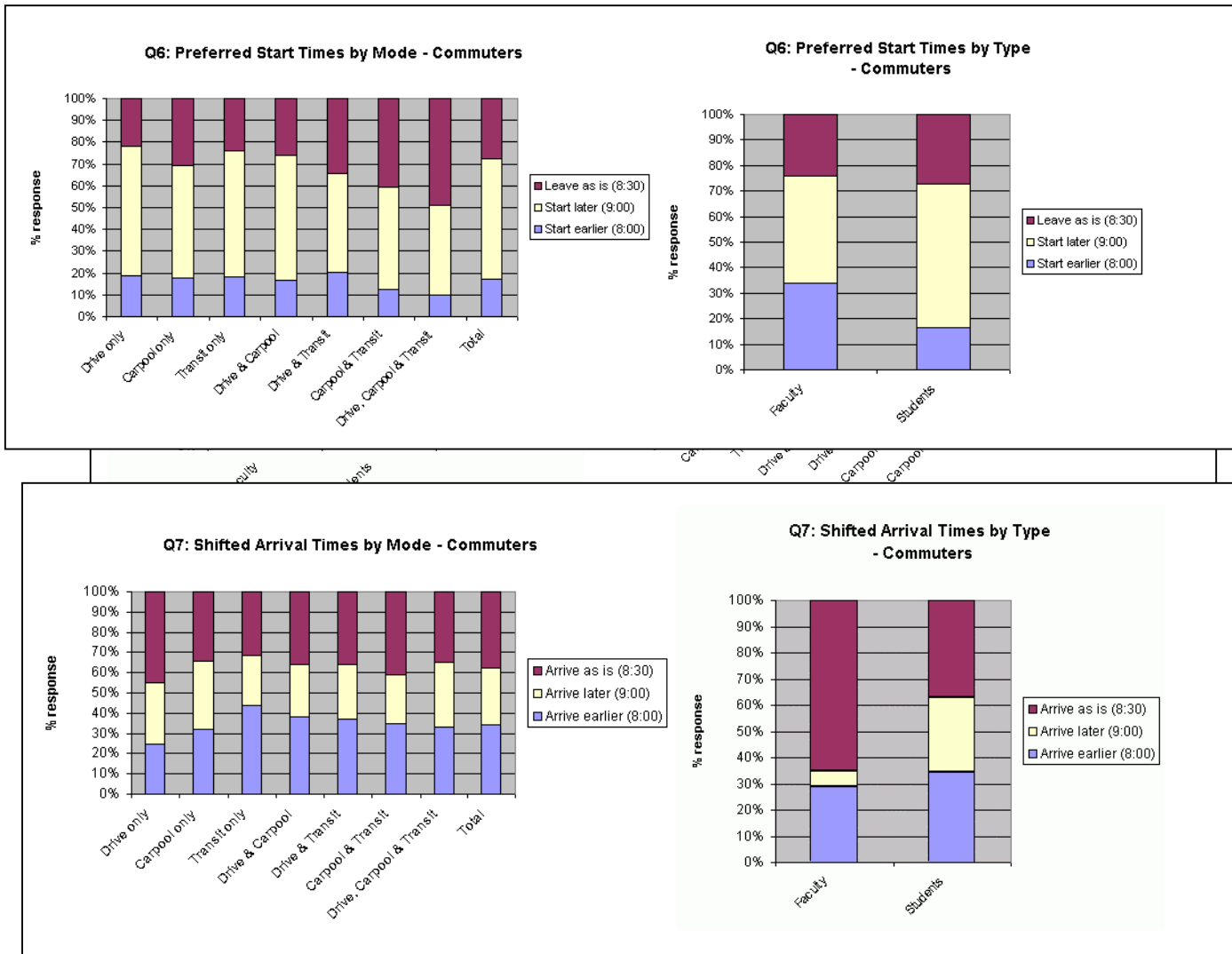
3.3   Current Arrival and Departure Times and Trips Made

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[1]   Determined as the major mode (driving alone, carpooling, using transit or some combination of these three) for the purposes of work and school, Monday to Friday.

To know how arrival times are affected by changes to class start times, it helps to have an idea what the current times are. Question 4 asked for the arrival time and departure times on a typical weekday. The results presented below are for commuters only. The percentages represent within type or mode.
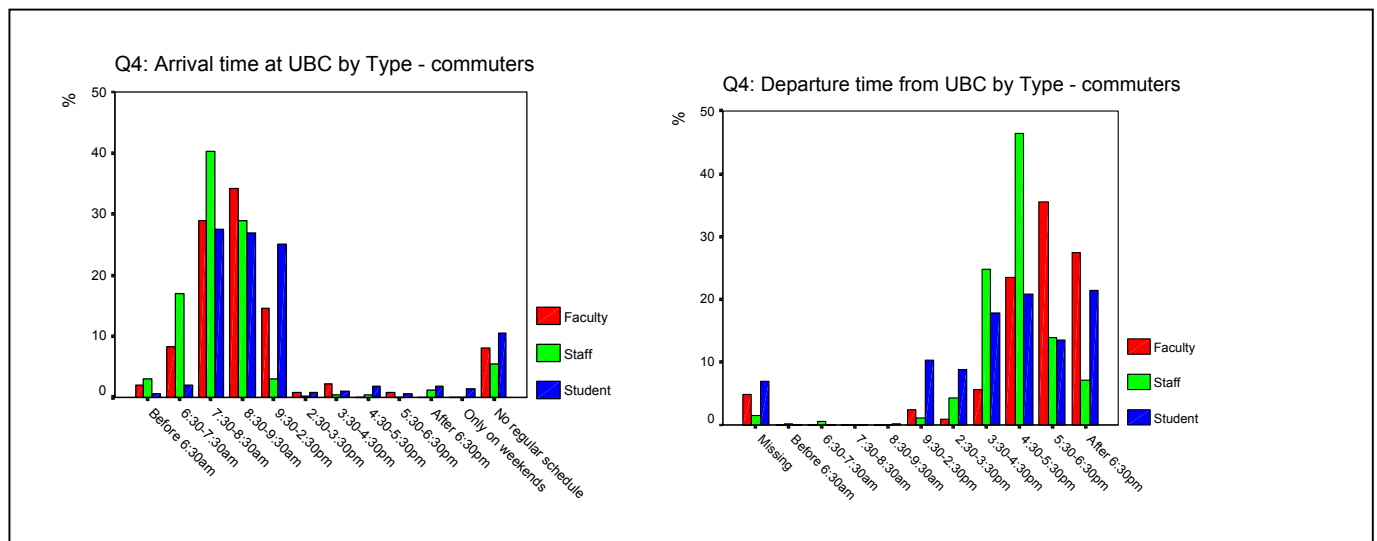
The earliest to arrive are staff, the majority of whom are present by 8:30am. Students are the stragglers, with more than half arriving between 8:30 to 9:30am.

Staff also tends to be the first to leave, grouped primarily into the two hours from 3:30-5:30. The peak departure time for faculty is two hours later, from 5:30pm on, whereas students leave in fairly steady numbers throughout the mid-to-late afternoon.

Of all modes to school, driving alone is the most common means, used by 38 percent in a typical week, followed by transit at 31.3 percent. When restricted to commuters only (those living off-campus), the proportion of sole-drivers and car-poolers increases and that for transit users and walkers decreases.

No particularly clear pattern stands out from a table of arrival and departure times by mode, except that drivers are under-represented during the second-most common arrival time (8:30-9:30). The percentages are within columns: to find unusually high or low numbers compare to the total column percent.

3.4 Preferences

Questions 8, 10, 12, 13 and 17 asked respondents to rate various programs: incentives for carpooling (Q8), cycling (Q10 and 12) and transit (Q13) and the Campus Security bus (Q17). Summary tables from these questions are reproduced below.

Q8: Carpooling Incentives[a]

	Student / Faculty / Staff		
	Faculty	Staff	Student
	Median	Median	Median
Lower parking rates	3	3	4
Reserved carpool parking	3	3	4
More flexible schedule	2	3	3
Guaranteed ride home	3	4	4
Help find partners	3	3	4
Use bus/HOV lanes	3	3	4
Flexible departure times	4	4	4
Drop children at daycare	1	1	1
Available for errands	3	3	3
Reduce SOV benefits	3	3	3

a. 1 = very weak incentive; 5 = very strong incentive

Q9: Carpool methods

	Faculty		Staff		Students		Total	
	Count	%	Count	%	Count	%	Count	%
Drop off others elsewhere en route	34	7.7	137	12.7	237	2.2	408	3.4
Am dropped off, driver continues elsewhere	38	8.6	193	17.9	644	6.1	875	7.2
Carpool with others to UBC	369	83.9	749	69.4	9689	91.7	10807	89.4
Total	440		1079		10571		12090	

Commuters received Carpool incentives (Q8) pretty neutrally, with only flexible departure times being accepted as an incentive across the board. Apparently parents do not wish to share their children with other car-poolers, or perhaps car-poolers do not wish to share their vehicle with children, since this option received an overwhelming rejection.

Car-poolers are most commonly in cars with sharers coming only to UBC (Q9). Staff are the most likely to share a car with others not coming to UBC, with the 30 percent of non-UBC bound riders split between others dropped off en-route, and other drivers continuing elsewhere. (Note this table is not just restricted to those who indicated they carpooled within the past week – there were an additional 2171 car-poolers included in Q9 above who did not indicate they carpooled in Q3).

Q10: Cycling incentives

	Student / Faculty / Staff		
	Faculty	Staff	Student
	Median	Median	Median
Secure, convenient parking	3	3	3
Information (route maps, information)	2	2	3
Bike buddy	1	1	2
More flexible schedule	1	2	3
Guaranteed ride home	3	3	3
Transit carry bikes	3	3	4
More lanes/routes	4	3	3
Showers around campus	4	3	3
Wet weather clothes	1	2	3
Reduce SOV benefits	3	3	3

a. 1 = very weak incentive; 5 = very strong incentive

Q13: Transit Incentives

	Transit Users			Non-transit Users		
	Faculty	Staff	Students	Faculty	Staff	Students
More direct routes	5	5	5	4	5	5
More reliable service	5	5	5	4	5	4
More/better shelters	4	4	4	3	4	4
More express	5	5	5	4	5	5
More frequent	5	5	5	4	5	5
Stops closer to home	3	3	4	3	4	4
Bike lockups at stops	3	3	3	3	3	3
More park & ride	3	3	3	3	3	3
Easier access to information	3	3	3	3	3	3
Luggage racks	3	3	3	3	3	3
Route schedules at stops	4	4	4	4	4	4
Improved cleanliness	3	3	3	3	3	4
Transit patrols	3	3	3	3	3	3
Reduced SOV benefits	4	4	4	4	4	4
Sample Size	551	1363	13525	1122	2291	15815

1 = very weak incentive; 5 = very strong incentive

Respondents (commuters) also did not have a particularly overwhelming response to cycle incentives (Q10); in fact, it is easier to point out the disincentives, such as riding with a "buddy". Faculty tended to have more extreme responses than staff or students.

By comparison, transit incentives (Q13) were rated much higher by both transit and non-transit users. For current transit users more direct routes and a more reliable and frequent service were particularly important, with opinions pretty consistent across faculty, staff and students. Among non-transit users the only options to increase in importance were stops closer to home (for staff) and improved cleanliness (for students), while a number of options declined in importance (especially for faculty).

There was not a great deal of interest in the campus security bus service (Q17), particularly among faculty and staff. Students were most interested in more frequent nightly service to more locations, with better co-ordinated connections with transit services. Since students were the group expressing most interest, their individual responses are broken out. Improvements to Day services get the least support. No one particular student year group expresses strong support or otherwise, so results are not presented by student year.

Q17: Campus Bus

	Student / Faculty / Staff		
	Faculty	Staff	Student
	Median	Median	Median
More frequent - Day	2	3	3
More frequent - Night	3	3	4
More locations - Day	2	3	3
More locations - Night	3	3	4
Larger buses - Day	1	3	3
Larger buses - Night	2	3	3
Information - Day	2	3	3
Information - Night	3	3	3
Longer hours - Day	2	3	3
Longer hours - Night	3	3	3
Connections - Day	2	3	3
Connections - Night	3	3	4

Q17: Campus Bus preferences - Students

		1[a]	2	3	4	5
More frequent - Day	%	33.9	6.0	33.3	12.5	14.2
More frequent - Night	%	19.0	3.4	26.1	20.3	31.2
More locations - Day	%	32.2	6.2	32.3	14.9	14.4
More locations - Night	%	18.5	3.8	25.4	21.1	31.1
Larger buses - Day	%	32.6	5.7	43.6	9.7	8.5
Larger buses - Night	%	21.5	5.8	44.1	15.2	13.5
Information - Day	%	29.8	4.4	33.2	17.6	15.0
Information - Night	%	18.8	3.4	30.0	22.6	25.1
Longer hours - Day	%	30.6	5.1	35.1	14.0	15.2
Longer hours - Night	%	19.4	2.5	28.4	21.4	28.3
Connections - Day	%	28.5	4.4	32.0	14.5	20.6
Connections - Night	%	18.3	3.1	26.5	19.9	32.2

a. 1 = very weak incentive; 5 = very strong incentive

Question 14 asked respondents if they were aware of the existing transit pass discount program (the Employee Pass program for faculty and staff, and the FastTrax upgrade for students). Staff were most aware, faculty least.

Q14: Awareness of transit discounts - commuters

			Student / Faculty / Staff			Total
			Faculty	Staff	Student	
Aware of transit discounts	No	Count	1098	1484	14436	17018
		% within Student / Faculty / Staff	65.6%	40.6%	49.2%	49.1%
	Yes	Count	575	2169	14904	17648
		% within Student / Faculty / Staff	34.4%	59.4%	50.8%	50.9%
Total		Count	1673	3653	29340	34666

This knowledge is reflected in the methods for paying for transit (Q15). The most common method for transit users was the FareCard, split between a discounted (Employee Pass / FastTrax) pass and a full-price pass. Cash predominates among non-regular users (defined as those who did not indicate they

used transit within the last week). Faculty transit users were the least likely to use a discounted monthly card, staff the most.

Q15: Method of Payment

	Transit Users			Non-transit Users		
	Faculty	Staff	Students	Faculty	Staff	Students
Discounted Farecard	5.2	24.2	21.7	0.0	1.5	4.4
Farecard	6.8	17.7	24.5	1.3	2.1	2.8
Cash	21.0	16.4	15.6	28.8	28.8	28.4
FareSaver	67.0	39.2	36.1	24.8	15.2	24.2
Do not use	0.0	2.5	2.1	45.0	52.4	40.2
Total	100	100	100	100	100	100

Respondents were also asked if they used multiple modes in their journey to UBC (Q16). Of all respondents, most (53 percent) used the B-line in their journey. Of these, the B-line was used least by faculty (29% of 1169 faculty) and most by students (55%). Faculty were also underrepresented in Skytrain and Carpooling, and over-represented in cycling. This reflects both the closeness of their residence to UBC (see section 3.5 following) and their propensity to drive.

Q16: Transfer to/from Modes - commuters

		Student / Faculty / Staff			
		Faculty N=1169	Staff N=2418	Student N=22705	Total N=26292
SeaBus	% Yes	3.2	4.9	5.0	4.9
SkyTrain	% Yes	5.5	19.8	25.3	23.9
WestCoast	% Yes	.4	4.0	2.1	2.2
99Bline	% Yes	28.5	49.5	55.0	53.3
Bicycle	% Yes	11.4	8.4	10.1	10.0
Carpool	% Yes	4.3	11.7	16.2	15.2
Park&Ride	% Yes	2.3	2.5	7.1	6.4

Q11b: University Boulevard bike lanes encouraged more bicycle trips

Of the cyclists to UBC, some have been encouraged to cycle (more) by the introduction of the University Boulevard cycle lanes (Q11a). Of these, faculty have been encouraged the most (20.8% of faculty) and staff the least (9.6%). Of those that have been encouraged to cycle University Boulevard more often, there were mixed responses as to why (Q11b), with a common response being that they always used this route. Staff were the most likely to switch from another cycle route to University Boulevard because of the cycle path (20% of staff); students were more likely than the other types to begin cycling (22%).

3.5   Residence Distribution

Of the 41 thousand who comprise the university community 64% reside in Vancouver or on campus. The most common residential areas for faculty are the Dunbar-Shaughnessay area, East Kits to Cambie and northern Cambie to Boundary, and Campus. For staff the most common areas are East Kits to Cambie, northern Cambie to Boundary, and Richmond. For students Campus predominates, followed by East Kits to Cambie, northern Cambie to Boundary and Richmond.

Residence Distribution

Q25: Postal Code aggregated into Zones

Zone	Faculty	Staff	Student	Total	% Faculty	% Staff	%Students	% Total
Campus	209	86	6169	6464	11.1	2.3	17.4	15.7
W. Point Grey-W. Kits	137	238	1658	2033	7.3	6.4	4.7	4.9
Dunbar-Shaughnessay	414	255	2608	3277	22.0	6.8	7.3	8.0
East Kits-Mt Pleasant	326	565	4838	5729	17.3	15.1	13.6	13.9
Burrard Peninsula	48	138	971	1157	2.6	3.7	2.7	2.8
N.E. of Cambie	237	550	3751	4538	12.6	14.7	10.6	11.0
S.E. of Cambie	57	302	2791	3150	3.0	8.1	7.9	7.7
West Vancouver	16	15	336	367	0.9	0.4	0.9	0.9
North Vancouver	60	134	1214	1408	3.2	3.6	3.4	3.4
North Burnaby		91	826	917	0.0	2.4	2.3	2.2
South Burnaby	25	177	1044	1246	1.3	4.7	2.9	3.0
Port Moody/Coquitlam	40	183	816	1039	2.1	4.9	2.3	2.5
New Westminster	12	74	406	492	0.6	2.0	1.1	1.2
Pitt/Maple		33	62	95	0.0	0.9	0.2	0.2
Langley		23	324	347	0.0	0.6	0.9	0.8
Richmond	133	451	3679	4263	7.1	12.1	10.4	10.4
East Richmond		3	278	281	0.0	0.1	0.8	0.7
North Surrey/Delta	55	204	2406	2665	2.9	5.5	6.8	6.5
Ladner/Tsawwassen	22	77	346	445	1.2	2.1	1.0	1.1
Sth Surrey/White Rock	51	53	165	269	2.7	1.4	0.5	0.7
Outside area	7	41	445	493	0.4	1.1	1.3	1.2
No Zone	33	48	374	455	1.8	1.3	1.1	1.1
Total	1882	3741	35507	41130	100	100	100	100

4   Table of Graphs Presented

	Q19: Attractiveness of features		
	Faculty	Staff	Student
	Median	Median	Median
Unlimited transit use	5	5	5
Free campus shuttle	3	3	3
Guaranteed ride home	4	4	4
Improved bike facilities	3	3	3
Priority carpool parking	3	3	4
Improved vanpool service	3	3	3
Subsidies for carpools	3	4	3
UBC pool car access	3	3	3
Ride matching	3	3	3
Goods discounts	3	4	4
Reduced parking prices	4	5	4

	Q21: Probability of Purchasing a U-Trek Card					
	Faculty		Staff		Student	
	Count	%	Count	%	Count	%
No response					11	.0%
Certainly Buy	159	8.4%	679	18.2%	9512	26.8%
Probably Buy	317	16.8%	787	21.1%	9049	25.5%
Probably Not Buy	533	28.3%	543	14.5%	5885	16.6%
Certainly Not Buy	402	21.4%	616	16.5%	4629	13.0%
Other / Can't Decide	471	25.0%	1114	29.8%	6423	18.1%
Total	1882	100.0%	3739	100.0%	35509	100.0%

Q6: Preferred start time by type - all respondents

	Faculty	Students	All
Start earlier (8:00)	0.338	0.177	0.178
Start later (9:00)	0.397	0.536	0.509
Leave as is (8:30)	0.265	0.287	0.313

Q7: Shifted start time by type - all respondents

	Faculty	Students	All
Arrive earlier (8:00)	0.272	0.322	0.319
Arrive later (9:00)	0.059	0.265	0.255
Arrive as is (8:30)	0.67	0.413	0.426

Q6: Preferred start time by mode - all respondents

	Drive only	Carpool only	Transit only	Drive & Carpool	Drive & Transit	Carpool & Transit	Drive, 'pool & Transit	Total
Start earlier (8:00)	0.205	0.179	0.175	0.166	0.203	0.125	0.114	0.178
Start later (9:00)	0.568	0.498	0.576	0.57	0.455	0.472	0.406	0.539
Leave as is (8:30)	0.227	0.323	0.249	0.264	0.342	0.403	0.481	0.283

Q7: Shifted start time by mode - all respondents

	Drive only	Carpool only	Transit only	Drive & Carpool	Drive & Transit	Carpool & Transit	Drive, 'pool & Transit	Total
Arrive earlier (8:00)	0.265	0.31	0.407	0.376	0.36	0.338	0.326	0.337
Arrive later (9:00)	0.285	0.323	0.249	0.26	0.288	0.242	0.316	0.275
Arrive as is (8:30)	0.45	0.367	0.344	0.364	0.353	0.42	0.359	0.388

Q4: Arrival time at UBC by Type - commuters

% within Student / Faculty / Staff

		Student / Faculty / Staff			
		Faculty	Staff	Student	Total
Arrive at UBC	Before 6:30am	2.0%	3.1%	.6%	.9%
	6:30-7:30am	8.3%	17.0%	2.0%	3.9%
	7:30-8:30am	28.9%	40.3%	27.5%	28.9%
	8:30-9:30am	34.2%	28.8%	26.9%	27.4%
	9:30-2:30pm	14.6%	3.0%	25.1%	22.2%
	2:30-3:30pm	.8%	.2%	.9%	.8%
	3:30-4:30pm	2.3%	.4%	1.0%	1.0%
	4:30-5:30pm		.4%	1.7%	1.5%
	5:30-6:30pm	.8%		.5%	.5%
	After 6:30pm		1.1%	1.9%	1.7%
	Only on weekends		.1%	1.5%	1.3%
	No regular schedule	8.2%	5.5%	10.5%	9.8%
Total		100.0%	100.0%	100.0%	100.0%

		Student / Faculty /			
		Facult	Staff	Student	Total
Depar from UB	Before 6:30-		.5%	.0%	.0%
	7:30-			.0%	.0%
	8:30-			.3%	.2%
	9:30-	2.5%	1.2%	11.1%	9.6%
	2:30-	.9%	4.4%	9.5%	8.5%
	3:30-	5.9%	25.1%	19.2%	19.2%
	4:30-	24.6%	47.2%	22.4%	25.2%
	5:30-	37.2%	14.1%	14.5%	15.6%
	After	28.8%	7.3%	23.0%	21.5%
Total		100.0	100.0	100.0	100.0

# 5   Transportation Survey Maps

The following maps use a zone system based on postal codes.

The proportion of drivers in a zone gives us an idea of how dependent UBC students, staff and faculty are on their cars. Here, a driver is anyone who uses their car, including those that may also take transit or carpool. Clearly zones that are inaccessible - far away from campus and without easy access to transit - have higher proportions of drivers. Notable exceptions are East Richmond and Pitt Meadows *et al*.
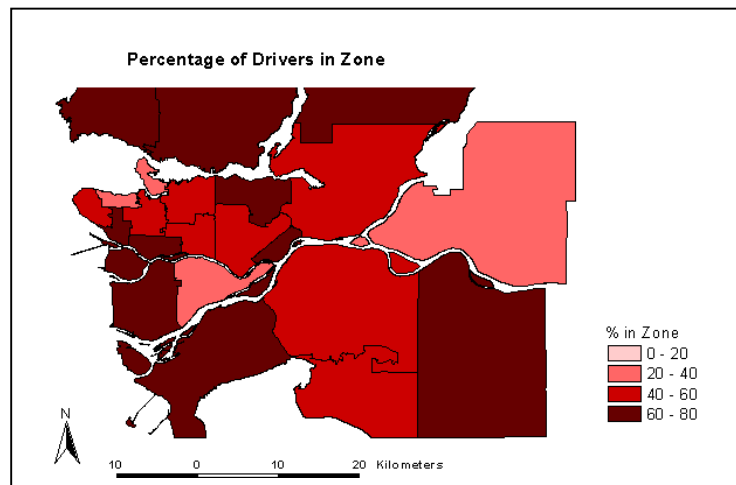

The percentage of zonal occupants using Transit (or transit with another mode) is mostly the compliment to drivers, although Pitt Meadows, Langley, Ladner and South Surrey also had high proportions of carpoolers.

The percentage of zonal occupants who Carpool is lower than for transit users or drivers, but with moderate usage rates occurring in the outer zones - Pitt Meadows, Langley, Ladner and South Surrey.
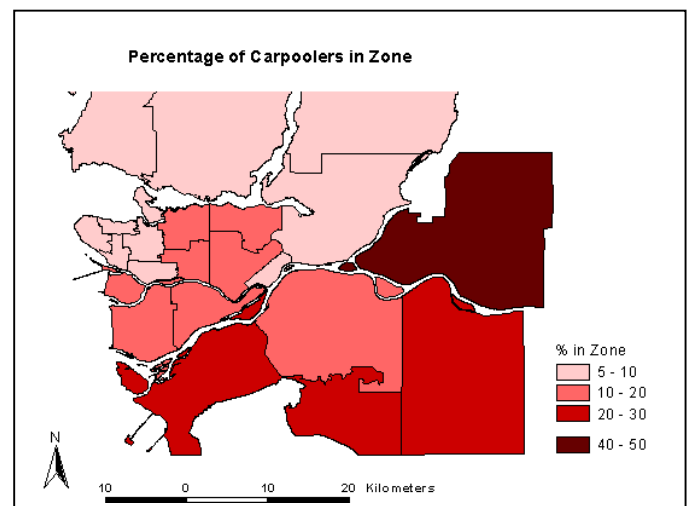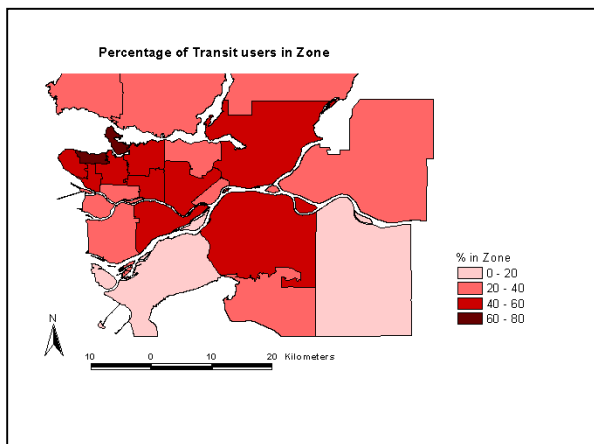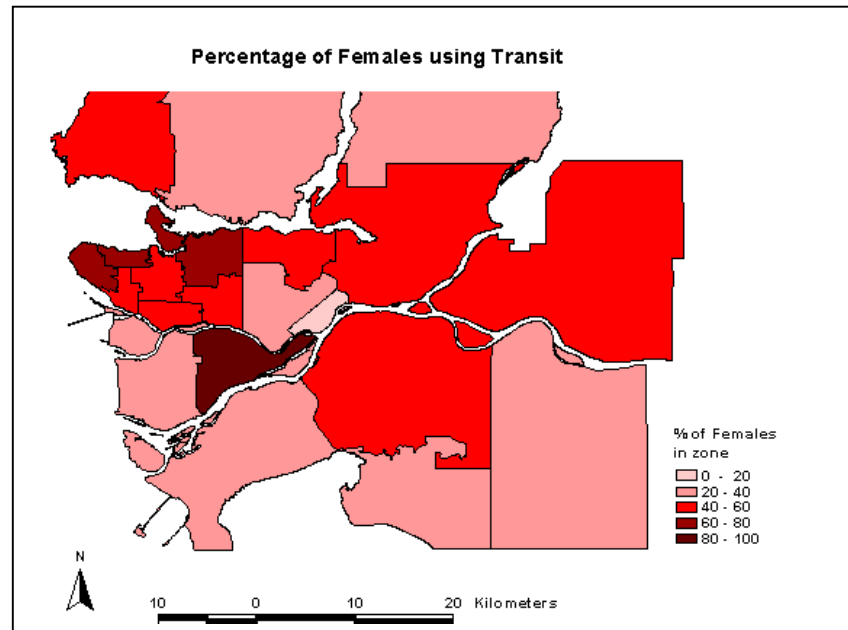
A ratio of transit use to driving was created to get a better idea of how patterns of transit use and driving vary around the lower mainland. Note this is of people using **transit only** to those who **drive only** - those who use transit and drive or carpool are ignored, because of double-counting.

The ratio of transit users to drivers tells us where transit use is exceptionally high or low relative to those who drive. Darker shades are areas where relatively more students within the zone take transit. The general pattern is for transit users to be close to the campus, but there are exceptions to this pattern: East Richmond is much higher than Richmond or south Vancouver (but with a small number of respondents); and Port Moody *et al*, New Westminster and Surrey are much higher than in Burnaby. This might indicate the importance of Skytrain and the West Coast Express.
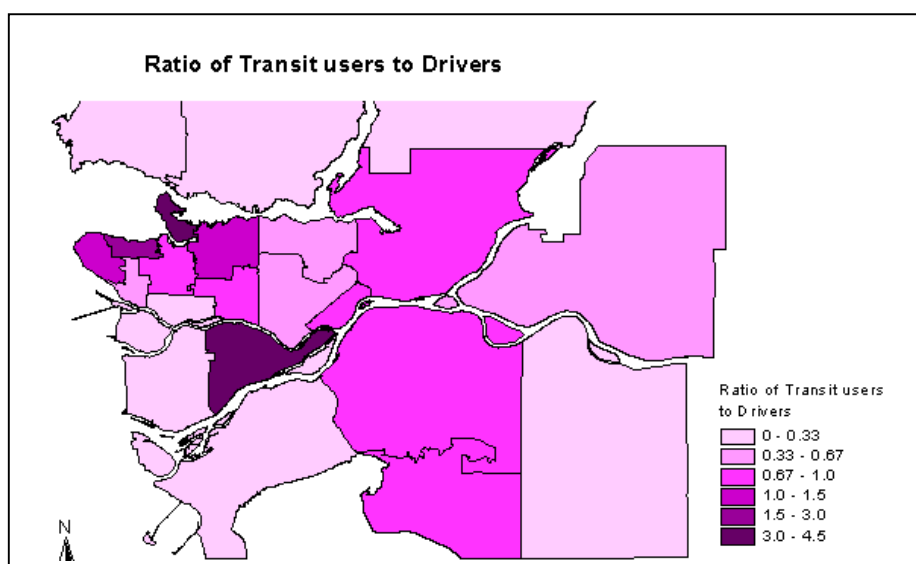

Downtown-Westend (3.9 - that is, 62 transiters to 16 drivers) and Kits-Pt Grey (165 to 59 = 2.8) are no real surprise, but East Richmond at 3.25 (13 to 4) is, although the number of residents is small. Areas of low transit penetration include Langley (no transit users, 10 drivers); Ladner/Tsawwassen (2 : 20); Richmond (23 : 141); West Vancouver (3 : 16), south Vancouver (Marpole - South Cambie: 18 : 67) and North Vancouver (15 : 47).

There is a distinct gender of transit use. Females are particularly likely to use transit as their sole means of transport in East Richmond, and to a lesser degree in Kits-Pt Grey, downtown and in east Vancouver. Note how different this pattern is to all transit users, and to males below.

Percentage of Females using Transit

% of Females in zone
☐ 0 - 20
☐ 20 - 40
■ 40 - 60
■ 60 - 80
■ 80 - 100

Males are particularly likely to use transit as their sole means of transport in South Surrey and downtown, and to a lesser degree in east Vancouver and Port Moody Coquitlam. Note how different this pattern is to all transit users and to females above.

Percentage of Males using Transit

% of Males in zone
☐ 0 - 20
☐ 20 - 40
■ 40 - 60
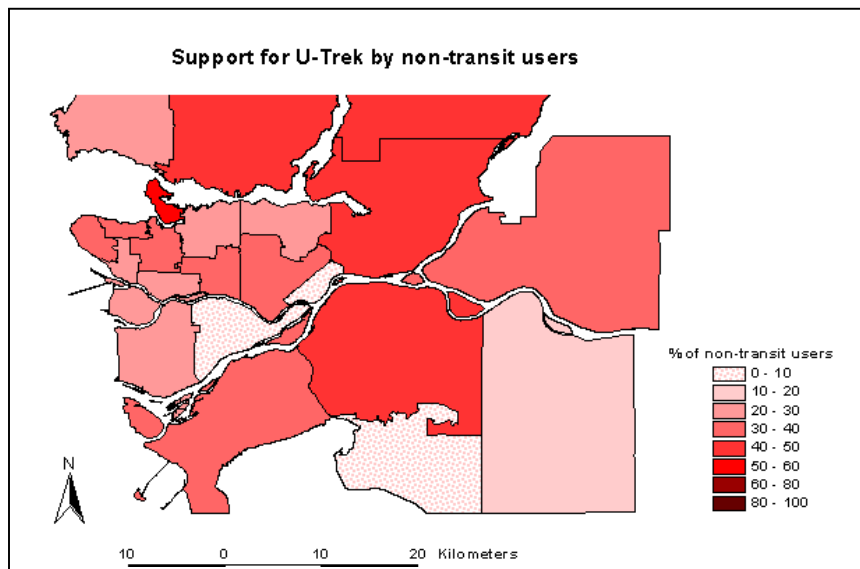■ 60 - 80
■ 80 - 100
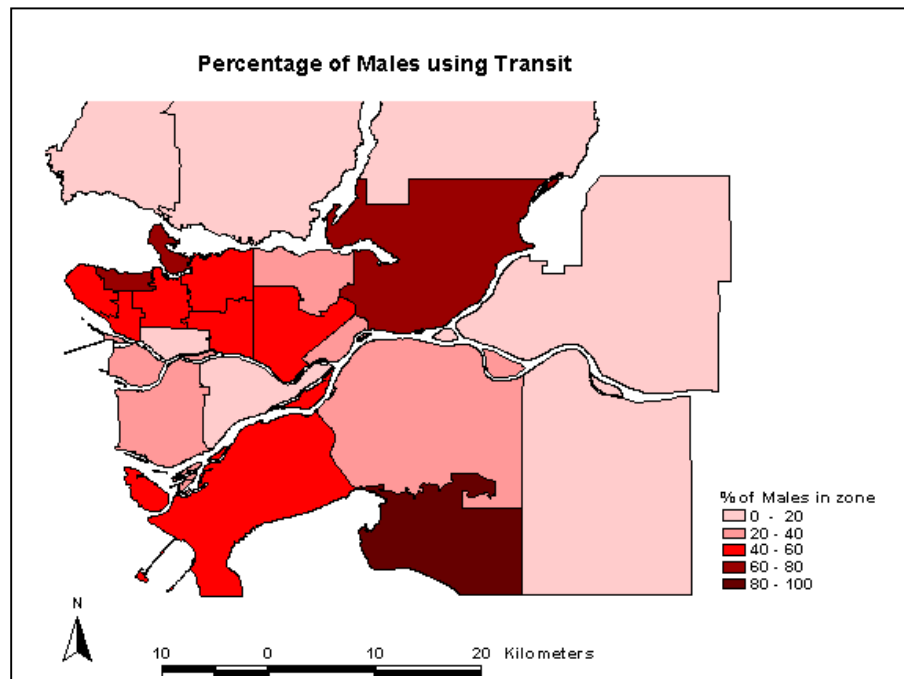
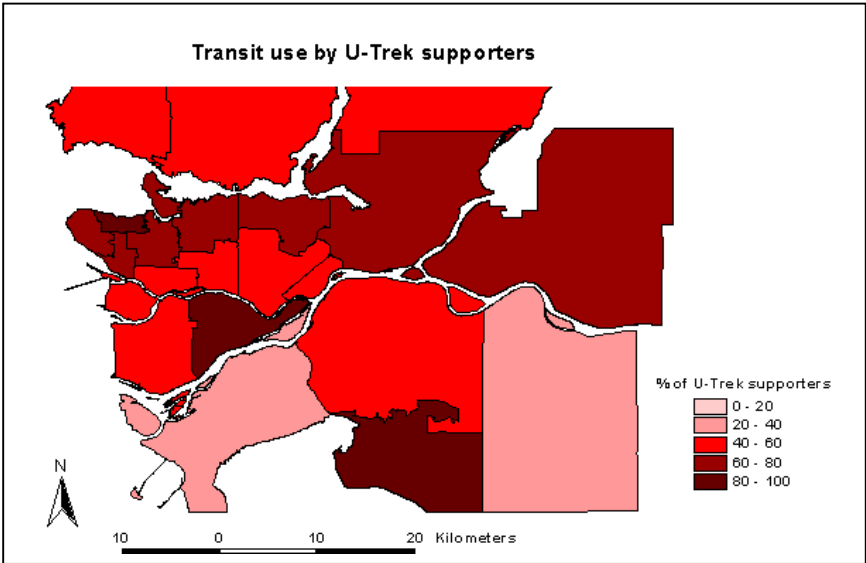### 5.1 Support for the U-Trek card was also mapped, as presented in section 3.1.

Support for U-Trek by Transit users
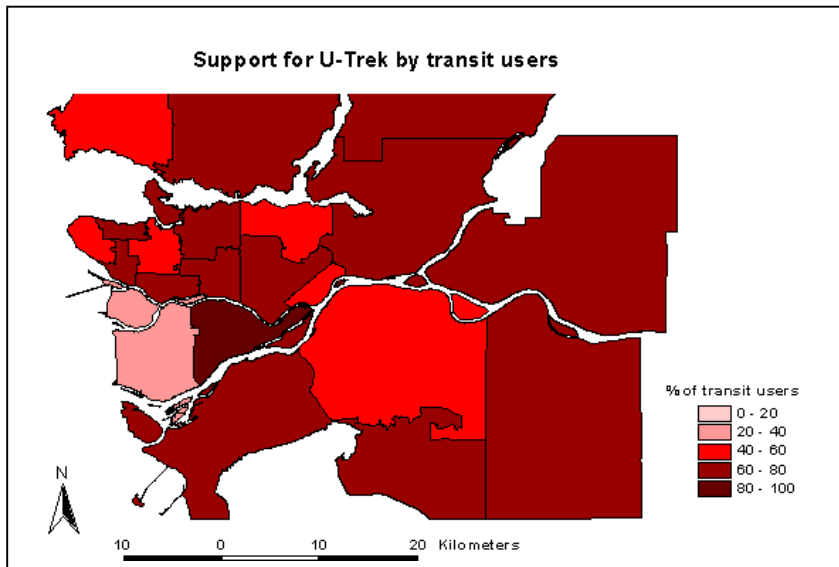
Support for U-Trek by non-Transit users
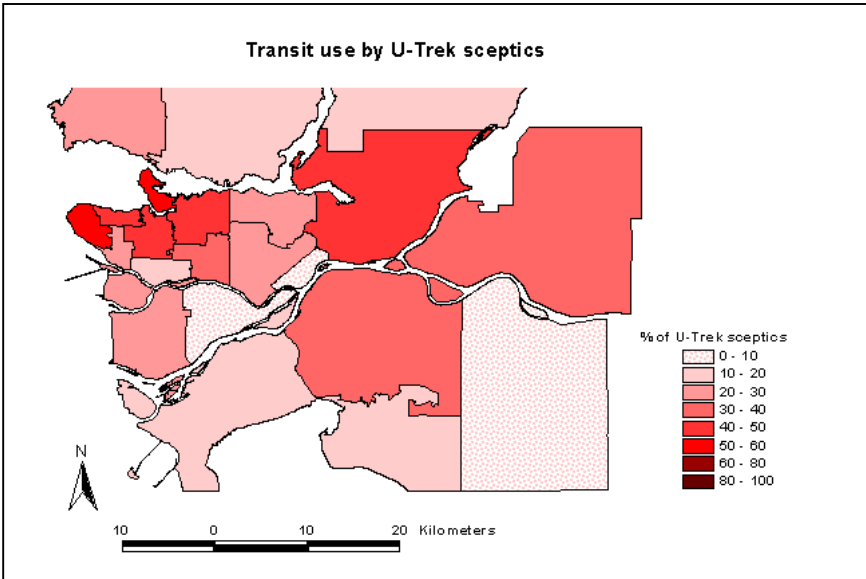
Transit use by U-Trek Supporters

Transit use by U-Trek supporters

Transit use by U-Trek Skeptics

Transit use by U-Trek sceptics

6 Appendix: Transit Trips to/from UBC and all possible additional trips if U-Trek Card Implemented - Ken Denike, MCIP

6.1 Business plan for implementing U-Trek card

One scenario would see a U-Trek card phased in over a number of years. In year one, a mandatory pass would be issued to first year students. Expansion of the program would follow this cohort group so in year two both first and second year students would be included. Eventually the pass would be issued to all students including graduate students.

There are two components in estimating the potential market:

- is there statically significant differences in current usage of transit and potential use by students in different years;

- what is the overall market and potential market that would need to be accommodated and hence increased level of transportation service required.

6.2 Transit use by year

For the current situation (all transit users, including on-campus residents), the difference in trips per student between first and all student users is on average 6.2853 versus 5.9779 trips per week for a difference of .3074 trips per week.

Student Year	All students (on campus and off) using transit	Trips/week transit	Trips/week all modes
	1981	12442.58	53408.56
first	3067	19277.15	48027.23
second	2447	14149.77	48677.51
third	3315	21092.43	61563.98
fourth	2913	17271.97	64239.19
unclass	3206	18741.34	46020.23
graduate	2542	14007.12	51375.37
Grand Total	19471	116982.36	373312.06

The relevant transit trip rate to be used to allocate base fare revenue by student program year is: weekly transit trips divided by all students in that year Looking at these transit usage rates, it is clear that all first year students make more transit trips on average than more senior and graduate students. But before altering the base fare revenue payable to TransLink in the first year the question of significance of the difference needs to be addressed.

In order to determine if this difference was statistically significant I used 95% a confidence interval and one-way analysis of variance. This is standard statistical practice. As the table below

shows, there is not a significant difference (α = .115) in the trip rates and the confidence interval for first year overlaps that for all years.

Descriptives

Year	Number	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean	Lower Bound Upper Bound
first	272	6.2853	4.3773	.2655	5.7626	6.8079
second	217	5.7815	4.0519	.2751	5.2393	6.3237
third	293	6.3682	3.9814	.2325	5.9106	6.8258
fourth	258	5.9302	3.8532	.2398	5.4579	6.4024
unclass	284	5.8453	3.2332	.1918	5.4678	6.2228
graduate	225	5.5105	3.7079	.2470	5.0238	5.9973
Total	1550	5.9779	3.8840	9.866E-02	5.7844	6.1715

ANOVA Transit

Groups	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	133.530	5	26.706	1.774	.115
Within Groups	23231.692	1543	15.056		
Total	23365.222	1548			

6.3 Proportion of part-time students

It could be that the proportion of part-time students influences use of transit. Proportion of students in part-time category increases by year with highest proportion of part-timers in Unclassified (generally having graduated).

Student Year * Status Cross tabulation

Group		Full-Time	Part-Time	Student Year
first	Count	414	36	450
	Expected Count	333.9	116.1	450.0
	Residual	80.1	-80.1	
second	Count	421	59	480
	Expected Count	356.2	123.8	480.0
	Residual	64.8	-64.8	
third	Count	478	100	578
	Expected Count	428.9	149.1	578.0
	Residual	49.1	-49.1	
fourth	Count	440	186	626
	Expected Count	464.5	161.5	626.0
	Residual	-24.5	24.5	
unclass	Count	126	382	508

		377.0	131.0	508.0
	Expected Count	377.0	131.0	508.0
	Residual	-251.0	251.0	
graduate	Count	457	49	506
	Expected Count	375.5	130.5	506.0
	Residual	81.5	-81.5	
Total	Count	2336	812	3148
	Expected Count	2336.0	812.0	3148.0

Chi Square Test

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	863.324	5	.000
N of Valid Cases	3148		
a	0 cells (.0%) have expected count less than 5. The minimum expected count is 116.07.		

6.4 Possible extra trips associated with U-Trek Card

Future trip making frequency for each year is estimated from responses to the question on 2000 survey,

"How many more one-way trips would you make on transit each week than you do now, if you had a U-TREK Card? Please count all trips, whether they would be to or from campus, or to other destinations. Enter zero if you would make no additional trips on transit."

For comparison, all potential extra trips are listed with current transit trips each week by all students including those living on campus and current transit users.

Student Year	Extra trips	Current trips	Transit users
First	15956	19277.15	3067
Second	13934	14149.77	2447
Third	15639	21066.91	3308
Fourth	17240	17271.97	2913
Graduate	12971	14007.12	2542
Other	12321	18741.34	3206
Grand Total	88161	104514.27	17484

The next table describing significance associated with extra trips refers to all students, not just transit users.

For this scenario (all students, including on-campus residents), the difference in extra trips per student between first and all student users is on average 3.14 versus 2.48 trips per week for a difference of only .66 extra trips per week. I used 95% a confidence interval and one-way analysis of variance which is standard statistical practice. As the table below shows, there is a significant difference (α = .000) in the trip rates and the confidence interval for first year does not overlap that for all years. Consequently there is a difference between first and other years in how these students responded to the question on potential use of transit with a U-Trek Card. Albeit the difference amounts to less than two and a half trips per month.

Descriptives

Group	N	95% conf. Mean	Std.Dev	Std. Error	Lower Bound	Upper Bound
first	450	3.14	4.12	.19	2.76	3.53
second	479	2.58	3.96	.18	2.22	2.93
third	577	2.40	3.29	.14	2.13	2.67
fourth	626	2.44	3.32	.13	2.18	2.70
unclass	508	2.15	2.96	.13	1.89	2.41
graduate	505	2.28	2.80	.12	2.03	2.52
Total	3146	2.48	3.43	6.11E-02	2.36	2.60

ANOVA Extra trips

Groups	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	283.834	5	56.767	4.864	.000
Within Groups	36643.849	3140	11.670		
Total	36927.683	3145			

6.5 Conclusions

It does not appear that first year students currently make significantly more trips than students in other years.

Based on standard statistical (F-tests), there is NO statistically significant difference between 1st, 2nd, 3rd, and so forth years. In other words, the random error in the sample (at a 95% confidence interval) is GREATER than the difference between the two means (1st years and other years usage), and it could quite easily have shown an UNDER usage by the same amount due to this randomness.

However when asked about potential use of transit both for getting to and from campus and for other purposes not directly related to campus they responded differently than students in other

years. Given a mandatory U-Trek Card, first year students indicated they would make slightly greater use of the card.