

The Potential Impact of Internet on Travel Decisions of Student Commuters at a U.S. University

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Abstract: This paper reports results of a survey of college students conducted at the University of Rhode Island, U.S.A, in April 2000. It is an initial attempt to assess the potential impact of Internet use on travel behavior in this population. The findings indicate that students' interest in Internet use for travel substitution is greater among those who use Internet for obtaining information and who perceive the Internet substitution as saving money. Students who perceive the Internet substitution as adding flexibility and saving money would change their future travel behavior if they enroll in IT-based distance courses.

Abbreviations: IT - information technology

Introduction

Previous travel surveys have focused on characteristics of traveler behaviors, such as travel mode and travel time; and on environmental and institutional factors that affect travel behaviors, such as weather and work schedule (see Spyridakis, Barfield, Conquest, Haselforn & Isakson 1991 for a survey of earlier studies and see De Palma & Rochat 1999 for a survey of recent studies; also see Chin 1990). Some researchers have started to draw attention to telecommunications as an emerging institutional factor that may affect travel behavior. Mokhtarian (1990) developed a typology of relationship between telecommunications and transportation and used two telecommuting programs in San Diego, USA, to illustrate a variety of telecommuting impacts on transportation-related behaviors (Mokhtarian 1997).

This paper focuses on the potential impact of telecommunications on travel behavior, specifically travel behaviors of college students. We first discuss the issues regarding the impact of IT-based distance education on travel behavior based on the theory proposed by Mokhtarian (1990). Then we report a study investigating the perceptions of a sample of student commuters regarding the potential impact of distance education on their travel patterns. Using student commuters for this research has several advantages. College students can be considered lead users of Internet applications, with close to 100% Internet access. Also, many college students tend to have greater flexibility and control over several components of their lifestyles, including course schedules and travel patterns.

Distance Education and Travel Behaviors

The concept of distance education has been in existence for more than a century in terms of correspondence courses, and later through the use of radio, television, and the videotape players. The widespread availability of computers in offices, schools and homes and of satellite

and videoconferencing technology offer prospects for extending distance education to large parts of the population, including market segments beyond traditional students (Patterson 1999).

While there is research on factors affecting the demand for distance education (e.g. see Farrell 1999), research on the impact of distance learning on travel behavior is limited. The impact of telecommunications technologies on education-related travel behaviors is yet to receive systematic research scrutiny.

Telecommunications and Transportation

Even though distance education has not been the focus, the impact of communication and information technology on other kinds of travel behavior has been explored in a number of studies (Niles 1995). Much of this work is related to the impact—or at least the potential impact—of telework on travel behavior in a number of projects in California (Nelson and Niles 1999). Prompted by environmental problems and congestion, policy and research initiatives have begun to address the question whether the use of communication technologies and other measures can lead to reduced vehicle travel miles.

Mokhtarian (1990) conceptually discussed the variety of demand and supply relationships between telecommunications and transportation. She used tele-education as one of the examples to demonstrate the substitution impact of telecommunications on the demand for transportation, but argued that telecommunications can also *stimulate* travel. She considered all communications to require some form of transportation and could take one or more of three forms: (i) transportation of people to meet face-to-face; (ii) transportation of objects, such as letters, books, newspapers, etc.; and or (iii) transportation of electronic impulses. She used historical, anecdotal, abstract, and hypothetical examples to support her theory that “the actual amount of personal

travel increases as part of a general expansion in communications, even though transportation's share *as a mode of communications* declines”

For student populations, traditional education requires students to travel from home to classroom while distance education could eliminate many such trips. Distance education, however, could also *stimulate* travel in several ways. As suggested by Mokhtarian (1990), telecommunications could have short-term direct, short-term indirect, and long-term effects. Telecommunications, for instance, may make students better informed about on-campus events and activities and encourage them to travel to campus to attend such events (short-term direct). Time saved traveling to school for course-related purposes could be used for traveling to other places, such as friends' homes, shopping centers, movie theaters, restaurants (short-term indirect). In addition, at the more aggregate level, universities that offer distance education may reach new groups of students who have to travel, even occasionally, since even perfect distance education rarely eliminates all travel to campus (long term effects).

Empirical Evidence on Telework and Travel Behaviors

Mokhtarian (1997) discusses the overall impact of telework on traffic volume. She points to positive aspects, namely the decrease in frequency of work trips, shift of work trips to off-peak periods, length of trips, and even vehicle ownership. While there may be potentially negative impact on carpools and public transit as well as trip-chaining patterns (shopping on the way to work etc.), Mokhtarian's data did not support these negative impacts. Overall, the number of miles saved outweighed, by far, the amount of travel generated by telecommuters.

Despite the considerable potential for trip reduction, the overall impact is limited due to the small number of teleworkers as a percentage of the total population. Furthermore, telecommuting tends to be primarily part-time, usually one or two days/week; for each

telecommuter, 25 or 30 percent of work related travel is eliminated rather 80 or even 100 percent. Nevertheless, even a 1–2 percent reduction in traffic volume can be significant, especially if peak travel times are affected. Mokhtarian (1997) reports a saving of 31 vehicle miles traveled per telecommuting occasion.

Overall impact of telecommuting on travel behaviors may also be limited due to effects on trip chaining, and the reduced use of carpools and public transportation. Gärtling, Gärtling and Johansson (2000) assessed options for car-use reduction measures in Swedish households. Trip chaining and choice of closer venues was preferred for shopping and leisure activities; for work, alternatives such as biking and public transit were chosen. Subsequent travel diaries, however, revealed a lower level of reduction in car-use than originally expected. Shopping and leisure trips, often not planned far in advance, are especially less likely to be subject to rationalization measures. The authors point out that besides economic considerations, an increased awareness of environmental consequences of automobile traffic may be necessary to lead to a change in car use patterns.

The Internet and Travel Behaviors

The relationship between telecommuting and travel behaviors and between distance education and travel behaviors has been affected by the widespread adoption of the Internet. Distance education via the Internet is a rather new phenomenon. The primary concern of writing on this topic has been the quality of the learning experience, as well as the relationship between technology, learners, and institutional needs (Cavanaugh 1999; Decker, Vega, Shallit & Wills 2000; Hecht & Klass 1999; Hodge-Hardin 1997).

The use of the Internet to influence travel behaviors has received very little attention. Dailey, Loseff, and Meyers (1999) utilized the Internet to increase rideshare use. They designed a dynamic rideshare matching. Interestingly they found that the WWW based system attracted a

very different group of users compared to a comparison condition of a traditional regional rideshare system. The Internet based system allowed flexible and fast access to rideshare information and matching. Users could graphically identify geographic and temporal information and then send a preformatted email to the identified rideshare partner(s).

In summary, the issue of reducing travel through distance learning, particularly distance learning offered via the Internet, has not been addressed in a satisfactory way. As part of a general program of research on telecommunications and travel behavior, our study focuses strongly on this issue. In the following two sections, we describe a study and report findings from a sample of American college students regarding these issues.

The Survey Method

The Context of Survey Location

Many students live and work off-campus and thus travel frequently. For many colleges in rural areas, travel to and from the campus can exacerbate traffic problems on roadways designed for light rural traffic. Such is the case at the University of Rhode Island where commuter students have a major impact on traffic in rural southern Rhode Island, especially in the town of South Kingstown. In terms of travel planning, university administrators are exploring ways to encourage alternatives to automobile travel and are considering measures such as increased bus services to campus, reduced bus fares, increasing shuttle services from distant parking lots and restricting automobile traffic (Carothers 2001). Findings from this study are expected to contribute to the state and university traffic plans and help in the reconstruction of routes and parking arrangements at the university and surrounding area.

While some institutions are offering full-fledged distance learning programs, including online degrees, the majority of postsecondary institutions have adopted the concept only

gradually. Initially, online courses were mainly targeted to part-time students with full-time jobs. The reach has expanded to the student body at large. At the University of Rhode Island, for instance, Web-based courses during the summer attract considerable numbers of out-of-state full-time students. Many students submit their assignments and comments from home.

Videoconferencing has also been used as another format to offer distance courses. At the University of Rhode Island, such courses are usually taught at the rural main campus and transmitted to the urban satellite campus. Highly specialized courses (e.g., nursing) are even transmitted to a network of regional universities. Aside from specifically designed distance learning classes, students use the Internet during the academic year in ways that may reduce their need to travel to campus. These include online registration, online library access, online contact with instructors, submission of assignments, class websites, and online course-related chat.

Data Collection

A team of four experienced researchers developed the questionnaire. It included questions regarding transportation and telecommunications behaviors, as well as demographics. The questionnaire was pre-tested and revised based on the pre-test. The registrar's office randomly selected 1,278 student telephone numbers from its internal database. The phone numbers were sorted into five groups: graduate, senior/junior/on campus, senior/junior/off campus, freshman/sophomore/on campus, and freshman/sophomore/off campus.

The groups were created based on housing patterns and level of education since these two variables were most likely to impact travel behavior. In 2000, for instance, 77 percent of the freshmen class lived in on-campus housing compared to 5 percent of the senior class (Office of Strategic Planning & Institutional Research, 2000). Upper classmen, living in off-campus housing, generally traveled longer distances to attend classes. Similarly, upper classmen had

greater flexibility in selecting courses since their programs of study included greater freedom in choosing electives.

The telephone survey was conducted in April 2000 by an on-campus polling service. This service conducts telephone polls on a regular basis for on-campus and off-campus clients. The interviews were conducted by students, trained and supervised by graduate assistants, hired by the polling center. Respondents were contacted by phone and quotas were established for each group. Each interview took about 10 minutes to complete, and the information was recorded manually on a printed form. A total of 572 telephone connections were successfully established to complete 220 surveys. The overall response rate was 38.5%. Because the purpose of this study was to identify student intentions to use Internet-based education to substitute for travel to campus, we selected only off-campus students (a sample size of 155) in the analyses.

Findings

Sample Composition. As reported in Table 1, the telephone survey yielded a student sample comparable to the University student profile in terms of gender and program of study. Compared to the University profile, there were more full-time and undergraduate students in the sample. Based on this comparison, we feel confident that the sampled students are representative of the student population at the University of Rhode Island.

Travel and Computer Use Behaviors. Table 2 presents descriptive statistics on transportation and computer use behavior among off-campus students. Almost all the students (92.9%) drive their own car; travel to class is high during the morning commute (7 to 9 a.m.), and peaks between 9 and 11 a.m., while return times peak between 2 and 4 p.m. Most off-campus students reach campus in less than 20 minutes. In terms of computer access, almost all (97.4%) have Internet access, and 85.2% of students have access to Internet from home. Most students access

Internet from their residences (44.7%) or from both residences and labs (34.7%), while a significant minority use university computer labs (10%) exclusively.

We provided twenty options to the question “What are your primary uses of the Internet”? We regrouped the twenty options into six broader categories: communications (e-mail, Internet telephony), course-related (course-related assignments, exchange of files, research related to courses, course registration), information (news/discussion groups, read papers/magazines, information search), e-commerce (banking/stock trading, shopping/ auction sites), entertainment (web surfing, chat rooms, online games, MP3/music, online travel), and other. The leading purposes of Internet use were communications (72.9%) and course related (71.6%). Entertainment (32.3%), information (29.0%), and e-commerce (12.3%) were other popular Internet applications.

Students used computers at home 6.17 days per week on average. Most students (40.0%) accessed Internet for 1 to 30 minutes a day, followed by 31-60 minutes per day (25.8%). A very limited number of sampled students (4.5%) were currently taking distance courses.

Factors Associated with Internet Substitution for Travel to Campus

To assess the potential of information technology to influence or substitute travel we asked the following question: “Do you use the Internet/World Wide Web so that you avoid traveling to campus now?” This question was designed employing Prochaska’s Stages of Change model with its key premise being that people go through several stages of change until they actually achieve a sustained level of a desirable target behavior (Prochaska, Norcross, and DiClemente, 1994). The behavior change sequence includes pre-contemplation (not intending to take action for the next 6 months), contemplation (intending to take action within the next 6 months), preparation (change planned in the next 30 days) and action (overt changes less than 6 months ago).

Sustained change (at least 6 months), often after several relapse cycles, culminates at the maintenance stage (Prochaska, Prochaska, and Levesque, 2001). The model implies varied interventions depending on the stage of change and other individual difference variables (e.g. temptations, decisional balance). Consequently, being able to identify the stage of change for transportation users would permit the design of messages for targeting behavioral changes.

The time frame was modified to be more consistent with the academic calendar and five response options were used in the study:

- 0 - I DO NOT intend to use Internet/WWW to avoid travel to URI in the next academic year/
Don't know
- 1 - I DO intend to use Internet/WWW to avoid travel in the next semester
- 2 - I DO intend to use Internet/WWW to avoid travel before the current Spring semester is over
- 3 - I have been using Internet/WWW to avoid travel since this semester started
- 4 - I have been using Internet/WWW to avoid travel since at least last semester

The key variable was whether or not students use or intend to use the Internet/WWW to avoid traveling to campus. Because less than half of students selected options 1 to 4, we collapsed these categories into one, resulting in two groups: those with no intention to use the Internet/WWW and those who intend to use or actually use it. For convenience, we labeled the two groups as users (including respondents who currently use or intend to use Internet in the future) and nonusers.

We conducted both bivariate and multivariate analyses. Using student characteristics, travel patterns, computer use, and perceived importance of using Internet, we conducted bivariate analyses. One-way ANOVA was used if the behavioral variables were continuous and Chi-square tests were employed if they were categorical. Table 3 presents the ANOVA results and Table 4 presents the Chi-square test results. Only statistically significant results ($p < .05$) are presented in the two tables. Among the key results are the following:

- The number of days per week going to class was negatively related to use of Internet as a substitute for travel: users went to class an average 3.1 days a week compared to 3.9 days for nonusers.
- The number of days of using the computer at home has a positive relationship to Internet substitution: computer use at home is 6.0 days a week for the Internet substitution group compared to 4.75 days for the non-substitution group.
- Perceived importance of using the Internet also has a positive relationship with Internet travel substitution. If students perceived that using the Internet to avoid traveling to campus could save money, add flexibility, and increase choices, they were more likely to use Internet to substitute for travel.

The highlights of the findings, based on the Chi-square tests (presented in Table 4) are:

- Part-time students were more likely to use the Internet for travel substitution than full time students. 54% of part-time students reported using or intending to use the Internet to avoid traveling to campus versus 36% of full-time students.
- Students who reported using the Internet to obtain information were more likely than others to use or intend to use the Internet to avoid traveling to campus (55.6% versus 36%).
- Those taking distance courses were more likely than others to use Internet to avoid traveling to campus (86% versus 39%).

To examine whether the relationships observed in the bivariate analyses are statistically significant, we also conducted multivariate logistic analysis to examine whether these variables have effects on actual or intended substitution behaviors when they are regressed together. The stepwise procedure (presented in Table 5) suggests three variables are still strongly significant.

These are: "number of days going to class," "perceived importance of saving money" and "use of Internet to obtain information."

- Students who went to class on more days were less likely to actually use or intend to use Internet to substitute for travel to campus.
- Students who feel that using Internet to avoid traveling to campus can save money were more likely than others to actually use or intend to use Internet to substitute for travel to campus.
- Students who reported using the Internet to obtain information were more likely to be actual or potential Internet users to substitute for travel to campus.

Factors Associated with Potential Impact of Distance Education

We found very little use of distance courses by our sampled students (less than 5%) so we could not gauge the actual impact of distance education on travel behaviors. We therefore focused on the potential impact of Internet based courses on student transportation behavior. We examined responses to the question "If Internet/web courses such as WebCT courses were to be offered more fully by URI, would your enrollment in these courses affect any of the following"? Specifically, we examined two transportation related impacts:

- Affect number of days traveled to campus (55.5% said "yes it would")
- Affect *types* of transportation used for traveling to campus (11.0% said "yes it would")

We conducted bivariate analyses to explore the factors that affect student perceptions of the potential impact of distance education on their transportation behavior. Table 6 presents ANOVA findings and Table 7 presents the Chi-square results. Among the main findings in Table 6:

- Number of days per week going to class was negatively associated with changes in the number of days traveling to campus (3.25 vs. 3.82 days among students who reported change

or not). A similar negative association was found between number of days of computer use and number of days traveling to campus.

- The perceived benefit of saving money was related to both impact variables – number of days of travel and type of transportation used to travel to campus. If students felt saving money was important, they were more likely to report changes in the number of days of travel (mean importance index (or MII) = 2.80 for students who reported possible change vs. 2.29 for those who did not) and type of transportation (3.65 vs. 2.45).
- The perceived benefits of flexibility and increased choices were positively related to students reporting changes in number of days for travel to school (for flexibility, the pairs of MII are 3.55 vs. 2.79; for choice, the pairs of MII are 3.10 vs. 2.43) but not for type of transportation.

As indicated in Table 7, students who currently access the Internet or take distance learning courses are more likely than others to change the number of days traveling to campus, 57.0% vs. 0% and 100% vs. 53.4%, respectively. Students who intended to use carpool or public transportation were more likely than the other two groups to change the type of transportation to campus (30.0% vs. 18.2% and 8.1%).

We also conducted stepwise multiple logistic analyses. After including variables that showed associations in the bivariate analyses as the independent variables in the logistic regression, one variable, the perception of using Internet will increase flexibility is still positively related to the change of number of days traveling to campus if Internet-based courses were to be offered more fully ($p=.001$, odds ratio=1.82). When the dependent variable in the logistic analyses was the possible change in types of transportation used to travel to campus if Internet-based courses were offered more fully, one variable, the perception of using Internet to substitute for travel can save money still showed a strong positive effect ($p=.0019$, odds ratio=2.175).

The Potential Impact of Distance Education on Direct and Indirect Travel Behaviors

Since only few sampled students took distance courses (4.5%), partly because the University was still at an early stage of offering Internet-based courses, we attempted to infer the potential impact of distance education on travel behavior through the effects of current Internet use. We examined the question "Has there been any change in the amount of time you spend on various activities since you started using the Internet?" We provided eight situations, four of them travel related, such as travel time for school, work, shopping, and socializing related activities. Table 9 reports the frequencies. For most activities, students generally reported no change or did not respond. School and work related travel activities saw both increased and reduced time; shopping was associated with reduced time while socializing was associated with increased time.

To estimate the net effects of Internet use on travel time, we recoded the variable (more time as 1, less time as -1, and no change/no response as 0). The scores were added together to create "nettime" which can be viewed as a measure of net effect of Internet use on travel time. The results indicate that 29% of the respondents reported spending less time for travel because of Internet use, while 13% reported spending more time for travel.

Summary and Conclusions

This paper discussed the potential impact of Internet-based distance education on travel behavior. It reports findings from a sample of college students at a U. S. university in terms of their perceptions and willingness to use the Internet to substitute for traveling to campus. Since the actual use of Internet-based distance education was limited in our survey sample, we can only draw some inferences about potential impacts on travel behaviors. Based on intentions, distance education is more likely to impact the number of days traveled to campus than the type of

transportation used. Moreover, the results indicate that if the students associate saving money with Internet use they are more likely to use the Internet to substitute for travel and to change types of transportation used to travel to campus. If students use the Internet for informational purposes, they are more likely to use the Internet to substitute for travel. If they expect that using the Internet can increase flexibility, they may change the number of days they travel to campus if more online courses are offered. These findings imply that the increased acceptance of Internet-based courses by students may reduce their travels for educational purposes.

Exploring the ways Internet use may impact travel behaviors, our survey data seem to suggest that Internet-based distance education may reduce as well as stimulate time spent on various types of travel behaviors. While the overall time spent on travel (nettime) is likely to be reduced, travel for socializing is more likely to increase than decrease; travel for shopping is more likely to decrease than increase. Travel for education, the focus of this study, is likely to see both an increase and a decrease, although the overall impact is likely to be a reduction in school-related travel since more people report less than more time spent on travel for education since the use of the Internet.

In terms of travel planning, the survey results provide some suggestions for university administrators who are exploring ways to encourage alternatives to automobile travel. Measures being considered include increased bus services to campus, reduced bus fares, increasing shuttle services from distant parking lots and restricting automobile traffic (Carothers 2001). The survey results suggest that students are more likely to restrict the number of days they plan to travel rather than use carpool arrangements or public transportations. In order to reduce automobile travel, it appears that instructors and university administrators need to offer distance education alternatives and foster perceptions that using the Internet from home for educational

purposes can save money, add flexibility and increase choices. Initially, these measures are likely to strike a positive chord among those students who already attend classes on fewer days and those who use the computers more.

This study is one of the first attempts to assess the potential impact of the Internet on student commuters' travel decisions. Several factors are identified that affect student intentions to change travel behavior because of the advances in information technology. However, the data used in this study are limited in scope and timeframe and many important questions are unanswered and need further research. These questions include: what are actual (rather than potential) behavioral changes of student commuters because of IT-based distance courses? Do students cut total travel as a result of reduced travel or does it stimulate other travels? And do these changes persist over time? Future research needs to collect longitudinal data from students in order to more systematically address these questions.

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TABLE 1 Survey Sample and URI Student Population

	Survey Sample	University Statistics ¹
Total Observations	220	14,362
<i>Gender</i>		
Male	41%	43%
Female	59	57
<i>Student status</i>		
Full time	78%	69%
Part time	22	31
<i>Class</i>		
Undergraduate	82%	77%
Graduate	18	23
<i>Program of Study</i>		
Business	12%	13%
Education	10	8
Engineering	8	7
Psychology, Communication Studies & Human Development and Family Studies	14	16
Pharmacy & Nursing	12	7
Other	44	49

¹ From "Fall 2000 Campus Highlights" provided by University of Rhode Island.

TABLE 2 Transportation & Computer Use Behaviors (N=155)

Variable	Percentage
<i>Transportation: Drive own car</i>	92.9%
<i>Number of days going to class</i>	
1 –2 days/week	27.7%
3 – 5 days/week	70.3%
Don't take class	1.9%
<i>Time going to class (peak periods)</i>	
7-9AM	31.1%
9-11AM	45.0%
<i>Time returning home (peak periods)</i>	
12-2PM	21.2%
2-4PM	35.8%
<i>Number of minutes going to class from home</i>	
≤20 min	50.9%
> 21min	49.0%
<i>Currently access Internet</i>	97.4%
<i>Home PC WithInternet access</i>	85.2%
<i>Place of Internet use</i>	
University lab/library only	10.0%
Home/dorm/fraternity/sorority	44.7%
Lab and home	34.7%
Work, Lab, work, and/or home	10.0%
<i>Internet purpose</i>	
Communication	72.9%
Course-related	71.6%
Information	29.0%
E-commerce	12.3%
Entertainment	32.3%
Other	6.5%
<i>Number of days per week use PC at home</i>	
Mean, (S.D.)	6.17 (2.01)
<i># of minutes per day access Internet at</i>	
0	16.8%
1-30 min	40.0
>31 min	43.2
<i>Currently take distance courses</i>	4.5%

TABLE 3 One Way ANOVA Results: Whether Or Not Use Internet/WWW To Avoid Traveling To Campus

Variable	N	Mean	Std. Dev.	F	p
<i># of days/week going to class</i>				8.33	.004
nonusers	92	3.89	1.52		
users	63	3.14	1.63		
<i># of days/week using computer</i>				7.55	.007
nonusers	92	4.75	2.92		
users	63	6.00	2.51		
<i>Using Internet can save money</i>				13.66	.000
nonusers	92	2.27	1.36		
users	63	3.06	1.22		
<i>Using Internet can add flexibility</i>				7.66	.006
nonusers	92	2.99	1.26		
users	63	3.51	.95		
<i>Using Internet can add choice</i>				10.35	.002
nonusers	92	2.52	1.22		
users	63	3.17	1.28		

Note: this table reads, for example, students who have fewer days of classes per week would be more likely than those who have more days of classes (3.14 vs. 3.89 days) to use/intend to use Internet to avoid travel.

TABLE 4 Chi-Square Test Results: Whether Or Not Use Internet/WWW To Avoid Traveling To Campus

	N	Nonuser	User	χ^2	p
<i>Student type</i>				4.34	.03
Full time	107	63.8%	36.2%		
Part time	47	45.7	54.3		
<i>Use Internet for information</i>				4.76	.02
No	110	63.7	36.3		
Yes	45	44.4	55.6		
<i>Current take distance course</i>				5.93	.02
No	148	60.7	39.3		
Yes	7	14.3	85.7		

Note: this table reads, for example, part time students are more likely than full time students (54.3% vs. 36.2%) to use/intend to use Internet to avoid travel.

TABLE 5 Logistic Regression Results: Whether Or Not Use Internet/WWW To Avoid Traveling To Campus

Variable	Estimate	Standard Error	Chi-square	p	Odds Ratio
Intercept	-0.8456	0.6343	1.78	0.18	
Number of days/week going to class	-0.3108	0.1213	6.57	0.01	0.733
Using Internet can save money	0.4917	0.1422	11.95	0.00	1.635
Use Internet to obtain information	0.9215	0.4026	5.24	0.02	2.513

TABLE 6 One way ANOVA results: If Internet Courses Were To Be Offered More Fully, Would Your Enrollment In These Courses Affect Any Of The Following:

	Sample size	Mean	Std. Dev.	F	p
I. Number of days travel to campus					
<i>Number of days/week going to class</i>				5.16	.03
no change/don't know	67	3.82	1.57		
will change	86	3.25	1.50		
<i>Use Internet can save money</i>				5.45	.02
no change/don't know	68	2.29	1.33		
will change	86	2.80	1.35		
<i>Use Internet can add flexibility</i>				17.72	.00
no change/don't know	68	2.79	1.28		
will change	86	3.55	.94		
<i>Use Internet can add choices</i>				11.41	.00
no change/don't know	68	2.43	1.26		
will change	86	3.10	1.22		
<i>Number of days/week using computer</i>				4.68	.03
no change/don't know	68	4.75	3.00		
will change	86	5.73	2.56		
II. Types of transportation used to travel to campus					
<i>Use Internet can save money</i>				12.69	.00
no change/don't know	137	2.45	1.33		
will change	17	3.65	1.11		

Note: (1) This table reads, for example, students who have fewer days of classes would be more likely to change the number of days travel to campus than those who have more days of classes (3.25 vs. 3.82 days) if Internet based courses were to be offered more fully.

(2) In each test, one or two observations with missing values were not included in the analyses.

TABLE 7 Chi-square Test Results: If Internet Courses Were To Be Offered More Fully, Would Your Enrollment In These Courses Affect Any Of The Following:

Variable	No change	Will change	χ^2	p
I. Number of days travel to campus				
<i>Current access to Internet</i>			5.12	.04
	Yes 43.0%	57.0%		
	No 100%	0%		
<i>Current take distance course</i>			5.88	.01
	Yes 0%	100%		
	No 46.6%	53.4%		
II. Types of transportation used to travel to campus				
<i>Carpool intention</i>			5.90	.05
	No intention 91.9%	8.1%		
	Intention in the near future 70.0%	30.0%		
	Current use 81.8%	18.2%		

Note: this table reads, for example, students who have access to Internet are more likely than those who do not (0 vs. 57%) to change the number of days traveling to campus if Internet based courses were to be offered more fully.

Table 8: Direct and Indirect Effects of Internet Use on Travel Behaviors

<i>Type of Travel</i>	Change in the amount of time since started using the Internet		
	<i>more time</i>	<i>less time</i>	<i>no change/ no response</i>
Travel to school	12%	20%	68%
Travel to work	7%	8%	85%
Travel for shopping	4%	19%	77%
Travel for socializing	8%	3%	89%
Nettime	13%	29%	58%