

December 2001

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Recommended Citation

Case, Thomas; Burns, O. Maxie; and Dick, Geoffrey, "Drivers of On-Line Purchasing Among U.S. University Students" (2001).
AMCIS 2001 Proceedings. 169.
<http://aisel.aisnet.org/amcis2001/169>

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DRIVERS OF ON-LINE PURCHASING AMONG U.S. UNIVERSITY STUDENTS

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Abstract

There is mounting evidence that business-to-consumer e-commerce is becoming mainstream among Internet users of all ages. Although numerous studies have identified an array of demographic variables related to online buying, little attention has been directed to one of the most "wired" and prolific groups of Internet users, university students. Results of online survey data collected from 425 undergraduate and MBA students suggest that Internet knowledge, income, and education level are especially powerful predictors of Internet purchases among university students. From a CRM perspective, the findings indicate that e-tailers and other online vendors are likely to achieve the greatest payoff from building relationships with upper division and graduate students with above average levels of disposable income and Internet knowledge.

Keywords: Electronic commerce, Internet buying, US college students, demographics, customer relationship management

Introduction and Literature Review

There is increasing evidence that while Internet shopping has perhaps not achieved the lofty heights of the sales targets expected a year or so ago, it has indeed entered the mainstream and is no longer a novelty. Major retailers such as J.C. Penney, L.L. Bean, Macy's, Sears, Spiegel, the Gap, and Wal Mart have set up electronic shops joining established pioneers like Amazon.Com, CDnow, and Virtual Vineyards. Some studies suggest that anxiety about online transaction security is diminishing among consumers and that the variety of goods and services being purchased on-line is broadening (e.g. *Direct Marketing*, 1999; Kruger, 1999).

Consumer comfort levels with Internet shopping are increasing. To some extent comparisons with the concerns and growth associated with telephone shopping and mail order catalogue shopping are relevant. It has, for example, been reported that consumers who have traditionally shopped by using paper catalogues are more likely to shop using the Internet (*Direct Marketing*, 2000). Lower taxes can be attractive too (Ovans 1999). Kotkin (1998) reports that consumers are generally interested in reducing the amount of time that they spend shopping in malls and over the next 15 years, non-store retail formats (catalog, phone, TV, and online) are expected to expand to account to more than 50% of all retailing.

Consumer acceptance of online shopping is driven in part by perceived benefits. According to Burke (1997), the most salient benefits of Internet shopping for consumers include convenience, product information, customized products and services, and an enhanced shopping experience. Burke's assertion is consistent with findings reported by Jarvenpaa and Todd (1997) and Then and DeLong (1999). Consumer comfort, confidence, and convenience are encouraging patterns of acceptance for online shopping that outstrip former projections (Greer and O'Kenner, 1999). In response, merchants are enhancing Website content to influence the purchasing decisions of online shoppers.

E-tailers are using a number of ingenious approaches to establish relationships with online shoppers via product information, personalized recommendations, and other Web-enabled approaches. For example, shoppers can preview music CDs by downloading digitized sound clips. Some e-tailers employ collaborative filtering software to stimulate on-line impulse buying by informing the buyers of specific product about other products also purchased by previous buyers of that product (*Fortune*, 1999). These approaches may not, however, have a great deal of longevity – it has been reported that complexity and novelty

have differential effects on the desire to approach shopping sites (Huang, 2000). Novelty keeps consumers exploring the site while complexity has the potential to reduce impulse purchases.

Shopping bots, available at price comparison Websites such as Bottom Dollar, mySimon, PriceScan, and Shopper.com, can provide added assurance to prospective buyers that they are not paying too much for a specific product (Turner, 1999). An increasing number of sites also enable prospective buyers to compare competing products from multiple vendors on features/specifications in addition to price; this enables customers to gather product research information faster and more easily than they can by leafing through print catalogs, visiting local bricks and mortar outlets, or even visiting individual vendor Websites. Such features contribute to increased consumer comfort levels with online shopping while simultaneously solidifying relationships with Website users.

Online product research does not necessarily translate into online sales. A study (Elliot and Fowell, 2000) reported some 70% of shoppers were satisfied with the convenience, service and access to products, however concerns about security, ease of use, levels of service and overall cost posed significant constraints on consumer growth, typically measured to date in sales to consumers. In many instances, consumers do online research only to close the deal in local retail outlets after seeing and touching the products on their short lists. Because of this, an increasing number of merchants now view the Internet as a tool for bringing more customers into their retail stores and as a means for carrying inventories online that are not carried in their stores (Kruger, 1999).

The tradeoff of convenience versus risk is explored in a study seeking to determine why Internet shopping is not enjoying a higher acceptance rate (Bhatnagar, Misra, and Rao, 2000). Risk, although multi-dimensional, is assessed in this study as product category risk (the consumers' beliefs as to whether the product would function according to their expectations) and financial risk (the risk associated with the Internet as a purchasing medium in itself). In both cases the authors hypothesize that increases in risk will decrease the likelihood of Internet purchasing, notwithstanding the convenience offered. The data tends to support the contention that for a product such as music, where one knows what one is about to get, the purchase becomes feasible. For more technologically complex products, which tend to be higher-priced, the risk factor rises, suggesting that the Internet is more likely to be used for low cost items. The authors suggest that management needs to address reducing the risk perception by, in addition to taking steps in the areas of security, focusing on product risk. They note segmentation within gender, marital status and age, and point out that such segmentation would need to be tailored for each product category. The CRM implications of such tailored segmentation are significant.

Other research indicates that online shoppers tend to be affluent (Holstein, Thomas, and Vogelstein, 1998) and more than half of the Web population has been using the Internet for over a year (Levy, 1998). Regular Internet users, as a group, hold 60% of the U.S. population's buying power (*Discount Store News*, 1999), and a significant percentage of this group (nearly 40%) report that they prefer to shop online rather than visit local stores. It is from this larger (and growing) group of online shoppers that e-tailors and online vendors are most likely to identify the economically valuable subsets of consumer with whom they want to establish long-term relationships.

Demographics and On-line Shopping

A considerable number of studies (as listed below in order of demographic variable) have focused on the types of products that are purchased online with books, computers, software, music, and travel services being consistently identified as the best selling products. A number of studies have also considered the demographics of online shoppers and buyers. Among the demographic variables considered are gender (Greer and O'Kenner, 1999; *Retail On-Line*, 1998; Then and DeLong, 1999; Tweney, 1999); age (e.g., Dietz, 1999; Gupta, 1995); and personality factors/individual differences (Jones and Vijayasarathy, 1998). Other variables that have been identified as being correlated with on-line shopping and purchasing include computer knowledge and use, Internet knowledge and use, and Web "veteran" vs. newcomer status (CyberAtlas, 2000a).

Several studies have reported that men are more likely than women to make purchases online (e.g. Marsh, Case, and Burns, 2000, Tweney, 1999). Other studies have indicated females may feel less comfort and competence with both computers and the Internet (Schumacher, 2001). However, the gap between male and female on-line buyers is narrowing largely because women are among the fastest growing group of Internet users and are now perhaps the biggest group of Internet users in the US (Pastore, 2001b; Tweney, 1999).

Some studies have indicated that Internet users over 25 years of age are more likely than users 18 to 25 to research product information online but actually make purchases in retail outlets (Dietz, 1999; *Retail On-Line*, 1998). However, senior citizens are projected to account for increasingly higher percentages of total consumer online spending in the years ahead (CyberAtlas, 2000b). Teenagers are also expected to demonstrate increases in on-line purchases over the next few years, although at the moment,

shopping is not a high priority when going on the Internet (Pastore 2001a). Research indicates that most teens prefer going online to watching television and prefer chatting online to talking on the telephone and, as they get older, the amount of time that they spend online increases (CyberAtlas, 2000b). Collectively, these studies suggest that age may be an important determinant of online purchasing as well as a key eCRM variable.

Online Shopping and Purchasing By College Students

According to one study college students are the most active group on the Internet; eighty-one percent of college students have made purchases there (Pastore, 2001c) with the most common purchases being CDs, books, clothing and tickets, reflecting a widespread trend of most purchases being low outlay, frequent purchases that have intangible values and are relatively highly differentiated (Phau and Poon 2000). In spite of being a major on-line force, little research has focused on the online shopping and buying patterns of college students. While the disposable income of college students may inhibit online buying (relative to older groups), it is reasonable to suspect that online shopping and product research is very common among college students.

Several predictions about the online purchasing behaviors of college students are suggested by the findings of the research cited previously. These include:

- 1) College students with considerable computer knowledge will be more likely to make online purchases than those with lesser knowledge.
- 2) Mirroring the patterns for Internet “veterans” and “newcomers”, college students with considerable Internet knowledge will be more likely to make online purchases than those with lesser knowledge (e.g. CyberAtlas, 2000a).
- 3) Consistent with studies indicating that more Internet buyers are male than female (e.g. Marsh et al, 2000; Tweney 1999), male college students are more likely than female college students to make online purchases.
- 4) Student disposable income will be directly related to making online purchases; this prediction is consistent with findings that the average on-line buyer has an annual income of more than \$50,000 (e.g. Holstein et al., 1998).
- 5) College students who are further along with their studies (upperclassmen and graduate students) are more likely to make online purchases than underclassmen. Because most college students are an extremely active group of Internet users, upperclassmen and graduate students are likely than underclassmen to be Internet “veterans” and thereby, online buyers (e.g. CyberAtlas, 2000a).

Methodology

In order to test these predictions, an 87-item survey instrument was developed. The items on the instrument were derived primarily from the measures used in the demographics and on-line shopping studies that underlie this investigation’s predictions. It was first administered in print form to MBA students enrolled in a required IT Management course during Spring Semester 1999. During Fall Semester 1999, the survey instrument was converted into an HTML document accessible on the World Wide Web. Response options were converted into radio buttons, check boxes, text fields, or text areas depending on the nature of the question. The “submit data” button at the end of the document invoked a Perl script that took the data from the form and processed it into the format needed to add it to a log files. The submit button also generates an e-mail response that can be used by the student to document survey completion. As each respondent submits the data, a new line containing all the information is added to the log the files as a delimited text field containing all the completed form’s information.

After announcement in class, student data was captured during Spring and Fall semester 2000. The log files were downloaded as text files and then imported into an Excel spreadsheet as a delimited text file. The undergraduate and graduate data files were subsequently merged into a single spreadsheet, which, in turn, was then imported into SPSS 10 to facilitate data analysis.

Results and Discussion

A total of 425 usable survey responses were obtained, 265 from undergraduate students and 160 from graduate students. Data were obtained from 198 males and 227 female students.

Numerous items in the survey focused on Internet use including online purchasing and shopping behaviors. For example, respondents were asked how frequently they used the Internet (on a five-point response scale that ranged from “not at all” to “daily”); more than 95% indicated that they used the Internet daily. Respondents were also asked to indicate on five-point scales

(from “none” to “more than 25”) how many Internet purchases they made in the past year, and how many they had ever made. As indicated in Table 1, 51% of the 425 students reported that they had made at least one purchase during the previous year while slightly more than 55% indicated that they had made at least one purchase at some time in the past

Table 1. Purchasing Data

	Total Number of Purchases Ever	Number of Purchases in Past Year
None	190	209
1 to 5	117	110
6 to 10	56	52
11 to 25	34	34
More than 25	28	20

Respondents also indicated the value of the most expensive item they had purchased as well as the average price of the purchases they had made; the five-point response ranges for these items were from “less than \$10” to “more than \$500”. A section of the questionnaire enabled respondents to identify the types of items they had purchased (books, clothing, gifts, travel services, etc.) and the type(s) of electronic transactions that they concerned. The online survey also included a section where respondents who had not made an on-line purchase were asked to identify the reasons why they had not.

The demographic variables related to this paper’s predictions were measured on various scales. Gender options were (1=male and 2=female). Computer knowledge was measured by a five-point scale (from 1=no knowledge to 5=expert) and Internet knowledge was measured by a similar five-point scale. Education was measured by a five-point scale (1=some high school, 5=post graduate) while income was assessed by a six-point set of ranges (where 1=less than \$15,000 and 6=more than \$100,000). Age was measured on a five point scale (where 1=less than 18 to 5=more than 55).

Correlations were calculated to determine the direction and strength of the relationships among the variables specified in the predictions. Relationships among key demographic variables and the total number of Internet purchases (during the previous year) are summarized in Table 2.

Table 2. Correlations Among Internet Purchases and Demographic Variables

Variable	Number of Purchases	Computer Knowledge	Internet Knowledge	Education	Income	Age
Computer Knowledge	.263**					
Internet Knowledge	.226**	.694**				
Education	.276**	.268**	.135**			
Income	.241**	.256**	.112*	.487**		
Age	-.020	.138**	.095	.334**	.461**	
Gender	-.063	-.019	-.045	-.055	-.086	-.044

*significant at the .05 level
 **significant at the .01 level

The correlations support most of our predictions. The number of Internet purchases made during the last year was directly correlated with computer knowledge and Internet knowledge and Internet use in the predicted direction; these results are consistent with predictions 1 and 2. Consistent with predictions 4 & 5, the total number of online purchases was correlated with income and education. Although the correlation between gender and number of purchases is in the appropriate direction, the fact that it is statistically insignificant does not provide support for prediction 3. The significant correlation between computer knowledge and Internet knowledge, as well as those indicating direct relationships among education, income, and age are not surprising.

A series of regression analyses was performed to further clarify the extent to which computer knowledge, Internet knowledge, gender, income, education, and age predict Internet purchases. In the first regression analysis, all of these variables were regressed on the number of Internet purchases over the last year. The overall model was significant ($F(6, 418) = 13.84, p < .001$) with an R of .407 and an adjusted R Square of .154. With the exceptions of computer knowledge and gender, the coefficients for all

independent variables were significant at the .05 or .001 levels. The tests for the independent variable coefficients provide the strongest support for predictions 2, 4, and 5.

The second regression analysis performed was a stepwise regression. This resulted in a significant four variable model ($F(4, 420) = 19.77, p < .001$) with an R of .398 and an adjusted R Square of .150. The coefficients for the predictor variables in the model (education, age, income and Internet knowledge) were all significant at the .001 level. The results of this stepwise regression support predictions 2, 4, and 5.

In the third regression analysis, all six variables were regressed on the total number of Internet purchases ever made. Once again the overall model was significant, $F(6, 418) = 14.06$, with an R of .410 and an adjusted R Square of .156. Only coefficients for Internet knowledge, income, and education were significant at the .05 level or higher. The follow-up stepwise regression produced a significant three variable model ($F(3, 421) = 26.84$) with an R of .401 and an adjusted R Square of .155. The coefficients for each of the variables in the model (education, income, and Internet knowledge) were significant at the .005 level or higher. Consistent with the first two regression analyses, these results support predictions 2, 4, and 5.

A series of one-way MANOVAs were also conducted to test the predictions. These were performed on a highly inter-correlated set of dependent variables that included total number of purchases during the last year, total number of purchases ever, the utilization of the Internet for shopping information (measured on a three point scale where 1=monthly or less, 2=weekly, 3=daily), most expensive Internet purchase (where 1=less than \$10 to 4=more than \$100), and average online purchase price (where 1=less than \$10 to 4=more than \$100). To facilitate interpretation, computer knowledge, Internet knowledge, income, and education were each recoded as trichotomized variables for the MANOVAs. In addition, only the responses of students indicating that they had made at least one Internet purchase were included in these analyses.

The MANOVAs reveal highly significant effects ($p < .01$ or higher) for

- computer knowledge,
- Internet knowledge,
- education,
- income, and
- a significant effect ($p < .05$) for gender

Computer knowledge, Internet knowledge, and income were highly significant ($p < .001$) on each univariate test. Highly significant univariate education effects were found for each of the dependent variables except using the Internet for shopping information. None of the univariate tests for gender were significant and only one (that for most expensive online purchase) was marginally significant ($p < .10$). These results provide additional support for predictions 1, 2, 4, and 5. The significant MANOVA effect for gender provides partial support for prediction 3.

Overall, findings from the initial analyses performed on survey responses collected from MBA and undergraduate students seem consistent with predictions derived from previous demographic studies that focused on computer knowledge, Internet knowledge, and education (e.g. CyberAtlas, 2000a). Our results are also consistent with the notion that Internet purchases are related to disposable income (e.g. Holstein et al., 1998). Only weak support was provided for the prediction that gender is related to online purchases. Male university students were found to be only slightly more likely to make online purchases than female students on the MANOVA and gender never appeared as a significant predictor variable in the regression analyses – this is contrary to much of the findings reported in the literature to date. From the perspective of customer relationship management, these results suggest that e-tailers and other online vendors should direct their efforts toward both male and female upper division and graduate students with above average levels of disposable incomes and Internet knowledge.

Because of the inter-correlations among the demographic variables, additional analyses are needed to tease out the demographic variables that best predict online purchasing by university students. For example, the significant effects for computer knowledge and Internet knowledge disappear when the other variable is included as a covariate in the MANOVA. These analyses should assist in the identification of moderator and/or mediator variables.

Future investigations should address the question of the extent to which university students are representative of the general population of Internet users and consumers who make online purchases. They should also address changes in the online shopping and purchasing behaviors of this group across time.

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