BUSINESS TO CONSUMER E-COMMERCE APPLICATIONS IN UNIVERSITY SETTINGS

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ABSTRACT

Researchers surveyed provosts and academic vice presidents to determine the extent to which SACS-accredited higher education schools participate in business-to-consumer e-commerce. The study revealed how classifying variables (school size, SACS level, state, and public/private status) affected e-commerce availability. Several applications, such as "search for contact information," and "complete application for admission," are available at over ¾ of responding schools and have been available a year or more in over half of the schools. Generally, smaller schools, private schools, and schools at lower SACS levels are less likely to have specific e-commerce applications, and are less likely to have had them for a year or more.

Keywords: e-commerce, higher education, SACS, online, student services, administration

INTRODUCTION

This research studies the extent to which universities are participating in growth of e-commerce. As retailers move into Internet-based transactions, are universities also moving to deliver their products and services in a digital environment? Into which corporate model of e-commerce does the university fit?

The motive for this research is to determine what should be emphasized, redesigned, or discarded as "new electronic student services" in an environment in which human and financial resources for such development are limited. Specifically, the study investigated the availability of 17 e-commerce applications in institutions of higher education in the southern U.S.—the area in which the authors' school competes.

This study is aimed at the business-to-consumer model, not the business-to-business model or staff-centered Intranet model. Universities are different from retailers in that their business model is more deliverer of (free?) services than tangible goods retailer. Thus this article is not concerned with back office e-commerce applications such as purchasing of furniture and supplies. While these applications promise much cost saving, they do not involve students directly (4). Rather, the researchers' interest lies in the extent to which Universities have opened e-commerce channels to students, such as allowing them to buy computers online (5). But some parallels between business and academia are still valid. Dickson and DeSanctis (2) model e-commerce by identifying such categories as focused distributors (retailer, marketplace, aggregator, and exchange); portal models, which can be horizontal, vertical or affinity models; producer models (manufacturers, service providers, educators, etc.); and infrastructure provider models. While their categorization places universities in the producer model, a university might have characteristics of some other models as well.

Because e-commerce is relatively applied, not theoretical, the researchers expect universities to be followers, even late adopters, of the mainstream elements of e-commerce. The researchers' original expectations were that universities will have adopted selected elements of e-commerce that (a) are simple to adopt, (b) are clearly connected to the institution's mission, (c) have low or no cost, or have a clearly favorable cost-benefit, and (d) have direct benefit to students.

These issues, while valid, require a survey population that is knowledgeable in technical, administrative, and financial areas—for example, a population of university IT directors. There is no reliable, complete sampling frame for these knowledgeable persons (3). For this reason, the researchers redirected the original research issues: whether selected e-commerce applications are available and whether they have been in place for some time. Virtually any university provost could answer these less detailed (technical and financial) questions.

METHODOLOGY

The researchers constructed an instrument to determine what e-commerce activities are present on a school-by-school basis. The researchers observed commercial sites for the range of services provided. These services went well beyond traditional retail offerings, to price comparisons, product reviews, and customer service. The researchers then built a list of similar items in the environment of higher education.

The Commission on Colleges of the Southern Association of Colleges and Schools listing of accredited schools as of January 2001 provided the population for the study (1). The sample consisted of 225 schools, the result of a systematic random sample within each SACS level. This included 60 Level II, 69 Level III, 15 Level IV, 50 Level V, and 31 Level VI schools. Schools offering less than a B.S. degree (Level I SACS) were excluded. The survey was mailed to Vice Presidents of Academic Affairs (or Provosts) at each school. That office is almost universal among schools and was assumed to be *broadly* knowledgeable of the university's e-commerce offerings. The instrument also asked respondents to identify how long these e-commerce applications have been available on their campus. Classification or respondent data included school size, school state, whether public or private, and SACS level.

The descriptive results illustrate which e-commerce tools are most common and least common on higher education campuses in the SACS region. Hypothesis tests, based on cross tabulation and Chi square, show how or whether the extent of e-commerce applications varies with the classification variables.

FINDINGS

The findings section is divided into two main parts: (1) the descriptive data including simple percentages on classification data and sought data, and (2) two-dimensional cross tabulations accompanied by appropriate Chi square hypothesis tests.

Descriptive Statistics: Classifications

A total of 113 usable responses were analyzed; this represented a 50.2% response rate. Tables 1 through 4 report the results, which appear representative of the population. Table 1 reflects the balance of the responses according to school size, although a slight peak can be observed at the 1,000 to 2,500 category. As illustrated in Table 2, private schools accounted for almost three-fifths (58.6%) of the respondents.

Table 1
Size of School

Size	Number	Percent
Under 1,000	25	22.5
1,000 - 2,500	28	25.2
2,501 - 5,000	21	18.9
5,001 - 10,000	11	9.9
10,001 - 20,000	15	13.5
Over 20,000	11	9.9
Totals	111	100.0

Table 2
Public versus Private Schools

Public/Private	Number	Percent
Public	46	41.4
Private	65	58.6
Totals	111	100.0

All 11 states within the SACS region were represented in the responses. As illustrated in Table 3, Texas has the most responses while Mississippi and Louisiana had the fewest. While Puerto Rico is also within the SACS region, there were no responses.

Table 3
Responding Schools by State
(n = 106)

State	Number	% of Total	State	Number	% of Total
Alabama	8	7.5	North Carolina	13	12.3
Florida	8	7.5	South Carolina	9	8.5
Georgia	9	8.5	Tennessee	14	13.2
Kentucky	8	7.5	Texas	21	19.8
Louisiana	4	3.8	Virginia	9	8.5
Mississippi	3	2.8			

As illustrated in Table 4, the smallest response group was SACS Level IV; this group was smallest in the initial mailing, reflecting its small numbers in the overall SACS classification system. As noted earlier, Level I schools (less than 4-year degrees) were excluded.

Table 4
SACS Level of Responding Schools

SACS Level	Number	Percent
II---Bachelor's highest degree	26	23.0
III--Master's highest degree	40	35.4
IV--Master's & Education Specialist highest	4	3.5
V---Three or fewer Doctoral degrees	21	18.6
VI--Four or more Doctoral degrees	22	19.5
Totals	113	100.0

Descriptive Statistics: E-Commerce Availability

The e-commerce application most often reported available for a year or more was "search directory for university services" (68.8%). This was followed closely (67.0%) by "search directory for faculty contact." Only 4 of the 16 items had been available a year or more in at least 50% of all responding schools. Within the not available category, 85% identified "purchase parking permit" and 83.2% identified "pursue a degree taking web courses only." Five other applications were also little used, with over 70% of vice presidents reporting those applications not available. Recent additions to school e-commerce (available under a year) included "review financial status with the university" (20.4%), "complete application for admission," (17.9%), "view final grades" (17.0%), and "search academic catalog" (16.8%). A full comparison of the length of availability of the e-commerce applications appears in Table 5.

Table 5
E-Commerce Application Availability

Item	% Reporting A Year or More	% Reporting Under a Year	% Reporting Not Available
Complete Application for admission	54.5	17.9	23.2
Order Transcript	12.6	9.0	76.6
View Final grades	29.5	17.0	53.6
Register for classes	30.1	15.0	54.9
Search directory for faculty contact info.	67.0	16.1	17.0
Search directory for university services	68.8	14.3	16.1
Search academic catalog	58.4	16.8	23.0
Audit a degree plan/academic performance	15.0	9.7	74.3
Purchase books from university bookstore	24.1	15.2	58.9
Pay tuition and fees	11.5	11.5	73.5
Reserve dorm room	5.3	5.3	77.9
Review financial status with university	19.5	20.4	56.6
Purchase parking permit	4.4	3.5	85.0
Receive "live" academic advice	11.5	7.1	77.9
Schedule meetings (tutoring, counseling, etc.)	23.9	15.0	60.2
Take a complete web-based course	39.3	13.4	47.3
Pursue a degree taking web courses only	10.6	5.3	83.2

Cross Tabulation and Chi square --Classifying Variables

The researchers prepared two-dimensional cross tabulations on all combinations of the classification variables: school size, school public/private status, state, and SACS level. The first of these examines the relationship between school size and school public/private status.

> H_o: School size and school pubic/private status are independent.
> H_a: School size and school pubic/private status are NOT independent.

The Chi square test of independence was significant at .01. That is, size of school and whether the school is public or private were not independent variables. While Chi square does not permit a direct cause and effect interpretation, it is clear that smaller schools were predominately more private and larger schools were more heavily public; of schools under 1,000 students, 24 were

private, and only 1 was public. In contrast, of those schools over 20,000 in enrollment, 11 were public and none were private.

The second cross tabulation examined whether there was a link between school size and state.

H$_o$: School size and state are independent.
H$_a$: School size and state are NOT independent

The Chi square test of independence failed to show significance.

The third cross tabulation examined the independence of school size and school SACS level.

H$_o$: School size and SACS level are independent.
H$_a$: School size and SACS level are NOT independent

The Chi square calculations showed significance at the .01 level, but the cross tabulation had too many small cells for a reliable or conclusive outcome. School size and school SACS level were not independent. The Level II schools were predominately under 1,000 students while the Level VI schools were almost all over 10,000.

The fourth cross tabulation examined the independence of public/private by state. The Chi square revealed no significance, but left a suggestion that some states have a higher balance of private schools than others. The fifth cross tabulation examined public/private status by SACS level. The appropriate Chi square test was significant at .01. Public schools made up over 80% of Level VI, almost half of Level V, while private schools made over 90% of Level II and 67.5% of Level III respondents. In the final cross tabulation, state by SACS level, the Chi square was not significant.

Cross Tabulation and Chi square --E-commerce Applications

This section reports several sets of two-dimensional comparisons. One set includes a cross tabulation and Chi square for each of the e-commerce applications against school size—17 tables and tests. A similar set compares the 17 e-commerce applications to the other classifying variables, public/private, state, and SACS level.

School size was cross-tabulated against "complete application for admission online." Those results are shown in Table 6. For different size classes of schools, availabilities differ significantly. Larger schools have greater availability of this e-commerce application and have had that application longer than smaller schools.

Table 6
"Complete Application for Admission Online" Versus School Size

Size	Under 1,000	1,000 to 2,500	2,501 to 5,000	5,001 to 10,000	10,001 to 20,000	Over 20,000
Available a year or more	16%	64%	57%	73%	67%	90%
Available under a year	60%	14%	14%	18%	7%	0%

This finding--that larger schools have greater availability and have had the application longer than smaller schools--held true with other e-commerce applications as well. Notably, the e-commerce applications "view final grades," "register for classes," "purchase books from university bookstore," "pay tuition and fees," "review financial status with university," and "take a complete web-based course" mirrored this pattern well.

The second set of cross tabulations analyzed e-commerce application availability by school public or private status. Of the 61 schools reporting "complete application for admission" for a year or more, 55.7% were public schools and 44.3% were private. Viewed differently, among all public schools, 75.6% had the application for more than a year; among private schools, the comparable percentage was 41.5. Of the 25 schools that reported this application not available, 24% were public and 76% were private. This means that private schools were over-represented in the not available group since private schools made up 59% of the responses to the question.

Two-thirds of the 33 responding schools that had "view final grades" online for a year or more were public; one-third were private. Of all public schools, 49% have had this application for a year or more. Of responding private schools, only 17 percent have had it a year or more. Of the 58 schools who said this e-commerce application is not available, 22% were public and 78% were private. As with the previous item, the private schools were disproportionately represented in this category.

Of the 34 schools that reported that students have been able to register on line for a year or more, 71% were public schools and 29% were private. Twenty-eight percent of public schools reported not available; for private schools that percent was 72. The pattern illustrated in the previous two items was clearly present in this third item as well.

The pattern illustrated in these examples held true for "pay tuition and fees," "review financial status," "take a complete web-based course," and "pursue a degree taking web courses only." Indeed, every e-commerce application with significant results mirrored this pattern.

The third set of cross tabulations, which analyzed the link between e-commerce availability and state, revealed no significant results.

The fourth set of cross tabulations analyzed the link between e-commerce availability and SACS level. The percent of schools that have had final grades online for a year or more rose monotonically from 8% of Level II schools to 62% of Level VI schools, suggesting that the higher the SACS level, the more schools have had this application in place. The non-available rate for "view final grades online" fell from 73% of Level II schools to 19% for Level VI schools. The higher the SACS level, the more likely the presence of this service delivery application.

Level II schools were least likely to have had the application "register for classes online" for a year or more; Level VI schools were the most likely, and the increase from level to level was monotonic. Similarly, the not-available rate for this application fell from 77% in Level II to 23% in Level VI. Again, higher level schools were more apt to have the application and more apt to have had it for a year or more.

E-commerce applications "audit a degree plan," "purchase books from university bookstore," "pay tuition and fees," "review financial status," and "take a complete web-based course" all showed dependence between SACS level and application availability. In all cases higher level schools were more likely to have a specific application and to have had the application for a year or more.

CONCLUSIONS AND RECOMMENDATIONS

The most available e-commerce application was "search a directory for university services"; the least available was "purchase parking permit." Many e-commerce applications, including "complete application for admission" and "view final grades" were dependent upon school size, with larger schools having greater availability of these applications. Several e-commerce applications including "complete application for admission," "view final grades," and "register for classes," were dependent on the school's public/private status, with public schools having greater availability of these applications. No link was found between e-commerce application availability and state. The availability of e-commerce applications was dependent upon SACS level—higher SACS level schools were more likely to have various e-commerce applications than lower SACS level schools.

Future research should include analysis of variance by application count and three-dimensional cross tabulations to answer concerns that public schools might behave differently from private schools in interaction with other variables. Future research could address the more technical issues of academic e-commerce: ease of adoption, cost of implementation, benefits to students, and cost-benefit analysis.

REFERENCES

1. Commission on Colleges of the Southern Association of Colleges and Schools. (2001). Member Schools. [online] www.sacscoc.org (accessed January 30, 2001).

2. Dickson, G. W., & DeSanctis, G. (2001). Information Technology and the Future Enterprise. Upper Saddle River, NJ: Prentice-Hall, Inc.

3. Kleen, B., & Shell, L.W. (2000). The impact of electronic whiteboard use in the classroom—phase II. Issues in Information Systems, 1, pp. 222-228.

4. Olson, F. (2000). E-commerce may help colleges cut costs and paperwork. The Chronicle of Higher Education, 46, (33), A45(2).

5. Olson, F. (2000). U. of Pittsburgh sets pace on digital certificates. The Chronicle of Higher Education, 46, (34), A47(1).