E-COMMERCE IN HIGHER EDUCATION

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**Rationale for ND Marketplace**

Electronic commerce, or e-commerce, refers to business conducted via the Internet. Businesses all over the world are utilizing e-commerce because of its convenience to customers, its potential to reduce costs and improve efficiency, and its ability to reach a broader audience.

For the same reasons, e-commerce adoption is increasing at institutions of higher education. Universities across the country are developing and implementing e-commerce solutions for a variety of reasons and to suit many purposes. Notre Dame is not isolated from this trend. Several University departments and organizations have independently entered into the e-commerce arena—many of them not fully aware of the potential liabilities and consequences that their actions entail. Some utilize non-secure tools to transmit sensitive financial information; others are uninformed about the legal, tax, and licensing implications of extending service beyond the campus to a global audience; and still others are unaware of the University’s contractual obligation with regard to merchant card processing.

The ND Marketplace initiative was established jointly by the Offices of Business Operations and Web Administration in an effort to identify relevant areas of concern related to e-commerce and to propose a comprehensive solution appropriate to all members of the University community. Such a solution will enable the Notre Dame community to reap the benefits of e-commerce while managing the associated risks.

**Depiction of Risks and Benefits in Higher Education**

**Identification of Associated Risks**

Although transactions executed using secure Internet resources are arguably more secure than person-to-person credit card transactions, some risk remains. Below are summarized five cases involving malicious attacks on institutions of higher learning. In a few cases, the institutions involved were violated despite precautions—a fact that underscores the more substantial risk to parties conducting business online using unsupervised and non-secure methods.

**Case Study 1: University of Texas - Arlington**

"University of Texas-Arlington officials still don't know what occurred when someone hacked into UT-Austin's database last weekend and stole personal information on thousands of students, former students and employees. Sunday evening, UT-Austin officials discovered a theft of information from approximately 55,200 students, former students, faculty and staff. The information obtained included names and Social Security numbers.

"I would hope the administration would take it a lot more seriously now that it [identity theft] happened at UT (Austin),’ [an official] said. With the dilemma in Austin, [the official] said he hopes students take personal security more seriously. ‘There're just so many ways it is being used that it needs to be looked at,’ he said. ‘It's an issue we're still trying to solve.’”

**Case Study 2: Tufts University**

"The prevalence of [identity theft] in the United States has been steadily increasing for quite some time: Bankrate.com reports that there are almost 900,000 new victims each year.

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Many of those targeted have been college students, who are especially prone to identity theft for a number of reasons.

“One reason is that Social Security numbers are used as universal identifiers at most colleges, including Tufts. At schools nationwide, SSNs are used in situations from purchasing items at the bookstore to replacing names on a list of test grades. Such blasé use of SSNs, however, can have devastating results, as was the case of college student Jenni D. (who did not wish to use her last name), whose identity theft received national coverage. In late 2002, someone stole Jenni D.’s SSN from her student ID card. Using the SSN, the thief opened up 13 credit card accounts, seven checking accounts, nine cell phone accounts, and bought a brand new Chevrolet Suburban, totaling $72,000.”

Case Study 3: Indiana University1

“During the last five years, four separate security breaches have surfaced on [IU's] campus...
• In March 1997, 256 faculty members had their Social Security numbers accessed, according to University officials.
• Last February, more than 3,000 students Social Security numbers were accessed by an outside individual when a security "hole" was left open in an Office of the Bursar database, University officials said.
• In June, a computer security breach in the School of Music gave hackers the opportunity to access more than 1,700 individuals' Social Security numbers, including nearly 150 IU students.”

Case Study 4: Texas Christian University2

“Half a dozen TCU students received calls from someone claiming to be with the university or Southern Association of Colleges and Schools and asking to verify the individual's Social Security number, date of birth and other personal information, TCU Police Detective Kelly Ham said. The calls were received by students the week of and the week prior to spring break, Ham said. 'I suspect the callers were identity thieves out to get information, to get credit cards and other financial gain,' Ham said.

“Though identity thieves could potentially use information students voluntarily put in the directories, the TCU computer network is safe from hackers but not 100 percent fool-proof, Assistant Provost of Information Services David Edmondson said. 'I can't tell you that someone is not going to hack into the system,' Edmondson said. 'The only way to handle a threat is through minimizing the possibility of a threat and by being proactive rather than reactive.'”

Case Study 5: Georgia Tech3

“Online intruders broke into a server containing the credit card numbers of some 57,000 patrons of a Georgia Institute of Technology arts and theater program, a university official said Monday. The online intrusions, which are thought to have occurred over the last two months, were only discovered in the past week or so, said David Terraso, a Georgia Tech spokesman. Both the Georgia Bureau of Investigations--an independent resource for the state's law enforcement personnel--and the FBI have started investigating the matter, he said.

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"The break-in came shortly after Georgia Tech became the first university in the state to do away with reliance on Social Security numbers. As of March 1, the university stopped using Social Security numbers as the primary way to track student data, according to the school’s Web site. The incident is the third known Internet break-in at a U.S. university within the last several months. Ironically, the latest victim is no slouch in terms of security. Georgia Tech is recognized by the National Security Agency as a ‘center of academic excellence’ in information security assurance education.”

Mitigation of Risk
These case studies illustrate the very real threat that institutions of higher education face. Dispersed and unmanaged e-commerce activity will be punished by opportunistic thieves. While there are no guarantees, having a well-organized, secure system of executing business online is an important first step in preventing the damage to the University’s finances, reputation, and relationships.

Involvement of administrative groups, a comprehensive application process, and applicable censure for misuse will lead to a more manageable system. Electronic resources and personal information most often fall subject to vulnerability through mismanagement or misuse of existing resources (server technology, paper files, etc.). By unifying data collection and asset management into one system, the probability of system compromise is significantly reduced.

Risk in the Marketplace must continually be assessed and evaluated. With a poor notion of electronic activity comes dramatically increased risk, and a probable failure of preventive measures.

Description of Benefits
The benefits of e-commerce adoption extend to internal customers (i.e. merchants wishing to sell online), external customers (i.e. consumers), and the institution itself. The benefits listed hereafter represent those that can be realized through the adoption of a secure, universal e-commerce solution such as the proposed ND Marketplace.

To Internal Customers
- Provides a streamlined, formal process for getting a store up and running including
  - Merchant ID and Account setup
  - Identification of legal, tax, and operational pitfalls
  - Guidance in understanding cost and revenue implications
- Reduces costs and frustration via collective bargaining and less check processing
- Increases revenue generation by increasing audience size and improving market penetration
- Simplifies application support by reducing the number of applications in use to one
- Gives access to merchant level financial reports that were previously unavailable
- Provides dedicated support for online stores
- Proffers optional tools for inventory management
- Allows merchants to charge student accounts online

To External Customers
- Improves access to ND goods and services
- Proffers more secure and convenient payment methods
- Provides a uniform purchasing procedure and user interface
- Standardizes fulfillment and customer service
To the Institution:

- Simplifies integration of online stores with *Renovare* by consolidating and standardizing dispersed activity before a large number of constituents invest in diverse technologies.
- Reduces liability through assurance that online vendors are utilizing secure transaction processing methods and preventing access or storage of credit card information within the University.
- Reduces liability by involving General Counsel in the merchant approval process.¹
- Satisfies our contractual obligations to University partners by providing a clear, streamlined process by which online vendors can acquire Account and Merchant ID numbers.²
- Minimizes risk through audit control structures such as an e-Commerce risk assessment and regular, formal reviews to be designed in cooperation with Audit.
- Ensures that groups understand and are in compliance with Federal, State, and Local Tax codes.
- Provides assurance that Unrelated Business Income Tax is identified and collected in accordance with law.
- Decreases instances of licensing infringements and improves compliance with licensing stipulations.
- Ensures that student groups selling online are following the existing policies and procedures set forth by the Student Activities Office.
- Promotes compliance with legal requirements with regard to fulfillment and packaging.
- Facilitates better technical support for internal customers by standardizing technology and providing structured administration and training.

¹Vendors must be apprised of the legal implications of selling online (e.g. international sales regulations, legal requirements with regard to order fulfillment, and other legal issues).²

² Refers to the Merchant Card processing agreement with Moneris.
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EVALUATION OF PEER INSTITUTIONS

OVERVIEW OF BENCHMARKING EFFORT

Over a hundred Web sites of some sixty peer institutions were evaluated according to their apparent level of e-commerce adoption. Those institutions identified as meriting further inspection were contacted and interviewed using a programmed line of questioning. Data collected include: (1) state of e-commerce adoption; (2) methods of e-commerce implementation, including shopping cart solutions, payment processing partners, and reporting standards; (3) policy clarification, provision, or both, dependant upon availability, and (4) details on funding models.

LIST OF INSTITUTIONS INSPECTED

Auburn University  New York University  University of Kansas
Baylor University  Northwestern University  University of Miami
Boston College  Oklahoma State University  University of Michigan
Brown University  Pennsylvania State University  University of Minnesota
Cal Tech University  Princeton University  University of Missouri - Columbia
Carnegie Mellon University  Providence College  University of North Carolina
Case Western Reserve  Purdue University  University of Oklahoma
Colorado University  Rice University  University of Pennsylvania
Columbia University  Rutgers University  University of Pittsburgh
Cornell University  Seton Hall University  University of Rochester
Dartmouth University  St. John's University  University of Texas
Duke University  Stanford University  University of Virginia
Emory University  Swarthmore College  Vanderbilt University
Georgetown University  Syracuse University  Villanova University
Harvard University  Temple University  Virginia Tech University
Indiana University  Texas Tech University  Wake Forest University
Iowa State University  UC - Berkeley  Washington University - St Louis
Johns Hopkins University  UCLA  West Virginia University
MIT  University of Chicago  William and Mary
Nebraska  University of Connecticut  Yale University

LIST OF INSTITUTIONS BENCHMARKED

California Institute of Technology  Princeton University
Duke University  Stanford University
Georgetown University  University of California - Berkeley
Indiana University  University of Oregon
MIT
CURRENT PEER TECHNOLOGY USE

<table>
<thead>
<tr>
<th>Technology Employed</th>
<th>Origin of Technology</th>
<th>Planned Future Technology Upgrades</th>
</tr>
</thead>
<tbody>
<tr>
<td>MIT</td>
<td>ClearCommerce gateway</td>
<td>ClearCommerce</td>
</tr>
<tr>
<td>Oklahoma State</td>
<td>MySQL server-driven solution</td>
<td>In-house, custom</td>
</tr>
<tr>
<td>Georgetown</td>
<td>GWPS</td>
<td>In-house, custom</td>
</tr>
<tr>
<td>University of Oregon</td>
<td>ColdFusion solution</td>
<td>In-house, custom</td>
</tr>
<tr>
<td>Duke</td>
<td>Multiple legacy</td>
<td>In-house, custom</td>
</tr>
<tr>
<td>Stanford</td>
<td>Verisign Payflow-Link/Flow, custom software</td>
<td>Verisign/In-house, custom</td>
</tr>
<tr>
<td>Berkeley</td>
<td>Custom, unknown development method</td>
<td>In-house, custom</td>
</tr>
<tr>
<td>Cal Tech</td>
<td>CampusHub Management software</td>
<td>CampusHub</td>
</tr>
<tr>
<td>Princeton</td>
<td>Verisign Payflow-Link/Flow</td>
<td>Verisign</td>
</tr>
<tr>
<td>IU</td>
<td>infiNET QuikPay</td>
<td>infiNET</td>
</tr>
</tbody>
</table>

SUMMARIES FOR INDIVIDUAL INSTITUTIONS

Georgetown University  www.georgetown.edu
Summary
Not available online.
Additional Resources
Georgetown's Long-Term Technology Plan: http://www.georgetown.edu/technology/ois/LRPasfunded.pdf

Duke University  www.duke.edu | www.dukestores.duke.edu
Summary
Not available online.
Additional Resources
About Duke Stores: http://www.dukestores.duke.edu/about.html
Stanford University       www.stanford.edu | marketplace.stanford.edu
Summary
Not available online.
Additional Resources
Stanford's e-commerce initiative: ecommerce.stanford.edu

University Of California - Berkeley       www.berkeley.edu | www.calmarketplace.org
Summary
Not available online.
Additional Resources
The eBerkeley Initiative: eberkeley.berkeley.edu

Massachusetts Institute Of Technology       www.mit.edu
Summary
Not available online.
Additional Resources
MIT Privacy Policy Template       ClearCommerce Corporation
Merchant Registration Form       E-commerce @ MIT

California Institute Of Technology       www.caltech.edu | www.bookstore.caltech.edu
Summary
Not available online.

University Of Oregon       www.uoregon.edu | www.uobookstore.com
Summary
Not available online.
Additional Resources
Bookstore Security Policy       Processing and Shipments

Princeton University       www.princeton.edu
Summary
Not available online.
Additional Resources
SunGard BSR       Giving to Princeton

Indiana University       www.iub.edu
Summary
Not available online.
CONCLUSION

E-commerce in higher education is an evolving practice; and, consequently, a variety of options for adoption have arisen. Despite the diverse solutions employed or planned by the universities surveyed, three general observations are in order.

Firstly, the consensus seems to be that a centralized and standardized solution is favorable to a centralized and non-standardized solution, which, in turn, is favorable to a decentralized and non-standardized model. Nevertheless, institutions have been forced to satisfice—adopting the centralized and non-standardized solution when possible, and, sometimes, settling for a decentralized and non-centralized model.

Secondly, most higher education institutions have resorted to creating their own in-house solutions without evaluating complete, off-the-shelf solutions. To be sure, there are an overwhelming number of options—many of which do not merit consideration. But a surprising number of peer institutions, when asked which solutions were evaluated replied, “This was the only one.”

Finally, as e-commerce continues to develop, so too will the needs of higher education. As these changes occur, universities and third-party vendors will evolve their solutions. While due diligence requires that an effort be made to evaluate a representative sample of solutions, no one institution can evaluate them all. Moreover, most shortcomings of software, planning, and support will only become evident upon full implementation. Thus, only through continuous dialogue and cooperation can institutions of higher learning hope to establish best practices or to identify the best solutions.