Hurricane Katrina's Aftermath: The Advancement of E-learning

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ABSTRACT

The rapid advancements of technology in the 21st century have directly impacted every facet of life. Moreover, it has enhanced the delivery of Higher Education throughout the world. The integration of education and technology has created the existence of mobile learning, also known as, Electronic learning or E-learning. For the past several years, universities considered E-learning as a means to meet the needs of their students, thereby increasing enrollment, retention, and quality at low cost. However, after the devastation of Hurricane Katrina, Southern University at New Orleans (SUNO) depended on E-learning as a means to provide basic education to their students. SUNO is now a testimony for the necessity of E-learning as the school's survival. Prior to Katrina approximately 9% of the SUNO student body participated in on-line courses. In the Spring 2006 semester, that number rose to 41%. E-learning has not only given SUNO the opportunity to keep its doors open, but it has also allowed the school to move forward with its mission to provide higher education to students from diverse backgrounds outside the boundaries of Louisiana.

Key Words: e-learning, enrollment, disaster, displaced, Katrina, recruiting, retention.

1. INTRODUCTION

The existence of E-learning is a high priority for many institutions for a variety of reasons. For some institutions, the emergence of E-learning programs is an institutional response to evolving faculty interest to apply technology to instruction. For other institutions, this phenomenon is a part of the overall institutional strategic vision to enhance the learning experience and reach a dispersed population or increase enrollment. It is also a response to the increased student demand for convenience as a logical extension of earlier distance learning programs offered through video or satellite television. The introduction of course management systems is also increasing penetration rates of E-learning across campuses (Arabasz and Baker, 2003).

The current emphasis on E-learning at SUNO is being fueled by five major events: the prevalence of natural disasters, the convergence of communication and computing technologies, the constant need for workers in all sectors of the economy to remain knowledgeable and highly skilled without interrupting work service for extended periods of time, the favorable economics of E-learning, and the fierce competition among institutions, colleges, and universities (Taylor, 2004).

The new demand of New Orleans' business industry ensures a role for SUNO's students in a vibrant and recovering economic environment. Therefore, SUNO faces the following performance challenges:

• Surviving/growing as a tuition-dependent, private institution.

• Retaining/increasing the current level of Full Time Enrollment (FTE)-based public funding.

• Improving retention rates.

• Increasing the proportion of degree-holders in the citizenry.

• Helping students complete degree programs.

• Increasing the supply of graduates in programs aimed at workforce and economic development goals-social workers, teachers, science and technology professionals, etc.

Since Hurricanes Katrina and Rita, the Louisiana Board of Regents, the state's coordinating board for higher education, has hosted regular meetings of the Louisiana Higher Education Response Team (LaHERT). LaHERT is composed of system presidents, university presidents/chancellors, campus representatives, and invited guests who address the many issues facing higher education as a result of the two hurricanes. More than 80,000 of Louisiana's public and private college students and 10,000 of the faculty and staff were displaced by the two storms. "The impact of the storms on postsecondary education in Louisiana has been both broad and deep." (www.regents.state.la.us).

In the wake of Hurricane Katrina during the 2005 Fall semester, SUNO students were displaced from the severely damaged university and were forced to continue their education through E-learning or attend another institution. SUNO's main campus was damaged by the flood. The University is currently housed in a temporary modular campus, in which both on-line and traditional face-to-face classes are offered (Figures 1 and 2).

Figure 1: Pre-Katrina Main Campus

Figure 2: Post-Katrina Modular Campus

2. LITERATURE REVIEW

An open and flexible definition for e-learning is "The use of Internet and digital technologies to create experiences that educate our fellow human beings" (Horton 2001).

Most American universities and businesses have heavily invested in programs using E-learning. Many of the developed countries have also followed this same initiative. A much more student-centered approach is necessary to fit this new learning opportunity into a coherent provision that is educational (Smith, 2000).

The power of on-line learning lies in its ability to enable all those interested to have equal access to available educational materials regardless of time and place. The opportunities and applications E-learning offers include reaching a wider student audience, conferring with experts around the world, linking students from different cultural and economic backgrounds, facilitating new research, and providing access to knowledge and experiences which otherwise would not be available (Kinnaman, 1995). Further-

more, it provides educational opportunities in the workplace, community, or the home for those unable to attend school or college because of cultural, economic, geographical, or social barriers.

In the hands of able teachers, E-learning plays a prominent role in fostering the development of important skills in students such as critical thinking, problem solving, written communication, and the ability to work collaboratively. Thus, teachers can encourage students to employ all available technology with the goal of having them weigh evidence, judge the authenticity of data, compare different view points on issues, analyze and synthesize diverse sources of information, and construct their own understanding of the topic at hand. By doing so, students will be well on their way to developing invaluable critical thinking and problem solving skills (Weinstein, 1997).

Students who successfully complete E-learning programs are generally very motivated, highly disciplined, and goal oriented. Furthermore, successful students tend to be independent leaders and mature adults who are comfortable in the realm of textual materials (Glenn, 2001).

A growing number of physical universities have started to offer a select set of academic degrees and certificate programs via the Internet at various levels in a multitude of disciplines. While some programs require students to attend some campus classes or orientations, many are delivered completely on-line. Many universities also offer on-line student support services, such as on-line advising and registration, E-counseling, on-line textbook purchases, student governments and student newspapers to accommodate E-learning needs.

These universities are characterized by very large student enrollments and use massive communication technology, such as print and broadcasting. Their main goal is to widen access by reaching out to students who cannot attend conventional universities. Distance educational institutions operate nationally and internationally to fulfill their purpose. As a result of high student enrollments, the universities are able to offer cheaper admission costs to their students as opposed to conventional campus-based institutions or even-dual mode education operations.

E-learning offers many advantages including access to educational resources from outside the institution on a global and instant basis; flexible interaction between faculty and students through e-mail and discussion forums; instant availability of course notes, diagrams, reading lists, and other course materials; the ability to combine text, graphics and multimedia, yielding a wide range of educational applications; the availability of professional/subject links on an international basis for research and teaching purposes; the opportunities for international, cross-cultural, and collaborative learning; the ease of creating materials through low-cost, public software such as Blackboard; and the efficient organization of course materials through on-line portals.

E-learning revolutionized the learning experience by making vital material available on-demand via the web and a company's intranet. Now the same content can be offered using familiar, wireless tools, making the learning experience even more convenient and flexible. (Koschembahr, 2005).

In the aftermath of Katrina, most institutions along the Gulf coast are resorting to a kind of back up system through a virtual presence. Local institutions have moved their computer servers out of state, and because they are equipped with Blackboard, a system cannot only set up on-line classes, but store up records, post documents, and allow text message chats among students and teachers. In a recent article by John Pope entitled, "UNO Virtual Campus to be used After Storms: Second Life provides on-line classes" the author quotes Merrill Johnson, associate dean of the College of Liberal Arts who showed off the system: "If the New Orleans area should be struck by another monster storm that forces students, teachers and administrators to scatter widely for an indefinite period, Second life [name of the system] will let teachers set up on-line classrooms overnight, keeping school functions from shutting down, as they did after Hurricane Katrina, and helping them hold on to students." (Pope, 2007, p.5)

E-learning courses make it possible to accommodate the growing needs of profes-

sionals to enhance knowledge and skills needed for their expanded roles in a competitive global economy.

3. STATEMENT OF THE PROBLEM

The impact of Hurricanes Katrina and Rita on SUNO was overwhelmingly devastating. The entire campus was flooded and left in shambles. All classrooms and lecture halls were ruined. As a result, classes are now conducted in Federal Emergency Management Agency (FEMA) modular trailers at various locations. The University's annual enrollment figure was heavily impacted, declining from 3,729 students in the semester preceding the natural disaster to 2,040 students post-Katrina. In the wake of this devastation, state law makers have advocated closing SUNO's doors permanently. SUNO's E-learning program evolved in an effort to sustain the university while providing continued quality education.

4. STATEMENT OF OBJECTIVE

With falling enrollment numbers due to displaced students across the nation, an alternative to traditional face-to-face learning was necessary. SUNO's E-learning mission encompassed designing and implementing a model for teaching and learning that met the needs of all learners through the use of the best practices, adaptive technologies and instructional techniques (Figure 3).

Figure 3: SUNO's E-learning Model
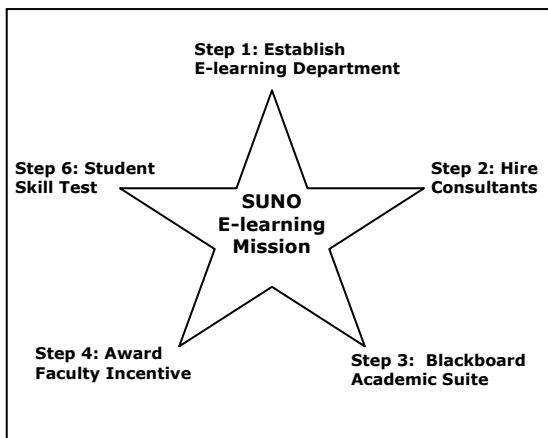
In despite of Hurricane Katrina, SUNO's immediate objectives were the following: to establish the E-learning department, to evaluate the growth of the E-learning program at SUNO, to evaluate its impact on student enrollment and retention pre and post Katrina, and to recommend ways to improve the E-learning process.

5. METHODOLOGY

In order for E-learning to become successful, students need uninterrupted access to technology, curriculum, and activities as well as immediate feedback in order to maximize student achievement (Starkman, 2006).

During the wake of Hurricanes Katrina and Rita, the SUNO administration assumed an aggressive approach to reach, retain, and recruit students by establishing the Department of E-learning and implementing on-line curricula. All faculty members were encouraged to implement at least one on-line course in his/her field. Consultants from the Tennessee Board of Regents, specializing in the design of on-line curricula, conducted workshops aimed at teaching SUNO faculty instructional design for on-line courses. A Blackboard academic suite was used for on-line course materials thereby providing students with unlimited access.

Faculty members were awarded wireless laptops and financial incentives for successful course implementation as set forth by the standards and recommendations of the consulting firm. All on-line students enrolled were required to complete the SUNO On-line Orientation and the On-line Knowledge and Skills Mastery Test which assists students in assessing their knowledge, skills, and technical requirements. It also incorporates student services, technical assistance, and a listing of academic resources to support students on-line.

With students displaced from New Orleans and scattered across the nation due to Hurricane Katrina, implementing E-learning on a full scale directly helped SUNO retain and graduate many of its students. Recently, students in California, Georgia, Mississippi, and Texas completed degree work through on-line curricula, an accomplishment that was impossible pre-Katrina.

By implementing E-learning, the number of on-line classes at SUNO increased from 15 courses pre-Katrina to 148 courses post-

Katrina (Table 1). Moreover, the Departments of Criminal Justice, Early Childhood Education, and General Studies have been approved to offer undergraduate degree programs through on-line courses. An on-line graduate degree program in Museum Studies was also approved. Accordingly, E-learning has given displaced students to continue their education at SUNO and increased the number of students enrolled in on-line courses from 558 (pre-Katrina) to 3117 (post-Katrina) (Table 2).

Table 1: On-line Classes Offered at
SUNO Pre/Post Katrina

Semester	Number of Classes
Spring 2005*	15
Spring 2006	89
Fall 2006	128
Spring 2007	148

*(Pre-Katrina)

Table 2: On-line Enrollment Pre/Post-Katrina

Semester	Number of Students
Spring 2005 *	558
Spring 2006	2445
Fall 2006	3085
Spring 2007	3117

*(Pre-Katrina)

The E-learning program has also positively impacted university enrollment. Overall, enrollment has increased from a student body of about 700 in the Fall of 2005 (post-Katrina) to 2,040 in the Spring of 2006. Currently, the university has an enrollment of 2344 (Table 3).

Table 3: Student Enrollment at
SUNO Pre/Post-Katrina

Semester	Number of Students
Fall 2005*	3,729
Fall 2005**	700
Spring 2006	2,040
Fall 2006	2,196
Spring 2007	2,344

* Pre-Katrina
**Post-Katrina, Southern University-Baton Rouge

The data illustrates the positive impact of E-learning on enrollment and retention.

Perceptions of the Student Body Concerning the Quality of On-line Courses

Active participation and engagement by students is critical to the educational process and success of an E-learning program. Students must be willing to use available academic resources such as communication with professors through chat rooms, discussion boards, e-mails, and messages. They must also be able to self manage the learning process wisely. Self-efficacy and goal setting have important implications for academic successes. SUNO resources available to students include three comprehensive campus labs as well as free wireless services. The university purchased a license to provide Blackboard service to all students. SUNO has also conducted workshops to facilitate student use of Blackboard. Furthermore, when a student emails an instructor with a question or submits a homework assignment, SUNO faculty must respond within 24 hours. Students in need of administrative advice can seek support from the E-learning department during office hours as well as 24/7 assistance from Blackboard help.

A student survey was conducted to evaluate Management Information Systems (MGIS) 164-Introduction to Information Processing, an on-line literacy course required by the Louisiana State Board of Regents for all students regardless of major. The survey evaluated technical assistance, access to computer resources, student expectations about E-learning, and instructor delivery (Table 4). One hundred and two surveys were administered, of which ninety one were completed. Of the respondents, 55% were freshman, 24% were sophomores, 15% were juniors, and 6% were seniors. The Likert Scale was employed to collect data based on five statements. Data analysis was accomplished via the arithmetic means: ($X = [X1 + X2 + X3 + … + XN] / N$) to measure the central tendency of the respondents. Respondents were required to strongly agree (SA); agree (A); neither disagree nor agree (N); disagree (D); or strongly disagree (SD) with the following statements:

I. I have full access to a personal computer and internet service 24/7.

II.   I understand how to access Blackboard in order to navigate my on-line courses.

III. I have adequate on-line course assistance from my instructor.

IV.   I expect a very good grade at the end of this course.

V.   I am likely to take another on-line course in the future.

Table 4: Student Response to MGIS 164 On-line Course

	SA	A	N	D	SD
I	45%	25%	15%	8%	7%
II	62%	30%	2%	4%	2%
III	60%	24%	7%	4%	5%
IV	65%	21%	8%	3%	3%
V	56%	25%	12%	5%	2%
AVG*	58%	25%	9%	5%	4%

*Average

The results of the survey indicate very favorable opinions from students towards the course and SUNO's E-learning efforts.

A second survey entitled "Student Satisfaction Survey: Fall 2006" was conducted by the Office of Student Affairs consisting of twenty-six questions. Four hundreds and seven students responded to the survey. Four out of twenty-six questions pertained to E-learning, as listed below (Figures 4-7):

I.   How would you rate on-line courses at Southern University at New Orleans?

II.   Of the credit hours for which you are registered, how many are on-line?

III. Have you activated your SUNO student email account?

IV.   Have you activated your SUNO Blackboard account?

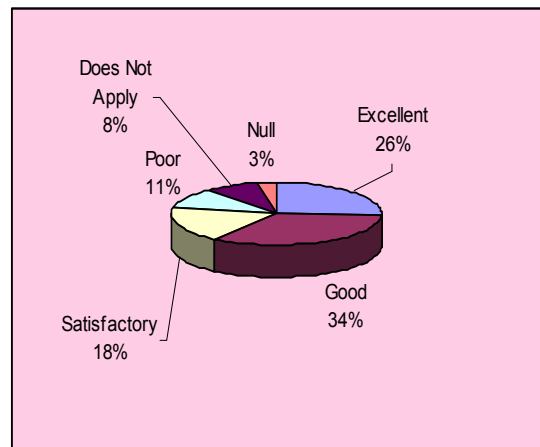Figure 4: How would you rate On-line Courses?

Figure 4 shows the number of students (n = 407) rating on-line courses as excellent and good is 60%, satisfactory is 18%, poor is 11%, and does not apply and null is 11%.

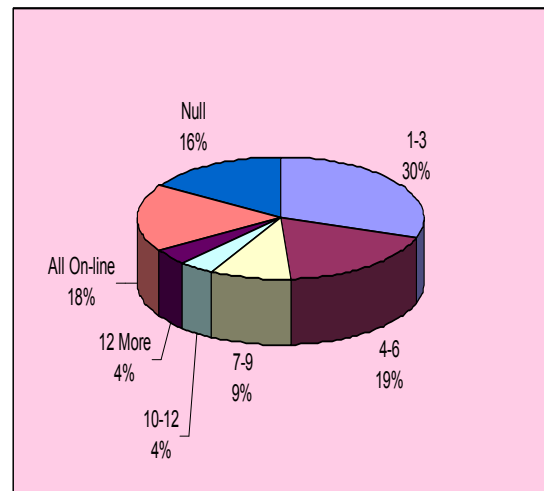Figure 5: Of the credit hours for which you are registered, how many are on-line?

Figure 5 shows that the number of students (n = 407) that counted the number of credit hours he/she is registered for on-line course(s) is 1-6 credit hours 49%, 7-12 credit hours is 13%, at least 12 credit hours 17.4%, all courses on-line 18%, and null is 16%.

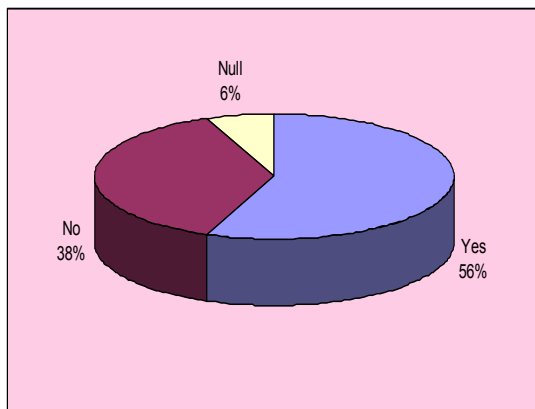Figure 6: Have you activated your SUNO student e-mail account?

Figure 6 shows the number of students (n = 407) that have activated their SUNO Email accounts are: Yes 56%, No 38%, Null 6%.

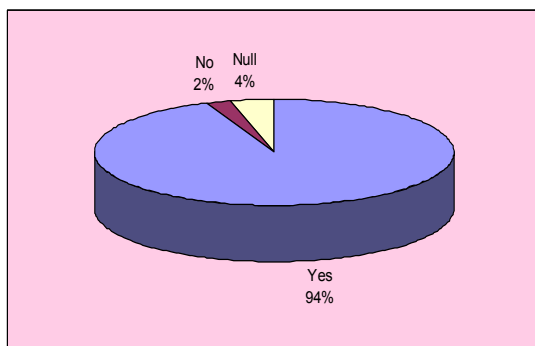Figure 7: Have you activated your SUNO Blackboard account?

Figure 7 shows the number of students (n = 407) that have activated their SUNO Blackboard accounts are: Yes 94%, No 2%, and Null 4%.

The results of this survey illustrate the increase of student enrollment and course in regards to SUNO's E-learning department. The majority of student responses have stated that they are enrolled in at least 1-3 Blackboard course(s) and believe that it is good. However, data in Figure 6 indicates that 38% of students did not activate their E-mail accounts. Such problem hinders communication and needs to be addressed by the administration.

Perception of Faculty Concerning the Quality of On-line Courses

Faculty responsibility and participation is critical to the learning process in an E-learning environment. In order to engage in good teaching practices, faculty must learn general and content-specific pedagogy to improve critical inquiry.

A third survey was administered to faculty who taught on-line courses. The survey instrument composed of the following five statements was submitted:

I. E-learning is a tool to promote retention.

II. E-learning is a tool to promote recruiting.

III. E-learning improves the quality of education.

IV. I am satisfied with on-line instruction.

V. I plan to develop new on-line courses.

Faculty were required to strongly agree (SA); agree (A); neither disagree nor agree (N); disagree (D); strongly disagree (SD); or not applicable (N/A). The results of the faculty survey are shown in Table 5.

Table 5: Faculty Response to the Quality of E-learning

	SA	A	N	D	SD	N/A
I	52%	24%	10%	10%	4%	0%
II	72%	19%	7%	2%	0%	0%
III	24%	22%	28%	12%	10%	4%
IV	24%	26%	17%	10%	10%	13%
V	33%	24%	24%	7%	7%	5%
AVG *	41%	23%	17%	8%	7%	4%

*Average

In the spring of 2005, nine faculty members taught on-line classes, in Spring 2006, forty-five teachers, in the Fall of 2006, fifty teachers taught, and in Spring 2007, there were seventy-one teachers who participated in on-line instruction. The results of the survey

indicate a very favorable opinion of E-learning as a tool for retention and recruiting. The faculty members were also eager to develop additional on-line curricula. However, responses were less favorable concerning faculty satisfaction with on-line instruction and their perceptions of the impact of on-line courses on the quality of the learning experience.

Perhaps, survey participants misinterpreted statement three and may have wrongly compared the quality of education offered by on-line courses to that of traditional classes. Statement three was designed to measure the quality of education for students displaced and unable to attend traditional classes in order to complete their respective degrees. Furthermore, E-learning at SUNO is at an early stage of implementation. Faculty may lack experience in preparing and managing on-line courses. Moreover, teachers fear that on-line courses may encourage plagiarism/cheating. On-line classes may also be more time consuming for teachers than traditional classes with no substantial incentive. The aforementioned reasons likely contribute to the responses concerning faculty satisfaction with on-line education.

Data Analysis of Students' Passing Rate to Failing Rate for E-learning Courses

Data from E-learning courses were used to examine students' passing rate to failing rate for spring 2005 – spring 2007 semesters as shown in tables 6-9 in the Appendix. Passing rate entails A, B, C, and D grades. Failing rate entails F grade. The grades were measured by class level consisting of Freshman (FR), Sophomore (SO), Junior (JR), Senior (SR), Master's Candidate (GR), New Freshman (NF), Special Undergraduate Certification (SUC), Special Undergraduate (SPU), and Special Undergraduate (SUG) 2. Six paired z-tests were conducted to test the differences between proportions. They were used to establish whether there was a significant difference between the two groups (Table 10). The resulting statistics include the number of students in each semesters, the z-statistic (at 0.01 level of confidence), and the critical z-value.

The difference between proportions is calculated based on the z-test statistic in table 10. Since the calculated z-statistic exceeded the critical z-value, the null hypothesis--there is significant difference between students' passing rate--was rejected; the alternative hypothesis--there is significant difference between students' passing rate--was accepted only for Table's 6 - 7 to Table's 7 -9.

In table's 8 & 9, the calculated z-statistic (.84) did not exceed the critical z-value (± 2.58) during fall 2006 and spring 2007 semesters.

Therefore, it was concluded that the passing rate of students is different from semester to semester except for Tables' 8 – 9.

6. CONCLUSION & RECOMMENDATIONS

As technology advances, course developers must plan for interactive collaborations among faculty and students in the most convenient setting. E-learning allows faculty and students to join in networks that overcome institutional or geographical boundaries.

Not only did E-Learning play a key role in the survival of SUNO post-Katrina and Rita, but it also revitalized the academic environment with motivated faculty/staff and eager students. SUNO's E-learning program has grown from 15 to 148 courses over an 18-month period, partly out of necessity but also for convenience. The number of students participating in on-line classes has also increased from 558 (pre-Katrina) to approximately 3117 (post-Katrina). These statistics attest to the success and popularity of SUNO's E-learning program and signify the start of a new beginning.
Designing an E-learning program requires various considerations. Faculty should notify the Recruitment and Retention Department of student participation in on-line curricula by the end of the second week of the semester. On-line course content should strictly adhere to course syllabi presented to students. Prompt faculty response to student concerns/questions is critical. Faculty should advise students as to their course loads (traditional and on-line) based on students' commitments and work responsibilities.

Based on its overall positive result, the E-learning program implemented by SUNO

may serve as a model for other institutions in regions affected by natural disasters. The implications of this model have shown that teaching and learning as well as attitudes on campus can be positively affected by incorporating E-learning technologies as part of a pedagogical design change.

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Appendix

Table 6: Online Grade Distribution Spring 2005

Class Level	A	B	C	D	F	I	P	W	Total
FR	0	0	0	0	1	1	0	1	3
GR	216	14	1	0	2	0	0	4	237
JR	5	0	5	0	3	4	36	8	61
NF	0	0	0	0	1	0	0	0	1
SO	0	0	1	0	2	7	17	3	30
SR	46	22	10	1	0	3	105	12	199
SUC	6	8	4	1	1	1	0	6	27
Total	273	44	21	2	10	16	158	34	558

Table 7: Online Grade Distribution Spring 2006

Class Level	A	B	C	D	F	I	P	W	Total
FR	39	31	29	16	78	4	1	49	247
GR	68	88	11	1	20	4	0	84	276
JR	70	65	37	12	48	2	15	78	327
NF	6	13	17	3	50	0	0	13	102
SO	47	62	45	12	88	4	5	82	345
SPU	2	1	1	0	0	0	0	0	4
SR	200	197	120	22	70	8	49	88	754
SUC	14	21	8	1	11	0	0	11	66
SUG	3	0	7	3	0	1	0	10	24
Total	749	478	275	70	365	23	70	415	2445

Table 8: Online Grade Distribution Fall 2006

Class Level	A	B	C	D	F	I	P	W	Total
FR	60	65	73	26	215	2	2	89	535
GR	213	64	5	1	4	17	0	23	329
JR	90	86	80	20	150	6	14	102	549
NF	9	6	23	9	66	0	0	17	132
SO	82	80	79	20	170	8	9	124	572
SPU	3	1	1	1	0	0	0	0	6
SR	233	202	144	38	128	3	24	127	899
SUC	17	8	4	1	4	1	0	13	48
SUG	2	5	3	0	3	0	0	2	15
Total	709	517	412	116	740	37	49	497	3085

Table 9: Online Grade Distribution Spring 2007

Class Level	A	B	C	D	F	I	P	W	Total
FR	51	81	73	27	156	22	2	114	526
GR	179	65	12	0	3	55	0	14	328
JR	114	102	83	28	92	44	18	70	551
NF	6	8	6	4	9	3	0	9	45
SO	92	101	91	29	105	40	8	124	590
SPU	1	1	0	0	0	0	0	0	2
SR	255	220	166	47	96	27	34	99	944
SUC	36	26	8	3	5	6	0	3	87
SUG	9	13	3	0	9	0	0	10	44
Total	743	617	442	138	475	197	62	443	3117

Table 10: Online Students' Passing Rate-Failing Rate Analysis

Tables	Semesters	N	α	z-statistics	critical z-value
6 & 7	spring 2005 & spring 2006	$n_1 = 350$ $n_2 = 1937$	0.01	7.51	± 2.58
6 & 8	spring 2005 & fall 2006	$n_1 = 350$ $n_2 = 2492$	0.01	10.65	± 2.58
6 & 9	spring 2005 & spring 2007	$n_1 = 350$ $n_2 = 2415$	0.01	7.74	± 2.58
7 & 8	spring 2006 & fall 2006	$n_1 = 1937$ $n_2 = 2494$	0.01	8.4	± 2.58
7 & 9	spring 2006 & spring 2007	$n_1 = 1937$ $n_2 = 2415$	0.01	-8.09	± 2.58
8 & 9	fall 2006 & spring 2007	$n_1 = 2494$ $n_2 = 2415$	0.01	.84	± 2.58