

Evaluation of SMART® Multimedia Classrooms: Impact on Student Face-to-Face Participation and E-Learning

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Abstract: This study shares the results of the evaluation of the \$1.78 million Title III-A U.S. Department of Education (USDoE) grant to the University of Southern Mississippi from 2001 to 2006. This report will focus on the final two of three surveys administered to faculty to assess their technological needs and evaluate how well those needs were met over the life of the grant. The faculty concluded that the SMART® multimedia classrooms enhanced both student face-to-face participation and e-learning.

In October, 2001, The USDoE funded a \$1.78 million Title III-A Strengthening the Institution grant for The University of Southern Mississippi. The grant objectives included creating faculty development programs which could enhance the integration of instructional technology into the classroom, improving student learning and participation, and increasing faculty, staff, and student exposure to emerging technologies. The purchase and implementation of Highly Visible Undergraduate Classrooms (HVUCs) or SMART® multimedia classrooms would allow the University to meet these objectives. Using information primarily from the departmental chairs and deans, 38 classrooms in “highly visible undergraduate programs” were identified. These classrooms were inspected to ascertain what equipment should be acquired and what physical adaptations might be necessary to make that equipment fully operational.

Several competing interactive whiteboard vendors offered trial products for demonstration testing purposes. An ad hoc committee, including faculty and staff members who were actually using that equipment, placed the interactive whiteboards side-by-side and used similar applications and features on all machines simultaneously. There was a consensus among committee members that the SMART® Boards performed at the highest level of productivity so the committee’s decision was to standardize on the SMART® equipment.

Evidence of improvement in student learning and participation using SMART® classrooms was abundant from various elementary, secondary and higher education sources (Damcott, Landato, & Marsh, 2000; Howse, Hamilton & Symons, 2000; and Nonis, & O’Bannon, 2001). The Provost’s Office at The University of Southern Mississippi also supported the finding that SMART® classrooms would prepare postsecondary students to learn the skills they would need to thrive in the 21st century. The implementation of these SMART® classrooms would enhance the overall educational experience, introducing faculty, staff, and students to new ideas and spurring their creativity and enthusiasm to learn in new and different ways (Public Relations, 2004).

In order to standardize the rooms to assess their total impact on face-to-face participation as well as preparing students for e-learning in hybrid courses, each SMART® classroom was outfitted with the following multimedia hardware and software:

- SMART® Symposium with lectern
- PC computer
- USB-PC Wireless adapter
- Ceiling-Mounted Video Data Projector
- DVD/VCR combo
- Audio System
- Wall-mounted Screen
- SMART® USB to serial adapter for laptop connectivity
- Key Span Presentation remote control
- Elmo Visual Presenter (video overhead projector)
- Wireless Internet access
- Microsoft Office Suite software

- SMART® software
- Adobe Reader software
- SPSS statistical software
- Macromedia Flash software
- Internet Explorer and Netscape Navigator Internet Browsers (Author, 2006).

Methodology

As part of the Title III-A grant evaluation in 2004 when most of the multimedia classrooms were in full operation, 101 questionnaires were campus-mailed to the faculty, staff, and graduate students (FSGS), who had been trained to use the HVUCs, from all university campuses with 57 usable surveys returned for a response rate of 27%. In 2006, 261 questionnaires were campus-mailed to HVUC-trained FSGS on all University campuses with an updated letter from the researchers encouraging participation; 55 usable surveys were returned for a response rate of 21%. In 2004, the University's Center for Research Support hand-entered the data into an SPSS file for data analyses

The 2004 Survey gathered demographic data including rank, PEF faculty status, college and campus affiliations, race, age group, highest level of education attained, number of courses taught in the SMART® classrooms and using the HVUC equipment, and the first semester taught in a HVUC room. Participants were asked to describe the importance of 17 specific pieces of HVUC software, hardware, and other technology equipment to accomplishing their course objectives. Questions also addressed FSGS satisfaction with HVUC room access, equipment, software, training, frequency of use, and overall satisfaction.

The 2006 Survey was designed to replicate as many questions as possible from the 2004 Survey to enable longitudinal analysis of the Title III-A grant. Two of the demographic questions were updated ("number of courses taught in the SMART® classrooms and using the HVUC equipment", and "the first semester taught in a HVUC room"). The 2006 Survey added one question (the importance of SPSS software to accomplishing course objectives) and changed the format of one item (from a Likert scale response on "This equipment has improved student participation in my class." to the open-ended response "In what ways has this equipment impacted student participation in your class?") SPSS software had been installed on the instructor's computer station in many of the HVUC rooms so the researchers wanted to assess its importance. The alteration of the format for the student participation question was done for two reasons: first, to replace the biased word "improved" with the objective word "impacted"; next, to allow participants to list the specific ways in which the equipment had impacted their students' learning and participation.

Answers on both surveys were based on a 5-point Likert scale which ranged from 1-Not Important At All to 5-Extremely Important or 1-Strongly Disagree to 5-Strongly Agree. See the HVUC instrument in Appendix A.

Results

SMART® Sympodium: Like the data video projector and the computer, the median of the importance of the SMART® Sympodium was 5. Approximately 90% of the FSGS agreed that the SMART® Sympodium was important in both the 2006 and 2004 Survey, making the SMART® Sympodium among the most highly prized pieces of equipment in the classroom.

SMART® Notebook: In 2006, over 10% more FSGS perceived the SMART® Notebook software to be an important aid to their accomplishing course objectives.

SMART® Classroom Faculty Development: An overwhelming 94.5% reported that they had attended a scheduled training session conducted by the LEC personnel. These numbers are markedly higher than in 2004.

SMART® Classroom Additional Faculty Development Requests: In 2006, faculty indicated the same need for additional software and software training as their cohorts did in 2004. They requested additional hardware and software training on the following: Data Video Projectors, SMART® Sympodiums, Visual Presenters (Elmos), External Laptop Connectivity (for iBook), Macromedia Flash, Web Conferencing, SMART® software, and updated versions of all of the installed software.

FSGS Assessment of Changes in Student Performance using SMART® Products and Technology:

- Students seem to grasp concepts and events at much faster pace with SMART® Aware which allows me to annotate visual components like PowerPoint & documentary clips even though they aren't SMART® applications. It also brings history alive for them allowing them to relate to the people of the past and thus to have an intellectual curiosity about them.
- Students in late night classes are more engaged & pay better attention than they did before we got the SMART® classrooms. For this reason, their average statistics' grades have improved by around 5 points. Several of my students have gone on to use the SMART® Board themselves in student presentations & later on in their own teaching!
- Students are more willing to ask questions or repeat a point. When I use the chalkboard only, due to the time and drawing involved, they ask fewer questions.
- Student feedback has been wonderful. The equipment allows demonstration and examples that otherwise would not be available and which are invaluable.
- The Symposium allows us to go on the internet and find applications of the concepts covered in class. We can discuss and annotate what we see.
- We have used the SMART® rooms for small group brainstorming results which have improved student presentations.
- The SMART® classrooms help with the adult learning model by providing alternative methods of delivery to reach all types of learning styles.
- A SMART® classroom ensures all students in a large class can do their own presentation.

Benefits of using the SMART® Products and Technology:

- Faculty have more channels of communication open to them for working with different learning styles.
- Faculty can show an item/picture to the entire class for discussion. This is an improvement over passing materials around. We can follow up on questions/comments immediately by use of web.
- Students are more eager for lecture because of the interactive discussions possible
- Students can respond to visual questions. They can interact with the internet.
- Students become engaged when they can see & hear the subject matter. They are more talkative during discussions.
- Students made great videos for my American political thought assignment to do a skit about a famous thinker. They presented their videos in the SMART® classrooms, holding their classmates attention.
- SMART® classrooms enhance the quality of education for visual learners, using interactive materials.

Grant Activities and Objectives Relevant to Student Participation and/or E-Learning

Activity I: Purchase of Equipment to Improve Academic Programs

Objective 3

By 2006, a minimum of 60% of USM faculty will report being "satisfied" to "very satisfied" with available classroom technologies.

Results

Between 94 and 98% of USM Faculty (along with Staff and Graduate Students who teach) reported being "satisfied" to "very satisfied" with available classroom technologies on the 3 questions in the 2006 Survey which measured overall satisfaction.

Activity 2: Faculty Professional Development

Objective 1

By 2006, 50% of the faculty will report adequate skill levels in basic technology applications and instructional equipment operation, including word processing, spreadsheets, electronic communications, electronic presentation methodologies, and other applications relevant to educational technology.

Results

An overwhelming 94.5% reported that they had attended a scheduled HVUC training session conducted by the LEC personnel. Furthermore, 93% reported that they knew how to operate the instructional equipment and around 85% also know how to utilize the installed software applications according to the 2006 Survey.

Objective 2

In each project year, present emerging instructional technologies on an ongoing basis throughout the project year to all faculty.

Results

This objective was completed on schedule. According to LEC records, at least 2,669 faculty, staff and graduate students have been trained in face-to-face workshops. Online training is also available on a continuous basis through LEC's website (http://www.usm.edu/lec/training_tutorials.html).

Objective 5

By 2003, 50% of USM faculty will report using email, email lists and/or ListServ to enhance teaching and learning activities.

***Special Note:** Objectives 5-7 were not measured either directly or completely through the Surveys. In most cases, faculty were questioned whether they would like to use these resources, not whether they actually did use them.

Results

Approximately 79% of the faculty reported in 2004 that they would very much like to use email/email lists with their classes. The majority (61%) also reported that existing training support met their requirements to accomplish that goal. By 2006, 83.5% of the faculty reported the desire to use class email/email lists, with almost the same majority (59%) indicating their awareness of available training support. However, in 2006, 43.3% of the faculty reported actually using ListServes with their classes. In 2004, 60.6% of the faculty reported using a ListServ. That percentage likely decreased based on the aftermath of Hurricane Katrina.

Objective 6

By 2004, 45% of USM faculty will report using web pages for instructional purposes.

Results

In 2004, 80% of the faculty reported that they would like to use web pages for instructional purposes and 45% knew that training was available to support that objective. By 2006, the percentage of the faculty who stated that they would like to use web pages for instructional purposes was unchanged, however 50% knew that training was available to support that objective. Only 35% of the faculty were using WebCT in 2004, while 40% of the faculty stated that they used the WebCT in 2006, which indicates that they are using web pages for instruction.

Objective 7

By 2006, 50% of USM faculty will report using multimedia presentation methods, including audio and/or video clips, slide production, and/or animation to augment curricula.

Results

In 2004, an overwhelming majority of faculty (86.8%) expressed the desire to use audio/video clips, animation, or slides to augment curricula, while 45.2% of them believed that existing training in these areas met their requirements. Around 80% of the faculty wanted to use multimedia presentations and almost 41% were aware of training support. Almost 30% of the faculty were using Quick Time Movies in class in 2004. By 2006, these numbers were virtually unchanged except that the percentage of faculty who reporting using Quick Time Movies had decreased to 18.8. In 2006, 74.4% of the faculty reported using PowerPoint, which is a type of “slide production.” Adrian Castillo and Susan Rayborn advised faculty on 21 multimedia projects in 2006. Twenty-one multimedia workshops were delivered in 2006 compared to 18 in 2005. Thirteen faculty requested assistance with integration of multimedia in existing courses in 2006.

Objective 8

By 2006, there will be 4 faculty members from each college (with the exception of the Honors College and the College of Continuing, International and Distance Education) who are able to serve as mentors and providing training and guidance to their colleagues related to educational technology.

Results

This objective was completed on schedule as shown in the list below: 4 Mentors from the College of Business, 9 mentors from the College of Health, 10 Mentors from the College of Education and Psychology, 20 mentors from the College of Arts and Letters, and 6 Mentors from the College of Science and Tech

SMART ® classrooms Actual Utilization Rate:

Spr	2004:	345 classes with 11,978 enrolled
Sum	2004:	181 classes with 3,176 enrolled
Fall	2004:	357 classes with 13,312 enrolled
Spr	2005:	362 classes with 12,361 enrolled
Sum	2005:	212 classes with 3,924 enrolled
Fall	2005:	371 classes with 14,988 enrolled
Spr	2006:	393 classes with 14,219 enrolled

Discussion

Student Face-to-Face Participation

Faculty characterized students as more attentive, more willing to participate and more engaged in various types of instruction in the SMART ® classrooms. The multimedia presentation methods, including audio and/or video clips, slide production, and/or animation augmented course curricula. Faculty described students as grasping learning objectives more quickly and easily in this environment. The SMART ® classrooms allowed faculty to meet the needs of students with different learning styles. The class times were described as being more interactive and efficient in these classrooms. These findings are supported in the literature on SMART® classrooms which also found evidence of improvement in student learning and participation (Dancott, Landato, & Marsh, 2000; Howse, Hamilton & Symons, 2000; and Nonis, & O’Bannon, 2001).

Student E-Learning

Faculty and staff used SMART ® classroom hardware and software to model basic technology applications and instructional equipment operation, including word processing, spreadsheets, electronic communications, electronic presentation methodologies, and other applications relevant to educational technology. Additionally, staff trained faculty who, in turn, taught students in hybrid classes how to use email lists, ListServs, and the WebCT

online course management system. Students reported feeling more comfortable with e-learning after this type of introduction of the hybrid online courses in the SMART® classrooms, making them more likely to enroll in fully online courses in the future. Also, many students who were taught in these classrooms later taught in them. They commented on how much easier it was to teach in the SMART® classrooms after they had experienced them first as students themselves.

Summary

“How do we, as educators, make changes in the ways we were traditionally taught and make better use of technology so that we help our students develop the information, literacy, problem-solving, collaboration and creativity skills they need to be successful in today’s workplace?” (Painter, Whiting, & Wolters, 2004) The answer to the preceding question from Southern Miss was SMART® classrooms. That environment has improved student face-to-face participation and e-learning.

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Appendix A

Highly Visible Undergraduate Classrooms Survey®

(By the U.S. Dept. of Education Title III-A Strengthening Institutions Grant)

Please check the appropriate response.

Status:

Professor	Assoc Professor	Asst Professor	Part-Time/ Adjunct	Graduate Assistant	Staff	Others (Please specify)

PEF Faculty:

Please indicate if you are a member of the Professional Education Faculty (responsible for K-12 teacher preparation):

Yes ___ No ___

College Affiliation:

Arts & Letters	Business & Economic Development	Education & Psychology	Health	Science & Technology

Campus Affiliation:

Hattiesburg	Gulf Park

Race:

American Indian	Asian	African American	Caucasian	Hispanic	Other

Age Group:

20-29	30-39	40-49	Above 50

Highest Education Level Attained:

BA/BS	MA/MS/MFA	Ph.D/Ed.D/J.D.	Others

Number of courses taught in the “SMART” classrooms and using the HVUC equipment:

0-2	3-5	6-8	9-11	12-14	15-17	More than 17 courses

First semester taught in an HVUC room:

Spring 2002-03 (January 2003) or before	Summer 2003-04 (June 2003)	Fall 2003-04 (August 2003)	Spring 2003-04 (January 2004)	Summer 2004-05 (June 2004)

First semester taught in an HVUC room:

Fall 2004-05 (August 2004)	Spring 2004-05 (January 2005)	Summer 2005-2006 (June 2005)	Fall 2005-2006 (January 2006)	Spring 2005-2006 (January 2006)

Please indicate your responses on a five-point scale.

Not Important At All	Somewhat Unimportant	Neutral	Somewhat Important	Extremely Important
1	2	3	4	5

For each question below, circle the number to the right that best describes how important each hardware or software item is in accomplishing your course objectives. Use the scale above to match your opinion.

Equipment/Software Importance	Scale				
a. Data Video Projector	1	2	3	4	5
b. Computer	1	2	3	4	5
c. DVD player /VCR	1	2	3	4	5
d. Visual Presenter (Elmo)	1	2	3	4	5
e. Smart Sympodium	1	2	3	4	5
f. External Laptop Connectivity	1	2	3	4	5
g. Internet Access	1	2	3	4	5
h. Microsoft Office Suite	1	2	3	4	5
i. Smart Notebook	1	2	3	4	5
j. Adobe Acrobat Reader	1	2	3	4	5

k. Flash Software	1	2	3	4	5
l. MS Media Player	1	2	3	4	5
m. QuickTime Player	1	2	3	4	5
n. Microphone	1	2	3	4	5
o. Camera	1	2	3	4	5
p. Audio	1	2	3	4	5
q. Mac Adaptors	1	2	3	4	5
r. SPSS Software	1	2	3	4	5

Please indicate your responses on a five-point scale.

Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
1	2	3	4	5

Room Access	Scale				
I can get access to an HVUC for teaching whenever I want it.	1	2	3	4	5
I can get access to an HVUC for meetings whenever I want it.	1	2	3	4	5
When planning a course or meeting, I try to reserve an HVUC room.	1	2	3	4	5
I would like to schedule all my classes in an HVUC room.	1	2	3	4	5
The key to the HVUC room and podium are easily accessible.	1	2	3	4	5
Equipment	Scale				
The equipment works properly.	1	2	3	4	5
The equipment is easy to use.	1	2	3	4	5
I know how to use the equipment in the classroom.	1	2	3	4	5
Software	Scale				
I know how to use the software installed on the computer.	1	2	3	4	5
The software that I need is installed on the computer	1	2	3	4	5

Training	Scale				
I received adequate training on the hardware.	1	2	3	4	5
I received adequate training on the software.	1	2	3	4	5

Please check the appropriate answer.	No	Yes
I attended a scheduled training session conducted by the Learning Enhancement Center (LEC) personnel.		
I would like more hardware training. List hardware here:		
I would like more software training. List software here:		

Please indicate your responses on a five-point scale.

Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
1	2	3	4	5

Overall Satisfaction	Scale				
My overall experience using the equipment has been good.	1	2	3	4	5
I would recommend the equipment to other faculty.	1	2	3	4	5
I believe my students' experience has been enhanced by the use of the equipment.	1	2	3	4	5

Frequency of Use
How frequently do you use the HVUC equipment?
<input type="radio"/> Two or more times per week <input type="radio"/> Once a week <input type="radio"/> One or two times per month <input type="radio"/> Once a semester <input type="radio"/> Other
The room(s) that I use most is(are):

Student Participation
In what ways has this equipment impacted student participation in your class?

