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Smart Classroom Technology: Instructional Effectiveness and Faculty and Student Satisfaction

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Smart Classroom Technology:
Instructional Effectiveness and Faculty and Student Satisfaction

by

Jon P. McKamey

A dissertation submitted in partial fulfillment of the requirements
for the degree of Doctor of Philosophy
in
Computing Technology in Education

Graduate School of Computer and Information Sciences
Nova Southeastern University

November 23, 2008
Dissertation Signature (Approval) Page

We hereby certify that this dissertation, submitted by Jon P. McKamey, conforms to acceptable standards and is fully adequate in scope and quality to fulfill the dissertation requirements for the degree Doctor of Philosophy.

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Numerous designs, practices, stakeholders, and technology options make it difficult for higher education institutions to find direction and established standards for classroom construction and remodeling projects. Different models of technology-enhanced classrooms are being adopted as various managers, integrators, and architects develop new classroom spaces. A planning process, standardized classroom model, and effective support structure will be valuable elements in meeting the needs of faculty and students.

The goal was to establish a best practices classroom model to meet the needs of community college faculty, students, and technology support personnel. Information collected from community colleges was used to determine the state of installed classroom technology that includes standard practices, policies and procedures, stakeholder involvement, ongoing budget and equipment replacement, and technical support. Community college faculty and students provided data related to the effectiveness of and their satisfaction with different technology classroom models.

A case study approach was employed. The cases included two different electronic classroom models (Model 1: remodel of rooms in existing buildings in 2004 and Model 2: new building construction in 1995). Data were collected from faculty and students related to the effectiveness of and their satisfaction with the particular environment. Background information on classroom design, standards, technology integration, and support was gathered from other community colleges to be included as part of the foundation provided by the review of literature. These data, together with the local data, were used to develop a classroom standards document. Faculty and student data were used to determine the effectiveness of the technology components, room and system design, and overall integration of technology in the electronic classroom.

Faculty and students reported a high level of satisfaction with the electronic classrooms as well as a perceived high level of instructional effectiveness. Some design considerations related to screen placement and lighting control were raised by both populations. There were no other significant differences between the two classroom models used in the investigation. Faculty and student preferences were incorporated into the classroom standards document developed at the conclusion of the research. Community college instructional support personnel reported a fairly consistent basic model for their electronic classrooms. The use of any form of standards document was rare. A team approach to planning, design, installation and support was widely used.
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Table of Contents

Abstract iii
List of Tables vii

Chapters

1. Introduction 1
   Problem Background 1
   Problem Statement 4
   Goal Statement 5
   Research Questions 6
   Relevance and Significance 7
   Scope of the Investigation 9
   Barriers, Issues, and Limitations 10
   Acronyms 14
   Summary 14

2. Review of Literature 15
   Introduction 15
   Technology Integration and Multimedia in the Classroom 16
   Classroom and Technology Design 20
   Support for Infrastructure, Technology, and Teaching and Learning 24
   Planning, Budgeting, and Stakeholders 28
   Instructional Effectiveness and Technology 33
   Faculty and Student Satisfaction 36
   Summary 39

3. Methodology 40
   Introduction 40
   Research Design 40
   Description and Selection of Population 43
   Instrumentation 47
   Approach 51
   Data Collection 58
   Data Analysis 59
   Resources 63
   Summary 64

4. Results 65
   Findings 65
   Summary of Results 105
5. Conclusion, Implications, Recommendations, and Summary 107
   Introduction 107
   Conclusions 108
   Implications 123
   Recommendations 128
   Summary 131

Appendixes 138
   A. Nova Southeastern University Institutional Review Board Approval 138
   B. Cincinnati State Technical and Community College Research Approval 140
   C. Informed Consent for Study Participation 141
   D. Data Collection Instrument for Community College Instructional Technology Support Centers 145
   E. Data Collection Instrument for Faculty Respondents 156
   F. Data Collection Instrument for Student Respondents 161
   G. Classroom Standards Document for Cincinnati State Technical and Community College 166
   H. Community College Survey Results 171
   I. Community College Survey Open-Ended Question Responses 181
   J. Community College Electronic Classroom Level Details 191
   K. Faculty Survey Results 194
   L. Faculty Survey Open-Ended Question Responses 200
   M. Student Survey Results 226
   N. Student Survey Open-Ended Question Responses 232

Reference List 250
List of Tables

1. Classroom Model Comparison 11
2. Survey Questions Addressing Research Question One 52
3. Survey Questions Addressing Research Question Two 53
4. Survey Questions Addressing Research Question Three 54
5. Survey Questions Addressing Research Question Four 54
6. Survey Questions Addressing Research Question Five 55
7. Survey Questions Addressing Research Question Six 56
8. Survey Questions Addressing Research Question Seven 56
9. Survey Response Rates 67
10. Faculty Response by Division 68
11. Faculty Length of Service Data 68
12. Electronic Classroom Comparison for Cincinnati State 69
13. Faculty Rankings of Equipment Importance 71
14. Faculty Data for Equipment Use 71
15. Faculty Screen Placement Preferences 72
16. Faculty Lectern Design Preferences 72
17. Faculty Levels of Agreement for Survey Question 15 73
18. Faculty Classroom Issues Identified 80
19. Student Demographic Data 81
20. Student Preferences for Electronic Classrooms 82
21. Stated Faculty Reasons for not Using Technology 83
22. Student Rankings of Equipment Importance in Electronic Classrooms 84
23. Student Rankings of Most Used Technology in Classrooms  84
24. Student Levels of Agreement for Survey Question 16  85
25. Student Satisfaction with Classroom Furniture Type  89
26. Classroom Issues Reported by Students  91
27. Student Recommendations/Comments  91
28. Electronic Classroom Names  92
29. Daily Activities for Electronic Classrooms  93
30. Classroom Screen Data  94
31. Classroom Lectern Details  95
32. Electronic Classroom Sources and Control Equipment  96
33. Classroom Level Names at Other Institutions  97
34. Level 1 Classroom Configurations  99
35. Level 2 Classroom Configurations  99
36. Level 3 Classroom Configurations  100
37. Level 4 Classroom Configurations  100
38. Classroom Control System Data  101
39. Departments Involved in Classroom Projects  102
40. Technology Committee Representation  103
41. Outside Classroom Project Assistance Needs  103
42. Items Addressed by Classroom Standards Documents  105
43. Faculty and Student Satisfaction Differences  110
Chapter 1

Introduction

Problem Background

The use of technology in the instructional setting is not a new idea, but advances in computer and other hardware technologies have made it possible to embed instructional technology in the classroom. Schools at all levels are installing technology in the classroom that allows the instructor to access software tools, the Internet, and audio and video resources from an integrated, centrally-controlled system. While these tools are typically put in place to allow easier access to instructional resources, the tools themselves present their own unique set of challenges. These challenges often surface at the outset of a project when room design, classroom renovation, and technology integration are first considered and continue on through faculty training and use of the tools.

In higher education, there are as many classroom designs as there are institutions, individuals, and technology integrators designing them. Discussion lists dealing with classroom technology issues are constantly filled with requests for institutional standards and practices, ideas for designs, equipment recommendations, and information regarding the types or levels of classroom technology being deployed on campus. Administrators and instructional technologists are hard-pressed to develop a design that will satisfy faculty and be acceptable to the engineers and technicians who will design, install, and
support such technology-rich learning environments. Conflicting demands placed on college classrooms require that they be designed to accommodate a wide variety of faculty requests, learning styles, and presentation techniques (Niemeyer, 2003), but properly designing multimedia facilities continues to be an afterthought rather than a required element to be planned into the beginning of classroom remodeling and construction projects (Zuckerman, 2004).

Instructional technology issues to be addressed before, during, and after implementation include needs assessment, an appropriate technology committee, and the use of external consultants as necessary (Vartabedian, 2002). With so many factors to consider in room design, additional challenges such as faculty and staff training, sufficient technical support, ongoing equipment replacement, security, periodic review and assessment of practices, and effectiveness of the technology in teaching and learning arise after installation (Vartabedian, 2002; Al-Bataineh & Brooks, 2003). Effectively meeting these challenges can increase the advantages of incorporating technology and diminish the disadvantages (Al-Bataineh & Brooks, 2003).

These challenges and those that precede remodeling and installation all contribute to the overwhelming choices that institutions must make when undertaking classroom construction and remodeling projects. The technology-enabled classroom and the audiovisual and information technology (AV/IT) infrastructure are affecting every facet of campus systems design, engineering, implementation, and operations. The challenge is to anticipate the impact of these new technologies and understand how related areas such as staffing, organization, evaluation metrics, and operating costs are affected (Valenti, 2002). Proper planning must be coordinated among users (faculty and students) and all of
the campus groups that will provide support functions. Faculty input should come from both early adopters and from the “average” faculty member who might agree that technology enhancement is needed but who does not know how to get started using it (Kerns, 2002).

In addition to considering the types of technology and control systems for these technology classrooms, faculty and student satisfaction and instructional effectiveness must be considered in the room design. Weaving technologies into the learning experience poses challenges that go beyond mere adoption, and the use of new tools does not ensure that teaching will improve or that students will learn (Laverty et al., 2003). Poindexter, Basu, and Kurncz (2001) maintain that while interactive teaching can work in most classroom facilities, having a technology-friendly classroom helps significantly. Support for teaching and learning in these types of classrooms cannot end when installation is complete. Instructional technology support is one of the three required elements for teaching in higher education (Strauss, 2002).

Some institutions refer to these classrooms as “Smart” Classrooms, while others use names such as Mediated Classrooms, Technology Classrooms, Multimedia Classrooms, and Electronic Classrooms. Such rooms typically have a computer, video and audio playback, Internet connection, and a computer/video projector. The definition of “smart” is something of a moving target, with institutions constantly changing their original configurations as the technology changes (Voyles, 2006). Niemeyer (2003) defines this type of room as the ultimate user-friendly environment conducive to the teaching and learning process, in which the resources that faculty require are permanently placed in simple, easy-to-use configurations. The function of these classrooms is to provide the
instructor with the necessary setting to assist him to interact successfully in a technology-based learning environment (Lee, 1998).

**Problem Statement**

The lack of consistent standards and practices, the wide variety of classroom designs and technology levels being used, the pressure from industry integrators to include their components, the needs of the faculty, and the desires of the technologists are so overwhelming that institutions have difficulty finding direction for classroom construction and remodeling projects. Day (2003) writes that while there is no single, award-winning design, institutions must consider how their technology decisions affect spending and effective use. Without a perfect design model, it is important to investigate as many options as possible before final decisions are made (Riley & Gallo, 2000). Brown (2005b) states that technology integration calls for a clear vision for learning and for the spaces where learning occurs. Such a vision provides leverage that affects all other decisions about learning space design. Even within the researcher’s home institution, different models of technology-enhanced classrooms are being adopted as various managers, integrators, and architects develop new classroom spaces on campus.

While providing smart classrooms is a worthy goal, the journey toward such a learning environment requires detailed planning, input from all stakeholders, sufficient funds, and cooperation from technology integrators. All educators need to be knowledgeable about the effective uses of technology in order to succeed with its integration (Al-Bataineh & Brooks, 2003). Oblinger (2005) maintains that responsibility for classrooms rests with different departments at different institutions, and that the stakes are too high for inadequate design. Funding for smart classrooms is sometimes
overlooked as grand plans are made for these projects (Voyles, 2006). Budget cuts are often made in the technology line items when funds are insufficient for a project (Johnson & Lomas, 2005).

In order to meet the needs of faculty and students, proper processes, designs, training, and support should lead to increased effectiveness and higher satisfaction. Zandvliet and Fraser (2005) demonstrated that physical factors in classroom environments can contribute to student satisfaction by subtly influencing the psychosocial aspects of the classroom. Faculty satisfaction is also linked to the level of support and access to faculty development and assistance to design and use of materials in electronic classrooms (Hartman & Truman-Davis, 2001). Strong and Kidney (2004) reported that their high degree of success in the design of a final product was the result of their collaborative work with the faculty. Their model is not simply a classroom design; it is a model for cultural change.

**Goal Statement**

The goal of the study was to establish a best practices, general purpose classroom model to meet the needs of faculty, students, and technology support personnel. Information collected from other community colleges was used to determine the state of installed classroom technology that includes standard practices, policies and procedures, stakeholder involvement, ongoing budget and equipment replacement allocation, and technical support. Cincinnati State Technical and Community College (the researcher’s home institution) faculty and students provided data related to the effectiveness of and their satisfaction with two different technology classroom models on campus. The anticipated outcome of the study was to establish a comprehensive view of best practices
so that technical and community colleges have a process for integrating technology into the learning environment and providing support for those tools during future construction and renovation projects. A classroom standards document was developed that incorporated the findings of the study. The document has been presented to Cincinnati State faculty and administrators for review and possible adoption.

The research and the model developed should be valuable to other institutions that confront these issues in their attempt to support teaching and learning with technology in the classroom. The findings will be shared through conference presentations and journal articles. Disseminating the research should provide usable information to others who are struggling with the same issues on their campuses.

Research Questions

1. How may learning needs and different kinds of learning experiences be met and extended with the implementation of electronic resources in the classroom?

2. How do technical and community college instructors and students judge electronic classrooms for effective teaching and learning? What are their levels of satisfaction with such classrooms?

3. What standards, if any, are used by technical and community colleges for classroom design and technology integration? Who develops and maintains the standards?

4. What components and technologies are included in various levels of classroom design on technical and community college campuses? What new technologies are being considered for future implementation?

5. What college offices, departments, and stakeholders are involved in decision-making for classroom design? Who has ultimate authority for classroom projects?
6. How are industry experts such as technology integrators and engineers used in the design of classrooms and technology systems?

7. How are ongoing funding, support, and upkeep of installed technology coordinated?
   What department provides the support for software, hardware, and network resources?

**Relevance and Significance**

An overreaching problem with classroom technology projects is that there are few standards that institutions can use when beginning such a project. There are many different designs and levels of technology-rich classrooms currently in use to meet the specific needs of a given college or university. The variety of designs, together with the disparate ideas of faculty, technologists, and vendors makes it difficult to know where to begin and what to include. Setting goals and involving all stakeholders is necessary in order to design a space that is usable and effective and that can be supported by the technical staff. Craig (2006b) states that the first step in any technology project related to classrooms is to carefully set goals and priorities. Changing institutional and faculty attitudes and approaches are also necessary. Strauss (2002) maintains that in order to get the most benefit from technology, educators must stop insisting on applying it to the old talk-and-chalk paradigm; maintaining this paradigm is one important reason why higher education has not seen a large return on its investment in classroom technology.

Giving consideration to the many issues surrounding design of the instructional space must begin at the start of the planning process and be carried through to the end. There is no single award-winning or “perfect” classroom, so a thorough investigation of instructional tools designed to support the curriculum is necessary (Riley & Gallo, 2000;
Day, 2003; Craig, 2006b). Establishing standards and using them in all rooms, even those designed by different vendors, will help to ensure that rooms look and function like others on campus (Craig, 2006b). By identifying standard practices, using common terms, and developing an overview of technology integration, Cincinnati State will have a more level playing field and be able to work with vendors and integrators more easily. By studying the different models of electronic classrooms on campus and gathering effectiveness and satisfaction data from faculty and students, future classroom projects can employ the best practices and models identified as a result of the study.

Tomei (2002) maintains that instructors should be able to model technology (use it routinely as a teaching and learning tool), demonstrate technology (exhibit it via classroom discussion), and apply technology (promote its use by students to augment their learning). These ideas should be applied to the design of integrated classroom technology as well. While each institution will maintain its own unique designs and practices that meet specific needs, college and university administrators and classroom support personnel will be better equipped to plan, budget, design, install, and support classroom technology by being able to reference the practices and standards already in place. Strong and Kidney (2004) describe a process that uses academic-related committees and departments to ensure that a pedagogical approach would be used. A long-range classroom technology plan was developed to address purposes, standards, support staffing, and estimated costs for classroom improvements. After faculty and student satisfaction and needs survey results were compiled, the long-range plan for technology standards in high-end classrooms was developed. The end result of planning should be a more effective and satisfying instructional environment that will enhance the
teaching and learning activities of faculty and students. Satisfaction is often largely dependent on the environment, ergonomics, training, staff partnerships, seamless fusion of technologies, and effective integration into the curriculum (Coppola & Thomas, 2000).

Scope of the Investigation

There is no single, award-winning classroom design (Day, 2003). Without a perfect design model, it is important to investigate as many options as possible before final decisions are made (Riley & Gallo, 2000). The study investigated the deployment of smart classroom technology at other community colleges. Other community college instructional support personnel provided data related to several important issues such as planning, budgeting, support, faculty training, and ongoing replacement of equipment. Several researchers and instructional technology experts have stated that these issues must be addressed during any classroom construction or renovation project (Hanley, 2001; Kerns, 2002; Laverty et al., 2003; Niemeyer, 2003; Zuckerman, 2004; Craig, 2005; Long & Ehrmann, 2005; Voyles, 2006). Both faculty and students served as the data points at the researcher’s institution, and they judged the instructional effectiveness with smart classroom technology as well as their satisfaction with it. The challenges and benefits of classroom technology addressed have also been investigated by others such as Passerini and Granger (2000), Al-Bataineh and Brooks (2003), Brown (2005a, 2005b), Long and Ehrmann (2005), and Oblinger (2005). Instructional effectiveness of electronic classroom environments, investigated by Hanley (2001); Heinecke, Milman, Washington, and Blasi (2001); Susskind (2005); Apperson, Laws, and Scepansky (2006); Voyles (2006); and Zandvliet and Fraser (2005) were addressed via the data collection instruments.
Barriers, Issues, and Limitations

Barriers and Issues

The wide variety of classroom integrations and models may make it difficult to categorize and generalize from the data collected from other colleges. Many of the discussion list topics regarding classroom construction and renovation seem to indicate that while there are different models and levels of classroom technology deployed on campus, most institutions have unique names for these levels that indicate the complexity or purpose of the installed components. There also seems to be a wide variety of problems related to classroom technology that are being addressed by colleges and universities (Day, 2003; Oblinger, 2005; and Craig, 2006b). Some of these issues might pertain to higher education institutions as a whole, while others are very institution-specific in nature.

Another barrier may have been the design of the survey and data-gathering instruments used for the study. An effective instrument for collecting data from other colleges must include common categories and also allow for institutions to include specific information related to their processes, designs, and support. The survey included both quantitative and qualitative information for the descriptive study. Again, the variety of institutional needs and issues may have caused difficulty in analyzing the data. The length of the instrument (60 questions) may also have been a limitation if individuals did not wish to take the time to complete it. Additional survey instruments for faculty and students were developed for gathering information related to effectiveness and satisfaction with the instructional spaces. These instruments collected both qualitative and quantitative information as well. Faculty and students were asked to judge their
perceptions and feelings about the classrooms as well as subjectively evaluate the room, the technology, and the effectiveness of using such an environment for teaching and learning. The response rates may have been an issue. Every effort was be made to collect as many completed instruments as possible from those who agreed to participate in the study. Design and evaluation of the instruments for the study was carefully considered throughout the process. In an effort to minimize the limitation, survey design was conducted using quality methods described in the literature (Gay & Airasian, 2000; Gillham, 2000b; Kitchenham and Pfleeger, 2002; Umbach, 2005). Instrument evaluation and validation is described in Chapter 3 in the Instrumentation section.

The study was not intended to compare and contrast electronic classrooms with “plain” classrooms. It did, however, attempt to compare and contrast the two different models of electronic classrooms on campus and determine their overall instructional effectiveness based on the survey data. These models are similar, but were designed and installed at two different times (2004 and 2005). Each model included similar equipment and overall functionality, but furniture, configuration, and control systems are different. A brief description of each classroom model is presented here and further explained in Chapter 4.

Table 1. Classroom Model Comparison

<table>
<thead>
<tr>
<th>Model 1</th>
<th>Model 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>2004 installation of 15 classrooms</td>
<td>2005 installation</td>
</tr>
<tr>
<td>Two existing buildings</td>
<td>New building</td>
</tr>
<tr>
<td>Custom-made lectern to house VHS/DVD player and control equipment</td>
<td>Commercially manufactured lectern to house VHS/DVD player and control equipment</td>
</tr>
<tr>
<td>Computer, document camera, laptop PC connection</td>
<td>Computer, document camera, laptop PC connection, lighting control</td>
</tr>
<tr>
<td>All necessary control equipment connected to a ceiling-mounted projector and in-room speakers</td>
<td>All necessary control equipment connected to a ceiling-mounted projector or LCD panel and in-room speakers</td>
</tr>
</tbody>
</table>
In the Model 2 installation, the furniture, projector, and control system were a different design and model. Because there are some differences in room control and design between the two models as well as the fact that Model 1 rooms were a retrofit and Model 2 rooms were new construction, faculty and students may approach these environments with different attitudes about their design and function.

Limitations

One limitation has been the ever-changing technology being used in classrooms. While the institutional data will be a “snapshot” of a particular time period, some institutions may have been in the process of developing standards, changing out existing technology for newer technology, or making changes to their practices. Technology is constantly changing (Al-Bataineh & Brooks, 2003) so while the study may not be applicable to future technologies, it should have provided a detailed picture of standards, relationships, and best practices that will be applicable to classroom planning and design in the future. While the specific components and their capabilities may change, room and systems design will probably remain fairly static because schools are planning for expansion and technology changes when they design their systems.

The research was conducted using a case study approach and collected data from all faculty and students using the Cincinnati State’s electronic classrooms. The nature of a case study approach is that it is more subjective than objective, and more qualitative than quantitative (Stake, 1995). On the other hand, the strength of the case study approach is that it allows researchers to achieve high levels of conceptual validity, to identify and measure the indicators that best represent the theoretical concepts being measured.
(George & Bennett, 2004). Being mindful of the pros and cons of the case study approach and designing the study with them in mind (as outlined in Chapter 3) should have helped to minimize the limitation.

Using Cincinnati State’s faculty and students for data collection was considered a convenience sample. Data were not collected from faculty and students at other community colleges. This potential limitation should have been offset by the fact that Cincinnati State is representative of other community colleges in Ohio and across the United States. Chapter Three, Description and Selection of Population, addresses these similarities to establish that the study done at Cincinnati State is generalizable to other community colleges.

A limitation may have existed due to the fact that technical difficulties may have arisen at any time during the study. These problems could have affected faculty and student satisfaction as well as instructional effectiveness. It is impossible to control these unforeseen circumstances, but ongoing maintenance and monitoring of classroom systems helped to keep these problems in check. Technical problems may have existed with responding to the electronic survey instrument, but was beyond the control of the researcher.

Finally, it will be up to the appropriate administrators and faculty advisory committees to adopt the classroom standards document developed at the conclusion of the study. Since the researcher cannot control that aspect of the study and its outcome, there could be difficulty in making the results and the document generalizable for other institutions. Developing the standards document based on sound research findings should have helped to minimize limitations and every effort was made to take that approach.
Acronyms

Advanced Technology and Learning Center (ATLC), p. 53
American Association of Community Colleges (AACC), p. 10
American Association of University Professors (AAUP), p. 47
Americans with Disabilities Act (ADA), p. 26
Audiovisual (AV), p. 6
Furniture, Fixtures, and Equipment (FF&E), p. 35
Information Technology (IT), p. 6
Institutional Review Board (IRB), p. 14

Summary

The wide variety of smart classrooms and the numerous processes used to plan, design, and install those rooms provides a unique opportunity to investigate this area of instructional technology. While institutions attempt to balance the demands of administrators, faculty, students, and technology integrators, they must continue to move ahead with technology integration and facility improvements. Technology staff could be better prepared to manage these projects if they had access to standards, consistent and reliable information, and best practices and processes employed by sister institutions. The study collected data and information in an attempt to establish such standards and practices for one institution that could also benefit other institutions in the future. Studying instructional effectiveness and faculty and student satisfaction in two different styles of smart classrooms was beneficial in establishing these standards and preparing for future classroom projects.
Chapter 2

Review of Literature

Introduction

Several areas of inquiry were selected as foundational to the study of smart classroom technology, instructional effectiveness, and faculty and student satisfaction. Reviewing the use of technology and multimedia in the college classroom helped to establish current practices related to the development of smart classrooms. The literature review also looks at the design of smart classrooms, including standards, components, and environmental aspects of the room. Ongoing support for the infrastructure, installed technology, and teaching and learning activities are reviewed in order to establish the need for such support and the role of the technical staff who provide the support. In order to look at the processes for designing and integrating smart classroom technology on campus, planning and budgeting procedures are reviewed.

The review also includes efforts to establish a team approach to such planning that involves faculty, staff, and students. In order to provide some background information related to instructional effectiveness of smart classrooms, the literature review discusses the effectiveness of instructional technology in general as well as how it relates to smart classrooms. Finally, literature related to instructional technology provides information on what aspects of technology and support contribute to overall faculty and student satisfaction when using smart classrooms.
Technology Integration and Multimedia in the Classroom

The use of technology in instruction is not a new concept. Instructors have been using transparencies, film, and video for many years. Recent advances in technology—computer technology in particular—have made it possible to change the traditional role that education has played by producing more independent ways of seeking knowledge. In the classroom, technology helps to break down barriers that exist within the confined space of a college campus. It brings to the classroom the opportunity to use materials and to involve others outside of the defined classroom space (Amiri, 2000). While the classroom can still be regarded as a core learning space, new opportunities have dramatically changed the landscape. The concept of classroom is expanding and evolving as traditional classrooms acquire new functionality. As functionality expands, new learning activities become possible (Brown & Lippincott, 2003).

Inside the classroom, computer projection systems are replacing traditional overhead transparencies, making it possible to harness the interactive and visual capabilities of the computer for lecture and group activities (Weston, 2005). Integrating technology into a classroom can be as simple as providing the instructor with a computer to be used for class lectures and presentations. In general purpose classrooms, an instructor’s computer can be used for lectures and presentations using software such as PowerPoint, to view Web-based resources, and to allow students to make presentations to the class. Passerini and Granger (2000) maintain that the benefits of the technology, its impact on learning objectives, and the availability of alternative instructional methods should be considered when integrating technology into the classroom. When used appropriately, computers in
the classroom should be used just like any other instructional tool, but should not be used if other low-tech tools can accomplish the job better (Nilson, 2003).

Long and Ehrmann (2005) maintain that the best classrooms of the future will be both technologically sophisticated and technologically invisible. The technology should become part of the fabric of the environment and be unremarkably essential. Technology systems should be present at every possible learning location and electronically linked. Craig (2006a) presents four criteria that need to be met for classroom display systems. The display must be large enough for everyone to see, must have a high contrast image for all lighting conditions, should be flexible in accommodating various resolutions and aspect ratios, and should not interfere with other classroom activities. Widescreen displays mean less room in front for whiteboards and more encroachment on places for the instructor to stand. Projectors still present design issues related to ambient light on the screen, inadequate lighting of instructor and whiteboard space, imbalance of whiteboard space, inadequate screen sizing, interference with instructor “wander zone,” distance education camera location, and projector fan noise. When these issues are not solved, the technology detracts from the learning experience.

Al-Bataineh and Brooks (2003) maintain that successful integration of technology requires effective uses of learning theories and content-specific approaches to curriculum development. All educators need to be knowledgeable about the effective uses of technology in order to succeed with its integration. Educators must not rely strictly on state-of-the-art technology as the means to promote effective teaching and learning strategies, because the moving target of the latest and greatest quickly becomes obsolete by today’s standards. Oblinger (2005) says that the focus must be on learning. Active
learning and knowledge construction require a different design than was required several years ago. Collaborative learning drives a different classroom design than traditional lecture-based instruction. Computer and communication technologies also require planning and design to enable more interactive learning environments.

Brown (2005b) states that technology integration calls for a clear vision for learning and for the spaces where it occurs. Such a vision provides leverage that affects all other decisions about learning space design. It allows the institution to effectively articulate goals to all stakeholders and helps to organize all participants in the design and implementation processes. The vision generates the design principles that will, in turn, be used to make key decisions about how learning spaces are configured. The vision and design principles should emphasize the options students have as active participants in the learning process.

Staley (2004) states that technologies used efficiently in education mediate the student-instructor relationship. An assessment of technology in the classroom must consider how these tools enhance, extend, and enable that relationship. He offers 10 questions that faculty need to consider when they want to adapt digital technologies for classroom use. These questions include such things as the impact of technology on the classroom space, whether it adds pedagogical value, whether it leads to knowledge acquisition, and whether it appeals to different learning styles.

Mayer (2001) defines multimedia learning as including words and pictures and he maintains that meaningful learning can be the result of using multimedia. The focus of the multimedia classroom is to provide the instructor with the necessary setting in which to assist him to interact successfully in a technology-based learning environment (Lee,
Multimedia combines individual media in a homogeneous product that appeals to different users and gives them control over the sequence of learning events. Multimedia appeals to different learning styles. Visually-oriented learners benefit from animation and video presentations. Linear-thinking learners benefit from reading text sequentially, while associative thinkers prefer presentations that allow hyper linking instead of page-by-page reading (Passerini & Granger, 2000). Aly, Elen, and Willems (2004) conducted a study in which an instructional multimedia program was found to be at least as effective as a standard course of lectures in orthodontics. The multimedia package was able to accommodate students’ diverse learning styles, experiences, and knowledge bases.

The traditional classroom can become an effective, technology-rich learning space when multimedia is incorporated into the environment. The lecture environment becomes more interactive when it is supported by technology. In the classroom, instructors can use streaming media, videoconferencing, and other collaborative learning activities. Lectures can be digitally captured for future review. Outside of the classroom, students can continue their learning by using wireless computer networks on campus, libraries, and computer labs to review and further explore those concepts from the lecture (Kerns, 2002). Passerini and Granger (2000) maintain that the interactive component of true multimedia is an essential piece of using technology in instructional activities. The stimulating effects of multimedia generate synergy (the whole is bigger than the sum of individual pieces) in a framework in which user participation is required.

Using graphics presentation software for classroom lectures is one way to incorporate multimedia instruction. In one study, students viewed themselves as more effective with PowerPoint presentations. They judged it was easier to understand the lecture and to take
notes when PowerPoint accompanied the lecture. Students said they took more notes and that their notes were more organized, easier to understand, and more useful for exams. They were also more confident for the exam that covered PowerPoint lectures, but they studied equally long for exams whether or not PowerPoint was used for lecture materials (Susskind, 2005). Apperson, Laws, and Scepansky (2006) conducted a study in which students judged that they were more likely to stay focused on lecture material, that the instructor maintained student interest in the material, that PowerPoint was helpful in increasing classroom learning, and that PowerPoint increased their interest level. They believed that instructors presented material more clearly, demonstrated how each topic fit into the course, summarized information in a way that aided in their retention, and used technology effectively to enhance presentations.

**Classroom and Technology Design**

When it comes to classroom design, there are as many issues, options, decisions, and preferences as there are educational institutions. Instructors often want one thing while architects and technology integrators have other ideas. Finding a solution that is a perfect fit for everyone is rare. Defining learning spaces is becoming increasingly difficult as institutions move from the traditional classroom to ubiquitous spaces around campus. Oblinger (2005) defines learning spaces as regularly scheduled, physical locations designed for face-to-face meetings of instructors and students. Long and Ehrmann (2005) state that learning spaces should be designed for change and allow a shift from fixed, inflexible spaces to spaces that can be reconfigured hourly, daily, weekly, or for longer periods of time.
Day (2003) writes that while there is no single, award-winning design, institutions must consider how their technology decisions affect spending and effective use. Without a perfect design model, it is important to investigate as many options as possible before final decisions are made (Riley & Gallo, 2000). Designs can be complex, sophisticated, and expensive or simple, low-cost designs using manual screens and multiple remote controls rather than master control equipment (Voyles, 2006). Designing technology-enhanced classrooms requires research and planning in order to address such issues as furniture and ergonomic issues, lighting, equipment selection and placement, switching and control, screen size and placement, electrical and infrastructure needs, digital storage, acoustics, and sightlines (Emmons & Wilkinson, 2001; Loveless, DeVoogd, & Bohlin, 2001; Poindexter, Basu, & Kurncz, 2001; Riley & Gallo, 2000).

Cohen and Castner (2000) found that most instructors prefer a flexible room layout with moveable furniture and basic technology items such as video playback and an overhead projector. They state that the faculty wants to be able to do simple things simply so that they are not overwhelmed with too many gadgets. In addition, designing rooms to maximize learning and to address multiple learning styles requires blending room design and technology layout. Room design should allow instructors to meet the diverse needs of students by providing a flexible environment for multiple types of learning. Where one design works for lectures and demonstrations, another design may be required for collaborative learning activities (Emmons & Wilkinson, 2001). Brown (2005a) states that bridging learning theory and practice is the key for any department or institution striving to design or redesign learning spaces. It is vital to give coherence and consistency to the
design of learning spaces by balancing learning theory, faculty and student culture, and institutional goals and resources.

The process for properly designing technology-enhanced classrooms requires the involvement of a diverse group of people with varying areas of expertise. Learning spaces should accommodate information technology, but also incorporate comfort, safety, and functionality while reflecting institutional values. Accessibility and network and Internet access policies should also be considered (Oblinger, 2005). While the classroom should be designed to maximize the function of instruction (Lee, 1998), there are typically differing ideas about how to make that happen. Niemeyer (2003) offers seven classroom design principles that should lead to a successful integration project. He maintains that the project goals should empower faculty, emphasize flexibility, encourage student interaction, stress simplicity, expand connectivity, contain costs, and concentrate on every detail. Every project design must include reasonable accommodations as outlined in the Americans with Disabilities Act (ADA) (Niemeyer, 2003; Emmons & Wilkinson, 2001.)

According to Craig (2005), getting campus technology experts involved early in the process has at least three main benefits. Technologists can ensure that the design includes the technology needed to accomplish the goals of a classroom project. Technologists can assess potential needs more accurately, with fewer expensive changes late in the process or after installation is complete. Campus technology staff can also assist in the design and development of user interfaces. They can determine locations of conduit, boxes, and switches to make the project user-friendly and aesthetically pleasing.
Several different approaches to design and planning exist. Hanley (2001) offers four phases of successful technology design. Phase One is the concept development phase. It involves building the team and defining and validating needs for course enhancement. Phase Two is the demonstration and validation phase that focuses on developing proof that proposed concepts can become real solutions. Whether or not the product will work well is the focus of Phase Three, the detailed design and construction phase. The final phase is the production and operation phase. It focuses on using the technology and includes deploying, sustaining, and revising the product.

At McMaster University in Ontario, Canada, the process included consultation, satisfaction/needs surveys, prototype development, and user evaluations prior to final deployment (Strong & Kidney, 2004). Wedge and Kearns (2005) offer a model that focuses on the campus community (the people) rather than the technology and includes a long list of questions that the planning team must ask. Their seven-step process includes 1) identifying the participants in the planning process, 2) developing goals, 3) analyzing existing learning facilities, 4) projecting future needs and learning from others, 5) conducting a reality check, 6) exploring alternatives, and 7) evaluating and making recommendations. Long and Ehrmann (2005) maintain that designing learning spaces is most effective when the planning team considers activities and facilities (meeting learning outcomes, aesthetics, connectivity), forms and functions (general versus specialized learning activities, flexibility, lifespan), and desired characteristics (ergonomics, usability, future needs).
Support for Infrastructure, Technology, and Teaching and Learning

No classroom project can be successful without an adequate infrastructure and sufficient support of the technology and the users of that technology. Hartman and Truman-Davis (2001) outline a systematic support model that includes faculty interest (in adopting technology), administrative direction (advanced planning), facilitation (organized assistance), institutional capacity (continual training and support), and advocacy (using champions to promote initiatives). They recommend several necessary elements in order to carry support across the institution. These elements include an accepted instructional model, using standards and conventions, providing faculty development opportunities, providing production support, supporting the technology infrastructure, offering incentives and rewards for development of technology-enhanced activities, and assessing the effectiveness of new initiatives.

Critical support functions include faculty development, server support, networking, help desks, courseware development, digital libraries, software evaluation, computer maintenance, classroom technology maintenance, and digital storage space. On most campuses, these functions are spread out over several departments, so careful coordination and planning is essential (Kerns, 2002). Providing the required staff and resources to foster campus-wide support depends on the cooperation of different departments and often entails hiring the appropriate personnel such as instructional designers and Web developers. It often requires the realignment of staff responsibilities so that personnel can keep up with changing needs and technological advances (Hartman & Truman-Davis, 2001). When the institution provides and supports the appropriate
infrastructure, instructors can concentrate on teaching and learning while the IT staff focuses on technical details (Strauss, 2002).

Weston (2005) found that almost half of the instructors in one study indicated that their institution had initiatives and professional development activities designed to help instructors integrate technology. However, none of those instructors had interacted with such instructional specialists or taken advantage of the professional development opportunities. Most of their interactions were with IT professionals and related to infrastructure or equipment issues. These instructors felt that their institutions had little to offer in the area of training or incentives. Instructors at larger institutions perceived IT specialists and others linked to educational technology initiatives as more of an obstacle than a help. Kotrlik and Redmann (2005) found that instructors tend to use workshops, conferences, and self-directed learning opportunities as their main source of professional development. The use of campus-based professional development and expertise does not appear to be a highly sought-after method for assistance and self-improvement. Wong (2006) states that in order to increase participation of faculty using technology it is critical to build trust by staying in regular contact and offering frequent workshops and one-on-one training.

Other issues, such as ongoing resources for repairs and upgrades, qualified and available personnel to support the rooms, periodic review and assessment of the technology, and addressing individual needs for mentoring and training may emerge after equipment has been purchased. Commitment from upper administration is necessary in order to support the planning and budgeting processes for such rooms (Vartabedian, 2002). In some cases institutions can maintain their own control systems and
infrastructure elements without the assistance of outside companies. Sophisticated control systems make it possible to create a universal campus interface and allows for quick updates and changes. Campus technicians can receive the training to do the work without relying on audiovisual companies. One trend is to combine traditional AV and IT functions so that helpdesk personnel can manage and maintain these control systems themselves (Valenti, 2002). The convergence of traditional AV and IT functions requires changes in support staff roles and attitudes. Support staff need to have interpersonal skills with which to encourage faculty and students to explore the full range of a classroom’s functions. Technicians become much more than troubleshooters. They get involved with instructional practices. A wider scope of technical support is necessary as new kinds of learning spaces emerge (Brown & Lippincott, 2003).

The amount of staff time needed can vary depending on the use of networked and centrally-managed projectors (Voyles, 2006). At the University of Minnesota, classroom technicians can monitor classroom usage from any network-connected computer on campus. After selecting a classroom, the technician’s screen displays a virtual image of the classroom’s control panel, allowing remote technical support during class time. The university has seen a decrease in the need to dispatch technicians to the rooms. Technicians can view usage statistics by room, check lamp hours, and make decisions about future needs based on that data. In addition to control and monitoring, the system also provides security monitoring of equipment items. If a security cable is removed from a piece of equipment, an alert signal is sent to the campus police department as well as to the classroom support personnel. The university has had no projector thefts since the system was installed (Regenold, 2005).
For the faculty, making the technology available is not the end of a successful classroom project. A team of support personnel, sound pedagogical advice, and infrastructure support is necessary to provide faculty the resources they need to be successful in their use of technology (Laverty et al., 2003). Faculty interest in using technology develops only with success and can be sustained only if the continuing needs of the faculty are met. These needs include access to equipment, software, and faculty development; support for developing and offering courses; and a reliable support network (Hartman & Truman-Davis, 2001). When training reluctant instructors, it helps to work slowly and introduce users to new technology in simple steps. It is also helpful to share with instructors what their colleagues are doing with technology. Little by little, the instructor starts to see the benefit of using technology in their teaching activities (Angelo, 2006).

Institutions must provide the resources and support necessary to enable faculty members to adapt to the changing learning and scholarly paradigms of the digital age. These resources include robust technology environments, staff support, and training opportunities (Duderstadt, Atkins, & Van Houweling, 2002). Without the technology support function at an institution, faculty cannot concentrate on their tasks of designing and delivering instruction. Bringing technology to the faculty requires more than merely putting it there to use. A change in instructional strategy is necessary in order to maximize the technology. Without the proper support after implementation, faculty cannot be successful with the new tools (Strauss, 2002). Additionally, faculty may need to seek out more experienced faculty and professional instructional technologists and
attend workshops to assist them with using these new technology resources (Nilson, 2003).

**Planning, Budgeting, and Stakeholders**

Classroom building and renovation projects take a great deal of advance planning so that the design, budget, needs of faculty and students, and various institutional and governmental guidelines and regulations are thought out and met. In most instances, the involvement of various institutional departments and offices is required for a project to be successful. Planning for a smart classroom should begin before budgets are determined and construction begins (Zuckerman, 2004). Vartabedian (2002) states that instructional technology issues need to be seriously addressed before, during, and after implementation. Such issues include needs assessment, a designated network manager, an appropriate technology committee, and the use of external consultants as needed.

Oblinger (2005) maintains that responsibility for classrooms rests with different departments at different institutions. A committee representing a cross section of the campus that may change every year or two can determine location and design of spaces. The spaces they design, however, can be in place for years to come. While a building or learning space may be designed to last 50 to 100 years, the curriculum and courses taught in those spaces may change every ten years, and the technology every year. The stakes are too high for inadequate design.

Before beginning such a project, institutional and academic goals should be considered so that technology is not deployed without a clear purpose or consideration for its appropriate use. Institutions need to ask questions and gather input regarding desired learning outcomes, and whether or not technology can help to reach those goals
efficiently and effectively (Poindexter, Basu, & Kurncz, 2001). Kerns (2002) states that technology planning for any instructional space or process must include both the early adopters and those more reluctant to use the technology. Planners need to listen to those who realize that technology enhancements are needed but who do not know how or where to start using the new tools. Riley and Gallo (2000) say that a strategic plan is necessary to support a vision of integrated technology. Such a plan should address needs, hardware obsolescence, manufacturers, vendors and their client base, and facility limitations such as electric and infrastructure.

Several experts advocate a team approach involving all of the possible stakeholders connected with a classroom technology project. Laverty et al., (2003) call for a collaborative approach and the use of project management and leadership from all departments involved in these projects so that both teaching and technical issues are addressed. Hanley (2001) promotes a team approach to classroom design and remodeling projects. The team effort includes face-to-face meetings as well as electronic communications. The team should include content specialists, programmers, systems integration and engineering personnel, instructional and graphic designers, and usability and project management experts. Oblinger (2005) recommends that a planning and design team should bring several people to the table, including administration, faculty, students, facilities, planning, information technology, library, and teaching and learning support. Everyone must have a thorough understanding of and pledge support for the vision and design principles.

Valenti (2005) states that a valuable first step in designing learning spaces is to engage the project’s stakeholders in developing a set of guidelines to enable future
decision-making as the project progresses. These guidelines consist of both precepts and assumptions. The precepts and assumptions provide a road map for the design team and enable good decision-making by the project leaders. Forming a committee or team from the entire population of stakeholders is important, but so is giving the team an opportunity to get to know each other and to understand each other’s perspective, expertise, and institutional role (Wedge & Kearns, 2005).

Kerns (2002) says that planning must be coordinated by the users (faculty and students) and those staff members who will provide support for the technology and the infrastructure. Those involved in the planning process should include computing and networking experts, human interface designers, pedagogy experts, faculty, administrators, and students. Coppola and Thomas (2000) state that they consulted with university architectural designers, interior decorators, physical plant personnel, budget office personnel, campus security, computer user services, and campus telecommunications personnel during classroom renovation projects at Pace University. They also established partnerships with faculty and IT services personnel to coordinate training in the newly renovated rooms.

Strong and Kidney (2004) report that using all of the academic-related committees and departments ensured that a pedagogical approach would be used in a classroom project. A long-range classroom technology plan was developed to address purposes, standards, support staffing, and estimated costs for classroom improvements. Using design standards also helps to keep the project on track. Standards can cover all areas of design without specifically identifying the technology itself. General assumptions are made regarding projection systems, displays, cameras, cabling, and conduit and
pathways. Standards should be reviewed every two to three years to ensure that they represent current best practices (Craig, 2005).

The convergence of AV and IT functions mentioned earlier in the Support section is also a contributing factor in the planning and budgeting processes for classroom enhancement projects. Valenti (2002) states that such a convergence affects every facet of campus systems design, engineering, implementation, and operations. Anticipating and planning for future changes requires an understanding of the relationships between staffing, organization, evaluation metrics, and cost. Problems often arise when departments fail to factor in the real cost of a converged technology solution. The AV/IT budget must be part of the project rather than a contingency associated with furniture, fixtures, and equipment (FF&E). A cohesive technology and budget plan includes three steps: 1) Organize (get all stakeholders together), 2) Participate (AV/IT staff must be involved at all steps), and 3) Interface (establish a standard user interface to enhance usability, manageability, serviceability, and scalability of AV systems).

Future planning and budgeting for the necessary infrastructure and the ongoing support of technology is necessary for the continued success of a project. A basic smart classroom that includes a networked computer, projector, screen, DVD and video players, and speakers typically costs around $15,000. Funding for smart classrooms is sometimes overlooked as grand plans are made for these projects (Voyles, 2006). Oblinger (2005) states that classroom projects represent a large investment and relates that some estimates state that $50 billion will be spent on higher education physical facilities over the next several years. A significant and consistent level of financial investment is necessary for a successful technology project or plan (Tomei, 2002). At the University of Minnesota,
remote control and monitoring capabilities allowed the university to eliminate student worker positions and put those funds toward additional control systems and rooms. The cost savings, increased equipment uptime, better security, and more efficient technical support help the classroom services department justify the cost (approximately $2,700 per room) of the management system (Regenold, 2005).

Duderstadt, Atkins, and Van Houweling (2002) maintain that the ongoing support of the infrastructure is necessary for successful teaching and research in the digital age. The digital infrastructure helps to attract and maintain faculty and students. Without it, they will move on to other institutions more committed to providing the necessary tools. The issue of financing will become significant as institutions seek a balance between institution-supported central services and point-of-access services. While technology has been seen as capital expenditure or an experimental endeavor, higher education should conceive of IT both as an investment and as a strategic asset that will be used by the entire learning community to enhance the mission of the institution. Establishing a regular, separate source of funding for IT and earmarking part of the budget for smart classrooms may be more successful than trying to pull funds from an established budget (Voyles, 2006). Financial challenges include the return on investment and whether not the technology solution is the best one for a given instructional problem. Furniture replacement costs and the length of time the installation will be viable before new technology comes along are additional challenges of electronic classroom projects (Riley & Gallo, 2000).

Johnson and Lomas (2005) relate that numerous decisions are often made regarding the actual construction as budgets are cut and priorities are shifted, and that these changes
cause projects to stray from their original instructional intent. Proper planning and use of the team approach help to eliminate the problem. Architects and designers are becoming more familiar with instructional and student needs, a development that helps to maintain the project’s original focus. Craig (2005) maintains that identifying technology needs early in the planning and design processes ensures that adequate funds are budgeted for those needs. Technologists can help identify new technologies and evaluate equipment items to present an accurate dollar figure for the equipment needs. Voyles (2006) states that leasing the equipment is an option that may save money. The life cycle of equipment and its regular replacement are figured into a lease arrangement and become part of the operating budget without needing to find extra funds for equipment replacement purchasing. Ordering equipment in large quantities and working cooperatively with other institutions in purchasing are other ways to save money on equipment costs.

**Instructional Effectiveness and Technology**

While the consensus today seems to be that smart classrooms are a good thing, there is no evidence that the addition of smart classroom technology has made any difference to student learning. Technology alone cannot improve the quality of instruction (Voyles, 2006). In order to gather evidence of instructional effectiveness in using technology, Hanley (2001) promotes evaluation metrics such as access to technology, ease of use, and achievement of learning outcomes. He also calls for usability testing and evaluation of the quality of the technology in order to promote faculty scholarship in the area of designing instructional technology. By using faculty expertise to evaluate instructional effectiveness, the use of technology is measured against content and pedagogy. A greater respect for the tools and to the revision of courses and programs that will include
technology use can flow from such an approach. Heinecke, Milman, Washington, and Blasi (2001) maintain that a formative approach to evaluating technology must be used because technology changes so quickly. They suggest that both qualitative and quantitative measures should be used. In addition, using a longitudinal approach to study cohorts over a period of years will help to determine the effectiveness of the technology.

Increased instructional effectiveness means that students learn in a better way than they would without the benefit of technology. Increased effectiveness includes greater recall accuracy, longer retention, and better transfer and generalization of skills and knowledge to similar or dissimilar situations (Newby, Stepich, Lehman, & Russell, 2000). Heinecke et al. (2001) maintain that technology can be used to improve basic skills but it can also be used to facilitate changes in teacher practices that promote students’ critical, analytic, higher order thinking skills as well as their real-world problem-solving abilities. The ability of teachers to foster such changes depends significantly on training that shows them how to integrate technology into content-specific instructional methods.

While instructors struggle with adapting to new technologies and developing materials for the classroom, students are arriving on campuses each year with more technology knowledge and experience than the previous freshman class (Summers & Vlosky, 2001). Students come to campus expecting their instructors to use the tools and the technology that they experienced in high school. At the same time, students are ready to move beyond the basic classroom lecture concept and access materials, lectures, notes, and presentations electronically after the class ends (Valenti, 2002).
Using multimedia in the classroom, as is the intent with electronic classrooms, is also a way to increase knowledge retention and synthesis. Mayer (2001) developed seven principles regarding specific multimedia design techniques to address whether or not multimedia works, when it works, for whom it works best, how it works, and what makes an effective multimedia presentation. The Multimedia Principle states that students learn better from words and pictures than from words alone. The Spatial Contiguity Principle says that students learn better when corresponding words and pictures are presented near each other on the screen. Mayer’s Temporal Contiguity Principle states that students learn better when corresponding words and pictures are presented simultaneously rather than successively.

The Coherence Principle says that students learn better when extraneous material is excluded. The Modality Principle states that students learn better when multimedia images are accompanied by spoken narration. Mayer’s Redundancy Principle says that students learn better from animation and narration than from animation, narration, and text because pictures and words together can overload the visual channel. The Individual Differences Principle states that design effects are stronger for low-knowledge learners than for high-knowledge learners, and for high-spatial learners rather than for low-spatial learners.

According to Apperson, Laws, and Scepansky (2006) students in courses where PowerPoint was used indicated that the instructor demonstrated the significance of the subject matter, more clearly stated the objectives of the course, offered more opportunities to apply learned skills through exercises and projects, and gave more projects that required problem-solving and critical, original or creative thinking. These
instructors also gave more helpful feedback on tests and assignments, and demonstrated how technology can be used to search for and present information or solve problems to a greater extent than students enrolled in classes not using PowerPoint. There were no differences in grades because of PowerPoint use, but students generally believed that it facilitated their learning. The students also had a more favorable impression of the class where the instructor used PowerPoint lectures, an indication that students believe they have a better experience when PowerPoint is used, though final grades are not affected. Susskind (2005) found no significant difference in student achievement for those whose instructor used PowerPoint in the lecture. Although the lectures were rated as more organized and easier to understand, they did not enhance the students’ performance on exams. While they felt they were more capable students with PowerPoint-enhanced lectures, their performance on exams was not affected by the presence or absence of multimedia presentations.

**Faculty and Student Satisfaction**

In addition to instructional effectiveness, user satisfaction from both the faculty and student perspectives is essential for a successful project. Coppola and Thomas (2000) reported that feedback from students showed that the new classrooms helped to keep their attention better and that the rooms had a more professional feel to them. As word spread of the rooms among the faculty, they began to come forward for training and felt that it was a privilege to teach in the new classrooms. Factors that had an effect on satisfaction overall included ergonomics, environmental conditions, faculty training, staff partnerships, seamless fusion of technologies, and technology integration into the curriculum. Zandvliet and Fraser (2005) demonstrated that physical factors in classroom
environments can contribute to student satisfaction by subtly influencing the psychosocial aspects of the classroom. Physical factors such as lighting and workspace can be a positive and practical method of influencing the environment and subsequently increasing the general educational productivity of a classroom setting.

Faculty satisfaction is also linked to the level of support and access to faculty development and assistance to design and use materials in electronic classrooms (Hartman & Truman-Davis, 2001). Having peers train each other is one way to lessen the strain on support staff and help to increase the credibility of the training and the attitudes of the instructors using the technology (Voyles, 2006). Audiovisual support staffs are taking on the assignment of teaching instructors about multimedia. While the traditional role of the technical support staff has been purely technical, they are now being called into service to help instructors and students realize the full potential of multimedia technology on campus (Angelo, 2006).

Faculty satisfaction can also come from their motivation to integrate technology and their initial success or failure with it. Weston (2005) found that almost all of the instructors who participated in a study about integrating technology into their courses said they would welcome dramatic rewards such as recognition, added pay, or credit toward promotion or tenure for their efforts to integrate the new technology. Other instructors said course buyouts would provide a sufficient reward. Many of the participants stated that their institutions did not provide any sort of reward as motivation to integrate technology.

Some earlier studies looked at individual aspects of classroom technology integration and faculty and student satisfaction with these environments. Song (2002) considered the
reasons for using installed classroom technology as part of a broader study investigating emerging technologies in Canadian higher education. She found a high degree of satisfaction from both faculty and students using integrated classroom technology. Tornabene (1998) also recorded significant positive student attitudes for learning in a smart classroom. Jones (2000) looked at faculty satisfaction in using smart classrooms and found installed technology helped faculty to incorporate more technology into their instructional activities. At the same time, he noted a lack of faculty trust in the technology and the need for continual, on-demand support for the classroom.

Strong and Kidney (2004) reported that their high degree of success in the design of a final product was the result of their collaborative work with the faculty. Their model is not simply a podium or classroom design, it is a model for cultural change. Their university is committed to a campus-wide cultural change to develop and engage its faculty and staff to work together at all levels, a positive step to ensure that faculty (and by extension, students) will be satisfied with the classroom technology. Johnson and Lomas (2005) say that today’s students are more accustomed to and comfortable with technology than many of their instructors. Planning and design teams should ask questions about students’ technology skills and preferences, their future skills, and how those needs will be met. They state that focusing on learning needs rather than space requirements and using ongoing communication that incorporates the institution’s values about what makes successful teaching and learning can help the institution revolutionize the design process to create learning spaces that meet the needs of both faculty and students.
Summary

The six areas contained in the Review of Literature (Technology Integration and Multimedia in the Classroom; Classroom and Technology Design; Support for Infrastructure, Technology, and Teaching and Learning; Planning, Budgeting, and Stakeholders; Instructional Effectiveness and Technology; and Faculty and Student Satisfaction) show that there is a good deal of research related to technology integration, classroom planning, design, budgeting, and support. There appear to be gaps in the areas of instructional effectives related to smart classrooms and in the area of faculty and student satisfaction with the technology. While the general use of instructional technology was not the focus, the specific use of installed classroom technology, or smart classrooms, was. The focus was on the areas of instructional effectiveness and faculty and student satisfaction in an attempt to use the data collected to establish standards and best practices for smart classrooms. The results should help to fill in some of those gaps in knowledge related to the issues of instructional effectiveness and faculty and student satisfaction.
Chapter 3

Methodology

Introduction

The research design and approach, instrumentation, and data collection and analysis were employed to meet the goal to establish a best practices, general purpose classroom model for faculty, students, and technology support personnel. The model was designed to address the lack of consistent standards and practices, the needs of the faculty, and the desires of the technologists who support these learning environments. The ultimate goal was to provide an environment where instructors and students experience effective teaching and learning as well as a high level of satisfaction with the classroom design.

Research Design

A qualitative approach has been used for this research. Qualitative research is useful for describing or answering questions about particular, localized occurrences or contexts and the perspectives of a participant group toward events, beliefs, or practices. In addition, qualitative research focuses on providing an understanding of a setting or activity from the perspective of the research participants. The qualitative approach is suited for exploration and for beginning to understand a phenomenon or the meaning of what is going on (Gay & Airasian, 2000; Gillham, 2000a). Qualitative research presses for understanding the complex interrelationships among all that exists. The case study
approach helps to tease out relationships, to probe issues, and to aggregate categorical
data (Stake, 1995).

In particular, a case study approach was used. According to Gillham (2000a), the
meticulous description of a case can have an impact greater than almost any other form of
research report. The case study is an empirical inquiry that investigates a contemporary
phenomenon within its real-life context, especially when the boundaries between
phenomenon and context are not clearly evident (Yin, 2003). The case study method
covered the contextual conditions (instructional effectiveness and faculty and student
satisfaction) that might have been highly pertinent to the phenomenon of study
(electronic classrooms). With the case study approach, all data collected are potentially
valuable and useful and therefore applicable to describing a particular situation or context
(Gillham, 2000a).

The case study approach employed a single case design with embedded units. The
design was used because the study of electronic classrooms involved data collected from
students, faculty, and other community colleges. The multiple embedded units should
predict contrasting results for predictable reasons since multiple sources of evidence
should converge with the case study design (Yin, 2003). Data were collected from faculty
and students related to the effectiveness of and their satisfaction with the particular
environment. According to Yin (2003), these multiple data collection points and study
populations call for the embedded design variation. The individual units (faculty and
students) share common characteristics (use of the classrooms) and the case study
approach provided the methods to deal with them individually and present them
collectively (Shkedi, 2005).
All research questions were addressed using the literature synthesis and the data collected from the survey instruments. Quantifiable data from the instruments provided descriptive statistics to assist in answering the research questions. The statistics will help to demonstrate the magnitude of various pieces of information from the instrument questions. Patterns emerging from analysis were used to form generalizations about various classroom design issues and to address the instructional effectiveness and faculty and student satisfaction issues raised in the research questions. Survey data collected from other community colleges provided information on current policies, practices, and procedures related to electronic classroom design and implementation. These data, together with the local data, were used in the development of a standards document for Cincinnati State. Faculty and student data were used to determine the effectiveness of the technology components, room and system design, and overall integration of technology in the electronic classroom. Based on the two room models studied, these data were also used to develop a Cincinnati State standard.

Approval to conduct the research described herein was granted by the Nova Southeastern University Institutional Review Board (IRB; Appendix A). Approval to conduct the research at Cincinnati State was granted by Anne Foster, Director of Institutional Research (Appendix B). Permission from faculty and students used in the study was obtained through an Informed Consent for Participation form (Appendix C). Community colleges who are members of the American Association of Community Colleges (AACC) were contacted for possible participation in the study. An attempt to identify the person and department to whom the materials should be sent was made using the selected institution’s Web site. These colleges received a cover letter and permission
form to participate in the study. Those who gave their permission received the link to the
electronic instrument. The electronic data collection tool was Zoomerang
(www.zoomerang.com). Additionally, computer resources (Microsoft Word, Microsoft
Excel, Pentium 4 Personal Computer) for proposal authoring, data analysis, and final
report authoring were provided by the researcher on a personally-owned computer.

Description and Selection of Population

In order to report on a diverse number of institutions’ deployment of smart classroom
technologies, data were collected from other community colleges. The participants to
whom the instrument was distributed were those with membership in the American
Association of Community Colleges (AACC). AACC is the primary advocacy
organization for the nation's community colleges. The Association represents more than
1,100 associate degree-granting institutions and some 10 million students. Formed in
1920, AACC is a national voice for community colleges. The request for participation
was distributed to a randomly chosen sample of the AACC’s 990 public community
college members and sent to the attention of the classroom or instructional technology
department or manager. Additional efforts to identify a specific individual to whom the
request for participation should be sent were accomplished by searching for staff or
departmental information on each institution’s Web site. Of those 990 member
institutions, a sample size of 325 was targeted to receive the survey. Simple random
sampling and a table of random numbers was used to select the survey sample.

After concluding that a response rate from colleges identified from the AACC list
was not sufficient for data analysis, the League for Innovation in the Community College
(www.league.org) was contacted about helping to sponsor more data collection efforts.
The League is an international organization of over 800 institutions dedicated to catalyzing the community college movement. It hosts conferences and institutes, develops Web resources, conducts research, produces publications, provides services, and leads projects and initiatives with its member colleges, corporate partners, and other agencies in its continuing efforts to make a positive difference for students and communities. The League is the leading community college organization in the application of information technology to improve teaching and learning, student services, and institutional management.

Working with Edward Leach, Vice President for Services and Programs and Director of the League’s annual Conference on Information Technology, the study was announced and the link to the survey sent to approximately 250 individuals at public institutions in the United States with connections to instructional technology at their respective institutions. The instrument did not require the respondents to provide an institutional name or any other identifying information.

Student and faculty participants were sought from the population at Cincinnati State Technical and Community College (commonly referred to as Cincinnati State) in Cincinnati, Ohio. The accessible population of faculty for the study was approximately 400 instructor course sections meeting in the rooms that were evaluated. All instructors teaching in the rooms to be evaluated were asked to participate. Instructors who taught in multiple rooms were surveyed for each room in which they taught.

The accessible population of students enrolled in courses meeting in the rooms to be studied was approximately 2,500. Of that number, 350 were considered a representative sample using the 10-20% sample size suggested by Gay and Airasian (2000). Using
simple random sampling and a table of random numbers, student participants were chosen randomly to participate in the study. Those selected through random sampling were asked to provide their permission and to participate in the study.

Both the faculty and student populations were a convenience sample in that they were readily available at the researcher’s institution. While convenience sampling can be less effective in making generalizations about the population, it is often necessary in qualitative research because this type of research is almost always purposive where the experiences and insight of the researcher is used to select the sample and randomness is rarely part of the process. Qualitative researchers often choose participants whom they judge to be thoughtful and who have information, perspectives, and experiences related to the topic of research (Gay & Airasian, 2000).

Cincinnati State is an urban, state-supported, two-year institution granting associate degrees and certificates in 115 majors in business, engineering, health and safety, and information technologies as well as general transfer associate degrees in arts and sciences. The College’s main campus is located within the Cincinnati city limits (Clifton), and other campus facilities are located in the northern part of the metropolitan area (Evendale, OH) and in western Hamilton County (Harrison, OH). Cincinnati State serves students in the tri-state area of Ohio, Kentucky, and Indiana. The College enrolls over 14,000 students annually. Thirty percent of the college’s students continue their education at other colleges and universities.

Cincinnati State is representative of other community colleges in Ohio and across the country. According to the Ohio Association of Community Colleges (http://www.ohiocc.org), Ohio two-year colleges consist of three types: technical, state
community, and community. Technical colleges provide hands on education in a specific field. Many technical college graduates transfer to baccalaureate programs. Both state community and community colleges offer technical programs and university parallel programs providing students with a variety of options. When the former Cincinnati Technical College became a state community college in 1994, the college felt it important to retain the word technical in the college’s name. Ohio required the inclusion of the words state and community in the name. Cincinnati State continues to offer technical education as well as the two year transfer degrees associated with many community colleges. The programs of study, degrees offered, average class size, and costs at Cincinnati State are similar to the other 22 technical and community colleges in Ohio. Cincinnati State offers six of the eight degree types offered at community colleges in Ohio.

The American Association of Community Colleges (http://www.aacc.nche.edu) provides statistical data that support Cincinnati State’s similarities with national trends. Nationally, community college populations are 59% female and 41% male. Cincinnati States students are 58% female and 42% male. The national average age of a community college student is 29, and Cincinnati State’s average student age is 27. Cincinnati State’s 30% minority student population is equal to that of the national community college population. Cincinnati State students receive more financial assistance (61%) compared to the national average of 47%. The national average of full-time to part-time students at community colleges is in line with Cincinnati State’s 60% part-time and 40% full-time enrollment status. Cincinnati State’s class size and student-to-teacher ratio is also in line with the national average ratio of 15:1.
The College employs approximately 160 full-time faculty and as many as 300 adjunct instructors each year. Both full- and part-time instructors come from a variety of backgrounds in business, industry, and education. Full-time faculty members teach 180 days each academic year. Full-time faculty, counselors, librarians, and instructional designers are represented by the American Association of University Professors (AAUP) for the purpose of collective bargaining. Data were collected from both full- and part-time instructors who used the technology-enhanced classrooms on campus.

Instrumentation

Three survey instruments needed to be developed for data collection. Questionnaires should not contain questions that are not directly related to the research (Gay & Airasian, 2000), so the survey instruments required very few demographic questions. Age and gender were not considered as important aspects of the study. Demographic data such as number of years teaching and teaching at Cincinnati State (for instructors), number of years in school (for students), and academic division were the only identifiable information collected from faculty and students. Community college instructional support personnel provided the name of their institution for the purposes of reducing duplication of responses. All survey questions should assist in answering the research questions for the study. As stipulated by Gay and Airasian (2000), all questions were developed to avoid jargon, to deal with a single concept per question, to provide a point of reference when necessary, and were presented in a logical and organized manner using a Web-based tool.

Umbach (2005) states that all surveys have errors associated with them. A survey error is the gap between what is true and what is measured. He makes several suggestions
for reducing survey error, and an attempt was made in the survey development to reduce error whenever possible. Having a defined objective as stated in the research goal and questions was beneficial in question development. According to Kitchenham and Pfleeger (2002), purposeful and concrete questions using conventional language are necessary to ensure more accurate results. Question wording was carefully considered and a single concept per question was used. The surveys were developed to be as brief as possible while still gathering data important to answering the research questions and moving toward the research goal.

The instrument sent to other community colleges (Data Collection Instrument for Community College Instructional Technology Support Centers; Appendix D) gathered demographic information about the institution as well as the background data related to classroom technology integration. The survey asked for information related to classroom design; levels of installed technology; specific equipment components; names and acronyms used for technology classrooms; institutional policies, procedures, and standards; the structure for classroom maintenance and infrastructure support; stakeholder involvement; faculty training and any requirements for such training; and vendor and engineer involvement. The length of the questionnaire (60 questions) was necessary in order to gather data on those aspects of smart classroom design, installation, use, and support at other institutions. Even though experts (Frankel & Wallen, 2000; Gillham, 2000b; Umbach, 2005) state that questionnaires should not be too long to discourage completion, they also maintain that the instrument must still incorporate the necessary elements that are crucial to the study. While long, the Web-based presentation of the questionnaire was designed so that respondents were encouraged to complete the
entire instrument. Section dividers and narrative were interspersed throughout the survey so that they were able to see how many questions were left to answer.

A second instrument was developed for gathering information from faculty regarding their experiences with the electronic classrooms on Cincinnati State’s campus (Data Collection Instrument for Faculty Respondents; Appendix E). The third instrument was used to gather information from Cincinnati State students who attend classes in the electronic classrooms (Data Collection Instrument for Student Respondents; Appendix F). The instruments for faculty and students at Cincinnati State requested specific room information as well as qualitative data (quantifiable and open-ended questions) to gauge their opinions related to classroom technology effectiveness and their satisfaction with the particular environment. The surveys included questions and rating scales related to design, usability, adaptability, furniture and ergonomic issues, lighting, control systems and interfaces, instructional effectiveness, and satisfaction with the environment.

Survey instruments were reviewed and validated by three individuals with experience in survey-based research. Dr. Terrence J. Glenn is Vice President Emeritus and an adjunct instructor at Cincinnati State Technical College. He has experience with institutional research and planning, self-study projects for the North Central Association of Colleges and Schools and as a consultant with other doctoral students conducting survey research. Dr. Ronald Craig is a psychology instructor at Cincinnati State Technical and Community College. He has extensive experience with developing and using various research instruments. Ms. Lynn Sadowski is a Research Analyst at Cincinnati State Technical and Community College. She has 20 years of research experience in product testing, focus groups, advertising research, and manipulation tests.
These three individuals reviewed the drafted surveys and questions and provided input regarding language clarity, necessity of questions, required demographic information to be collected, and overall flow. Much emphasis was placed on terminology and assumptions that each survey population will understand the technical jargon and be able to answer the questions accurately based on their knowledge. A reliable question is one that conveys the same meaning to all people in the population being surveyed (Berdie, Anderson, & Niebuhr, 1986). Reliability of individual questions also means that each question can stand on its own without the rest of the questions being present (Gay & Airasian, 2000). Those who evaluated the instruments identified questions that needed to be revised in order for them to satisfy that criteria. Feedback was shared with all reviewers, revised drafts were reviewed for further changes, and final drafts were included with the request to do research at Cincinnati State and with IRB documents submitted to Nova Southeastern University.

Following survey development, all instruments were pre-tested using instructional support staff, faculty, and students from Cincinnati State. These individuals were given paper versions of the instruments and asked to complete them as well as to note any comments for any question as needed. They were also asked to record how long it took to complete the instrument. Faculty and student instruments were completed in approximately 15 minutes on average. The instrument for community college instructional support personnel was completed in approximately 30 minutes on average. Some minor adjustments to wording and terminology were made based upon comments from those who pre-tested the surveys. Those who provided feedback on the instruments during the reliability testing were not used during the formal data collection period.
All instruments were developed in their final form using Zoomerang, a Web-based survey tool (http://www.zoomerang.com). The survey tool allowed for electronic dissemination of the instrument as well as electronic data collection. The tool was used to manage both quantitative and qualitative data. The Zoomerang link was included in the letter or email sent to each participant that described the study and provided directions for submitting the online survey.

**Approach**

The approach for the study included the following steps: 1) identifying the course sections meeting in the classrooms that will be the focus of student and instructor data collection, 2) selecting samples and seeking permission from instructors and students to participate in the study, 3) seeking permission from community college instructional support staff to participate in the study, 4) disseminating the survey instruments accordingly, 5) collecting the data using the electronic survey instruments, 6) analyzing the data according to the processes outlined below, and 7) reporting the results and developing the classroom standards document.

The three instruments were used to address the seven research questions. The instruments provided data collection for closed-ended questions that could be quantified and open-ended questions that provided supplementary information and opinions. Quantifiable questions were evaluated for the number and percentage of responses to help establish trends and generalizations for the various topics. In addition to the data collected using the instruments, the literature synthesis established several trends and practices related to all of the research questions. What follows is a restatement of the
Research Questions and specific items from the instruments that were used to address each question.

*Question One*: How may learning needs and different kinds of learning experiences be met and extended with the implementation of electronic resources in the classroom?

**Table 2. Survey Questions Addressing Research Question One**

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<th>Faculty Instrument Questions Addressed</th>
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Both of the instruments for faculty and students (Appendixes E and F), posed questions aimed at addressing the question. Likert scales in both instruments assessed items such as whether or not the installed technology enhances the teaching or learning experience. The rating also addressed whether or not the classroom technology detracts from the teaching or learning experience and ask how the classroom time is negatively affected if there is a negative experience. The two classroom models used for the study were evaluated separately and the data analysis from the responses was used to determine the best features of each. This information was used in the development of the classroom standards document. The literature synthesis also addressed the use of technology and provided insights into learning needs and how they are affected by the technology.

*Question Two*: How do technical and community college instructors and students judge electronic classrooms for effective teaching and learning? What are their levels of satisfaction with such classrooms?
Both of the instruments for faculty and students (Appendixes E and F), posed questions aimed at addressing the question. Likert scales in both instruments assessed the level of satisfaction of room arrangement and use of technology, instructional effectiveness, and perceived benefits of the installed technology. Faculty and students also provided input on how installed technology added to or detracted from the teaching and learning experience. Faculty and students provided data on their perceived importance of having a class in an electronic classroom as opposed to a standard classroom. The data collected from these instruments were evaluated and categorized in order to provide quantitative data for the appropriate questions to establish the benefits or detrimental effects of electronic classroom environments on effective teaching and learning. The two classroom models (2004 installation of 15 classrooms in existing buildings and 2005 installation of approximately 20 classrooms in a new building) used for the study were evaluated separately and the data analysis from the responses was used to determine the best features of each in order to incorporate them into the classroom standards document.

Question Three: What standards, if any, are used by technical and community colleges for classroom design and technology integration? Who develops and maintains the standards?
The instrument for Community College Instructional Support Personnel (Appendix D) asked questions related to design and technology standards at community colleges. In addition to the use of such a document, questions were posed about specific standards addressed in the document, document preparation, review, updating, and approval. The data provided by these questions addressed the potential use of such a document in the community college setting and helped to formulate an overall analysis of what is included in the document, and who prepares, updates, and approves it.

**Question Four:** What components and technologies are included in various levels of classroom design on technical and community college campuses? What new technologies are being considered for future implementation?

Table 4. Survey Questions Addressing Research Question Three

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Table 5. Survey Questions Addressing Research Question Four

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The instrument for Community College Instructional Support Personnel (Appendix D) asked specific questions related to the individual types of technology included in electronic classrooms. The variety of questions addressed such topics as the level of installed technology and components used, wireless technology, system and component control, screen placement, and the type of furniture used and location of the instructor’s station. New technologies were addressed in an open-ended question. The data provided by answers to these questions were categorized and used to reflect different models and levels of electronic classrooms and the anticipated use of new technologies for future models. The faculty and student instruments (Appendixes E and F) asked their respondents to provide their input on the type of equipment that should be used in electronic classrooms. The answers to these questions, when evaluated, provided data from actual practice to compare with the technologies currently being used in community college classrooms.

**Question Five: What college offices, departments, and stakeholders are involved in decision-making for classroom design? Who has ultimate authority for classroom projects?**

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The instrument for Community College Instructional Support Personnel (Appendix D) posed questions related to the involvement of stakeholders and departments in the decision-making and design processes for classroom projects. The data gathered from
answers to these questions were categorized and evaluated to address the status of cooperative involvement in the community college arena. These responses helped to establish the narrow or wide use of a team approach to learning environment design and implementation.

*Question Six:* How are industry experts such as technology integrators and engineers used in the design of classrooms and technology systems?

Table 7. Survey Questions Addressing Research Question Six

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The instrument for Community College Instructional Support Personnel (Appendix D) asked respondents to provide information on the use of integrators and engineers during the design and installation phases of classroom projects. It also asked about the point at which they are asked to become part of the project. These responses helped to establish how widespread such experts are used and whether or not they are used in design or mostly during installation.

*Question Seven:* How are ongoing funding, support, and upkeep of installed technology coordinated? What department provides the support for software, hardware, and network resources?

Table 8. Survey Questions Addressing Research Question Seven

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The instrument for Community College Instructional Support Personnel (Appendix D) asked respondents to provide information related to funding and support of classroom technology. These questions were intended to gather information related to funding sources and requirements as well as the support staff and processes used to provide ongoing technical support and training. The review of literature also addressed recommended funding and support models for electronic classroom projects.

The College Registrar provided a list of course sections meeting in technology-enhanced classrooms (approximately 35 rooms). The information included the course and section, instructor name, class meeting time, and building and room number. Permission was sought from faculty members to include their course section in the study. Each instructor received a letter describing the research and a copy of the release form to be signed and returned to the principal investigator. Those faculty members who granted permission by returning the release form received letters and release forms to distribute to students requesting their participation in the study. Upon receipt of the release forms, an email was sent to the individual instructors and students with information and a link to the Zoomerang survey tool to be completed.

Potential respondents from other community colleges were identified from the membership list of the AACC. An email was sent to one individual from each institution and included information about the study and an electronic copy of the release form to be signed and returned. Upon receipt of the release form, an email was sent to the individual with information and a link to the Zoomerang survey tool to be completed. Following a disappointing return of responses, the League for Innovation in the Community College assisted with sponsoring data collection and with distributing the survey link to
individuals at member institutions who work with instructional technology. The instrument did not ask for any identifying information. The Zoomerang surveys for all populations were constructed in “kiosk mode” to allow individuals who may have visited the survey link and not responded at that time to come back later to complete the survey.

Data Collection

Data collection for faculty and students was conducted in January and February 2007. Out of a possible 400 instructor sections eligible for the study, 129 (approximately 32%) instructors agreed to participate in the study, and 102 survey responses (in 135 visits to the survey) were received for a 25% response rate from the total population and a 79% response rate from those who initially agreed to participate. Out of a possible 2,578 students in the population, 234 (approximately 9%) students agreed to participate in the study, and 136 survey responses (in 160 visits to the survey) were received for a response rate of 5% from the total population and 58% from those who initially agreed to participate. Community college instructional support personnel participated in data collection in June 2007 and October 2007. Of the initial 325 individuals in the sample identified from the membership of the American Association of Community Colleges (AACC), 11 individual institutions agreed to participate completed the survey for a return rate of 3%. An additional 250 individuals were provided the link to the survey (revised without the question asking for the institution’s name) sponsored and distributed by the League for Innovation in the Community College. A total of 28 responses (in 73 visits to the survey) were generated from that population for a return rate of 11%. A total 39 institutions provided data via the community college instrument, and the survey data from both attempts has been merged into one comprehensive data set.
All data collection was conducted electronically using the Zoomerang Web-based survey tool. Each respondent was presented with specific instructions for completing the questionnaire when they begin the survey. Questions for faculty and students were presented consecutively on one scrolling Web page so that respondents were able to see the entire survey. The survey for community colleges was divided into five sections with a header and footer on each section to explain the number of questions in the section and the number of questions in the following section. At the conclusion of the survey page, respondents clicked a Submit button to send their responses to the database. They received a thank you message immediately upon submission of their responses.

**Data Analysis and Presenting Results**

*Data Analysis Procedures*

Data analysis began with a systematic approach to categorize data, answer the research questions, and develop a classroom standard document at the conclusion of the analysis phase. According to Stake (1995), data analysis should not be seen as a separate event apart from the everlasting efforts to make sense of things. Analysis is the process of giving meaning to first impressions as well as final compilations. It requires taking apart the collected data sets and giving meaning to those parts in order to draw conclusions. It is also important to establish a carefully constructed basis of comparison in order to say precisely what has been discovered (Sapsford & Jupp, 2006). The approach was important in identifying the best parts of the different classroom design models in order to establish a standard for future designs.

By nature of the qualitative study being conducted, the data collected were largely unstructured data. It was not pre-coded with values that could be used for analysis. The
data were categorized and organized using a grounded theory approach, the attempt to render thematic analysis through the process of analysis itself rather than through prior specification of categories (Boulton & Hammersley, 2006). The goal of grounded theory was to facilitate the more rigorous definition of categories through the process of analysis, rather than specifying what categories are appropriate and how they are to be defined at the beginning of the research process. Such analysis is appropriate for both single and multiple case designs where data can be kept separate or pooled and applied to the entire body of the work. Categorizing the data as it relates to the research questions was designed to lead to effectively answering the questions included in the study. In addition to the categorization of the data to address the research questions, the total sample size, overall percentage of returns, and response rate for each survey item is reported in the data analysis.

Using grounded theory for data analysis requires that the specific categories will be developed only after the data have been collected. The following broad topics were addressed in order to answer the research questions, but the specific results depended on the categorization process during the data analysis stage. Faculty and student surveys provided a breakdown of their evaluation of the various classrooms, the effectiveness of the integrated technology, and faculty and student satisfaction with the particular environment. Faculty and student survey instruments addressed the instructional effectiveness and satisfaction with the environment (Research Questions 1-2). The goal of the survey of other community colleges was to develop a descriptive “snapshot” of the current practices related to electronic classroom integration and support. Classroom design standards and types, use of installed technology, policies and procedures used,
faculty and staff involvement, use of industry experts, ongoing equipment replacement, and support issues were addressed in the instrument (Research Questions 3-7).

The first step in the grounded theory approach was the close reading of the data in order to identify aspects that may be significant. Developing categories from the data collected was an essential first step in using grounded theory with qualitative studies. Once the first broad categories were defined, other segments of data that were relevant to the categories were recorded (such as identifying positive and negative aspects of the different classroom models from both the student and instructor perspective). The goal was to generate as many categories as appeared necessary, with each collecting together several segments of data. Other categories that arose out of the reading and re-reading of the data and these categories were added to the list of categories for possible further consideration after the recording was completed. Boulton and Hammersley (2006) state that it is beneficial to generate as many categories as possible and to deal with the significance of the categories at a later time when a more detailed analysis is conducted. Some items may appear in multiple categories.

The next step was to compare and contrast all the items of data that had been assigned to the same category (Strauss & Corbin, 1990). This step was used to clarify the meaning of the recognized categories, as well as to identify sub-categories and relations among categories. Any additional categories were developed and some data segments were reassigned. Once again, a reading of the data was conducted to identify any additional categories that may be needed. The goal was to generate categories and interpretations of the data in terms of the categories in order to form the core of the main claims of the resulting research. The multiple sources of evidence collected together allowed for the
development of converging lines of inquiry that were likely to be more convincing and accurate because they were based on several sources of information (Yin, 2003).

Using the grounded theory approach was beneficial in analyzing the data from the three survey instruments. The questions asked in the survey instruments were directly related to the research questions of the study. The data collected from the surveys were categorized according to the expert analysis outlined above and was sorted appropriately to answer the research questions. The process required constant reflection and categorization of the data, so it was important to make the collection and analysis sufficiently explicit to ensure validity. Such reflexivity required the researcher to think continuously about the process of the research, his role in it, and the implications for analysis. The process was continued throughout the course of the research (Boulton & Hammersley, 2006).

Following the establishment of all categories and the listing of data, triangulation was used to check the validity of the data. Triangulation is a more direct check on the validity of observations by crosschecking them with other sources of data (Foster, 2006). Triangulation allowed the researcher to establish meaning by comparing observations to find grounds for interpretation (Stake, 1995). Data source triangulation was used to compare the data from instructors and students and to crosscheck it with the two models of classrooms used in the study. The process led to the development of an overview of the cases that reflected the perceived instructional effectiveness and faculty and student satisfaction with the classroom models.
**Format for Presenting Results**

Chapter 4 provides a detailed overview of results and findings based on the data collected from the three populations (Cincinnati State faculty, Cincinnati State students, and community college instructional support personnel). Results are presented for each of the populations and similarities between the faculty and student responses have been identified as part of the analysis. These comparisons have been beneficial in establishing faculty and student results related to perceived instructional effectiveness and satisfaction with the technologies. Analysis of data provided by community college instructional support personnel has been used to establish a best practices model of a Classroom Standards Document (Appendix G). The categories developed from the grounded theory analysis procedures described above are presented for each population. The Classroom Standards Document addresses furniture, source equipment, projector and projection screen placement, wireless vs. wired technology, infrastructure (data and electrical wiring, conduit), audio, and lighting. It also details the necessary budget and support issues and equipment replacement schedules based on usable life of the equipment.

**Resources**

**Human Resources**

Approval from the Nova Southeastern University Institutional Review Board (IRB) was required since human subjects were used to collect the data. The approval was granted. Permission was sought from Anne Foster, Director of Institutional Research at Cincinnati State Technology and Community College, in order to conduct the survey with College faculty and students. The approval was granted.
Technology Resources

The electronic data collection tool used was Zoomerang (www.zoomerang.com). A subscription to Zoomerang was purchased by the primary investigator. Additionally, computer resources (Microsoft Word, Microsoft Excel, Pentium 4 Personal Computer) for proposal authoring, data analysis, and final report authoring were be provided by the researcher on a personally-owned computer.

Summary

The case study approach for the proposed study provided an opportunity to investigate the current use of two smart classroom models on a community college campus. The research focused on aspects of faculty and student satisfaction as well as their opinions regarding instructional effectiveness of the classroom environments. Other community college technology support personnel provided data related to their institutions’ use of smart classrooms and the various designs, processes, and support models for the technology. New survey instruments were developed to collect data from all populations. Data collection was done using an electronic survey instrument. At the conclusion of the data analysis, a standards document was developed for possible adoption at the researcher’s home institution.
Chapter 4

Results

Findings

Introduction

The goal of the study was to establish a best practices, general purpose classroom model to meet the needs of faculty, students, and technology support personnel. The anticipated outcome was to establish a comprehensive view of best practices so that technical and community colleges have a process for integrating technology into the learning environment and providing support for those tools during future construction and renovation projects. A classroom standards document was developed that incorporated these findings. Three survey instruments were created to gather data from all participants. Faculty and student instruments were used to collect information about their satisfaction with and the effectiveness of the technology components, room and system design, and overall integration of technology in the electronic classroom. Survey data collected from other community colleges provided information on current policies, practices, and procedures related to electronic classroom design, implementation, support, and standards. These data, together with the local data, were used in the development of a standards document for Cincinnati State.
The data were categorized and organized using a grounded theory approach. The goal of grounded theory is to facilitate the more rigorous definition of categories through the process of analysis (Boulton & Hammersley, 2006). Using the grounded theory approach was beneficial in analyzing the data from the three survey instruments. The questions asked in the survey instruments were directly related to the research questions. The data collected from the surveys were sorted appropriately to answer the research questions. The grounded theory approach, used with data triangulation, provided meaningful data interpretation.

Responses to the three surveys were not as good as expected and therefore the results may not have as good internal validity (do the responses actually represent the sample) as they do external validity (do the chosen samples represent the larger populations) as established in Chapter 3. Because of the low response rate, the number of student and other community college participants may not provide the best representation of their given populations and the results and recommendations listed here and in Chapter 5 may not be as conclusive as they would be if larger numbers of individuals participated.

Gay and Airasian (2000) state that attempts to deal with low returns by using additional efforts to obtain data are worthwhile. While trying to use follow-up surveys to solicit additional responses is an accepted practice, this method will not always return a better response rate. According to Porter and Whitcomb (2005) no matter what efforts are made to elicit cooperation from survey non-respondents in a follow-up survey, large numbers of these non-respondents will also refuse to participate in the follow-up survey. To obtain more input from other community college instructional support personnel, a second data collection period was initiated with the League for Innovation in the
Community College’s members connected to instructional support (classroom) type of work.

The total survey return rates were as follows:

Table 9. Survey Response Rates

<table>
<thead>
<tr>
<th>Survey Group</th>
<th>Total Population</th>
<th>Selected to Participate</th>
<th>Agreed to Participate</th>
<th># of Returns</th>
<th>% of Total Population Responding</th>
</tr>
</thead>
<tbody>
<tr>
<td>Faculty</td>
<td>400</td>
<td>400</td>
<td>129</td>
<td>102</td>
<td>26%</td>
</tr>
<tr>
<td>Students</td>
<td>2,579</td>
<td>350</td>
<td>234</td>
<td>136</td>
<td>5%</td>
</tr>
<tr>
<td>Community College Personnel (AACC group)</td>
<td>990</td>
<td>325</td>
<td>11</td>
<td>11</td>
<td>1%</td>
</tr>
<tr>
<td>Community College Personnel (League group)</td>
<td>800</td>
<td>250</td>
<td>NA</td>
<td>29</td>
<td>4%</td>
</tr>
</tbody>
</table>

The following sections will provide details on data analysis from the three instruments. Data analysis and results are presented for each of the three populations: Cincinnati State faculty, Cincinnati State students, and community college instructional support personnel (both data collection attempts). In addition, summary analysis, based on grounded theory and its resulting categories and generalizations formed through triangulation, will be presented for open-ended responses and related data. Conclusions from the analysis and responses to the Research Questions are presented in Chapter 5. The full output of each instrument (raw data before analysis with grounded theory evaluation and redistribution of open-ended responses) is presented in Appendixes H-N.

Community College Faculty

Data collection for faculty was conducted in January and February 2007. Out of a possible 400 instructor sections eligible for the study, 129 (approximately 32%)
instructors agreed to participate, and 102 survey responses were received for a 26% response rate from the total population and a 79% response rate from those who initially agreed to participate. Faculty responded to the Web-based Faculty Electronic Classroom Survey made available to them through Zoomerang.

Cincinnati State is organized into four academic divisions: Business Technologies, Center for Innovative Technologies, Health and Public Safety, and Humanities and Sciences. Approximately 62 (60%) had been teaching at the college level for more than 10 years, with 35 (34%) teaching college level courses between 10 and 20 years. For comparison purposes, respondents were also asked to indicate how long they had been teaching at Cincinnati State. Thirty-six (55%) indicated that they had been at Cincinnati State between less than one to 10 years. Of the 46 (45%) who had been at Cincinnati State for over 10 years, 37 (36%) of them indicated that they had been teaching at the College between 10 and 20 years. The complete results of faculty division representation and length of service follow.

Table 10. Faculty Response by Division

<table>
<thead>
<tr>
<th>Academic Division</th>
<th>#/% Responses</th>
</tr>
</thead>
<tbody>
<tr>
<td>Business Technologies</td>
<td>11/11%</td>
</tr>
<tr>
<td>Center for Innovative Technologies</td>
<td>19/19%</td>
</tr>
<tr>
<td>Health &amp; Public Safety</td>
<td>24/24%</td>
</tr>
<tr>
<td>Humanities &amp; Sciences</td>
<td>48/47%</td>
</tr>
</tbody>
</table>

Table 11. Faculty Length of Service Data

<table>
<thead>
<tr>
<th>Length of Service</th>
<th>Community College Teaching</th>
<th>Teaching at Cincinnati State</th>
</tr>
</thead>
<tbody>
<tr>
<td>Less than 1 year</td>
<td>1/1%</td>
<td>6/6%</td>
</tr>
<tr>
<td>1-3 Years</td>
<td>10/10%</td>
<td>14/14%</td>
</tr>
<tr>
<td>3-5 Years</td>
<td>12/12%</td>
<td>25/25%</td>
</tr>
<tr>
<td>5-10 Years</td>
<td>17/17%</td>
<td>11/11%</td>
</tr>
<tr>
<td>10-23 years</td>
<td>35/34%</td>
<td>37/36%</td>
</tr>
<tr>
<td>20-30 Years</td>
<td>23/23%</td>
<td>5/5%</td>
</tr>
<tr>
<td>30+ Years</td>
<td>4/4%</td>
<td>4/4%</td>
</tr>
</tbody>
</table>
The distribution of faculty among the classrooms in the study shows that 42 (43%) were teaching in rooms in the Main and Health Professions (HPB) buildings. These rooms were in the first group of smart classroom installations done in existing facilities and are being referred to as Model 1. Faculty teaching in rooms in the Advanced Technology and Learning Center (ATLC) building accounted for 56 (57%) of respondents. These rooms are Model 2. The 2005 installation (Model 2) was done in a newly-constructed building and included the same equipment types. Most classrooms had at least one instructor responding for that room. Two rooms in Model 1 (Main 341 and HPB 02) and one room in Model 2 (ATLC 307) were not used.

A complete comparison of Model 1 and Model 2 rooms follows.

<table>
<thead>
<tr>
<th>Classroom Model</th>
<th>Buildings and Year</th>
<th>Project Type</th>
<th>Equipment Installed</th>
</tr>
</thead>
<tbody>
<tr>
<td>Model 1 (15 rooms)</td>
<td>Main and Health Professions Buildings (2004 project)</td>
<td>Retrofitted existing classrooms in two buildings built in 1955 and 1994</td>
<td>Custom-built lectern with VHS/DVD, document camera, computer, laptop connection, touch panel control, projector, audio amplifier and speakers, control and monitoring hardware</td>
</tr>
<tr>
<td>Model 2 (22 rooms)</td>
<td>Advanced Technology and Learning Center (2005 project)</td>
<td>New construction built in 2005</td>
<td>Manufactured lectern with VHS/DVD, document camera, computer, laptop connection, touch panel, projector or LCD display panel, audio amplifier and speakers, control and monitoring hardware, room lighting control</td>
</tr>
</tbody>
</table>
Faculty responses show that 40 (39%) have had one to three classes meet in electronic classrooms, 23 (23%) have had four to six classes, 10 (10%) have had seven to nine classes, and 29 (28%) have had 10 or more classes in these rooms. In addition, 60 (61%) indicated that they specifically request to have their classes meet in electronic classrooms. When asked if they thought teaching in an electronic classroom detracted from their overall teaching experience, 91 (93%) indicated that they do not believe that is true. Of the 7% who thought teaching in an electronic classroom was detrimental to their experience, five (62%) indicated that they felt they wasted too much time with the equipment, whereas one person (12%) indicated he felt overwhelmed by the equipment. Other reasons given included equipment location or performance and student attention issues.

Twenty-three (23%) instructors indicated that they have not used the equipment in the electronic classroom for various reasons. Of those, nine (41%) indicated that it was because they did not need to use the equipment. Equipment malfunction was the reason given by four (18%) and three (14%) indicated that they did not know how to use the equipment. The remainder indicated a mix of the specific primary reasons listed as choices on the survey.

Instructors were asked to indicate all of the components and controls that they wanted to see in an electronic classroom. The complete listing in order of preference follows. Of the 21 open-ended other responses, four instructors wanted classroom response systems. Two instructors indicated a need for screen blanking, remote mouse, and an overhead transparency projector.
Instructors also provided information regarding what equipment components and sources they use most of the time in an electronic classroom. A computer and projector for PowerPoint presentations is used 58% of the time with other components falling much farther down the list. The full set of responses follows.

<table>
<thead>
<tr>
<th>Component/Feature</th>
<th>Responses</th>
</tr>
</thead>
<tbody>
<tr>
<td>Computer</td>
<td>91 (96%)</td>
</tr>
<tr>
<td>Projector</td>
<td>90 (95%)</td>
</tr>
<tr>
<td>Internet Connection</td>
<td>89 (94%)</td>
</tr>
<tr>
<td>Lighting Control</td>
<td>85 (89%)</td>
</tr>
<tr>
<td>Document Camera</td>
<td>78 (82%)</td>
</tr>
<tr>
<td>Hookup for instructor’s laptop PC</td>
<td>70 (74%)</td>
</tr>
<tr>
<td>Window Darkening Shades</td>
<td>69 (73%)</td>
</tr>
<tr>
<td>Video Playback</td>
<td>66 (69%)</td>
</tr>
<tr>
<td>Audio Playback</td>
<td>53 (56%)</td>
</tr>
<tr>
<td>Wireless Internet</td>
<td>43 (45%)</td>
</tr>
<tr>
<td>Video Recording</td>
<td>22 (23%)</td>
</tr>
<tr>
<td>Audio Recording</td>
<td>21 (22%)</td>
</tr>
<tr>
<td>Other, please specify</td>
<td>21 (22%)</td>
</tr>
<tr>
<td>Two-way Videoconferencing</td>
<td>11 (12%)</td>
</tr>
</tbody>
</table>

In addition, 52 instructors (55%) indicated that they use PowerPoint for most in-class lectures. Instructors also provided open ended comments about their reasons for whether or not to use PowerPoint. The use of grounded theory to organize instructor comments led to findings that indicate that 15 (15%) believe PowerPoint lectures help to keep them
and their students organized and focused. Nine instructors (9%) indicated that they prefer to write on the board or that they do not like to use PowerPoint. An additional five (5%) indicated that they either do not know how to use PowerPoint or that they have no time to use it. When asked about a preference for wired versus wireless keyboard and mouse, 50 (56%) preferred the wireless configuration. Of the 49 instructors indicating a reason for their preference, 19 (39%) indicated that they would prefer the flexibility of a wireless configuration.

Instructors were asked to indicate their preferences for placement of the projection screen in the room as well as the preferred design of the instructor’s lectern or teaching station. Almost 60% of instructors wanted the screen at the front center of the classroom. One-half of instructors also preferred a combination teaching station design that allows both sitting and standing space. The full results for both items follow.

### Table 15. Faculty Screen Placement Preferences

<table>
<thead>
<tr>
<th>Preferred Screen Placement</th>
<th>Responses</th>
</tr>
</thead>
<tbody>
<tr>
<td>At the front center of the room</td>
<td>54 (57%)</td>
</tr>
<tr>
<td>Off to one side on the front wall</td>
<td>19 (20%)</td>
</tr>
<tr>
<td>In a front corner of the room</td>
<td>10 (11%)</td>
</tr>
<tr>
<td>No preference</td>
<td>7 (7%)</td>
</tr>
<tr>
<td>Multiple Locations (please specify locations)</td>
<td>4 (4%)</td>
</tr>
</tbody>
</table>

### Table 16. Faculty Lectern Design Preferences

<table>
<thead>
<tr>
<th>Preferred Lectern Design</th>
<th>Responses</th>
</tr>
</thead>
<tbody>
<tr>
<td>A combination of standing and sitting</td>
<td>51 (50%)</td>
</tr>
<tr>
<td>Standing</td>
<td>42 (41%)</td>
</tr>
<tr>
<td>No preference</td>
<td>7 (7%)</td>
</tr>
<tr>
<td>Sitting</td>
<td>2 (2%)</td>
</tr>
</tbody>
</table>

Instructors provided their level of agreement on 17 statements related to classroom use, design, instructional effectiveness, and overall satisfaction. Grounded theory
techniques were used to categorize the open ended-comments provided by respondents. Those items that were mentioned the most, resulting in the categories being reported, will be presented for each of the statements. The full set of responses is presented here including a comparison of the Model 1 and Model 2 rooms for each statement combining strongly agree and agree into one category, keeping the neutral response separate, and combining disagree and strongly disagree responses. These groupings were used to develop conclusions outlined in Chapter 5. All comments provided for each statement are listed in Appendix L with the full set of responses.

Table 17. Faculty Levels of Agreement for Survey Question 15

<table>
<thead>
<tr>
<th>Statement</th>
<th>Strongly Agree</th>
<th>Agree</th>
<th>Neutral</th>
<th>Disagree</th>
<th>Strongly Disagree</th>
</tr>
</thead>
<tbody>
<tr>
<td>The electronic classroom is easy to use (all responses)</td>
<td>33 (32%)</td>
<td>47 (46%)</td>
<td>15 (15%)</td>
<td>6 (6%)</td>
<td>1 (1%)</td>
</tr>
<tr>
<td>Model 1</td>
<td>31 (74%)</td>
<td>10 (24%)</td>
<td>1 (2%)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Model 2</td>
<td>47 (84%)</td>
<td>4 (7%)</td>
<td>5 (9%)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>The equipment control system (touch panel) is easy to use (all responses)</td>
<td>36 (35%)</td>
<td>47 (46%)</td>
<td>13 (13%)</td>
<td>5 (5%)</td>
<td>1 (1%)</td>
</tr>
<tr>
<td>Model 1</td>
<td>35 (83%)</td>
<td>4 (10%)</td>
<td>3 (7%)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Model 2</td>
<td>46 (82%)</td>
<td>7 (13%)</td>
<td>3 (5%)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>The placement of source equipment (PC, VHS, DVD, Document Camera) is</td>
<td>38 (37%)</td>
<td>34 (33%)</td>
<td>20 (20%)</td>
<td>5 (5%)</td>
<td>5 (5%)</td>
</tr>
<tr>
<td>satisfactory (all responses)</td>
<td>Model 1</td>
<td>30 (71%)</td>
<td>10 (24%)</td>
<td>2 (5%)</td>
<td></td>
</tr>
<tr>
<td>Model 2</td>
<td>40 (71%)</td>
<td>9 (16%)</td>
<td>7 (13%)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>The placement of the projection screen or flat panel video display is</td>
<td>33 (32%)</td>
<td>38 (37%)</td>
<td>14 (14%)</td>
<td>12 (12%)</td>
<td>5 (5%)</td>
</tr>
<tr>
<td>satisfactory (all responses)</td>
<td>Model 1</td>
<td>25 (24%)</td>
<td>7 (17%)</td>
<td>10 (24%)</td>
<td></td>
</tr>
<tr>
<td>Model 2</td>
<td>43 (77%)</td>
<td>7 (13%)</td>
<td>6 (11%)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Description</td>
<td>Model 1</td>
<td>Model 2</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>----------------------------------------------------------------------------</td>
<td>---------------</td>
<td>---------------</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>The projected or displayed image is bright enough to see without dimming the lights (all responses)</td>
<td>6 (6%)</td>
<td>20 (20%)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Model 1</td>
<td>15 (36%)</td>
<td>8 (19%)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Model 2</td>
<td>11 (20%)</td>
<td>14 (25%)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>There is sufficient control of room lighting (all responses)</td>
<td>15 (15%)</td>
<td>31 (30%)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Model 1</td>
<td>13 (31%)</td>
<td>11 (26%)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Model 2</td>
<td>33 (59%)</td>
<td>11 (20%)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>The acoustics in the room (spoken word and audio playback) are satisfactory (all responses)</td>
<td>32 (31%)</td>
<td>46 (45%)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Model 1</td>
<td>27 (64%)</td>
<td>31 (13%)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Model 2</td>
<td>50 (89%)</td>
<td>5 (9%)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>The window treatments in the room are satisfactory for controlling outside light (all responses)</td>
<td>16 (16%)</td>
<td>26 (25%)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Model 1</td>
<td>13 (31%)</td>
<td>15 (36%)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Model 2</td>
<td>27 (48%)</td>
<td>17 (30%)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>The lectern and equipment arrangement facilitates using the installed classroom technology (all responses)</td>
<td>24 (24%)</td>
<td>41 (40%)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Model 1</td>
<td>24 (57%)</td>
<td>11 (26%)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Model 2</td>
<td>39 (70%)</td>
<td>11 (20%)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>During instruction, multiple technologies are used in this electronic classroom (all responses)</td>
<td>42 (41%)</td>
<td>40 (39%)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Model 1</td>
<td>34 (81%)</td>
<td>2 (5%)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Model 2</td>
<td>45 (80%)</td>
<td>5 (9%)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Model 1</td>
<td>Model 2</td>
<td>Model 1</td>
<td>Model 2</td>
<td></td>
</tr>
<tr>
<td>-------------------------------------------------------------------------------------------</td>
<td>---------------</td>
<td>---------------</td>
<td>---------------</td>
<td>---------------</td>
<td></td>
</tr>
<tr>
<td>The equipment in the electronic classroom enhances my teaching experience (all responses)</td>
<td>65 (64%)</td>
<td>23 (23%)</td>
<td>11 (11%)</td>
<td>2 (2%)</td>
<td></td>
</tr>
<tr>
<td>Model 1</td>
<td>32 (76%)</td>
<td>9 (21%)</td>
<td>1 (2%)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Model 2</td>
<td>53 (95%)</td>
<td>1 (2%)</td>
<td>2 (3%)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>The equipment in the electronic classroom enhances the students' learning experience (all responses)</td>
<td>56 (55%)</td>
<td>32 (31%)</td>
<td>13 (13%)</td>
<td>1 (1%)</td>
<td></td>
</tr>
<tr>
<td>Model 1</td>
<td>32 (76%)</td>
<td>10 (24%)</td>
<td>0 (0%)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Model 2</td>
<td>52 (93%)</td>
<td>3 (5%)</td>
<td>1 (2%)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Using the electronic classroom allows for more effective instruction (all responses)</td>
<td>56 (55%)</td>
<td>31 (30%)</td>
<td>11 (11%)</td>
<td>3 (3%)</td>
<td></td>
</tr>
<tr>
<td>Model 1</td>
<td>35 (83%)</td>
<td>5 (12%)</td>
<td>2 (5%)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Model 2</td>
<td>49 (87%)</td>
<td>5 (9%)</td>
<td>2 (4%)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Using the electronic classroom allows for better organization and more effective use of time to deliver course materials (all responses)</td>
<td>49 (48%)</td>
<td>35 (34%)</td>
<td>14 (14%)</td>
<td>3 (3%)</td>
<td></td>
</tr>
<tr>
<td>Model 1</td>
<td>35 (83%)</td>
<td>6 (14%)</td>
<td>1 (2%)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Model 2</td>
<td>46 (82%)</td>
<td>7 (13%)</td>
<td>3 (5%)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Students who attend class in an electronic classroom have higher grades than those who attend class in a traditional classroom (all responses)</td>
<td>5 (5%)</td>
<td>10 (10%)</td>
<td>68 (67%)</td>
<td>13 (13%)</td>
<td></td>
</tr>
<tr>
<td>Model 1</td>
<td>8 (19%)</td>
<td>23 (55%)</td>
<td>11 (26%)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Model 2</td>
<td>6 (11%)</td>
<td>42 (75%)</td>
<td>8 (14%)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>The College should convert all standard lecture classrooms into electronic classrooms (all responses)</td>
<td>58 (57%)</td>
<td>20 (20%)</td>
<td>14 (14%)</td>
<td>5 (5%)</td>
<td></td>
</tr>
<tr>
<td>Model 1</td>
<td>31 (74%)</td>
<td>7 (17%)</td>
<td>4 (9%)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Model 2</td>
<td>45 (80%)</td>
<td>6 (11%)</td>
<td>5 (9%)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Overall, I am satisfied with my teaching experience in an electronic classroom (all responses)</td>
<td>51 (50%)</td>
<td>39 (38%)</td>
<td>10 (10%)</td>
<td>1 (1%)</td>
<td></td>
</tr>
<tr>
<td>Model 1</td>
<td>35 (83%)</td>
<td>7 (17%)</td>
<td>0 (0%)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Model 2</td>
<td>53 (95%)</td>
<td>1 (2%)</td>
<td>2 (3%)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Regarding the classroom and its control system, grounded theory categorization shows that two issues were most often mentioned regarding these two aspects of the classrooms. Of the 32 comments offered regarding how easy the classroom was to use, ten (31%) indicated issues related to training or lack of training. In addition, there were seven (22%) comments about the usability or human factors of the rooms related to equipment placement or system design. Comments on the control system were nearly the opposite with six (27%) of the 22 comments reporting training issues and seven (32%) of them relating to usability. Twenty-two comments were offered related to the placement of the source equipment. Of those comments, 12 (55%) stated problems with the location of equipment in the rack being too low or difficult to reach. Lectern placement was poor according to five (23%) of the comments. Respondents either wanted it to one side of the room or farther from the front wall.

Opinions about satisfactory placement of the projection screen were quite different for each classroom model as indicated in the data above. Comments regarding the placement of the screen or display panel were offered by 32 respondents. Of those comments, 24 (75%) stated that the projection covers too much of the white board and prevents them from fully using the classroom writing surface.

Sixty four percent indicated either strongly agree or agree with the satisfactory arrangement of the lectern and equipment. Respondents offered 25 comments regarding the lectern with five (20%) of them related to the poor location of the lectern for the particular room. Four comments (16%) referred to feeling “chained to the lectern” and not being able to control equipment without standing at the lectern to do so. Satisfaction with the brightness of the projected image did not rank as high. Thirty comments were
offered regarding the quality of the image without dimming the lights. Nine comments (30%) were offered calling for the need for better lighting control and for better window coverings.

Ratings for lighting control were spread across the scale with the Model 2 classroom faring better than their Model 1 counterparts. There were 33 comments offered about the control of room lighting with 21 (64%) of those requesting better control or more options to control room lights. For controlling ambient light in the room, respondents provided 41 comments related to the window treatments. Grounded theory categories show that seven (17%) of those comments indicated the room is still too bright with the blinds closed, and eight (20%) refer to repair issues with inoperable shades. Regarding room acoustics, the Model 2 rooms were rated better than Model 1. There were nine comments regarding acoustics with two of them (22%) referring to ambient noise from the projector or ventilation system in the room.

Instructors were also asked to state their level of agreement on several items related to instructional use, effectiveness, and satisfaction with the electronic classrooms. When responding to the statement that multiple technologies are used in the classroom during instruction, 80% either stated strongly agree or agree. Responses for Model 1 and Model 2 were nearly identical to each other across the board. Comments were generally related to what they use and the ability to switch between sources, but there was no one issue that stood out among the comments.

Regarding whether or not the electronic classroom enhances their teaching experience, instructors overwhelmingly agreed that the electronic classroom was beneficial. Twenty-two comments were provided related to the enhancement of teaching
in the electronic classroom. Eight (36%) stated that the instructor relies on the equipment, and four (18%) indicated they enjoy using the technology. When asked if they believe that using an electronic classroom detracts from their experience, an answer of no was provided by 93% overall. For Model 1, 97% do not believe the electronic classroom detracts from their teaching experience, and 93% responded the same way for Model 2. Eight-five percent either strongly agree or agree that the electronic classroom allows for more effective instruction, and 82% either strongly agree or agree that the electronic classroom allows for better organization and more effective use of time to deliver course materials. There were 21 comments provided related to the perceived effectiveness of instruction, with nine (38%) indicating that the electronic classroom helps to engage students or to address their diverse learning styles.

Instructors were presented two statements related to their students’ experiences in electronic classrooms. Eight-six percent stated that they either strongly agree or agree with the statement that the classroom enhances their students’ learning experiences. Of the 27 comments provided, ten (37%) indicated that the technology is helpful for student comprehension or retention, five (19%) stated that students enjoy or like the technology, and three (11%) indicated that the technology offers too many opportunities for students to lose focus or drift off during presentations.

The majority (68%) of instructors took the neutral position when asked if students attending classes in electronic classrooms have higher grades than their peers in traditional classrooms. Respondents provided 45 comments that offered a broad range of opinions. The majority (53%) stated that they do not know or do not have data to support
such a position. Only two (4%) said there is a relationship between electronic classrooms and student grades, and three (6%) indicated that there is no relationship between the two.

Instructors were asked to respond to the statement: *Using the electronic classroom allows for better organization and more effective use of time to deliver course materials.* Eighty-two percent indicated that they strongly agree or agree with the statement. Respondents offered 20 comments, with 11 (55%) of them indicating improved organization or presentation of information or materials to students. Five (25%) indicated the detrimental effect of non-working technology or time spent working with the equipment or controls.

Finally, instructors were asked to respond to the statement: *Overall, I am satisfied with my teaching experience in an electronic classroom.* Results indicate that 88% stated strongly agree or agree to this statement. The most frequently occurring comments were three (21%) related to the need to maintain the equipment and seven (50%) who indicated their desire to use or their insistence on being scheduled in electronic classrooms.

The final questions in the faculty instrument asked about recurring difficulties with the classroom, what they would like to see in a room that they do not currently have, what changes they would recommend, and any other comments they would like to make. Instructors choose from a list of possible problems in the classroom and were able to choose all that applied to their experience. There were 27 items indicated as *other*, with 11 (41%) of those relating to equipment settings or use and 27 (11%) relating to both lighting and projection screen issues. Data related to recurring difficulties in the classrooms was reported as follows.
Table 18. Faculty Classroom Issues Identified

<table>
<thead>
<tr>
<th>Classroom Issue</th>
<th>Responses</th>
</tr>
</thead>
<tbody>
<tr>
<td>Other, please specify</td>
<td>27 (34%)</td>
</tr>
<tr>
<td>Room lights too bright on the screen</td>
<td>26 (32%)</td>
</tr>
<tr>
<td>Poor placement of instructor teaching station</td>
<td>23 (29%)</td>
</tr>
<tr>
<td>Unable to control light from windows</td>
<td>22 (28%)</td>
</tr>
<tr>
<td>Inferior image on the screen</td>
<td>20 (25%)</td>
</tr>
<tr>
<td>Unreliable source device (computer, VHS, DVD, document camera)</td>
<td>17 (21%)</td>
</tr>
<tr>
<td>Equipment control system unreliable</td>
<td>15 (19%)</td>
</tr>
<tr>
<td>Slow Internet speed</td>
<td>13 (16%)</td>
</tr>
<tr>
<td>Poor sightline to the screen</td>
<td>8 (10%)</td>
</tr>
</tbody>
</table>

Fifty-three respondents provided comments to the question about what, if anything is missing from the electronic classroom that they would like to have. A grounded theory approach for categorizing these items indicated that 12 instructors (23%) need or desire more remote control of equipment or pointing devices away from the lectern. Better training or instructions, more comfortable seating or ergonomics, and better lighting control were all mentioned four times (8%). Three responses (6%) were received for a classroom response system and control of student computers by the instructor.

Sixty-two comments were offered about recommendations for future installations. Initial grounded theory organized these comments into 19 categories and then reduced them to 15 based on regrouping. Of the remaining 15, screen placement or an additional whiteboard to allow for more instructor writing space accounted for ten responses (16%). Better lighting control was mentioned nine times (15%), and better equipment placement or control were mentioned eight times each (13%). Instructor training was listed six times.
(9%), and both maintenance issues and remote presentation capabilities had 4 comments each (6%). Other items were only mentioned one or two times.

Additional comments were offered by 34 respondents. Comments were varied, and only four items had more than one person state the similar issue. Of those, both training and a feeling that electronic classrooms make teaching somewhat easier received three (9%) comments. Student inattention during presentations and poor equipment placement both received two comments each for 6% of the responses.

Community College Students

Data collection for students was conducted in January and February 2007. Out of a possible 2,578 students in the population, 234 (approximately 9%) students agreed to participate, and 136 survey responses were received for a response rate of 5% from the total population and 58% from those who initially agreed to participate. The low response rate and suggestions for further research are addressed in the Implications section of Chapter 5. Participating students came from all four academic divisions of the college and had been attending classes at Cincinnati State for various lengths of time as detailed below.

<table>
<thead>
<tr>
<th>Academic Division</th>
<th>First Term</th>
<th>2-5 Terms</th>
<th>6-10 Terms</th>
<th>More than 10 Terms</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Business Technologies</td>
<td>3</td>
<td>7</td>
<td>11</td>
<td>7</td>
<td>28</td>
</tr>
<tr>
<td></td>
<td>19%</td>
<td>14%</td>
<td>25%</td>
<td>26%</td>
<td>21%</td>
</tr>
<tr>
<td>Center for Innovative Technologies</td>
<td>0</td>
<td>8</td>
<td>11</td>
<td>4</td>
<td>23</td>
</tr>
<tr>
<td></td>
<td>0.0%</td>
<td>16%</td>
<td>25%</td>
<td>15%</td>
<td>17%</td>
</tr>
<tr>
<td>Health and Public Safety</td>
<td>7</td>
<td>21</td>
<td>12</td>
<td>14</td>
<td>54</td>
</tr>
<tr>
<td></td>
<td>44%</td>
<td>43%</td>
<td>27%</td>
<td>52%</td>
<td>40%</td>
</tr>
<tr>
<td>Humanities and Sciences</td>
<td>6</td>
<td>13</td>
<td>10</td>
<td>2</td>
<td>31</td>
</tr>
<tr>
<td></td>
<td>38%</td>
<td>27%</td>
<td>23%</td>
<td>7%</td>
<td>23%</td>
</tr>
<tr>
<td>Total</td>
<td>16</td>
<td>49</td>
<td>44</td>
<td>27</td>
<td>136</td>
</tr>
<tr>
<td></td>
<td>12%</td>
<td>36%</td>
<td>32%</td>
<td>20%</td>
<td>100%</td>
</tr>
</tbody>
</table>
Students with classes in rooms in the Main or Health Professions buildings (Model 1) accounted for 50.4% and students in rooms in the Advanced Technology and Learning Center accounted for 49.6%, nearly a 50% split among all responses. Students indicated that they have had individual courses (not the number of class meetings) meet in electronic classrooms one to three times (46%), four to six times (28%), seven to nine times (15%), and 10 times or more (11%). Students indicated their preferences for classes meeting in electronic classrooms and for scheduling their courses in these rooms as indicated below.

Table 20. Student Preferences for Electronic Classrooms

<table>
<thead>
<tr>
<th>Student Statement</th>
<th>Yes</th>
<th>No</th>
</tr>
</thead>
<tbody>
<tr>
<td>I prefer a course that meets in electronic classroom.</td>
<td>103 (81%)</td>
<td>24 (19%)</td>
</tr>
<tr>
<td>When scheduling my courses, I look for courses that will meet in an electronic classroom.</td>
<td>13 (10%)</td>
<td>111 (90%)</td>
</tr>
</tbody>
</table>

Students were able to offer open-ended comments on their reasons for a preference of an electronic or traditional classroom and for the reasons they do or do not search for courses that will meet in the electronic classrooms. The grounded theory approach for analyzing and categorizing the data led to some common categories. Students provided 103 comments regarding their preference for taking a course that meets in an electronic classroom. Of those comments, 39 (38%) referred to better lectures or more organized instruction using the installed technology. Students who provided comments related to their visual learning style accounted for 19 (18%) of the responses. Other comments were offered one to four times each, but no significant categories developed as a result of the analysis. Regarding actively searching for courses that meet in electronic classrooms, 43
(43%) indicated that scheduling or curriculum requirements are more important than the specific classroom. Those who indicated that the specific classroom does not matter, they do not care, or they never think to look to see if the classroom is equipped, accounted for 25 (25%) comments. Those who are more focused on the instructor or the technology used by the instructor rather than the specific room accounted for 12 (12%) of the comments.

Students were asked whether they have ever had a class meet in an electronic classroom in which the instructor never used any of the equipment at any time during the term. Eighty-nine (66%) responded no, whereas 45 (34%) indicated that it has happened in the past. Twenty-three students (21%) further responded that the instructor gave a reason for not using the equipment. Those reasons given by the instructor (as reported by the students) are detailed below.

<table>
<thead>
<tr>
<th>Reason Given for not using the Electronic Classroom Equipment</th>
<th>Responses</th>
</tr>
</thead>
<tbody>
<tr>
<td>Did not need to use the equipment</td>
<td>12 (31%)</td>
</tr>
<tr>
<td>Equipment was not functioning</td>
<td>10 (26%)</td>
</tr>
<tr>
<td>Other, please specify</td>
<td>6 (15%)</td>
</tr>
<tr>
<td>Did not know how to use the equipment</td>
<td>5 (13%)</td>
</tr>
<tr>
<td>Did not want to be bothered with the equipment</td>
<td>4 (10%)</td>
</tr>
<tr>
<td>Did not want to be in an electronic classroom</td>
<td>0 (0%)</td>
</tr>
</tbody>
</table>

Regarding equipment or features that should be included in the classrooms, students were able to choose any or all of 13 items along with a choice of other in which they could add specific information. Nine items were offered as other selections and included two for large desk spaces, two for electrical connections for student computers, and one each for telephone, overhead projector, and adequate white or black board space. There
were also general comments not related to the question. The full results for the students’ rankings of equipment and features follows.

Table 22. Student Rankings of Equipment Importance in Electronic Classrooms

<table>
<thead>
<tr>
<th>Component/Feature</th>
<th>Responses</th>
</tr>
</thead>
<tbody>
<tr>
<td>Projector</td>
<td>105 (88%)</td>
</tr>
<tr>
<td>Computer</td>
<td>104 (87%)</td>
</tr>
<tr>
<td>Internet Connection</td>
<td>103 (87%)</td>
</tr>
<tr>
<td>Lighting Control</td>
<td>92 (77%)</td>
</tr>
<tr>
<td>Window Darkening Shades</td>
<td>75 (63%)</td>
</tr>
<tr>
<td>Hookup for instructor’s laptop PC</td>
<td>72 (61%)</td>
</tr>
<tr>
<td>Wireless Internet</td>
<td>64 (54%)</td>
</tr>
<tr>
<td>Audio Playback</td>
<td>61 (51%)</td>
</tr>
<tr>
<td>Video Playback</td>
<td>56 (47%)</td>
</tr>
<tr>
<td>Document Camera</td>
<td>42 (35%)</td>
</tr>
<tr>
<td>Video Recording</td>
<td>29 (24%)</td>
</tr>
<tr>
<td>Audio Recording</td>
<td>21 (18%)</td>
</tr>
<tr>
<td>Two-way Videoconferencing</td>
<td>20 (17%)</td>
</tr>
<tr>
<td>Other, please specify</td>
<td>6 (5%)</td>
</tr>
</tbody>
</table>

Sixty-seven percent of students indicated that their instructors use the computer and projector for PowerPoint or other software presentation. Sixty percent indicated that their instructor uses PowerPoint for most in-class lectures. In a related question, students also indicated that 90% of instructors do not require their students to use the classroom equipment for in-class presentations. Students also provided data on the equipment used by the instructor to determine what is used most of the time. The combination of a computer and projector for PowerPoint or other software presentation was used about two-thirds of the time. Student responses generated the following data.

Table 23. Student Rankings of Most Used Technology in Classrooms

<table>
<thead>
<tr>
<th>Component/Feature Used</th>
<th>Responses</th>
</tr>
</thead>
<tbody>
<tr>
<td>Computer and projector for PowerPoint/other software presentation</td>
<td>78 (66%)</td>
</tr>
<tr>
<td>VHS or DVD video playback and projector</td>
<td>13 (11%)</td>
</tr>
<tr>
<td>Computer and projector for Internet browsing</td>
<td>11 (9%)</td>
</tr>
<tr>
<td>Document Camera and projector</td>
<td>11 (9%)</td>
</tr>
<tr>
<td>Input for his/her own laptop PC with the room projector</td>
<td>6 (5%)</td>
</tr>
</tbody>
</table>
Students were asked to indicate their level of agreement on 16 statements related to classroom use, design, instructional effectiveness, and overall satisfaction. Data collection summaries to follow will indicate the level of overall agreement versus disagreement for the statements. Students provided a very small number of verbal comments for questions that asked for them. Grounded theory techniques were used to categorize the open-ended comments provided by respondents. Those items that were mentioned the most, resulting in the categories being reported, will be presented for each of the statements when applicable.

The full set of responses is presented here including a comparison of the Model 1 and Model 2 rooms for each statement combining strongly agree and agree into one category, keeping the neutral response separate, and combining disagree and strongly disagree responses. These groupings were used to develop conclusions outlined in Chapter 5. All comments provided for each statement are listed in Appendix N with the full set of responses.

Table 24. Student Levels of Agreement for Survey Question 16

<table>
<thead>
<tr>
<th>Statement</th>
<th>Strongly Agree</th>
<th>Agree</th>
<th>Neutral</th>
<th>Disagree</th>
<th>Strongly Disagree</th>
</tr>
</thead>
<tbody>
<tr>
<td>The placement of the projection screen or flat panel video display is satisfactory</td>
<td>68 (53%)</td>
<td>46 (36%)</td>
<td>10 (8%)</td>
<td>2 (2%)</td>
<td>2 (2%)</td>
</tr>
<tr>
<td>Model 1</td>
<td>57 (85%)</td>
<td>7 (10%)</td>
<td>3 (5%)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Model 2</td>
<td>59 (91%)</td>
<td>4 (8%)</td>
<td>2 (3%)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>The projected or displayed image is bright enough to see without dimming the lights</td>
<td>15 (12%)</td>
<td>37 (29%)</td>
<td>23 (18%)</td>
<td>39 (30%)</td>
<td>14 (11%)</td>
</tr>
<tr>
<td>Model 1</td>
<td>33 (49%)</td>
<td>8 (12%)</td>
<td>26 (39%)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Model 2</td>
<td>24 (37%)</td>
<td>15 (23%)</td>
<td>26 (40%)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Item</td>
<td>Model 1</td>
<td>Model 2</td>
<td>Model 1</td>
<td>Model 2</td>
<td></td>
</tr>
<tr>
<td>----------------------------------------------------------------------</td>
<td>-------------</td>
<td>-------------</td>
<td>-------------</td>
<td>-------------</td>
<td></td>
</tr>
<tr>
<td>The instructor has sufficient control of lights in the room</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Model 1</td>
<td>43 (64%)</td>
<td>50 (77%)</td>
<td>13 (19%)</td>
<td>11 (16%)</td>
<td></td>
</tr>
<tr>
<td>Model 2</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>The acoustics in the room (spoken word and audio playback) are satisfactory</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Model 1</td>
<td>50 (75%)</td>
<td>48 (74%)</td>
<td>14 (21%)</td>
<td>3 (4%)</td>
<td></td>
</tr>
<tr>
<td>Model 2</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>The type of student furniture in the room is satisfactory</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Model 1</td>
<td>38 (57%)</td>
<td>45 (69%)</td>
<td>13 (19%)</td>
<td>11 (14%)</td>
<td></td>
</tr>
<tr>
<td>Model 2</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>The window treatments in the room are satisfactory for controlling outside light</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Model 1</td>
<td>30 (45%)</td>
<td>33 (51%)</td>
<td>22 (33%)</td>
<td>15 (22%)</td>
<td></td>
</tr>
<tr>
<td>Model 2</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>The instructor’s lectern and equipment arrangement facilitates using the installed classroom technology</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Model 1</td>
<td>53 (79%)</td>
<td>47 (72%)</td>
<td>12 (18%)</td>
<td>1 (2%)</td>
<td></td>
</tr>
<tr>
<td>Model 2</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>The equipment in the electronic classroom enhances my learning experience</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Model 1</td>
<td>57 (85%)</td>
<td>52 (80%)</td>
<td>7 (10%)</td>
<td>11 (17%)</td>
<td></td>
</tr>
<tr>
<td>Model 2</td>
<td></td>
<td></td>
<td></td>
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<td></td>
</tr>
</tbody>
</table>
I learn more in an electronic classroom than in a standard classroom

<table>
<thead>
<tr>
<th></th>
<th>Model 1</th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>35 (27%)</td>
<td>31 (24%)</td>
<td>44 (34%)</td>
<td>11 (9%)</td>
<td>7 (5%)</td>
</tr>
<tr>
<td>Model 2</td>
<td>38 (57%)</td>
<td>22 (33%)</td>
<td>7 (10%)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>32 (49%)</td>
<td>22 (34%)</td>
<td></td>
<td>11 (17%)</td>
<td></td>
</tr>
</tbody>
</table>

Having a class in an electronic classroom helps me to stay more focused on the instructor’s lessons

<table>
<thead>
<tr>
<th></th>
<th>Model 1</th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>44 (34%)</td>
<td>37 (29%)</td>
<td>27 (21%)</td>
<td>17 (13%)</td>
<td>3 (2%)</td>
</tr>
<tr>
<td>Model 1</td>
<td>50 (74%)</td>
<td>7 (10%)</td>
<td>10 (15%)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>35 (54%)</td>
<td>20 (31%)</td>
<td>10 (15%)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

I expect a higher grade for a course that meets in an electronic classroom

<table>
<thead>
<tr>
<th></th>
<th>Model 1</th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>20 (16%)</td>
<td>22 (17%)</td>
<td>51 (40%)</td>
<td>26 (20%)</td>
<td>9 (7%)</td>
</tr>
<tr>
<td>Model 1</td>
<td>22 (33%)</td>
<td>29 (43%)</td>
<td></td>
<td>16 (24%)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>19 (29%)</td>
<td>26 (40%)</td>
<td>20 (31%)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

The instructor uses multiple technologies in the electronic classroom

<table>
<thead>
<tr>
<th></th>
<th>Model 1</th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>25 (20%)</td>
<td>57 (45%)</td>
<td>25 (20%)</td>
<td>19 (15%)</td>
<td>2 (2%)</td>
</tr>
<tr>
<td>Model 1</td>
<td>42 (63%)</td>
<td>12 (18%)</td>
<td>13 (19%)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Model 2</td>
<td>44 (68%)</td>
<td>12 (18%)</td>
<td>9 (14%)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

The instructor effectively uses instructional technologies in an electronic classroom

<table>
<thead>
<tr>
<th></th>
<th>Model 1</th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>39 (30%)</td>
<td>59 (46%)</td>
<td>21 (16%)</td>
<td>8 (6%)</td>
<td>1 (1%)</td>
</tr>
<tr>
<td>Model 1</td>
<td>53 (79%)</td>
<td>8 (12%)</td>
<td>6 (9%)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Model 2</td>
<td>49 (75%)</td>
<td>13 (20%)</td>
<td>3 (5%)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Instructors using electronic classrooms to deliver course materials are better organized

<table>
<thead>
<tr>
<th></th>
<th>Model 1</th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>45 (35%)</td>
<td>32 (25%)</td>
<td>31 (24%)</td>
<td>16 (12%)</td>
<td>4 (3%)</td>
</tr>
<tr>
<td>Model 1</td>
<td>46 (69%)</td>
<td>15 (22%)</td>
<td>6 (9%)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Model 2</td>
<td>36 (55%)</td>
<td>15 (23%)</td>
<td>14 (21%)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Overall, I am satisfied with my learning experience in an electronic classroom

<table>
<thead>
<tr>
<th>Model 1</th>
<th>Model 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>60 (90%)</td>
<td>57 (88%)</td>
</tr>
<tr>
<td>6 (9%)</td>
<td>7 (11%)</td>
</tr>
<tr>
<td>1 (1%)</td>
<td>1 (1%)</td>
</tr>
</tbody>
</table>

One-hundred-sixteen students (88%) indicated either strongly agree or agree to the satisfactory placement of the projection screen or display panel. Three comments relate to issues with a student’s line of sight to the screen because another student’s head blocks their view. Students were also asked to indicate their level of satisfaction with the brightness of the displayed image without dimming room lights. Fifty-seven (43%) indicated an overall level of agreement. Two comments were provided related to the need to have enough room lighting to take notes if the lights need to be dimmed.

Regarding the instructor having sufficient control of the room lights themselves, the overall level of agreement was offered by 73 students (70%). Students in Model 1 rooms indicated that the light control is by the door and not at the instructor’s lectern which causes difficulty with convenient light control. A related question asked about the effectiveness of a room’s window treatments in controlling outside light in the room. An overall level of agreement with the statement was reported by 66 students (50%).

Classrooms have a variety of furniture including freestanding tables and chairs, tablet desks, and fixed seating. All rooms in Model 2 (ATLC building) have tables and a separate chair. Of the 15 Model 1 rooms used in the research, three have fixed seating, five have tablet desk chairs, and seven have tables and chairs. Students responding for rooms with the same type of furniture show that there were seven responses for fixed seating rooms, 27 for rooms with tablet desk chairs, and 33 for rooms with tables and
separate chairs. All furniture comments were related to tablet desks in various classrooms, and students indicated that the furniture is either uncomfortable or not adequately sized for larger people. Tablet desks have a full-width desktop, and there were no comments about the difficulties of being a left-handed writer. These students rate their levels of satisfaction with the seating arrangements as follows.

<table>
<thead>
<tr>
<th>Table 25. Student Satisfaction with Classroom Furniture Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>Strongly Agree and Agree</td>
</tr>
<tr>
<td>----------------------------</td>
</tr>
<tr>
<td>Fixed Seating</td>
</tr>
<tr>
<td>Tablet Desk</td>
</tr>
<tr>
<td>Table/Chair</td>
</tr>
</tbody>
</table>

Students were asked to respond to statements about their own learning experiences in the electronic classrooms. One-hundred-nine students (83%) indicated an overall agreement that the equipment in an electronic classroom enhances their learning experience. One student comment mentioned the benefit of *multitasking* in the classroom using multiple teaching tools. Students also responded to a statement that having a class in an electronic classroom helps them stay more focused on the instructor’s lessons. Eight-five students (64%) indicated an overall agreement. Just two comments indicated an opinion of *it depends* regarding how the instructor uses the technology.

A separate question asked students if they believe having a class in an electronic classroom detracts from their learning experience. The overall response of no was provided by 98% compared to 2% of yes responses. The breakdown of responses for Model 1 and Model 2 rooms was identical to the overall response. Of those who answered yes to the question, two indicated their reason was that the instructor wastes too
much time with the equipment. One student indicated that he feels over-stimulated by the
multiple types of presentation devices used in the room.

Seventy students (53%) indicated an overall level of agreement to a statement that
they learn more in an electronic classroom. One student comment mentioned the
beneficial use of visual technologies, and two students commented that it depends on how
the instructor uses the technology. Students were split on whether or not they expect
higher grades from courses meeting in electronic classrooms. The levels of agreement
were distributed with 41 (31%) indicating an overall positive agreement, 55 (42%) taking
the neutral position, and 36 (27%) indicating an overall disagreement. Two student
comments indicated that the use of classroom technology has nothing to do with their
grades. Regarding satisfaction with their learning experiences in the electronic classroom,
students provided an 89% overall level of positive agreement. Students in both classroom
models were very close in their level of agreement across the scale.

The final question provided a list of choices for the students asking them to indicate
any noticeable recurring difficulties in their classrooms. Students were given eight
reasons and an option to specify other if desired. Other responses for Model 1 rooms
included one for a dirty screen, two for poor audio, and two issues related to equipment
control or lack of instructor knowledge for using the equipment. Other responses for
Model 2 rooms included one for an inability to connect a personal laptop, and two issues
related to instructor knowledge for using the technology. The overall results for the list
are as follows.
Table 26. Classroom Issues Reported by Students

<table>
<thead>
<tr>
<th>Classroom Issue</th>
<th>Responses</th>
</tr>
</thead>
<tbody>
<tr>
<td>Room lights too bright on the screen</td>
<td>30 (35%)</td>
</tr>
<tr>
<td>Unable to control light from windows</td>
<td>30 (35%)</td>
</tr>
<tr>
<td>Other, please specify</td>
<td>15 (18%)</td>
</tr>
<tr>
<td>Equipment control system unreliable</td>
<td>13 (15%)</td>
</tr>
<tr>
<td>Unreliable source device (computer, VHS, DVD, document camera)</td>
<td>13 (15%)</td>
</tr>
<tr>
<td>Inferior image on the screen</td>
<td>12 (14%)</td>
</tr>
<tr>
<td>Poor sightline to the screen</td>
<td>12 (14%)</td>
</tr>
<tr>
<td>Slow Internet speed</td>
<td>9 (11%)</td>
</tr>
<tr>
<td>Poor placement of instructor teaching station</td>
<td>6 (7%)</td>
</tr>
</tbody>
</table>

Students provided 54 comments related to recommendations for future electronic classroom installations and 19 comments related to their personal experiences in the classrooms. The following results were derived using grounded theory to evaluate and categorize the comments.

Table 27. Student Recommendations/Comments

<table>
<thead>
<tr>
<th>Recommendations</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>Better lighting control</td>
<td>16 (30%)</td>
</tr>
<tr>
<td>Instructor training</td>
<td>13 (24%)</td>
</tr>
<tr>
<td>Moveable lectern and equipment</td>
<td>6 (11%)</td>
</tr>
<tr>
<td>Better sightline to the screen</td>
<td>5 (9%)</td>
</tr>
<tr>
<td>Better equipment performance and control</td>
<td>4 (7%)</td>
</tr>
<tr>
<td>Comments</td>
<td>Results</td>
</tr>
<tr>
<td>Prefer electronic classroom (various reasons)</td>
<td>9 (47%)</td>
</tr>
<tr>
<td>Instructor training needed</td>
<td>6 (32%)</td>
</tr>
<tr>
<td>Students using their own computers during class is distracting to others</td>
<td>2 (11%)</td>
</tr>
</tbody>
</table>

Community College Instructional Support Personnel

The third and final group from whom data were collected included personnel from community college instructional technology support departments. Of the initial 325 individuals in the sample identified from the membership of the American Association of Community Colleges (AACC), 11 individual institutions agreed to participate and
completed the survey for a return rate of 3%. An additional 250 individuals were provided the link to the survey (revised without the question asking for the institution’s name). The survey was sponsored and distributed by the League for Innovation in the Community College to those members who had an instructional technology-related role. A total of 28 responses were generated from that population for a return rate of 11%. A total 39 institutions provided data via the community college instrument. Additional discussion on the number of community colleges participating in data collection will be presented in Chapter 5.

Ninety-five percent indicated that their institution has some form of electronic classroom in use on a campus. Of those with such classrooms, a variety of names are used to refer to them. The following name choices were available for participants to choose, and they could include their own name under the Other, please specify option.

<table>
<thead>
<tr>
<th>Classroom Name</th>
<th>Responses</th>
</tr>
</thead>
<tbody>
<tr>
<td>Technology Classroom</td>
<td>2 (6%)</td>
</tr>
<tr>
<td>Electronic Classroom</td>
<td>2 (6%)</td>
</tr>
<tr>
<td>Smart Classroom</td>
<td>22 (61%)</td>
</tr>
<tr>
<td>Multimedia Classroom</td>
<td>6 (17%)</td>
</tr>
<tr>
<td>Mediated Classroom</td>
<td>1 (3%)</td>
</tr>
<tr>
<td>Other, please specify</td>
<td>3 (8%)</td>
</tr>
</tbody>
</table>

Three other responses (8%) indicated some other name including Smart Multimedia Classroom, Learning College Classroom, and Classroom of the Future. Institutions reporting the use of electronic classrooms were asked to indicate the number of such installations on campus. These responses ranged from a low of one to a high of 260 rooms. The median number of rooms was 55, with a mean of almost 70 rooms per campus.
The number of full-time staff used to support electronic classrooms ranged from zero to 20, with an average of four and a median number of three full-time support personnel. While 5 (16%) have personnel dedicated to supporting electronic classrooms, 26 (84%) of support staff personnel have additional responsibilities. Those responsibilities include 10 (38%) performing information technology, computer, and helpdesk support, seven (27%) taking care of delivery and setup of equipment for classrooms, seven (27%) supporting campus events, three (12%) managing satellite and instructional television, and two (8%) each taking care of computer lab support, equipment repair, and administrative duties.

The survey asked about the types of daily activities performed by instructional support personnel related to electronic classrooms.

<table>
<thead>
<tr>
<th>Daily Activity</th>
<th>Responses</th>
</tr>
</thead>
<tbody>
<tr>
<td>Other, please specify</td>
<td>21 (64%)</td>
</tr>
<tr>
<td>Check lamp hours in projector</td>
<td>16 (48%)</td>
</tr>
<tr>
<td>Check all components for proper functioning</td>
<td>15 (45%)</td>
</tr>
<tr>
<td>Monitor systems with Web-based monitoring tools</td>
<td>11 (33%)</td>
</tr>
<tr>
<td>Open rooms in the morning</td>
<td>4 (12%)</td>
</tr>
<tr>
<td>Lock rooms at the end of the day</td>
<td>4 (12%)</td>
</tr>
<tr>
<td>Unlock equipment cabinets/lecterns in the morning</td>
<td>3 (9%)</td>
</tr>
<tr>
<td>Lock equipment cabinets/lecterns at the end of the day</td>
<td>3 (9%)</td>
</tr>
</tbody>
</table>

Of the 64% of other responses provided, nine (64%) are related to ongoing or on-demand troubleshooting, and five (36%) listed faculty training as a regular activity. Regarding faculty training, 12 (33%) indicated that they require faculty training in advance of using an electronic classroom compared to the 24 (67%) that do not require such training.

The second section of the instructional support personnel survey included questions related to room set-up and equipment. Regarding the typical student furniture used in
classrooms, tables and chairs are used in 42% of rooms, integrated tablet desk and chair units are used in 36%, and fixed seating is provided in 12%. Of the 9% of other types specified, all indicated that a variety of furniture types are used. Wireless Internet access is included in 23 (68%) installations. Of those with wireless access, 17 (68%) use it for students’ laptop computers, and 10 (40%) indicated that they use it for instructors’ laptop computers. Thirty-six percent use it for Internet access on the installed classroom computer. Of the 16% of other responses, two respondents indicated that wireless access is used for the public, and one indicated that it is used for all users and computers for accessing the Internet. Telephones are provided in 12 (35%) of the electronic classrooms, with 10 (56%) of those also posting a list of telephone numbers for support contacts in the classroom. By comparison, 22 (71%) indicated that they also provide printed instructions to assist instructors with using the classroom equipment.

Data regarding classroom projection screens included screen location, format, and type of screen used. Results for these items are presented in the following table.

Table 30. Classroom Screen Data

<table>
<thead>
<tr>
<th>Screen Location</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Front Center</td>
<td>22 (67%)</td>
</tr>
<tr>
<td>Angled in a corner</td>
<td>4 (12%)</td>
</tr>
<tr>
<td>Other, please specify</td>
<td>4 (12%)</td>
</tr>
<tr>
<td>Front Off-Center</td>
<td>3 (9%)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Screen Format</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>4x3</td>
<td>25 (74%)</td>
</tr>
<tr>
<td>16x9</td>
<td>5 (15%)</td>
</tr>
<tr>
<td>Other, please specify</td>
<td>4 (12%)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Screen Type Used</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Fixed Screen</td>
<td>4 (12%)</td>
</tr>
<tr>
<td>Pull-down window shade style</td>
<td>13 (39%)</td>
</tr>
<tr>
<td>Pull down tensioned</td>
<td>8 (24%)</td>
</tr>
<tr>
<td>Fixed Screen</td>
<td>4 (12%)</td>
</tr>
<tr>
<td>Electric window shade style</td>
<td>4 (12%)</td>
</tr>
<tr>
<td>Other, please specify</td>
<td>3 (9%)</td>
</tr>
<tr>
<td>Electric tensioned</td>
<td>1 (3%)</td>
</tr>
</tbody>
</table>
For screen location, the 12% of other locations all indicated that it varies or screens are installed in a combination of all of the location choices provided. For screen format, the indication of both was provided by one institution (3%), while three (9%) indicated don’t know as their response. Additional types of screens reported included a white board or a Smartboard as the projection surface in 6% of installations. Both electric-tensioned screens and all of the above are indicated for 3%.

Instructor lectern or teaching design, location, and ADA requirements were considered in four separate questions. The full results for those items follow. Eighteen percent indicated other as their choice for the lectern location and indicated that it varies from room to room depending on the installation. The typical teaching style or design station location varied for 34% of the rooms. Of the 30% of other items for ADA requirements, respondents listed closed-caption decoders, adjustable chairs, and adjustable table heights.

Table 31. Classroom Lectern Details

<table>
<thead>
<tr>
<th>Lectern Type</th>
<th>Stand-up style</th>
<th>Combination stand-up and sitting style</th>
<th>Other, please specify</th>
<th>Sit-down style</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>18 (56%)</td>
<td>13 (38%)</td>
<td>6 (18%)</td>
<td>5 (15%)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Lectern Location</th>
<th>Other, please specify</th>
<th>Left of center</th>
<th>Right of center</th>
<th>Center</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>11 (34%)</td>
<td>9 (28%)</td>
<td>9 (28%)</td>
<td>3 (9%)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>ADA Requirements and Considerations</th>
<th>Included/considered</th>
<th>Lectern height</th>
<th>Control mounting location</th>
<th>Push button control vs. touch panel</th>
<th>Other, please specify</th>
<th>Not included/considered</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>19 (58%)</td>
<td>15 (56%)</td>
<td>15 (56%)</td>
<td>14 (52%)</td>
<td>8 (30%)</td>
<td>14 (42%)</td>
</tr>
</tbody>
</table>

Only one institution (3%) leases any of the equipment included in classroom installations. Computers are the only leased equipment used. All other equipment is
purchased by the institution. Of those using any type of equipment security system or hardware (respondents were able to indicate all of the types of devices used), 25 (78%) use some form of cable lock, whereas 22 (69%) use locking cabinets or closets. Security plates mounted to equipment are used by nine (28%), with keycards or combination lock access to rooms being used by 8 (25%) institutions. Equipment security cages are used in five (16%), with network-based security monitoring being used in four (12%) schools.

Considerations related to the design of the teaching station include the source equipment used by the instructors and the control equipment components placed in the station. Other responses for equipment sources included a Sympodium (2) and a laptop connection (1) for the instructor. Respondents provided the following data related to teaching station design configurations.

Table 32. Electronic Classroom Sources and Control Equipment

<table>
<thead>
<tr>
<th>Item</th>
<th>Component</th>
<th>Responses</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Equipment Sources</strong></td>
<td>Computer w/ monitor, keyboard, and mouse</td>
<td>31 (94%)</td>
</tr>
<tr>
<td></td>
<td>Document Camera</td>
<td>29 (88%)</td>
</tr>
<tr>
<td></td>
<td>Classroom control panel (push button or touch panel)</td>
<td>24 (73%)</td>
</tr>
<tr>
<td></td>
<td>Combination VHS/DVD</td>
<td>23 (70%)</td>
</tr>
<tr>
<td></td>
<td>Preview Monitor</td>
<td>16 (48%)</td>
</tr>
<tr>
<td></td>
<td>DVD</td>
<td>15 (45%)</td>
</tr>
<tr>
<td></td>
<td>VHS deck</td>
<td>13 (39%)</td>
</tr>
<tr>
<td></td>
<td>Other, please specify</td>
<td>7 (21%)</td>
</tr>
<tr>
<td><strong>Control Equipment</strong></td>
<td>Switcher</td>
<td>20 (69%)</td>
</tr>
<tr>
<td></td>
<td>Audio amplifier</td>
<td>18 (62%)</td>
</tr>
<tr>
<td></td>
<td>Room control hardware</td>
<td>16 (55%)</td>
</tr>
<tr>
<td></td>
<td>Audio mixer</td>
<td>10 (34%)</td>
</tr>
<tr>
<td></td>
<td>Wireless keyboard or mouse receiver</td>
<td>10 (34%)</td>
</tr>
<tr>
<td></td>
<td>Other, please specify</td>
<td>8 (28%)</td>
</tr>
<tr>
<td></td>
<td>Wireless microphone receiver</td>
<td>7 (24%)</td>
</tr>
<tr>
<td></td>
<td>Camera controllers</td>
<td>7 (24%)</td>
</tr>
<tr>
<td></td>
<td>Videoconferencing equipment</td>
<td>7 (24%)</td>
</tr>
</tbody>
</table>

Institutions were asked whether they provide multiple levels of electronic classrooms with different equipment configurations and complexities. Multiple levels of installed
technology often include a range of classrooms that are very basic (a computer and a projector) to a sophisticated installation capable of supporting multiple video sources and two-way video distance learning. While some institutions have only one classroom version, others may have three or more with increasing levels of installed technology and complex capabilities.

Sixteen (53%) indicated they do provide multiple levels of installed classroom technology compared to 14 (47%) that do not. Of those indicating that they do provide multiple levels, six (35%) indicated that they have two levels, seven (41%) provide three levels, and two (12%) provide four levels. Two respondents (12%) indicated the other response. One indicated the institution installs equipment to meet specific needs rather than following set levels, and one indicated that they have multiple levels by default. Without further explanation it is impossible to guess the meaning of the response.

Those using multiple levels were asked to provide typical classroom model names in order to see if any one name or group of names for various levels is used throughout the colleges. The names for all four levels as indicated by other community colleges are listed in the following table.

<table>
<thead>
<tr>
<th>Table 33. Classroom Level Names at Other Institutions</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Level 1 Names</strong></td>
</tr>
<tr>
<td>Mobile Media (limited equipment)</td>
</tr>
<tr>
<td>AV Classroom, Classroom</td>
</tr>
<tr>
<td>Standard Classroom</td>
</tr>
<tr>
<td>Tier 1</td>
</tr>
<tr>
<td>Learning College Classroom-Lecture</td>
</tr>
<tr>
<td>Level 1 (two responses)</td>
</tr>
<tr>
<td>Tech Classroom, Smart Classroom (two responses)</td>
</tr>
<tr>
<td>Multimedia</td>
</tr>
<tr>
<td>Classroom of the Future</td>
</tr>
</tbody>
</table>
There is a wide variety of equipment and technology options included in the various classroom levels. Reading the data required categorizing the items to get an accurate look at what is included in each level across the board. Appendix J includes the full listing of the responses for each level. Listed here are the categories for each level that were identified and the number of times (if more than one) each item was included in the particular classroom level. Respondents were asked to list the typical setup for each level and to include an equipment list, installed items, and control systems if applicable.

Rooms above Level 1 are sometimes addressed by listing equipment provided in addition to a standard Level 1 setup or a list of items rather than providing the complete list for that level.

The least complex Level 1 classrooms typically include the following items:

<table>
<thead>
<tr>
<th>Level 2 Names</th>
</tr>
</thead>
<tbody>
<tr>
<td>Permanent Media (additional equipment)</td>
</tr>
<tr>
<td>Smart Classroom</td>
</tr>
<tr>
<td>Telelearning Classroom</td>
</tr>
<tr>
<td>Large Auditorium Style Classroom</td>
</tr>
<tr>
<td>Tier 2</td>
</tr>
<tr>
<td>Learning College Classroom-Computer Lab</td>
</tr>
<tr>
<td>Level 2 (two responses)</td>
</tr>
<tr>
<td>Tech Classroom with Document Camera</td>
</tr>
<tr>
<td>Enhanced Learning Environment (ELE)</td>
</tr>
<tr>
<td>Multimedia Enhanced</td>
</tr>
<tr>
<td>Classroom of the Future</td>
</tr>
<tr>
<td>Distance Learning Classroom</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Level 3 Names</th>
</tr>
</thead>
<tbody>
<tr>
<td>Smart Multimedia Classroom</td>
</tr>
<tr>
<td>Tier 3</td>
</tr>
<tr>
<td>Level 3 (two responses)</td>
</tr>
<tr>
<td>Multimedia with DL Support</td>
</tr>
<tr>
<td>Teleconference Classroom</td>
</tr>
<tr>
<td>Technology Equipped</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Level 4 Names</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tier 4-Digital Video Conferencing (DVD)</td>
</tr>
<tr>
<td>Level 4</td>
</tr>
<tr>
<td>Basic</td>
</tr>
</tbody>
</table>
Table 34. Level 1 Classroom Configurations

<table>
<thead>
<tr>
<th>Component or Item Included in Level 1 Classrooms</th>
<th># of Responses</th>
</tr>
</thead>
<tbody>
<tr>
<td>computer</td>
<td>21</td>
</tr>
<tr>
<td>projector</td>
<td>20</td>
</tr>
<tr>
<td>document camera</td>
<td>12</td>
</tr>
<tr>
<td>DVD/VHS combination player</td>
<td>10</td>
</tr>
<tr>
<td>control panel or system</td>
<td>10</td>
</tr>
<tr>
<td>audio amplification or speakers</td>
<td>6</td>
</tr>
<tr>
<td>DVD player</td>
<td>4</td>
</tr>
<tr>
<td>VHS deck</td>
<td>4</td>
</tr>
<tr>
<td>screen</td>
<td>4</td>
</tr>
<tr>
<td>closed-caption decoder</td>
<td>3</td>
</tr>
<tr>
<td>network access</td>
<td>3</td>
</tr>
<tr>
<td>Smartboard</td>
<td>3</td>
</tr>
<tr>
<td>wireless mouse</td>
<td>3</td>
</tr>
<tr>
<td>printer</td>
<td>2</td>
</tr>
<tr>
<td>television or monitor</td>
<td>2</td>
</tr>
<tr>
<td>lectern</td>
<td>2</td>
</tr>
<tr>
<td>remote control, Sympodium, wireless network access, laptop computer input, auxiliary video input, and overhead transparency projector.</td>
<td>1</td>
</tr>
</tbody>
</table>

Items listed for Level 2 rooms (some increased complexity over Level 1) include:

Table 35. Level 2 Classroom Configurations

<table>
<thead>
<tr>
<th>Component or Item Included in Level 2 Classrooms</th>
<th># of Responses</th>
</tr>
</thead>
<tbody>
<tr>
<td>projector</td>
<td>8</td>
</tr>
<tr>
<td>DVD/VHS combination player</td>
<td>7</td>
</tr>
<tr>
<td>computer</td>
<td>6</td>
</tr>
<tr>
<td>document camera</td>
<td>5</td>
</tr>
<tr>
<td>switcher or control system</td>
<td>4</td>
</tr>
<tr>
<td>speakers</td>
<td>4</td>
</tr>
<tr>
<td>instructor multimedia lectern</td>
<td>4</td>
</tr>
<tr>
<td>laptop computer connection</td>
<td>3</td>
</tr>
<tr>
<td>television or monitor</td>
<td>2</td>
</tr>
<tr>
<td>remote mouse</td>
<td>2</td>
</tr>
<tr>
<td>videoconferencing equipment, public address system, screen, printer, camera, and DVD player</td>
<td>1</td>
</tr>
</tbody>
</table>

Those with a third level of technology in the classroom listed equipment items as:
Table 36. Level 3 Classroom Configurations

<table>
<thead>
<tr>
<th>Component or Item Included in Level 3 Classrooms</th>
<th># of Responses</th>
</tr>
</thead>
<tbody>
<tr>
<td>document camera</td>
<td>8</td>
</tr>
<tr>
<td>control system</td>
<td>6</td>
</tr>
<tr>
<td>projector</td>
<td>5</td>
</tr>
<tr>
<td>computer</td>
<td>5</td>
</tr>
<tr>
<td>DVD/VHS combination player</td>
<td>4</td>
</tr>
<tr>
<td>microphone</td>
<td>3</td>
</tr>
<tr>
<td>audio equipment</td>
<td>3</td>
</tr>
<tr>
<td>lectern</td>
<td>3</td>
</tr>
<tr>
<td>videoconferencing</td>
<td>3</td>
</tr>
<tr>
<td>Smartboard</td>
<td>2</td>
</tr>
<tr>
<td>Sympodium</td>
<td>2</td>
</tr>
<tr>
<td>camera</td>
<td>2</td>
</tr>
<tr>
<td>television or monitor</td>
<td>2</td>
</tr>
<tr>
<td>laptop computer connection, editing capability, and screen</td>
<td>1</td>
</tr>
</tbody>
</table>

Finally, those listing a Level 4 indicated that equipment included:

Table 37. Level 4 Classroom Configurations

<table>
<thead>
<tr>
<th>Component or Item Included in Level 3 Classrooms</th>
<th># of Responses</th>
</tr>
</thead>
<tbody>
<tr>
<td>DVD/VHS combination player</td>
<td>3</td>
</tr>
<tr>
<td>control system</td>
<td>3</td>
</tr>
<tr>
<td>document camera</td>
<td>3</td>
</tr>
<tr>
<td>audio equipment</td>
<td>3</td>
</tr>
<tr>
<td>projector</td>
<td>3</td>
</tr>
<tr>
<td>microphone</td>
<td>2</td>
</tr>
<tr>
<td>screen</td>
<td>2</td>
</tr>
<tr>
<td>computer</td>
<td>2</td>
</tr>
<tr>
<td>lectern</td>
<td>2</td>
</tr>
<tr>
<td>Smartboard, Sympodium, student computers, wireless mouse, closed-caption decoder, and audio capture equipment</td>
<td>1</td>
</tr>
</tbody>
</table>

The next section of the community college personnel survey addressed the use of control systems in electronic classrooms. In addition to whether or not a control system was used, respondents were asked if they used features such as an auto off setting, a video mute to blank the screen, and centralized network monitoring of the classrooms. Results for those items are as follows.
Table 38. Classroom Control System Data

<table>
<thead>
<tr>
<th></th>
<th>Yes</th>
<th>No</th>
</tr>
</thead>
<tbody>
<tr>
<td>control system used?</td>
<td>19 (66%)</td>
<td>10 (34%)</td>
</tr>
<tr>
<td>auto-off function?</td>
<td>8 (31%)</td>
<td>18 (69%)</td>
</tr>
<tr>
<td>video mute?</td>
<td>14 (56%)</td>
<td>11 (44%)</td>
</tr>
<tr>
<td>network monitoring?</td>
<td>8 (30%)</td>
<td>19 (70%)</td>
</tr>
</tbody>
</table>

Of those using control systems, nine (38%) indicated that they use Extron equipment, five (21%) reported using Crestron, three (12%) use AMX, two (8%) use SP Controls, and one (4%) indicated that they use a home grown system. The response of other was indicated by four respondents (17%). Of those responses, equipment remote controls or a variety of control options are used.

Those using power management typically indicated that normal hours of operation start between 7:00 and 8:00 a.m. with systems shut down between 10:00 and 11:00 p.m. Those who use such a monitoring system were asked to indicate which staff positions are authorized to monitor the room software. Results indicated that six (55%) allow classroom technicians and department managers to perform such monitoring. In addition, five (45%) have someone from their networking or information technology department monitor the classrooms. Other responses supplied by respondents included media staff and technology support helpdesk.

Community colleges were asked several questions related to design, planning, installation, and standards for electronic classrooms. Two open-ended questions asked about the name of the campus department that handles overall coordination for classroom projects and the department that oversees technical support for these rooms. Grounded theory techniques were used to organize and categorize the responses. Thirteen (52%) indicated that coordination of classroom design, planning, and installation is handled by a
media services or media technology type of department. Information technology
departments are primarily in charge at two (44%) schools. One institution (4%) indicated
a more specialized department named Flexible Learning Options. Technical support of
installed classrooms is managed by audio visual or media services departments at 16
(59%) institutions. The information technology or similar department houses the support
functions for the other two (11%).

Institutions generally involve other departments and offices in electronic classroom
projects. Sixteen (62%) believe that their institution effectively coordinates with all
departments and offices that need to be involved with electronic classroom projects.
Respondents were asked to indicate all of the departments that are involved in such
projects. Those departments involved included the following.

<table>
<thead>
<tr>
<th>Department or Office</th>
<th>Responses</th>
</tr>
</thead>
<tbody>
<tr>
<td>information technology services</td>
<td>22 (81%)</td>
</tr>
<tr>
<td>facilities</td>
<td>21 (78%)</td>
</tr>
<tr>
<td>academic departments or divisions</td>
<td>10 (70%)</td>
</tr>
<tr>
<td>capital projects and finance</td>
<td>7 (26%)</td>
</tr>
<tr>
<td>finance</td>
<td>7 (26%)</td>
</tr>
<tr>
<td>library/media</td>
<td>1 (7%)</td>
</tr>
<tr>
<td>All of the above (from other)</td>
<td>1 (7%)</td>
</tr>
</tbody>
</table>

Some form of standing technology committee or group is in place at 21 (78%) schools
where the committee membership includes a wide variety of campus constituents.
When asked to indicate the positions or offices included on such a committee, the
responses were as follows.
Table 40. Technology Committee Representation

<table>
<thead>
<tr>
<th>Individuals on Technology Committee</th>
<th>Responses</th>
</tr>
</thead>
<tbody>
<tr>
<td>faculty</td>
<td>18 (86%)</td>
</tr>
<tr>
<td>instructional technology manager/director</td>
<td>16 (76%)</td>
</tr>
<tr>
<td>media specialists</td>
<td>15 (71%)</td>
</tr>
<tr>
<td>networking or infrastructure support</td>
<td>14 (67%)</td>
</tr>
<tr>
<td>instructional technologists</td>
<td>13 (62%)</td>
</tr>
<tr>
<td>academic dean</td>
<td>12 (57%)</td>
</tr>
<tr>
<td>chief information officer</td>
<td>9 (43%)</td>
</tr>
<tr>
<td>chief academic administrator</td>
<td>8 (38%)</td>
</tr>
<tr>
<td>campus facilities manager</td>
<td>5 (24%)</td>
</tr>
<tr>
<td>chief fiscal officer</td>
<td>2 (10%)</td>
</tr>
<tr>
<td>Other, please specify: library, classified employee, access specialist</td>
<td>3 (14%)</td>
</tr>
</tbody>
</table>

Respondents were asked to provide information related to classroom installation work including the time of year that the work is done, how they work around space needs, their use of outside contractors for various parts of the work, and whether a bid process is used for equipment and labor. Ten institutions (37%) do their classroom installations either in the summer or throughout the year. Doing the work between semesters or terms is used by six (22%), whereas one institution (4%) does installation work on the weekends. Eight (32%) use swing rooms or temporary classroom space during installations.

Work on electronic classroom projects is done by both campus personnel and outside contractors. Survey questions asked whether or not outside engineers or integrators were used for design and installation, electrical work, data or network wiring, and if a bid process was required. The summary results for those items follow.

Table 41. Outside Classroom Project Assistance Needs

<table>
<thead>
<tr>
<th>Outside Project Assistance</th>
<th>Yes</th>
<th>No</th>
</tr>
</thead>
<tbody>
<tr>
<td>Outside engineer/integrator for design?</td>
<td>6 (24%)</td>
<td>19 (76%)</td>
</tr>
<tr>
<td>Outside engineer/integrator for installation?</td>
<td>11 (42%)</td>
<td>15 (58%)</td>
</tr>
<tr>
<td>Outside electrical contractor?</td>
<td>11 (41%)</td>
<td>16 (59%)</td>
</tr>
<tr>
<td>Outside data wiring contractor?</td>
<td>10 (37%)</td>
<td>17 (63%)</td>
</tr>
<tr>
<td>Bid process required?</td>
<td>14 (52%)</td>
<td>13 (48%)</td>
</tr>
</tbody>
</table>
Institutions that use an outside integrator or contractor for any part of their projects (from design to installation) were asked to indicate the stage at which the contractor is brought into the project. Of those responses, six (40%) indicated that they do the design and write the specification but then hire the integrator for installation. Four (27%) hire the integrator after the needs assessment but before the design phase begins. Integrators are hired after the design phase but before formal specifications are written at three (20%). Finally, two (13%) hire an integrator during the initial needs-assessment phase. Responses listed in the Other, please specify option were included in the above categories.

Of those requiring a bid process, eight (50%) of bids required are for installation, whereas three (19%) are required to bid out the equipment components. Preparation of a classroom specification is a bid requirement for one institution (6%), and one (6%) also indicated all of the above. Those items also included initial planning/consultation and design, but neither of these received any individual responses. Responses listed in the Other, please specify option were included in the above categories.

The final questions on the community college survey addressed the existence and use of a standards document to guide electronic classroom planning, design, and installation. Such a document is used by just five (19%) of the institutions responding. Those documents had names such as IT Standards Document, Classroom Design Standards, Classroom Technology Standards, and Electronic Instructor Station Specifications. Documents are written by both individuals and committees that include technology consultants, media or instructional support personnel, and campus technology committees. Seven (86%) of standards documents are updated on an as needed basis,
whereas one (14%) is updated annually. Changes to the document are approved by individuals or groups including media or instructional support personnel, technology committees, and a college council. Those using a standards document on campus were asked to indicate those items or topics addressed in the document. Those results follow.

Table 42. Items Addressed by Classroom Standards Documents

<table>
<thead>
<tr>
<th>Items Addressed by Standards Document</th>
<th>Responses</th>
</tr>
</thead>
<tbody>
<tr>
<td>Equipment placement</td>
<td>4 (57%)</td>
</tr>
<tr>
<td>Projector placement</td>
<td>4 (57%)</td>
</tr>
<tr>
<td>Minimum equipment specifications</td>
<td>4 (57%)</td>
</tr>
<tr>
<td>Equipment brands or models</td>
<td>3 (43%)</td>
</tr>
<tr>
<td>Lectern design and construction</td>
<td>3 (43%)</td>
</tr>
<tr>
<td>Electrical requirements</td>
<td>2 (29%)</td>
</tr>
<tr>
<td>Wiring/cable specifications</td>
<td>2 (29%)</td>
</tr>
<tr>
<td>Conduit</td>
<td>2 (29%)</td>
</tr>
<tr>
<td>Projector brightness</td>
<td>2 (29%)</td>
</tr>
<tr>
<td>Classroom furniture type or style</td>
<td>2 (29%)</td>
</tr>
<tr>
<td>Lighting</td>
<td>2 (29%)</td>
</tr>
<tr>
<td>Screen size or type</td>
<td>2 (29%)</td>
</tr>
<tr>
<td>Projector contrast ratio</td>
<td>1 (14%)</td>
</tr>
<tr>
<td>Window treatments</td>
<td>1 (14%)</td>
</tr>
<tr>
<td>Equipment (but not brands)</td>
<td>1 (14%)</td>
</tr>
</tbody>
</table>

Summary

Survey results from the faculty and student populations have provided an insightful look into their attitudes about and their experiences in the electronic classroom environment. These two populations are on the front lines of instructional technology, and their input is important in establishing trends related to instructional effectiveness and overall satisfaction with the technology. These data will be further analyzed for presentation in Chapter 5 in order to draw conclusions and make recommendations regarding future design and the development of a standards document for Cincinnati State. Data collected from the community college instructional support group, though small in numbers, help to begin to build an overall picture of the use of electronic
classrooms in the community college institution. Recommendations for further study will be included.

Responses to two of the three surveys (students and other community college personnel) were not as good as expected and therefore may not provide the best representation of their given populations. The results listed here and the recommendations in Chapter 5 may not be as conclusive as they would be if larger numbers of individuals participated. The results can, at least, begin to provide insight into how faculty and students perceive their teaching and learning experiences in electronic classrooms. Results from other community colleges, while only showing a very small snapshot of their practices, processes, and procedures, can offer a start to others who may want to explore these technologies further. Chapter 5 will include build upon those possible explorations for future research.
Chapter 5

Conclusions, Implications, and Recommendations

Introduction

Faculty and students are, for the most part, very satisfied with their experiences in the electronic classroom environment. They judge that the technology is beneficial to the teaching and learning process and that they prefer to teach or attend classes in these rooms. Issues of image brightness and control of room and ambient lighting were common concerns, but overall design and installation appears to have been satisfactory. Other community colleges are using electronic classrooms as well, though there were few standards regarding design. There appear to be several approaches to developing multiple levels of installed technology with differing levels of complexity. What one institution may refer to as a Level 1 classroom with a very simple installation may be much more complex at another institution. Leadership and support for such projects appears to be consistent in that instructional or information technology, or media services departments are heavily involved in electronic classroom projects.

The data collected from the three populations have been used to answer the research questions and draw conclusions to them. Conclusions are presented here that address instructional effectiveness and faculty and student satisfaction. Conclusions related to the data collected from community college instructional support personnel will be used with
the faculty and student data to develop the standards document for Cincinnati State Technical and Community College. The Standards Document is presented in Appendix G.

Following the discussion of the conclusions, the implications section will address how the conclusions can be used to assist other community colleges in their development and deployment of electronic classroom environments. Any perceived strengths, weaknesses, or limitations will be addressed in the implications section as well. Finally, the recommendations section will address further research opportunities and additional directions related to these topics that could be pursued by others.

Readers should be aware that conclusions drawn from the student and community college instructional support personnel populations may not be as well supported as those related to the faculty population. The low response rates from students and other community colleges (addressed in Chapter 4 and later in the Implications section) make it more difficult to draw conclusions that are truly representative of these participants. While each sample can be fairly compared to the larger population (external validity) they may or may not be as representative of their sample (internal validity).

Conclusions

The research questions presented in Chapter 1 have been answered by the data collected from the study populations. Each question is restated here and followed by the appropriate conclusions drawn from the data analysis. Differences in results between room models and/or populations will be discussed as they relate to the conclusions based on categorizing and analyzing agreement levels. Research questions will be presented in
three categories: 1) instructional effectiveness, 2) faculty and student satisfaction, and 3) classroom design and support.

Faculty and Student Instructional Effectiveness and Satisfaction Conclusions

There are two research questions related to instructional effectiveness and faculty and student satisfaction. They are number one, “How may learning needs and different kinds of learning experiences be met and extended with the implementation of electronic resources in the classroom?” and number two, “How do technical and community college instructors and students judge electronic classrooms for effective teaching and learning? What are their levels of satisfaction with such classrooms?”

A majority of both instructors and students preferred to have classes that met in electronic classrooms, though most students scheduled their classes based on meeting their scheduling needs rather than whether the class would be conducted in an electronic classroom. Instructors also taught courses in traditional classrooms, but almost two-thirds of them specifically request an electronic classroom. Instructors and students almost universally agreed on the equipment items that should be made available in electronic classrooms. The top four items, including a computer, projector, Internet connection, and lighting control were indicated by both populations. Most other items were similarly ranked, with instructors placing a higher value on a document camera and students preferring room-darkening shades and wireless Internet for instructors. Computer-based instruction projected to the entire class appears to be a high priority for both populations. Both instructors and students indicated that a computer and projector for PowerPoint presentations was the most used equipment. There was also agreement that the projection screen should be located at the front-center of the classroom, but more instructors than
students preferred the screen to be placed either off-center or in a corner of the room so that they could make better use of the writing surface when needed.

Instructors and students were asked to rate their level of agreement or disagreement with various aspects of the electronic classroom environment and its use by the instructor. The results have been analyzed for the overall population and further analyzed based on which room model (Model 1 or Model 2) was being rated. Faculty and student levels of agreement on these aspects of the classroom environment appear to show that both populations have a high level of satisfaction or agreement on most items, but the following classroom issues were rated differently in one way or another.

Table 43. Faculty and Student Satisfaction Differences

<table>
<thead>
<tr>
<th>Survey Item</th>
<th>Faculty</th>
<th>Students</th>
</tr>
</thead>
<tbody>
<tr>
<td>screen placement</td>
<td>Model 2 rooms rated much higher</td>
<td>Both models ranked well</td>
</tr>
<tr>
<td>lectern/equipment arrangement</td>
<td>Model 2 rooms rated much higher</td>
<td>Both models ranked well</td>
</tr>
<tr>
<td>image brightness</td>
<td>Both Model 1 and Model 2 rated poorly</td>
<td>Split between agreement and disagreement</td>
</tr>
<tr>
<td>lighting control</td>
<td>Model 2 rooms rated much higher</td>
<td>Both models ranked well</td>
</tr>
<tr>
<td>acoustics</td>
<td>Model 2 rooms rated much higher</td>
<td>Both models ranked well</td>
</tr>
<tr>
<td>window treatments</td>
<td>Split between agreement and disagreement</td>
<td>Both models ranked well</td>
</tr>
</tbody>
</table>

The majority of instructors judged that the electronic classroom and the control system were easy to use and that the placement of the equipment was satisfactory. Students also indicated a high level of agreement with the placement of the equipment in the room to facilitate the use of the installed technology. The combination of equipment sources and the installation design appear to be satisfactory for all instructors and students in both room models.
Differences in satisfaction with screen may be due to the fact courses taught in Model 2 rooms are technology-related courses, the projection screen is used more, and there may be less need for writing on a white board. Those in Model 1 rooms seem to prefer screen placement that facilitates using the white board without the need to raise the screen and blank the projected image.

There were problems noted with image brightness that could negatively affect the learning experience in the classroom. Instructors indicated a 51% level of disagreement that the projected image was bright enough to see in the classroom without dimming the room lighting. Students were nearly evenly split in their levels of agreement and disagreement. Also related to image brightness and room lighting control, instructors indicated that they had better control in Model 2 classrooms compared to Model 1 classrooms. Model 1 classrooms are in older buildings in which the electronic classrooms were not original installations and room lighting control was not part of the technology installation. In Model 2 rooms in the newer ATLC building, lighting control and zoned lighting was part of the design and installation of each classroom. Overall, image brightness and the ability to control ambient light appear to be important considerations for room design.

Another factor related to satisfaction with the electronic classroom environment is the audio capability and acoustics. Students had a high level of satisfaction with the acoustics of both room models, but instructors indicated a difference of opinion regarding acoustics. The notable difference occurred between their level of overall agreement and the indication of neutral. Once again, the retrofitting of rooms used in Model 1 compared to the new construction of Model 2 rooms may explain the difference of opinion. Model 2
rooms were built specifically with an electronic classroom design from the beginning, whereas Model 1 rooms were fitted with sound equipment and speakers as part of the retrofit process to convert them into electronic classrooms. The indication is that speaker placement and zoning in the Model 2 design is superior to Model 1.

Several items were rated by instructors and students related to their teaching and learning experiences in the classrooms. In some instances, instructors were judging their level of agreement to aspects of their teaching and to perceived aspects of their students’ learning experiences. Similarly, students were judging their own experiences and the perceived attitudes of their instructors’ teaching in the electronic classroom. Instructors indicated a high level of overall agreement that the electronic classroom allowed for more effective instruction, but there was a difference of 19 percentage points between Model 1 (76%) and Model 2 (95%). These levels of agreement between room models are significant and compare very closely to the instructors’ ratings of the electronic classroom enhancing their students’ learning experiences. These differences may be attributed to the age of the installed equipment and supporting technology; the relationship between image brightness, ambient light, and the ability to control the room lights; and the perceived newness of the learning environments of Model 2 compared to the older rooms that use the Model 1 arrangement.

Students offered similar ratings of their experiences in the classrooms. Their overall level of agreement that the instructor used the technology effectively was 77% with a two percentage point difference between Model 1 and Model 2 rooms. Students also highly agreed that electronic classrooms enhanced their learning experiences. Students indicated that they believed they learned more in an electronic classroom and offered a 53% overall
level of agreement, with a neutral position of 33%. Again, there may be perceived differences in the environment based on newer construction of Model 2 rooms versus the retrofitting done to place technology in Model 1 rooms. What is shiny and new may be perceived to be better when, in fact, the technology is actually very similar between the two classroom models.

Items related to the use of multiple technologies, organization, student focus, and academic achievement in electronic classrooms were presented to both instructors and students. The responses show a high level of agreement and appear to indicate that the electronic classroom does enhance the teaching and learning experiences to a high degree for both instructors and students.

The majority of instructors (65) took the neutral position when asked if students earn higher grades when taking classes in electronic classrooms. Comments indicated that there were not enough data to support agreement or disagreement to the statement. Students were more evenly split on their response. The majority (42%) indicated the neutral position, whereas 31% indicated overall agreement, and 27% indicated overall disagreement to the statement about expecting a higher grade for a class meeting in an electronic classroom. The conclusion is that there were not enough data to support the statement that students either expect or receive higher grades from courses that meet in electronic classrooms. Further study may be beneficial and will be discussed in the recommendations section.

Ninety-one percent of instructors did not believe that the electronic classroom was a detriment to their teaching experience, and 97% of students did not believe it was a detriment to their learning experience. These high numbers seem to indicate that the
experience in an electronic classroom is overwhelmingly positive as it relates to the overall experience. The few comments offered for both instructor and student responses indicated that time is wasted with the equipment (7 comments), the technology makes the experience overwhelming to the instructor, or over-stimulates the student’s experience (2 comments).

Both populations indicated that the most recurring problem was related to the room lights being too bright on the projection screen. The inability to control the ambient light from windows was the number two problem for students and the number three problem for instructors. An inferior image on the screen was the number four problem for both populations. Looking at the data for each classroom model shows that these lighting issues were the top two difficulties noted for both Model 1 and Model 2 rooms but were more often mentioned for Model 1 rooms.

As previously mentioned, Model 1 rooms do not have all of the room lighting controls that were installed in Model 2 rooms. All of these issues point to the need for bright projected images and effective lighting control (both from classroom lights and ambient light from windows) in the classroom. Equipment problems, placement, and control issues were rated as the number three problem for students and as numbers five and six for instructors. Comments offered were related to various equipment performance or placement issues but were not in significant numbers to form any conclusions regarding equipment performance.

Instructors were asked an open-ended question to share their opinions on what, if anything, they considered to be missing from an electronic classroom. Breaking out these responses into categories using grounded theory techniques shows that the top item was
the need to control presentations via a remote mouse or presentation clicker to advance slides and navigate Websites. Other items offered multiple times but in much lower numbers included instructor training, better seating arrangement for the instructor, better lighting control, a classroom response system, and the ability to control students’ computers in the classroom. Based on these comments, future room designs should incorporate the remote control capabilities mentioned by the instructor participants.

Using grounded theory methods to categorize instructor comments resulted in the top five recommendations regarding future classroom projects (in order of number of times mentioned): placing the projection screen off-center in the room or including a second white board on a side wall, better lighting control, better equipment arrangement or control, faculty training, and equipment maintenance or replacement with more current technology. Several other items were mentioned one or two times. Screen placement and room lighting control were once again ranked as high priority items for instructors. Final instructor comments provided very little useful data, but some similar comments that were offered multiple times included the need for faculty training and statements that the technology makes it easier to teach and saves time, the technology leads to student inattention, and equipment poorly placed in the classroom. Instructor training is a recurring theme in the final open-ended questions and should be addressed for current classrooms and any new classrooms that come online in the future.

Design, Installation, Standards, and Support Conclusions

Five research questions (numbers three through seven) were designed to be answered by other community college instructional support departments. These questions were related to design standards, technology use, campus-wide involvement and support of
classroom projects, the use of external consultants, and ongoing funding and support.

Data gathered from the community college survey were used to establish a snapshot of current practices and procedures and to develop the classroom standards document. Each research question is restated here, and the related conclusions are included for each question.

3. What standards, if any, are used by technical and community colleges for classroom design and technology integration? Who develops and maintains the standards?

The most common name given to electronic classrooms was *smart classroom*. The term *multimedia classroom* was also popular, and *technology classroom* and *electronic classroom* were used on occasion. Very few indicated that their institution has or uses a classroom standards document. When used, it is most often updated on an as needed basis rather than on a set timeline. The documents are most often written by campus instructional technology staff or a campus technology committee. Changes to the standards documents are authorized by those in similar positions, committees or a higher level administrator.

Several items are addressed in the documents, with the most often mentioned items being equipment placement, projector placement, and minimum equipment specifications. It appears that equipment items are more often specified than other technical specifications that relate to infrastructure (cabling) or environment issues such as screen placement and lighting. Faculty and students had a high level of interest in these environment items, yet they do not appear to be high priorities for standards. Since very few respondents indicated that they have such a document, the development of some
form of adaptable document that can be used by other institutions may be beneficial and widely sought to help provide direction, especially for smaller community and technical colleges.

4. **What components and technologies are included in various levels of classroom design on technical and community college campuses? What new technologies are being considered for future implementation?**

Most institutions indicated that they include a computer, document camera, video playback, and some form of system or equipment control. For control purposes, component switching and control and audio amplification are typically included as well. About 50% indicated that they have multiple levels of classroom installations on campus. Of those institutions, the majority had either two or three levels that included various equipment and control capabilities. Various names of these levels are used in the reporting institutions, but there appears to be no significant pattern of naming conventions. The terms *smart classroom, electronic classroom, and multimedia classroom* appear for various levels, and some institutions simply use terms such as *Level 1 or Tier 1* and so on. Observations in the educational technology field show that the term *smart classroom* is widely used to refer to classrooms with installed technology regardless of the complexity.

Those reporting only one classroom level stated a similar equipment configuration including computer, projector, video playback, and document camera. Those with two levels reported additional equipment such as video conferencing, more advanced switching and control, integrated instructor lectern, more audio control, and an instructor laptop connection. Level 3 rooms added items such as a Smartboard, Sympodium,
cameras, and other video capabilities. Level 4 rooms, if used, had similar equipment to others in level three. Because there are so many diverse designs, it is difficult to determine patterns based on the data. What some institutions add to Level 2, others add on at Level 3, and so on. The basics of computer, projector, and video playback exist starting at Level 1 in most cases, whereas some Level 1 classrooms are fully integrated with Level 2 adding distance learning equipment. It appears that institutions determine their levels of technology based on local needs rather than any standards or predefined models. What some call Level 1 has the same complexity of what others call Level 2 or Level 3.

A classroom control system is used in about two-thirds of the reporting institutions. Systems manufactured by Extron and Crestron are the most popular. These control systems become a necessity as more complex equipment configurations are used and instructors require the capability to switch between sources. A video mute feature to blank the projected image was included in over 50%. Only about one-third with control systems have designated operating times and control the systems by automatically shutting them down for some designated time period. One-third also used centralized monitoring or management tool. These systems are fairly expensive and are more beneficial for larger numbers of classrooms. Participants reported a range of 1-260 electronic classrooms, with the average of around 70 per institution and its various campuses or locations. Since the number of installed classrooms also varies widely and different institutions have different priorities regarding such centralized monitoring systems, there appears to be direct correlation between the number of rooms and the use of such systems.
Screen location is typically at the front-center of the room. The centered screen location was also preferred by faculty though there were several comments about the desire to have it located off-center or in a corner. Institutions also continue to use the 4x3 aspect screen though a change to the wide-screen format will be needed as digital video comes into the classroom in the near future. Pull-down screens are also the most popular, often due to cost and the need to raise the screen in order to use a writing surface.

Incorporating usable furniture and security features to protect equipment appears to be becoming more popular in room design. The instructor station style most used by other institutions was a stand-up lectern style followed by a combination stand-up and sit-down furniture. Faculty respondents preferred the combination style followed by the stand-up style. Slightly less than 60% included ADA requirements in their instructor station design. Both height of the work surface and the location of controls were the most required features, followed closely by the use of push buttons versus touch panel controls. Adjustable furniture and closed-caption capabilities were also reported. Tables and chairs or tablet style desks were the most used furniture styles for student seating. These were also the most used styles reported for Cincinnati State, and students expressed a high level of agreement with their furniture being satisfactory. Security features most widely used were cable locks and locked cabinets. These theft deterrents are fairly inexpensive and easy to install and manage.

Over two-thirds of community college respondents used wireless technologies in electronic classrooms. Of those using wireless, its most popular use was for student laptop computers in the classroom. Wireless access for instructors’ laptops and for the installed teaching station was also used around 40% of the time. Cincinnati State faculty
and students expressed a desire for wireless access in the classroom as well. Other new
technologies desired by other institutions included (in order of frequency): Smartboards,
Symposium or smart lectern, classroom video capture capability, and classroom or
audience response systems. Classroom video capture and classroom response systems are
also being considered at Cincinnati State, and there is a lot of discussion on various
technology listservs regarding these technologies.

5. What college offices, departments, and stakeholders are involved in decision-
making for classroom design? Who has ultimate authority for classroom projects?

Media Services or a similar instructional technology department and Information
Technology departments were reported most often. Recent years have seen a blending or
merging of former instructional media departments and campus IT organizations. Those
with the instructional technology focus or the former traditional audiovisual support role
appear to still lead the way on most campuses. In most instances, the authority for
classroom projects appears to fall to the instructional or IT areas with support from a
wide variety of campus stakeholders.

The majority of institutions have assistance or cooperation from facilities,
information technologies, and the academic divisions or schools. A few institutions also
have assistance from capital projects, finance, the chief academic officer’s office, or the
library. Since classroom renovations always involve some electrical, infrastructure, or
other facilities-related work, the high number of institutions using facilities and
information technologies was expected. Seventy-eight percent used a standing technology
committee or group. These committees were typically composed of faculty, instructional
technology personnel, media specialists, information technology and networking staff,
and academic administrators. Two-thirds reported that they judge their campus
effectively coordinates their classroom projects with all involved departments and
stakeholders. Such a team approach helps to ensure that all needs are met and supports
the call for such an approach in the literature.

6. How are industry experts such as technology integrators and engineers used in the
design of classrooms and technology systems?

It appears that most institutions rely on their own staff and employees to design,
specify, and prepare for installation projects. While only about one quarter reported
contracting with an outside integrator for classroom design services, nearly 60% used
integrators for classroom installation. Installation and integration (including such things
as wiring, cabling, and system programming) are typically saved for outside
professionals. Only about one-half were required to bid out any phase of a classroom
project, and one-half of those did so only for installation services, further supporting the
notion that no standard is being used and that most colleges rely on their own staff to
design and specify equipment and classroom needs.

Some of the skilled labor required for classroom installations includes the need for
electrical wiring and network or data cabling. Nearly 60% that they use their own in-
house personnel for any required electrical work. For data cabling, over 60% used their
in-house personnel. Again, much of the work is being done by the institutions themselves
prior to installation and integration. Most campuses appear to have the necessary,
qualified personnel on site to take care of these project-related needs.
7. How are ongoing funding, support, and upkeep of installed technology coordinated? What department provides the support for software, hardware, and network resources?

Audio-visual or media departments on campus handle technical support for most electronic classrooms. Most department staff members have other duties in addition to supporting the electronic classrooms on campus. Faculty training is also a common function, but only one-third reported that they require any training for faculty to use the electronic classroom. Support of the classrooms and of the faculty appears to be a common service that is needed in order to offer the technological benefits of the electronic classroom.

Institutions provide various daily support activities for their electronic classrooms. The most common activity reported was responding to classroom issues or troubleshooting problems that occurred during the day. Training was also an ongoing support activity. The reported daily opening of classrooms and equipment cabinets at the start of the day and locking them after classes were over makes it appear that classroom and equipment security is an ongoing issue. Only about one-third indicated that a telephone was provided in the electronic classrooms, but over 70% reported including printed operating instructions for the rooms. Telephones in the classroom make it easier to call for assistance, but providing instructions is a more popular activity and may help to cut down on the number of assistance calls.

Classroom installation projects typically occur in the summer months or are performed year-round. Sometimes campuses use *swing rooms* to temporarily house classes while installations are going on, but was only reported by about one-third.
Though it was not correlated in the data collection, those doing year-round installations may be more likely to use the *swing rooms*. It appears that institutions do their installations at times that meet their individual needs and schedules, though there was not a clear majority for any one time of the year.

Funding for electronic classroom projects on campus involves capital projects and finance offices as well as academic units and information or instructional technologies. A standing technology committee is also typically involved in decision-making for these projects and has a financial officer as a member in some instances. The number of different departments involved in classroom projects on most campuses that reported effective coordination of these projects indicates that financial support is a priority and a part of the process, though few institutions would ever say that they have all of the funds they need to do all of the projects they desire.

**Implications**

There are two specific research limitations that should be addressed. Part of the challenge of survey-based research is getting enough individuals to agree to participate and is further complicated by the need for participants to sign informed-consent forms. These forms, which grew out of the need for informed consent in medical research, do not appear to be as important in educational research. Burgess (2007) states that observational research with a low magnitude of risk provides an opportunity for mutual respect and understanding between researches and participants without the need for such consent. Repeating this research without informed consent forms may lead to better results for the student and community college instructional support populations.
The number of students who participated in the study was very low with a total response rate of only 5% of the random sample that included 2,579 individuals. The participation rate of community colleges was also very low with an initial return of 11 responses from the 325 institutions in the random sample. An additional 28 institutions responded following another call for volunteers for a total of 39 institutions reporting. Because of the low response rate, the number of student and other community college participants may not provide the best representation of their given populations. Several reasons for the low participation are listed in the literature. They include the lack of incentives to respond, time involved to complete the survey, a lack of interest or relevance in the topic or the results, and confidentiality or privacy concerns (Burgess, 2007; Selm & Jankowski, 2006; Hayslett & Wildemuth, 2004; and Sax, Gilmartin, & Bryant, 2003). The implications from this research may not be as conclusive as they would have been with more participation from the two low-responding populations. Additional details regarding the response rates are found in the introduction to Chapter 4.

Instructional Effectiveness and Faculty and Student Satisfaction

Faculty and students appear to have a high level of satisfaction with electronic classrooms and believe that their experiences are positively affected by using these environments. While instructors preferred to teach in electronic classrooms, students were most likely to choose their courses based on their scheduling needs. Some form of computer-assisted instruction projected for the entire class to see was a high priority for both groups. Instructors believed that they were able teach effectively in these rooms, and students tended to agree that their learning experiences were enhanced. Students also indicated a high level of satisfaction with their instructors’ effective instructional
delivery. Instructors believed they were better organized and used time more effectively, and students agreed that their instructors were better prepared to teach when using an electronic classroom. The outlook is favorable for institutions installing such classrooms and for faculty and students who may be apprehensive about using them.

Typical classroom installations on Cincinnati State’s campus appear to be in line with those at other institutions. The equipment sources, control devices, and ancillary items provide the necessary technologies to effectively deliver instruction in these environments. Issues of screen placement and control of room and ambient light were noted by both instructors and students and deserve further attention during classroom design so that higher quality images are available for viewing in the room. Instructors want more available writing space through either moving the screen off-center or by providing another writing surface in the classroom. Instructors also desire more freedom to move about the classroom via a remote device for controlling presentations and navigating Websites during instruction. Instructor training was also noted as a desired service.

Some additional design considerations and modifications to classroom installations could easily take care of the few issues raised by instructors and students. These necessary changes in design could easily be incorporated into any standards document, and have been included in the document presented in Appendix G. Taking faculty and student data into consideration should lead to a better classroom environment and therefore to an even higher level of satisfaction. Faculty training and ongoing technical support should also contribute to the level of satisfaction for both populations as well.
Others who may desire to perform research in the future may wish to consider a larger student population and to perform some long-term research to determine if there is any relationship between student achievement and the use of smart classroom environments. Both faculty and students judged that there were not enough data to indicate a level of agreement with a statement about such a relationship. There may also be opportunities to address newer technologies such as classroom response systems and other interactive classroom technologies in future research.

Design, Installation, Standards, and Support

Community colleges that responded to the survey do not typically use any written standards document for their electronic classroom design and installation. While the term smart classroom is popular, there does not appear to be a consistent design for classrooms that are more complex than the basic model. The basic model which includes a computer, projector, document camera, video playback device, screen, audio reinforcement, and equipment control appears to be fairly standard. Once institutions move beyond that basic level, a variety of additional equipment items and functions is included. Additional levels of installed technology are also referred to by several different names.

Those with a standards document address issues that are relevant to all institutions including equipment, projector, and screen placement; instructor furniture design; wiring and cabling; projector brightness; and lighting. Environmental issues of image brightness, room lighting, and the ability to control ambient light were highly regarded by instructors and students, but do not appear to be as important in those standards documents that were reported. Some institutions go even farther and specify conduit sizes and other
infrastructure design issues as well. Classroom control systems were popular, but centralized monitoring was not as widely used. The cost of these systems and the need to monitor large numbers of rooms probably drives the decision to use such equipment. Furniture design should be carefully considered in the classroom design as most instructors preferred a combination stand-up and desk-height station while most community college installations were using stand-up style lecterns.

A team approach to classroom projects is popular and highly recommended for all institutions to consider. Involving faculty, facilities, administrators, financial staff, information and instructional technology staff and other appropriate individuals or departments can lead to better buy-in from faculty and a more successful project. Those reporting the use of technology committees and a team approach also indicated that they believe their campus effectively coordinates their classroom projects. Having the technical expertise on site for the design and specification phase helps to save money, but most institutions identified the need to hire out the installation. Post-installation support from campus personnel is also a necessity for providing training and technical assistance for the faculty.

Those who may wish to further investigate these topics will need to have a larger population to validate the conclusions and recommendations made here. With hundreds of public community colleges in the United States, a larger sample size would be beneficial to get a better snapshot of the current status of smart classrooms on campuses. Collecting the various standards documents used by other institutions and performing some comparison of them could also be beneficial in developing a broader standard that could be adopted by most any institution. The ever-changing technology capabilities
could also lead to further research by looking at how new technologies are being used in the classroom and how their use relates to satisfaction and instructional effectiveness.

**Recommendations**

Community college instructional technology personnel and faculty can be fairly certain that their smart classrooms are being used well and that instructional activities are being positively affected by these projects. Campus planners and the entire campus community can move forward with these projects by using quality planning, design, and appropriate input from all stakeholders. The level of faculty and student satisfaction with smart classrooms and their perceived effectiveness for teaching and learning activities indicates that these learning environments are beneficial and meaningful. The fact that nearly two-thirds of instructors preferred to teach in smart classrooms and over 80% of students preferred to have a class in one supports the notion of satisfaction. The benefit of using multimedia in the classroom, which is already supported by other research (Weston, 2005; Brown & Lippincott, 2003), extends to smart classroom systems as well. Diverse learning styles can benefit from the wide variety of audio and visual technologies used in the classrooms. Using software packages and the Internet to assist with instructional delivery by which the entire class can see and hear the same thing at the same time fully extends these capabilities.

For faculty and students, good room design and layout with considerations for lighting control from all light sources is extremely important. Everyone wants to see projected images clearly, yet turning off all room lights can lead to inattention and difficulty with note-taking. The use of lighting controls from the instructor teaching station and controlling light from windows, when paired with a quality projector, can lead
to a more positive experience for both faculty and students. Addressing these items in a campus standards document will help to ensure that these issues are considered in the design and planning stages.

A campus standards document that addresses all aspects of room design would be beneficial in planning for consistent classroom projects. Such a document should address those issues unique to the institution and which also help integrators gain experience in effective design for the classroom environment. While levels of classroom technology installations and names of such rooms can be unique, a typical set of equipment items and infrastructure considerations would be helpful to other colleges as well as integrators. Such a document is proposed for Cincinnati State to adopt and could certainly be used by others as a model for developing their own.

Community colleges should also consider using some form of campus-wide technology advisory group with additional members as needed when considering major room renovation or new construction projects. Involving instructional technology personnel, information technology staff, faculty, support staff, administrators, facilities staff, and financial office personnel will ensure that all stakeholders are represented for these projects. A campus instructional technology committee or group could serve other purposes when classroom projects are not on the docket. There are always various instructional technology issues to be addressed. Faculty should always be included.

Further research on these issues should be conducted with a larger population of students and other community college instructional support departments. Additional student data, collected over a longer period of time, could be used to investigate issues of academic achievement for students having classes in smart classrooms. The data
collected during this research regarding students expecting or earning higher grades in smart classrooms is inconclusive. Additional participation by community colleges could also be used to develop a better understanding of the current state of smart classrooms on campus as well as to gather information related to design and installation processes and the use of standards.

Other opportunities may exist through the investigation of how installed technology alters behaviors in the classroom. Do instructors or students approach their teaching or learning differently when technology is at their command? Are there real differences in the instructional process in traditional classrooms versus electronic classrooms? Are there differences in anticipated learning outcomes? While research has been conducted regarding the use of multimedia in the instructional process, what additional implications are there regarding this ever-present technology? Does the traditional lecture format stand to gain or lose by using so much technology? The rising popularity of classroom capture technology also provides an opportunity for further investigation.

Some research is being done on the use of classroom response systems in the instructional process. Using this technology in an electronic classroom to assess student learning through the use of multiple technology sources could be another avenue for exploration. Could classroom response systems cause a dramatic behavior change if students knew they were going to be continuously assessed throughout their class time? The rich mixture of multimedia sources and resources paired with new assessment techniques may lead to a new understanding of the teaching and learning process where technology plays a significant role in that process.
Summary

An overarching problem with classroom technology projects is that there are few standards that institutions can use when beginning such a project. There are many different designs and levels of technology-rich classrooms currently in use to meet the specific needs of a given college or university. The variety of designs, together with the disparate ideas of faculty, technologists, and vendors makes it difficult to know where to begin and what to include. The wide variety of smart classrooms and the numerous processes used to plan, design, and install those rooms provides a unique opportunity to investigate this area of instructional technology. Technology staff could be better prepared to manage these projects if they had access to standards, consistent and reliable information, and best practices and processes employed by sister institutions. Data were collected in an attempt to establish such standards and practices for one institution that could also benefit other institutions in the future. Studying instructional effectiveness and faculty and student satisfaction in two different styles of smart classrooms was beneficial in establishing these standards and preparing for future classroom projects.

The goal was to establish a best practices, general purpose classroom model to meet the needs of faculty, students, and technology support personnel. Data collected from other community colleges were used to determine the state of installed classroom technology that includes standard practices, policies and procedures, stakeholder involvement, ongoing budget and equipment replacement allocation, and technical support. Cincinnati State Technical and Community College faculty and students provided data related to the effectiveness of and their satisfaction with two different
technology classroom models on campus. A classroom standards document was
developed that incorporated the findings.

Several areas of inquiry were selected as foundational to the study of smart classroom
technology, instructional effectiveness, and faculty and student satisfaction. Reviewing
the use of technology and multimedia in the college classroom helped to establish current
practices related to the development of smart classrooms. The literature review also
looked at the design of smart classrooms, including standards, components, and
environmental aspects. Ongoing support for the infrastructure, installed technology and
teaching and learning activities were reviewed in order to establish the need for such
support and the role of the technical staff who provide the support. In order to look at the
processes for designing and integrating smart classroom technology on campus, planning
and budgeting procedures were reviewed as well. In order to provide some background
information related to instructional effectiveness of smart classrooms, the literature
review explored the effectiveness of instructional technology in general as well as how it
relates to smart classrooms. Finally, literature related to instructional technology provided
information on which aspects of technology and support contributed to overall faculty
and student satisfaction when using smart classrooms.

The qualitative case study approach for this research employed a single case design
with embedded units (Yin, 2003). The embedded units design was used because the study
of electronic classrooms involved data collected from students, faculty, and other
community colleges. Three survey instruments were developed and used to collect data
from all populations. These instruments were used to address the research questions and
collect data related to the areas of instructional effectiveness and satisfaction with the
classrooms (faculty and students) and the current processes and practices of the design, development, installation, and support of electronic classrooms (community college instructional support personnel). Faculty and student data were used to determine the effectiveness of the technology components, room and system design, and overall integration of technology in the electronic classroom. Data from other community colleges were used to form a snapshot of the current processes and practices of classroom planning, design, integration, and support.

These data were categorized and organized using a grounded theory approach. The goal of grounded theory is to facilitate the more rigorous definition of categories through the process of analysis (Boulton & Hammersley, 2006). Using the grounded theory approach was beneficial in analyzing the data from the three survey instruments. The questions asked in the survey instruments were directly related to the research questions. The data collected from the surveys were sorted appropriately to answer the research questions. The grounded theory approach, used with data triangulation, provided meaningful data interpretation.

Survey results from the faculty and student populations appear to have provided an insightful look at their attitudes about and their actual use of the electronic classroom environment. The data collected from the community college instructional support group, though small in numbers, helped to begin to build an overall picture of the use of electronic classrooms in the community college institution. Faculty and students appear to have a high level of satisfaction with electronic classrooms and judge that their experiences are positively affected through the use of these environments. While instructors preferred to teach in an electronic classroom, students were most likely to
choose their courses based on their scheduling needs. Instructors judged that they were able to teach effectively in these rooms, and students tended to agree that their learning experiences were enhanced. Students also indicated a high level of satisfaction with their instructors’ effective content delivery. Instructors judged that they were better organized and used time more effectively, and students agreed that their instructors were better prepared to teach when using an electronic classroom.

Typical classroom installations on Cincinnati State’s campus appear to be in line with those at other institutions. The equipment sources, control devices, and ancillary items provide the necessary technologies to effectively deliver instruction in these environments. Issues of screen placement and control of room and ambient light were noted by both instructors and students and deserve further attention during classroom design so that higher quality images are available for viewing in the room. Some additional design considerations and modifications to classroom installations could easily take care of the few issues raised by instructors and students. These necessary changes in design could easily be incorporated into any standards document and have been included in the document developed and presented in Appendix G. Taking faculty and student data into consideration should lead to a better classroom environment and therefore to an even higher level of satisfaction.

Community college instructional technology personnel and faculty can be fairly certain that their smart classrooms are being used well and that instructional activities are being positively affected by these projects. Campus planners and the entire campus community can move forward with these projects by using quality planning, design, and appropriate input from all stakeholders. The level of faculty and student satisfaction with
smart classrooms and their perceived effectiveness for teaching and learning activities indicates that these learning environments are beneficial and meaningful.

A team approach to classroom projects is popular and highly recommended for all institutions to consider. The use of technology committees and a team approach can help to ensure that institutions effectively coordinate their classroom projects on campus. Having the technical expertise on site for the design and specification phase helps to save money though most institutions will need to hire out the installation of the equipment. Post-installation support from campus personnel is also a necessity for providing training and technical assistance for the faculty.

Community colleges do not typically use a written standards document for their electronic classroom design and installation. While the term smart classroom is popular, there does not appear to be a consistent design for classrooms that are more complex than the basic model. The basic model, which includes a computer, projector, document camera, video playback device, screen, audio reinforcement, and equipment control, appears to be fairly standard. Once institutions move beyond that basic level, there is a variety of additional equipment items and functions included. Those with a standards document address issues that are relevant to all institutions including equipment, projector, and screen placement; instructor furniture design; wiring and cabling; projector brightness; and lighting. Environmental issues of image brightness, room lighting, and the ability to control ambient light were highly regarded by instructors and students but do not appear to be as important in those standards documents that were reported. Some institutions go even farther and specify conduit sizes and other infrastructure design issues as well.
Additional research could determine if there is any relationship between student achievement and the use of smart classroom environments. Both faculty and students judged that there were not enough data to indicate a level of agreement with a statement about such a relationship. There may also be opportunities to address newer technologies such as classroom response systems, classroom lecture capture, and other interactive classroom technologies in future research. Opportunities exist to further explore how the teaching and learning process and instructor and student behaviors are affected by installed, ever-present technology. Those who may wish to further investigate these topics will need to have a larger population in order to further explore and validate the conclusions and recommendations made here. With hundreds of public community colleges in the United States, a larger sample size would be beneficial for getting a better snapshot of the current status of smart classrooms on campuses.

Collecting the various standards documents used by other institutions and performing some comparison could also be beneficial in coming up with a broader standard that could be adopted by most any institution. The ever-changing technology capabilities could also lead to further research by looking at how new technologies are being used in the classroom and how their use relates to satisfaction and instructional effectiveness.

Smart classrooms allow instructors to access many resources from an integrated, centrally-controlled system. While the tools themselves present their own unique set of challenges, good classroom design and support can benefit the teaching and learning process and lead to higher levels of instructional effectiveness and user satisfaction with these classroom environments. Instructional technologists, faculty, and students can all stand to gain from effective design that can be guided through a set of generic standards
that could be adapted by any institution. While each college is unique in its approach, research that supports such a standard could provide a useful and effective tool for their future smart classroom projects.
MEMORANDUM

To: Jon McKamey

From: James Cannady, Ph.D.
    Institutional Review Board

Date: November 15, 2006

Re: Smart Classroom Technology: Instructional Effectiveness and Faculty and Student Satisfaction

IRB Approval Number: kannady11150602

I have reviewed the above-referenced research protocol at the center level. Based on the information provided, I have determined that this study is exempt from further IRB review. You may proceed with your study as described to the IRB. As principal investigator, you must adhere to the following requirements:

1) CONSENT: If recruitment procedures include consent forms these must be obtained in such a manner that they are clearly understood by the subjects and the process affords subjects the opportunity to ask questions, obtain detailed answers from those directly involved in the research, and have sufficient time to consider their participation after they have been provided this information. The subjects must be given a copy of the signed consent document, and a copy must be placed in a secure file separate from de-identified participant information. Record of informed consent must be retained for a minimum of three years from the conclusion of the study.

2) ADVERSE REACTIONS: The principal investigator is required to notify the IRB chair and me (954-262-5369 and 954-262-2085 respectively) of any adverse
reactions or unanticipated events that may develop as a result of this study. Reactions or events may include, but are not limited to, injury, depression as a result of participation in the study, life-threatening situation, death, or loss of confidentiality/anonymity of subject. Approval may be withdrawn if the problem is serious.

3) AMENDMENTS: Any changes in the study (e.g., procedures, number or types of subjects, consent forms, investigators, etc.) must be approved by the IRB prior to implementation. Please be advised that changes in a study may require further review depending on the nature of the change. Please contact me with any questions regarding amendments or changes to your study.


Cc: Protocol File
   Office of Grants and Contracts (if study is funded)
Appendix B

November 20, 2006

Office of Institutional Research and Planning
Cincinnati State Technical and Community College
3520 Central Parkway
Cincinnati, OH 45223

Dear Mr. McKamey:

This letter is in response to your request to conduct research during the 2007 Winter and Spring terms at Cincinnati State Technical and Community College.

Approval is granted provided:

- we receive a copy of your research findings
- faculty members and students are informed their participation is voluntary

Let me know should you have any questions or comments.

Anne Foster
Director, Institutional Research and Planning
Appendix C

Informed Consent for Participation in an
Investigational Study of Community College Instructional Technology Support
Centers, Community College Faculty and Students

Title of Study:
*Smart Classroom Technology: Instructional Effectiveness and Faculty and Student Satisfaction*

Funding Source: None

IRB approval #

Principal Investigator: Co-investigator(s) NONE
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Institutional Review Board
Office of Grants and Contracts
Nova Southeastern University
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Description of the Study:

This research study is the result of personal experiences, observations, and discussions with other instructional technologists. Such experiences indicate that the journey toward a learning environment requires detailed planning, input from all stakeholders, sufficient funds, and cooperation from technology integrators. The lack of consistent standards and practices, the wide variety of classroom designs and technology levels being used, the pressure from industry integrators to include their components, the needs of the faculty, and the desires of the technologists are so overwhelming that institutions have difficulty
finding direction and consistent resources for classroom construction and remodeling projects. A planning process, standardized classroom model, and effective support structure are needed in order to meet the needs of faculty and students.

The goal of this study is to establish a best practices, general-purpose classroom model to meet the needs of faculty, students, and technology support personnel. Information collected from other community colleges will be used to determine the state of installed classroom technology that includes standard practices, policies and procedures, stakeholder involvement, ongoing budget and equipment replacement allocation, and technical support. Cincinnati State faculty and students will provide data related to the effectiveness of and their satisfaction with the different technology classroom models on campus.

This research study is qualitative in nature and will require participants to complete an online survey instrument. The case study approach for this research will employ a multiple case design with embedded units. This design will be used because the study contains more than a single case, thus requiring a multiple case design. The two cases studied will include two different electronic classroom models on Cincinnati State’s campus. Each case will collect data from faculty and students related to the effectiveness of and their satisfaction with the particular environment. These multiple data collection points and study populations call for the embedded design variation. Background information on classroom design, standards, technology integration, and support will be gathered from other community colleges to be included as part of the foundation provided with the review of literature.

Survey data collected from other community colleges will provide information on current policies, practices, and procedures related to electronic classroom design and implementation. These data, together with the local data, will be used in the development of a standards document for Cincinnati State. Faculty and student data will be used to determine the effectiveness of the technology components, room and system design, and overall integration of technology in the electronic classroom. Based on the two room models studied, these data will also be used to develop an electronic classroom standard and standards document.

Data collection will take place between January 22 and February 2, 2007. Depending on the length of the survey, completion time should be between 20 minutes (for faculty and students) and 30 minutes (for other community colleges). Because faculty and students may be using multiple electronic classrooms on campus, they will be asked to provide input for each room used for class. In such cases, faculty and students will need to complete more than one instrument.

**Risks /Benefits to the Participant:**

There are minimal risks associated with participation in this study. Participants will need to spend some time completing a survey instrument and will need to use the Internet to do so.
Potential benefits of this study include improvements to classrooms and instructional technologies. These benefits may be applicable to colleges, faculty, and students in the future.

If you have any concerns about the risks or benefits of participating in this study, you can contact Jon P. McKamey or the IRB office at the numbers indicated above.

**Costs and Payments to the Participant:**

There are no costs to you or payments made for participating in this study.

**Confidentiality and Privacy:**

All information obtained in this study is strictly confidential unless disclosure is required by law. Participants will not be listed by name or in any other way that allows them to be specifically identified. Participants will not be required to provide their name when completing a survey instrument. Those who choose to participate in this study will log onto a Web-based form to answer survey questions. Instructions for accessing such form will be provided to those who agree to participate in the study. Collected data are not accessible to participants or any other individual as the survey data are password protected. Only the investigator will have access to this data. Data from the study will be presented in aggregate form and identify participants in various treatment groups (community college instructional support centers, faculty, and students) and not in terms of individuals. The Institutional Review Board of Nova Southeastern University and other regulatory agencies may review research records.

**Use of Protected Health Information (PHI):**

This study does not require the disclosure of any Protected Health Information.

**Participant's Right to Withdraw from the Study:**

You have the right to refuse to participate in this study. If you choose not to participate, simply destroy this form and you will not be contacted for further information or participation.

You have the right to withdraw from this study at any time by contacting the principal investigator listed at the beginning of this form. If you do withdraw, it will not adversely affect you or your schoolwork in any way. If you choose to withdraw, you may request that the investigator destroy any collected data.

**Other Considerations:**

If significant new information relating to the study becomes available which may relate to your willingness to continue to participate, this information will be provided to you by
the investigator.

Voluntary Consent by Participant:

I have read the preceding consent form, or it has been read to me, and I fully understand the contents of this document and voluntarily consent to participate. All of my questions concerning the research have been answered. I hereby agree to participate in this research study. If I have any questions in the future about this study they will be answered by Jon P. McKamey. A copy of this form has been given to me. This consent ends at the conclusion of this study.

Participant's Signature:__________________________ Date:__________________

Authorized Representative________________________Date__________________
Authority of Representative is based on:_____________________________________

Witness's Signature:_____________________________ Date:__________________
Appendix D

Smart Classroom Technology:
Instructional Effectiveness and Faculty and Student Satisfaction

Data Collection Instrument
Community College Instructional Technology Support Centers

NOTE: For the purposes of this survey, an “electronic classroom” refers to those rooms with installed equipment such as lectern, video equipment, document camera, computer, ceiling-mounted projector, integrated room speakers, and some form of control system. These rooms can include varying levels of installed equipment.

(1) Institution Name
Open Ended

(2) What common name do you give to “electronic classrooms” on campus?
Check one:
• Technology Classroom
• Electronic Classroom
• Smart Classroom
• Multimedia Classroom
• Mediated Classroom
• Other (please specify)

(3) How many electronic classroom installations (all levels) do you have on campus? Include classrooms at all locations if you have multiple campuses.
Open ended - number

(4) How many support staff positions (full time equivalent - FTE) do you have to support all electronic classrooms? Include classrooms at all locations if you have multiple campuses.
Open ended - number

(5) Are support personnel dedicated to electronic classrooms or do they have other duties as well?
Choose one:
• Dedicated to electronic classrooms
• Have other responsibilities (please specify two or three examples of other duties)
What types of “daily activities” are conducted by the electronic classroom support staff? Check all that apply.

**Multiple Answer:**
- Open rooms in the morning
- Lock rooms at the end of the day
- Unlock equipment cabinets/lecterns in the morning
- Lock equipment cabinets/lecterns at the end of the day
- Check lamp hours in projector
- Check all components for proper functioning
- Monitor systems with Web-based monitoring tools
- Other (please specify)

Do you require training before faculty members can teach in an electronic classroom?

**Yes or No**

Who conducts the training (voluntary or mandatory) for electronic classrooms on your campus? Indicate the title(s) of the position or positions that handle this training, NOT the name of an individual.

**Open ended**

What type of classroom seating is typically used in electronic classrooms?

**Choose one:**
- Tablet Desks
- Tables and chairs
- Fixed seating
- Other (please specify)

Does the classroom control system include an “auto off” function to shut down the projector, equipment sources, or equipment control at a pre-set time each day? The “auto off” function does not need to control all equipment items or systems.

**Yes or No**

If the answer to the above question is “yes”, what are the normal hours of active operation for your classroom systems?

**Open ended**

Are electronic classrooms monitored through a network-based remote management tool (such as Crestron Room View software)?

**Yes or No**
(13) What staff members (position titles, not individual names) are capable of viewing such a centralized monitoring system?
Open ended

(14) Which of the following security options do you use in electronic classrooms on campus? Check all that apply.
**Multiple answer:**
- Cable Locks
- Security Plates
- Locking Cabinets/Closets
- Network-based Security Monitoring/Alarms
- Motion Detectors
- Video Surveillance
- Equipment Security Cages
- Keycard or Combination Lock Room Access
- Other (please specify)

(15) What type of classroom control system do you use in most electronic classrooms on campus?
**Single answer:**
- Crestron
- AMX
- SP Controls
- Extron
- Home-grown
- Other (please specify)

(16) Do you include wireless network access in electronic classrooms?
**Yes or No**

(17) If wireless access is included, how is it used? Check all that apply.
**Multiple Answer:**
- Installed computer’s Internet access
- For instructors’ wireless laptops
- For students’ wireless laptops
- Other (please specify)

(18) Is a telephone provided in electronic classrooms on campus?
**Yes or No**
(19) If a telephone is provided, are “help numbers” posted near the telephone?
Yes or No

(20) Are printed instructions provided in electronic classrooms?
Yes or No

(21) Does the room control system include a “video mute” function to blank the projected image temporarily?
Yes or No

(22) What is the name of the campus department that coordinates designing, planning, and installation of electronic classrooms?
Open ended

(23) What is the name of the campus department that provides technical support for electronic classrooms?
Open ended

(24) What other departments are involved in electronic classroom projects? Check all that apply.
Multiple answer
- Facilities
- Capital Projects
- Information Technology Services
- Academic divisions/departments
- Chief Academic Officer’s office
- Finance
- Other, please specify

(25) Does your institution have a standing “technology committee” or similar group?
Yes or No

(26) If your institution does have such a group, what positions are represented on the committee? Check all that apply.
Multiple answer
- Faculty
- Networking/Infrastructure support
- Chief Information Officer (CIO)
• Chief Financial Officer (CFO)
• Instructional Technology Manager/Director
• Media Specialists
• Instructional Technologists
• Campus Facilities Manager
• Chief Academic Administrator (Provost, Vice President)
• Academic Dean
• Other (indicate position name)

(27)
Do you believe your campus effectively coordinates with all involved departments and offices for your electronic classroom projects?

Yes or No
Why or Why Not? Open-ended

(28)
What time of the year do classroom installations typically take place?

Check one:
• Summer
• Weekends
• Between semesters or terms
• Year-round

(29)
Does your institution have “swing rooms” (temporary rooms, not necessarily equipped with technology) that are available for classes to use when other rooms are taken off line for equipment installation or servicing?

Yes or No

(30)
Does your institution have a “standards document” that outlines the requirements and details for all electronic classrooms?

Yes or No

(31)
If yes, what is the document called?

Open ended

(32)
If yes, who wrote the document (position or committee, NOT individual name(s))?  

Open ended

(33)
How often is the standards document reviewed and updated?

Check one:
• Annually
• Every Two Years
• Every Three Years
• Other (please specify)

(34) Who approves and authorizes changes to the document (position or department, NOT individual name)?  
**Open ended**

(35) What does the standards document address? Check all that apply. 
**Multiple Answer:**
• Electrical requirements
• Wiring/Cable specifications
• Conduit
• Equipment placement
• Projector placement
• Minimum equipment specifications
• Specific equipment brands/models
• Projector brightness
• Projector contrast ratio
• Classroom furniture type/style
• Lectern design and construction
• Lighting
• Window treatments
• Screen size and type
• Wall finishes
• Floor finishes
• Other – please specify

(36) What is the typical screen installation position in an electronic classroom?  
**Check one:**
• Front Center
• Front Off-Center
• Angled in a corner

(37) What projection screen format is typically installed in electronic classrooms?  
**Check one:**
• 4x3
• 16x9
• Other (please specify)
What type of projection screen do you typically use in electronic classrooms?

**Check one:**
- Fixed screen
- Pull-down window shade style
- Pull down tensioned
- Electric window shade style
- Electric tensioned

What type of “teaching station” is included in electronic classrooms? Check all that apply.

**Multiple Answer:**
- Stand-up lectern
- Sit-down station
- Combination stand-up and sit-down
- Other (please specify)

Does your institution factor in ADA requirements to the teaching station design?

**Yes or No**

What provisions are included in electronic classrooms to meet ADA requirements? Check all that apply.

**Multiple Answer:**
- Instructor lectern/teaching station height
- Mounting location of system controls
- Push button controls vs. Touch Panel controls
- Other (please specify)

Which of the following equipment SOURCE or instructor-managed components are mounted in or placed on the teaching station? Check all that apply.

**Multiple Answer:**
- VHS deck
- DVD
- Combination VHS/DVD
- Document Camera
- Computer w/ monitor, keyboard, and mouse
- Classroom control panel (push button or touch panel)
- Preview Monitor
- Other (please specify)
Which of the following CONTROL equipment components are mounted in or placed on the teaching station? Check all that apply.

**Multiple Answer:**
- Switcher
- Room control hardware
- Audio amplifier
- Audio mixer
- Wireless keyboard or mouse receiver
- Wireless microphone receiver
- Camera controllers
- Videoconferencing equipment
- Other (please specify)

What is the typical location of the teaching station in the classroom?

**Choose One:**
- Center
- Left of Center (as you face the front)
- Right of Center (as you face the front)
- Other (please specify)

Do you lease any of the equipment used in electronic classroom installations?

**Yes or No**

If you lease any of the classroom equipment, which items do you lease? Check all that apply.

**Multiple Answer:**
- Computer
- Video equipment (DVD and or VHS)
- Document Camera
- Videoconferencing Equipment
- Control equipment, Projector
- Other (please specify)

What new technologies are you exploring and do you anticipate using in future installations of electronic classrooms?

**Open Ended**

Do you contract with an AV Integrator or Engineer for electronic classroom design?

**Yes or No**
(49) 
Do you contract with an AV Integrator for electronic classroom installation? 
Yes or No

(50) 
If you contract with an AV Integrator or Engineer for any purpose, at what stage of the design or installation process do you begin using their services? 
Check one: 
• During an initial needs assessment phase 
• After needs assessment but before design begins 
• After design but before formal specifications are written 
• We do the design and write the specifications, but hire an Integrator for installation

(51) 
Are you required to bid out any phase of electronic classroom projects? 
Yes or No

(52) 
If you bid out electronic classroom projects, which parts do you put out to bid? Check all that apply. 
Multiple Answer: 
• Initial Planning/Consulting 
• Design 
• Specification Preparation 
• Installation

(53) 
Who does the electrical work for your electronic classroom projects? 
Check One: 
• Campus personnel 
• Electrical contractor hired by your institution 
• Electrical contractor hired by an AV Integrator 
• Other (please specify)

(54) 
Who does the data/network wiring for your electronic classroom projects? 
Check One: 
• Campus personnel 
• Contractor hired by your institution 
• Contractor hired by an AV Integrator 
• Other (please specify)
Does your institution provide multiple levels of installed classroom technology in different classrooms? For example, Level One includes a computer, video source, projector, and control; Level Two adds equipment to Level One, etc.

Yes or No

If you have only one level of an electronic classroom, what is the typical set-up? Please include equipment sources, installed items, and control systems used.

Open Ended

If you provide multiple levels of installed classrooms, how many levels exist?

Choose One:
- Two
- Three
- Four

What name do you give to each level of installed classroom? Provide your name for each level used at your institution.

Open Ended for Each Level:
- Level One with comment box
- Level Two with comment box
- Level Three with comment box
- Level Four with comment box

If you provide two levels of installed classrooms, what is the typical set-up for each level? Please include equipment sources, installed items, and control systems used for each level.

Open Ended for Each Level:
- Level One with comment box
- Level Two with comment box

If you provide three levels of installed classrooms, what is the typical set-up for each level? Please include equipment sources, installed items, and control systems used for each level.

Open Ended for Each Level:
- Level One with comment box
- Level Two with comment box
- Level Three with comment box
If you provide four levels of installed classrooms, what is the typical set-up for each level? Please include equipment sources, installed items, and control systems used for each level.

**Open Ended for Each Level:**
- Level One with comment box
- Level Two with comment box
- Level Three with comment box
- Level Four with comment box
Appendix E

Smart Classroom Technology: Instructional Effectiveness and Faculty and Student Satisfaction

Data Collection Instrument for Faculty Respondents

NOTE: For the purposes of this survey, an “electronic classroom” refers to those rooms with installed equipment: lectern with video equipment, document camera, computer, ceiling-mounted projector, and integrated room speakers.

(1) My academic division is:  
**Choose one:**  
- Business Technologies  
- Engineering Technologies  
- Information Technologies  
- Health and Public Safety  
- Humanities and Sciences

(2) How many years have you been involved in teaching at the college or university level?  
**Choose one:**  
- Less than one year  
- 1-3 years  
- 3-5 years  
- 5-10 years  
- 10-20 years  
- 20-30 years  
- More than 30 years

(3) How long have you been on the faculty at Cincinnati State?  
**Choose one:**  
- Less than one year  
- 1-3 years  
- 3-5 years  
- 5-10 years  
- 10-20 years  
- 20-30 years  
- More than 30 years
Indicate the classroom (Building and Room) to which this survey applies. Note: The cover letter or email identified a particular course and section where you are using an electronic classroom. You may have also been asked to rate your experience in multiple rooms.

**Choose one:** from list of all Building and Rooms for the term when survey is being conducted

Including your current course(s), how many different courses have you taught in electronic classrooms at Cincinnati State? Please indicate number of courses, not number of actual class meetings.

**Choose one:**
- 1-3
- 4-6
- 7-9
- 10 or more

I specifically request that my classes meet in an electronic classroom.

**Yes or No**

Have you had a course meet in an electronic classroom where you never used the installed equipment?

**Yes or No**

If yes, what was your **primary** reason for not using the equipment during class?

**Choose one:**
- Did not know how to use the equipment
- Did not want to be bothered with the equipment
- Did not need to use the equipment
- Did not want to be in an electronic classroom
- Equipment was not functioning
- Other – please specify

*If you are teaching in an electronic classroom but **DO NOT** use the installed equipment, please skip to the end of this survey and click the Submit button.*

The following questions will ask about your experiences teaching in an electronic classroom.
In your opinion, what equipment should be included in an electronic classroom? Check all that apply:

- Computer
- Hookup for my laptop PC
- Projector
- Internet Connection
- Video Playback
- Video Recording
- Document Camera
- Audio Playback
- Audio Recording
- Wireless Internet
- Two-way Videoconferencing
- Lighting Control
- Window Darkening Shades
- Other – please specify

What installed equipment or source do you use most of the time? Check all that apply:

- Computer and projector for PowerPoint or other software presentation
- Computer and projector for Internet browsing
- Input for my own laptop PC
- VHS or DVD video playback and projector
- Document Camera and projector

Do you use PowerPoint for most in-class lectures? Yes or No

Do you prefer the projection screen: Choose one:

- At the front center of the room?
- Off to one side on the front wall?
- In a front corner of the room?
- No preference

Do you prefer a wireless keyboard and mouse to the traditional hard-wired type? Yes or No
Do you prefer a teaching station/lectern designed for:

Choose one:
• Standing?
• Sitting?
• A combination of standing and sitting?
• No preference

Please rate the following statements using the scale of Strongly Agree, Agree, Neutral, Disagree, or Strongly Disagree as they relate to the room you indicated in Question 4.

Rating matrix using 5 for SA down to 1 for SD with a comment field for each item to indicate reasons for rating given
• The electronic classroom is easy to use
• The equipment control system (touch panel) is easy to use
• The placement of source equipment (PC, VHS, DVD, Document Camera) is satisfactory
• The placement of the projection screen or flat panel video display is satisfactory
• The projected or displayed image is bright enough to see without dimming the lights
• There is sufficient control of room lighting
• The acoustics in the room (spoken word and audio playback) are satisfactory
• The window treatments in the room are satisfactory for controlling outside light
• The lectern and equipment arrangement facilitates using the installed classroom technology
• During instruction, multiple technologies are used in this electronic classroom
• The equipment in the electronic classroom enhances my teaching experience
• The equipment in the electronic classroom enhances the students’ learning experience
• Using the electronic classroom allows for more effective instruction
• Using the electronic classroom allows for better organization and more effective use of time to deliver course materials
• Students who attend class in an electronic classroom have higher grades than those who attend class in a traditional classroom
• The College should convert all standard lecture classrooms into electronic classrooms
• Overall, I am satisfied with my teaching experience in an electronic classroom

Does teaching a class in an electronic classroom detract from your teaching experience? Yes or No

If you answered Yes to question 16, please indicate why you believe your teaching experience is negatively affected.

Check all that apply:
• I waste too much time with the equipment
• A smaller amount of material is covered in class
• I feel overwhelmed by multiple types of presentation devices
• Other – please specify

(18)
If you noticed any recurring difficulties with the classroom technology, what were they?
**Check all that apply:**
• Slow Internet speed
• Inferior image on the screen
• Room lights too bright on the screen
• Unable to control light from windows
• Poor sightline to the screen
• Equipment control system unreliable
• Unreliable source device (computer, VHS, DVD, document camera)
• Poor placement of instructor teaching station
• Other – please specify

(19)
What, if anything, is missing from the electronic classroom that you would like to have?
**Open-ended comment box**

(20)
Based on your experiences in this classroom, what changes, if any, would you recommend for future electronic classrooms that will enhance the teaching and learning experience?
**Open-ended comment box**

(21)
If you have other comments based on your personal experience in an electronic classroom, please include them here:
**Open-ended comment box**
Appendix F

Smart Classroom Technology:
Instructional Effectiveness and Faculty and Student Satisfaction

Data Collection Instrument
for Student Respondents

NOTE: For the purposes of this survey, an “electronic classroom” refers to those rooms with installed equipment: lectern with video equipment, document camera, computer, ceiling-mounted projector, and integrated room speakers.

(1)
My primary academic division is:
Choose one:
• Business Technologies
• Engineering Technologies
• Information Technologies
• Health and Public Safety
• Humanities and Sciences

(2)
How long have you been a student at Cincinnati State?
Choose one:
• First term
• 2-5 terms
• 6-10 terms
• More than 10 terms

(3)
Indicate the classroom (Building and Room) to which this survey applies. Note: The cover letter or email should have identified a particular course and section where you are using an electronic classroom. You may have also been asked to rate your experience in multiple rooms.
Choose one: from list of all Building and Rooms for the term when survey is being conducted

(4)
Including your current course(s,) how many different courses have you had that met in electronic classrooms at Cincinnati State? Please indicate number of courses, not number of actual class meetings.
Choose one:
• 1-3
• 4-6
• 7-9
• 10 or more

(5)
I prefer to take a course that meets in an electronic classroom.
Yes or No

(6)
When scheduling my courses, I look for courses that will meet in electronic classrooms.
Yes or No

(7)
Have you had a course meet in an electronic classroom where the instructor never used the installed equipment?
Yes or No

(8)
If the instructor never used the equipment in an electronic classroom, did he or she indicate a reason why the equipment was not used?
Yes or No

(9)
If yes, what was the primary reason given?
Choose one:
• Did not know how to use the equipment
• Did not want to be bothered with the equipment
• Did not need to use the equipment
• Did not want to be in an electronic classroom
• Equipment was not functioning
• Other – please specify

(10)
If the instructor did not use the equipment in an electronic classroom, to what degree do you agree or disagree that your learning experience was lessened?
Rating Scale
5  Strongly Agree that my learning experience was lessened
4  Agree that my learning experience was lessened
3  Neutral/No Opinion
2  Disagree that my learning experience was lessened
1  Strongly Disagree that my learning experience was lessened

If you have been in an electronic classroom where the instructor chose not to use the equipment, please skip to the end of this survey and click the Submit button.
The next set of questions will ask you about your experiences in electronic classrooms where the instructor did use the equipment during class meetings in the room. Remember that your responses refer to the room you selected in Question 3.

(11) In your opinion, what equipment should be included in an electronic classroom?

**Check all that apply:**
- Computer
- Hookup for instructor’s laptop PC
- Projector
- Internet Connection
- Video Recording
- Video Playback
- Document Camera
- Audio Playback
- Audio Recording
- Wireless Internet
- Two-way Videoconferencing
- Lighting Control
- Window Darkening Shades
- Other – please specify

(12) What installed equipment or source does the instructor use most of the time?

**Choose one:**
- Computer and projector for PowerPoint or other software presentation
- Computer and projector for Internet browsing
- Input for his/her own laptop PC
- VHS or DVD video playback and projector
- Document Camera and projector

(13) The instructor uses PowerPoint for most in-class lectures.

**Yes or No**

(14) The instructor requires student presentations using the installed equipment.

**Yes or No**

(15) The projection screen(s) should be located:

**Choose one:**
- At the front center of the room
- Off to one side on the front wall
- In a front corner of the room
• No preference
• Other-Multiple Locations (please specify locations desired)

(16)
Please rate the following statements using the scale of Strongly Agree, Agree, Neutral, Disagree, or Strongly Disagree as they relate to the room you indicated in question 3.

**Rating matrix using 5 for SA down to 1 for SD with a comment field for each item to indicate reasons for rating given**

- The placement of the projection screen or flat panel video display is satisfactory
- The projected or displayed image is bright enough to see without dimming the lights
- The instructor has sufficient control of lights in the room
- The acoustics in the room (spoken word and audio playback) are satisfactory
- The type of student furniture in the room is satisfactory
- The window treatments in the room are satisfactory for controlling outside light
- The instructor’s lectern and equipment arrangement facilitates using the installed classroom technology
- The equipment in the electronic classroom enhances my learning experience
- I learn more in an electronic classroom than in a standard classroom
- Having a class in an electronic classroom helps me to stay more focused on the instructor’s lessons
- I expect a higher grade for a course that meets in an electronic classroom
- The instructor uses multiple technologies in the electronic classroom
- The instructor effectively uses instructional technologies in an electronic classroom
- Instructors using electronic classrooms to deliver course materials are better organized
- The College should convert all standard lecture classrooms into electronic classrooms
- Overall, I am satisfied with my learning experience in an electronic classroom

(17)
Does having a class in an electronic classroom detract from your learning experience?  
**Yes** or **No**

(18)
If you answered yes to the above question, how does having a class in an electronic classroom detract from your learning experience?  
**Check all that apply:**

- The instructor wastes too much time with the equipment
- A smaller amount of material is covered in class
- Multiple examples make it difficult to comprehend the material presented
- I feel over-stimulated by multiple types of presentation devices
- Other – please specify

(19)
If you noticed any recurring difficulties with the classroom technology, what were they?
Check all that apply:
- Slow Internet speed
- Inferior image on the screen
- Room lights too bright on the screen
- Unable to control light from windows
- Poor sightline to the screen
- Equipment control system unreliable
- Unreliable source device (computer, VHS, DVD, document camera)
- Poor placement of instructor teaching station
- Other – please specify

(20)
Based on your experiences in this classroom, what changes, if any, would you recommend for future electronic classrooms that will enhance the teaching and learning experience?
Open-ended comment box

(21)
If you have other comments based on your personal experience in an electronic classroom, please include them here:
Open-ended comment box
Appendix G

Cincinnati State Technical and Community College
Classroom Technology Standards Document

Introduction

This proposed standard for all electronic classrooms at Cincinnati State Technical and Community College has been developed based on the outcomes of research conducted during a doctoral dissertation entitled Smart Classroom Technology: Instructional Effectiveness and Faculty and Student Satisfaction. Some language in this document has been used in previous classroom project bid packages. The Classroom Standards Document used by Portland (OR) Community College has also been helpful in developing some of the language. This standards document will be presented to the College’s Academic Technology Committee (ATC) in September 2008 for consideration and possible adoption for all future electronic classroom projects on campus.

Purpose and Goals

The need for electronic classrooms is crucial to the mission of the College, and will provide faculty and students with the basic tools needed for the teaching and learning process to be successful. Classroom design should allow faculty to present computer-based content and learning modules as part of their teaching activities. Having a standard configuration for all general purpose lecture rooms and learning laboratories will help faculty to be familiar with the technology and to transition from room to room as necessary. Faculty have expressed a number of expectations for electronic classrooms:

- Classrooms are intuitive and easy to use.
- Classrooms will provide growth potential for emerging technologies.
- Classrooms will be as similar as possible to existing electronic classrooms, with a similar user-interface on the touch-panel control system.
- Classrooms are easily maintained, with common equipment.

The goal is to install technology tools in the classroom and to remotely monitor, manage, and support them as much as possible. All new construction must allow for rooms to be technology ready even if technology will not be installed as part of the initial construction. This includes providing conduit and wiring pathways, electrical service, proper lighting and control, acoustical considerations, and other infrastructure needs for future use. The Standards Document will serve as a general guide for these projects. Specific bid language will be provided for each project that details all requirements in order to provide a finished and working product.
General Requirements for All Electronic Classroom Projects

- The College will identify tentative workspace locations in each of the classrooms, and will coordinate placement with the vendor.
- Equipment security is required. Equipment must be fastened so that it is not easily removed (security screws on rack-mounted equipment) with access panels in the workspace for access by authorized service personnel.
- The spaces above the ceilings are considered active airways and require plenum cabling.
- Systems should be capable of remote administration and integrated with existing Crestron RoomView enterprise-edition control software.
- College personnel will pull network cables to the classroom locations and connect network and telephone wiring in the appropriate data closets. The selected vendor is responsible for installation and termination of all other cables including additional AC power.
- The selected vendor will be responsible for working with the Cincinnati State maintenance supervisor to provide electrical power runs to instructors’ stations and to the ceiling-mounted projectors.
- The College will provide telephone instruments and handsets. The selected vendor is responsible for all other equipment.
- All classroom planning and equipment purchasing must be coordinated with Instructional Support Technologies (IST) and the College’s Purchasing Office. Purchases not approved via this process may not be supported by IST.

Ongoing Technology Refresh and Support

After classroom installations have been completed, an equipment replacement and refresh fund of at least five percent (5%) of the value of the classroom hardware is required each year. This fund will ensure that equipment and software upgrades are done in order to keep the rooms up-to-date with current technology. Control and management software upgrades will also be funded as needed. All future changes to room equipment and other instructional tools will be coordinated by IST with assistance from the ATC, Purchasing, and Physical Facilities. The process for updating this Standards Document is described below.

Post-installation support of the classrooms will be managed by IST in cooperation with the College’s Information Technology Services Helpdesk. Trouble calls will be placed to the Helpdesk and the Helpdesk will launch a trouble ticket and assign it to the IST group for investigation and resolution. The IST group will monitor classrooms via the centralized management software and will dispatch a technician as needed. Repairs, lamp replacements, and other related maintenance needs will be managed by IST.
Room Design Standards

Specific components, source equipment, control equipment, and all necessary devices will be quoted in all bid and design documents for electronic classroom projects. Because models, features, and technology capabilities change, those specifics are not included in the standards document. For those reasons, a general classroom standard for installed and included items and features in being spelled out here. The typical electronic classroom will include the following items:

- Ceiling-mounted computer/video projector, capable of supporting the most current video standard, minimum ANSI lumens to be determined based on current technology and classroom needs
- Manual pull-down projection screen, sized appropriately for the specific room
- Ceiling speakers for program audio
- Permanently located technology lectern
- Touch-screen instructor control panel
- Instructor computer with CD/DVD drive, 2 front USB ports, 17” flat screen monitor
- VGA and Ethernet input for additional laptop computer
- Auxiliary audio and video inputs for other equipment items
- Combination VCR/DVD player
- Document Camera
- Classroom Response System
- Wireless presentation remote mouse/clicker
- Wireless network access point in the room for user laptop computers
- Closed caption decoder
- Audio mixer/amplifier
- Audiovisual switcher
- Appropriate Crestron, Extron, and other control for all components, lighting, audio and video sources
- Appropriate racks, mounts, shelves, keyboard drawers, and other hardware necessary for proper installation
- Telephone located as near to the teaching station as possible

The instructor lectern should be located at the front of the room, but off to one side as determined by the specific room. It may be at an angle rather than parallel with the front wall depending on available space. When standing at the lectern, the projected image should not be blocked by the instructor or by any portion of the lectern or other equipment. The lectern should be a combination standing and sitting type of furniture to give instructors some desktop space. Height of the desktop will be to current ADA specifications. Space around the lectern will also conform to ADA requirements. Computer, audio, video, and control equipment will be installed in the lectern and frequently used items will be located at a convenient user height. Lighting control should be part of the control panel or located on a wall near the teaching station.
Classroom control and monitoring equipment will include appropriate Crestron, Extron, and other management items to all for full instructor control and for centralized monitoring of the classroom system and components. Crestron RoomView connections will be made to existing server. The touch screen design for source control will be designed in cooperation with IST staff in order to meet the needs of the room. A standard set of control screens will be used for as often as possible.

Projection screen size will be determined by the specific classroom installation requirements. As a rule, the 16x9 wide-screen format will be used to support future high-definition and wide-screen format video sources. A matte white window-shade pull-down style will be used. The screen will be mounted at the front-center of the room at the appropriate height, but a video mute feature in the control system will allow for easy image blanking so instructors can raise the screen and use the writing surface. Front wall-mounted writing surfaces should be wide enough to allow for maximum writing space to each side of the screen when it is lowered. In addition, a side-wall mounted writing surface should be included on the side of the room nearest the instructor teaching station.

Pathway Standards

**Floor Box:** A floor box for termination of conduit will be installed at the teaching station location. The placement will be a minimum of 5.5 feet from any wall. The floor box will be sized appropriately to accept all necessary conduit needed for the project. For existing classrooms, any floor trenching to install floor box and conduit will be refinished with concrete and matching floor covering so that it is not apparent the floor has been opened and closed.

**Floor Power:** A duplex 110v outlet will be installed in each floor box and will require an isolated 20 amp breaker.

**Conduit:** Provide a minimum of 1.5” low voltage conduit from the floor box into the space above suspended ceiling. Provide a minimum of ¾” conduit for dedicated 110v power service from the floor box to the appropriate wire path. Provide a 1” conduit for data wiring from the floor box to the appropriate wire path. All conduit will have a maximum of two 90 degree sweeps and no hard bends or angles will be allowed.

**Projector Power:** A duplex outlet will be provided at the projector mount location. It will face downward on the ceiling surface. Exact location will be determined during design phase.

**Projector Data:** A 1” conduit will be provided above the projector location to accommodate data cabling when needed, either at installation or for future installations.

**Phone and Data:** A minimum of three data outlets and one telephone outlet will be routed to and installed in the floor box.
Lighting Standards and Window Treatments

Lighting will be determined by the orientation of the room and will be designed to allow the brightest projected image possible in each room. The main lighting control will be located either on or as near to the teaching station as possible and will provide full instructor control of the lights. A main light switch will also be located near the room’s entry door and will act as a master switch to turn all lights on and off.

Ceiling lights that may adversely affect the projected image will be controlled so that they can be dimmed and/or turned off independently from other lights. No low hanging light fixtures will be used where they will impair the projected image.

Window shades will be room darkening rather than light filtering style. Shades should be institutional grade and should be easy to raise, lower, open, or close. Mini blinds will not be used in classrooms. When possible, the front of a classroom should not be directly across from windows.

Student Furniture Standards

The preferred student seating includes free standing tables and moveable chairs. At least one table in each room will be a standard ADA height to accommodate a wheelchair. While a wide variety of seating furniture is available, the size of the chair should be appropriate for larger-built students as well. Furniture flexibility is paramount to collaborative work in the classroom, and every effort will be made to allow for tables and chairs that can be rearranged for such activities.

Standards Document Updates and Approval

Ongoing review of the Standards Document is preferred, but specific updates will be needed before any new classroom projects are begun. The process for approval and subsequent updates to this document will be managed in the following fashion:

- Instructional Support Technologies will continually monitor classroom needs and technology changes in order to identify necessary changes to the document.
- Instructional Support Technologies will receive suggestions for changes from instructors on an ongoing basis, but will call for specific suggestions when planning for a new classroom project.
- Instructional Support Technologies will draft a revised document for presentation to the Faculty Senate Academic Technology Committee (ATC).
- The ATC will receive and discuss the changes. Recommendations from the ATC will be forwarded to the Faculty Senate for approval. Faculty Senate will forward the new draft documents to the Academic Vice President who will share it with the Academic Dean’s Council and the College’s Executive Team for final approval.
- Once approved, the updated document will be posted as the current standard to be used for all future projects. It will include the date of the current version.
Appendix H

Community College Personnel Survey Results

Does your campus have electronic classrooms in use? These rooms would include classrooms with "permanently" installed technology of any type.

| Yes | 37 | 95% |
| No  | 2  | 5%  |
| Total | 39 | 100% |

2. What common name do you give to "electronic classrooms" on campus?

<table>
<thead>
<tr>
<th>Name</th>
<th>Count</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Technology Classroom</td>
<td>2</td>
<td>6%</td>
</tr>
<tr>
<td>Electronic Classroom</td>
<td>2</td>
<td>6%</td>
</tr>
<tr>
<td>Smart Classroom</td>
<td>22</td>
<td>61%</td>
</tr>
<tr>
<td>Multimedia Classroom</td>
<td>6</td>
<td>17%</td>
</tr>
<tr>
<td>Mediated Classroom</td>
<td>1</td>
<td>3%</td>
</tr>
<tr>
<td>Other, please specify</td>
<td>3</td>
<td>8%</td>
</tr>
<tr>
<td>Total</td>
<td>36</td>
<td>100%</td>
</tr>
</tbody>
</table>

3. How many electronic classroom installations (all levels) do you have on campus? Include classrooms at all locations if you have multiple campuses.

Remember to include electronic classrooms at ALL campus locations for your institution.

36 Responses

4. How many support staff positions (full time equivalent - FTE) do you have to support all electronic classrooms? Include classrooms at all locations if you have multiple campuses.

37 Responses

5. Are support personnel dedicated to electronic classrooms or do they have other duties as well?

<table>
<thead>
<tr>
<th>Type</th>
<th>Count</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dedicated to electronic classrooms</td>
<td>5</td>
<td>16%</td>
</tr>
<tr>
<td>Have other responsibilities (give 2-3 examples)</td>
<td>26</td>
<td>84%</td>
</tr>
<tr>
<td>Total</td>
<td>31</td>
<td>100%</td>
</tr>
</tbody>
</table>

6. What types of "daily activities" are conducted by the electronic classroom support staff? Check all that apply.

<table>
<thead>
<tr>
<th>Activity</th>
<th>Count</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Open rooms in the morning</td>
<td>4</td>
<td>12%</td>
</tr>
<tr>
<td>Lock rooms at the end of the day</td>
<td>4</td>
<td>12%</td>
</tr>
<tr>
<td>Unlock equipment cabinets/lecterns in the morning</td>
<td>3</td>
<td>9%</td>
</tr>
<tr>
<td>Lock equipment cabinets/lecterns at the end of the day</td>
<td>3</td>
<td>9%</td>
</tr>
<tr>
<td>Check lamp hours in projector</td>
<td>16</td>
<td>48%</td>
</tr>
<tr>
<td>Check all components for proper functioning</td>
<td>15</td>
<td>45%</td>
</tr>
<tr>
<td>Monitor systems with Web-based monitoring tools</td>
<td>11</td>
<td>33%</td>
</tr>
<tr>
<td>Other, please specify</td>
<td>21</td>
<td>64%</td>
</tr>
</tbody>
</table>
7. Do you require training before faculty members can teach in an electronic classroom?

<table>
<thead>
<tr>
<th>Yes</th>
<th>12</th>
<th>33%</th>
</tr>
</thead>
<tbody>
<tr>
<td>No</td>
<td>24</td>
<td>67%</td>
</tr>
<tr>
<td>Total</td>
<td>36</td>
<td>100%</td>
</tr>
</tbody>
</table>

8. Who conducts the training (voluntary or mandatory) for electronic classrooms on your campus? Indicate the title(s) of the position or positions that handle this training, NOT the name of an individual.

34 Responses

9. What type of student seating is typically used in electronic classrooms?

<table>
<thead>
<tr>
<th>Type</th>
<th>12</th>
<th>42%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tablet Desks</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tables and chairs</td>
<td>14</td>
<td>42%</td>
</tr>
<tr>
<td>Fixed seating</td>
<td>4</td>
<td>12%</td>
</tr>
<tr>
<td>Other, please specify</td>
<td>3</td>
<td>9%</td>
</tr>
<tr>
<td>Total</td>
<td>33</td>
<td>100%</td>
</tr>
</tbody>
</table>

10. Do you include wireless network access in electronic classrooms?

<table>
<thead>
<tr>
<th>Yes</th>
<th>23</th>
<th>68%</th>
</tr>
</thead>
<tbody>
<tr>
<td>No</td>
<td>11</td>
<td>32%</td>
</tr>
<tr>
<td>Total</td>
<td>34</td>
<td>100%</td>
</tr>
</tbody>
</table>

11. If wireless access is included, how is it used? Check all that apply.

<table>
<thead>
<tr>
<th>Usage</th>
<th>9</th>
<th>36%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Installed computer’s Internet access</td>
<td></td>
<td></td>
</tr>
<tr>
<td>For instructors’ wireless laptops</td>
<td>10</td>
<td>40%</td>
</tr>
<tr>
<td>For students’ wireless laptops</td>
<td>17</td>
<td>68%</td>
</tr>
<tr>
<td>Other, please specify</td>
<td>4</td>
<td>16%</td>
</tr>
</tbody>
</table>

12. Is a telephone provided in electronic classrooms on campus?

<table>
<thead>
<tr>
<th>Yes</th>
<th>12</th>
<th>35%</th>
</tr>
</thead>
<tbody>
<tr>
<td>No</td>
<td>32</td>
<td>65%</td>
</tr>
<tr>
<td>Total</td>
<td>34</td>
<td>100%</td>
</tr>
</tbody>
</table>

13. If a telephone is provided, are “help numbers” posted near the telephone?

<table>
<thead>
<tr>
<th>Yes</th>
<th>10</th>
<th>56%</th>
</tr>
</thead>
<tbody>
<tr>
<td>No</td>
<td>8</td>
<td>44%</td>
</tr>
<tr>
<td>Total</td>
<td>18</td>
<td>100%</td>
</tr>
</tbody>
</table>

14. Are printed instructions provided in electronic classrooms (to help with using the equipment)?

<table>
<thead>
<tr>
<th>Yes</th>
<th>22</th>
<th>71%</th>
</tr>
</thead>
<tbody>
<tr>
<td>No</td>
<td>9</td>
<td>29%</td>
</tr>
<tr>
<td>Total</td>
<td>31</td>
<td>100%</td>
</tr>
</tbody>
</table>
15. What is the typical screen installation position in an electronic classroom? Choose one.

<table>
<thead>
<tr>
<th>Position</th>
<th>Count</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Front Center</td>
<td>22</td>
<td>67%</td>
</tr>
<tr>
<td>Front Off-Center</td>
<td>3</td>
<td>9%</td>
</tr>
<tr>
<td>Angled in a corner</td>
<td>4</td>
<td>12%</td>
</tr>
<tr>
<td>Other, please specify</td>
<td>4</td>
<td>12%</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>33</td>
<td>100%</td>
</tr>
</tbody>
</table>

16. What projection screen format is typically installed in electronic classrooms? Choose one.

<table>
<thead>
<tr>
<th>Format</th>
<th>Count</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>4x3</td>
<td>25</td>
<td>74%</td>
</tr>
<tr>
<td>16x9</td>
<td>5</td>
<td>15%</td>
</tr>
<tr>
<td>Other, please specify</td>
<td>4</td>
<td>11%</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>34</td>
<td>100%</td>
</tr>
</tbody>
</table>


<table>
<thead>
<tr>
<th>Type</th>
<th>Count</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fixed screen</td>
<td>4</td>
<td>12%</td>
</tr>
<tr>
<td>Pull-down window shade style</td>
<td>13</td>
<td>39%</td>
</tr>
<tr>
<td>Pull down tensioned</td>
<td>8</td>
<td>24%</td>
</tr>
<tr>
<td>Electric window shade style</td>
<td>4</td>
<td>12%</td>
</tr>
<tr>
<td>Electric tensioned</td>
<td>1</td>
<td>3%</td>
</tr>
<tr>
<td>Other, please specify</td>
<td>3</td>
<td>11%</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>33</td>
<td>100%</td>
</tr>
</tbody>
</table>

18. What type of “teaching station” is included in electronic classrooms? Check all that apply.

<table>
<thead>
<tr>
<th>Type</th>
<th>Count</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stand-up lectern</td>
<td>19</td>
<td>56%</td>
</tr>
<tr>
<td>Sit-down station</td>
<td>5</td>
<td>15%</td>
</tr>
<tr>
<td>Combination stand-up and sit-down</td>
<td>13</td>
<td>38%</td>
</tr>
<tr>
<td>Other, please specify</td>
<td>6</td>
<td>18%</td>
</tr>
</tbody>
</table>

19. Does your institution factor in ADA requirements to the teaching station design?

<table>
<thead>
<tr>
<th>Response</th>
<th>Count</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>19</td>
<td>58%</td>
</tr>
<tr>
<td>No</td>
<td>14</td>
<td>42%</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>33</td>
<td>100%</td>
</tr>
</tbody>
</table>

20. What provisions are included in electronic classrooms to meet ADA requirements? Check all that apply.

<table>
<thead>
<tr>
<th>Provision</th>
<th>Count</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Instructor lectern/teaching station height</td>
<td>15</td>
<td>56%</td>
</tr>
<tr>
<td>Mounting location of system controls</td>
<td>15</td>
<td>56%</td>
</tr>
<tr>
<td>Push button controls vs. Touch Panel controls</td>
<td>14</td>
<td>52%</td>
</tr>
<tr>
<td>Other, please specify</td>
<td>8</td>
<td>30%</td>
</tr>
</tbody>
</table>
21. Which of the following equipment SOURCE or instructor-managed components are mounted in or placed on the teaching station? Check all that apply.

<table>
<thead>
<tr>
<th>Equipment Description</th>
<th>Count</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>VHS deck</td>
<td>13</td>
<td>39%</td>
</tr>
<tr>
<td>DVD</td>
<td>15</td>
<td>45%</td>
</tr>
<tr>
<td>Combination VHS/DVD</td>
<td>23</td>
<td>70%</td>
</tr>
<tr>
<td>Document Camera</td>
<td>29</td>
<td>88%</td>
</tr>
<tr>
<td>Computer w/ monitor, keyboard, and mouse</td>
<td>31</td>
<td>94%</td>
</tr>
<tr>
<td>Classroom control panel (push button or touch panel)</td>
<td>24</td>
<td>73%</td>
</tr>
<tr>
<td>Preview Monitor</td>
<td>16</td>
<td>48%</td>
</tr>
<tr>
<td>Other, please specify</td>
<td>7</td>
<td>21%</td>
</tr>
</tbody>
</table>

22. Which of the following CONTROL equipment components are mounted in or placed on the teaching station? Check all that apply.

<table>
<thead>
<tr>
<th>Equipment Description</th>
<th>Count</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Switcher</td>
<td>20</td>
<td>69%</td>
</tr>
<tr>
<td>Room control hardware</td>
<td>16</td>
<td>55%</td>
</tr>
<tr>
<td>Audio amplifier</td>
<td>18</td>
<td>62%</td>
</tr>
<tr>
<td>Audio mixer</td>
<td>10</td>
<td>34%</td>
</tr>
<tr>
<td>Wireless keyboard or mouse receiver</td>
<td>10</td>
<td>34%</td>
</tr>
<tr>
<td>Wireless microphone receiver</td>
<td>7</td>
<td>24%</td>
</tr>
<tr>
<td>Camera controllers</td>
<td>7</td>
<td>24%</td>
</tr>
<tr>
<td>Videoconferencing equipment</td>
<td>7</td>
<td>24%</td>
</tr>
<tr>
<td>Other, please specify</td>
<td>8</td>
<td>28%</td>
</tr>
</tbody>
</table>

23. What is the typical location of the teaching station in the classroom? Choose one.

<table>
<thead>
<tr>
<th>Location Description</th>
<th>Count</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Center</td>
<td>3</td>
<td>9%</td>
</tr>
<tr>
<td>Left of Center (as you face the front)</td>
<td>9</td>
<td>28%</td>
</tr>
<tr>
<td>Right of Center (as you face the front)</td>
<td>9</td>
<td>28%</td>
</tr>
<tr>
<td>Other, please specify</td>
<td>11</td>
<td>34%</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>32</td>
<td>100%</td>
</tr>
</tbody>
</table>

24. Do you lease any of the equipment used in electronic classroom installations?

<table>
<thead>
<tr>
<th>Response</th>
<th>Count</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>1</td>
<td>3%</td>
</tr>
<tr>
<td>No</td>
<td>32</td>
<td>97%</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>33</td>
<td>100%</td>
</tr>
</tbody>
</table>

25. If you lease any of the classroom equipment, which items do you lease? Check all that apply.

<table>
<thead>
<tr>
<th>Equipment Description</th>
<th>Count</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Computer</td>
<td>2</td>
<td>40%</td>
</tr>
<tr>
<td>Video equipment (DVD and or VHS)</td>
<td>0</td>
<td>0%</td>
</tr>
<tr>
<td>Document Camera</td>
<td>0</td>
<td>0%</td>
</tr>
<tr>
<td>Videoconferencing Equipment</td>
<td>0</td>
<td>0%</td>
</tr>
<tr>
<td>Control equipment, Projector</td>
<td>0</td>
<td>0%</td>
</tr>
<tr>
<td>Other, please specify</td>
<td>3</td>
<td>60%</td>
</tr>
</tbody>
</table>
26. Which of the following security options do you use in electronic classrooms on campus? Check all that apply.

<table>
<thead>
<tr>
<th>Security Option</th>
<th>Count</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cable Locks</td>
<td>25</td>
<td>78%</td>
</tr>
<tr>
<td>Security Plates</td>
<td>9</td>
<td>28%</td>
</tr>
<tr>
<td>Locking Cabinets/Closets</td>
<td>22</td>
<td>69%</td>
</tr>
<tr>
<td>Network-based Security Monitoring/Alarms</td>
<td>4</td>
<td>12%</td>
</tr>
<tr>
<td>Motion Detectors</td>
<td>1</td>
<td>4%</td>
</tr>
<tr>
<td>Video Surveillance</td>
<td>4</td>
<td>15%</td>
</tr>
<tr>
<td>Equipment Security Cages</td>
<td>5</td>
<td>16%</td>
</tr>
<tr>
<td>Keycard or Combination Lock Room Access</td>
<td>8</td>
<td>25%</td>
</tr>
<tr>
<td>Other, please specify</td>
<td>7</td>
<td>22%</td>
</tr>
</tbody>
</table>

27. What new technologies are you exploring and anticipate using in future installations of electronic classrooms?

18 Responses

28. Does your institution provide multiple levels of installed classroom technology in different classrooms? For example, Level One may include a computer, video source, projector, and control; Level Two adds equipment to Level One, etc.

If the answer is NO, go to question 31 to respond for only one level.

<table>
<thead>
<tr>
<th>Answer</th>
<th>Count</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>16</td>
<td>53%</td>
</tr>
<tr>
<td>No</td>
<td>14</td>
<td>47%</td>
</tr>
<tr>
<td>Total</td>
<td>30</td>
<td>100%</td>
</tr>
</tbody>
</table>

29. If you provide multiple levels of installed classrooms, how many levels exist?

<table>
<thead>
<tr>
<th>Level</th>
<th>Count</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Two</td>
<td>6</td>
<td>35%</td>
</tr>
<tr>
<td>Three</td>
<td>7</td>
<td>41%</td>
</tr>
<tr>
<td>Four</td>
<td>2</td>
<td>12%</td>
</tr>
<tr>
<td>Other, please specify</td>
<td>2</td>
<td>12%</td>
</tr>
<tr>
<td>Total</td>
<td>17</td>
<td>100%</td>
</tr>
</tbody>
</table>

30. What name do you give to each level of installed classroom? Provide your name for each level used at your institution.

14 Responses

31. If you have only one level of an electronic classroom, what is the typical set-up? Please include equipment sources, installed items, and control systems used.

21 Responses

32. If you have two levels of electronic classrooms, what is the typical set-up for Level 2? Please include equipment sources, installed items, and control systems used.

10 Responses

33. If you have three levels of electronic classrooms, what is the typical set-up for Level 3? Please include equipment sources, installed items, and control systems used.

8 Responses
34. If you have four levels of electronic classrooms, what is the typical set-up for Level 4? Please include equipment sources, installed items, and control systems used.

4 Responses

35. Do the electronic classrooms on campus typically have some form of integrated control system to control equipment sources, projector, etc.?

<table>
<thead>
<tr>
<th></th>
<th>Yes</th>
<th>No</th>
</tr>
</thead>
<tbody>
<tr>
<td>Count</td>
<td>19</td>
<td>10</td>
</tr>
<tr>
<td>Percent</td>
<td>66%</td>
<td>34%</td>
</tr>
<tr>
<td>Total</td>
<td>29</td>
<td>100%</td>
</tr>
</tbody>
</table>

36. What type of classroom control system do you use in most electronic classrooms on campus? Choose one.

<table>
<thead>
<tr>
<th>System</th>
<th>Count</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Crestron</td>
<td>5</td>
<td>21%</td>
</tr>
<tr>
<td>AMX</td>
<td>3</td>
<td>12%</td>
</tr>
<tr>
<td>SP Controls</td>
<td>2</td>
<td>8%</td>
</tr>
<tr>
<td>Extron</td>
<td>9</td>
<td>38%</td>
</tr>
<tr>
<td>Home-grown</td>
<td>1</td>
<td>4%</td>
</tr>
<tr>
<td>Other, please specify</td>
<td>4</td>
<td>17%</td>
</tr>
<tr>
<td>Total</td>
<td>24</td>
<td>100%</td>
</tr>
</tbody>
</table>

37. Does the classroom control system include an “auto off” function to shut down the projector, equipment sources, or equipment control at a pre-set time each day? The “auto off” function does not need to control all equipment items or systems.

<table>
<thead>
<tr>
<th></th>
<th>Yes</th>
<th>No</th>
</tr>
</thead>
<tbody>
<tr>
<td>Count</td>
<td>8</td>
<td>18</td>
</tr>
<tr>
<td>Percent</td>
<td>31%</td>
<td>69%</td>
</tr>
<tr>
<td>Total</td>
<td>26</td>
<td>100%</td>
</tr>
</tbody>
</table>

38. If the answer to the above question is “yes”, what are the normal hours of active operation for your classroom systems?

10 Responses

39. Are electronic classrooms monitored through a network-based remote management tool (such as Crestron Room View software)?

<table>
<thead>
<tr>
<th></th>
<th>Yes</th>
<th>No</th>
</tr>
</thead>
<tbody>
<tr>
<td>Count</td>
<td>8</td>
<td>19</td>
</tr>
<tr>
<td>Percent</td>
<td>30%</td>
<td>70%</td>
</tr>
<tr>
<td>Total</td>
<td>27</td>
<td>100%</td>
</tr>
</tbody>
</table>

40. What staff members (position titles, not individual names) are capable of viewing such a centralized monitoring system? Check all that apply.

<table>
<thead>
<tr>
<th>Position Title</th>
<th>Count</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Department manager</td>
<td>6</td>
<td>55%</td>
</tr>
<tr>
<td>Classroom technicians</td>
<td>6</td>
<td>55%</td>
</tr>
<tr>
<td>Clerical or support staff</td>
<td>0</td>
<td>0%</td>
</tr>
<tr>
<td>Networking/ITS staff</td>
<td>5</td>
<td>45%</td>
</tr>
<tr>
<td>Student employees</td>
<td>0</td>
<td>0%</td>
</tr>
<tr>
<td>Other, please specify</td>
<td>3</td>
<td>30%</td>
</tr>
</tbody>
</table>
41. Does the room control system include a “video mute” function to blank the projected image temporarily?

<p>| | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>14</td>
<td>56%</td>
</tr>
<tr>
<td>No</td>
<td>11</td>
<td>44%</td>
</tr>
<tr>
<td>Total</td>
<td>25</td>
<td>100%</td>
</tr>
</tbody>
</table>

42. What is the name of the campus department that coordinates designing, planning, and installation of electronic classrooms?

27 Responses

43. What is the name of the campus department that provides technical support for electronic classrooms?

27 Responses

44. What other departments are involved in electronic classroom projects? Check all that apply.

<table>
<thead>
<tr>
<th>Department</th>
<th>Yes</th>
<th>78%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Facilities</td>
<td>21</td>
<td></td>
</tr>
<tr>
<td>Capital Projects</td>
<td>7</td>
<td>26%</td>
</tr>
<tr>
<td>Information Technology Services</td>
<td>20</td>
<td>81%</td>
</tr>
<tr>
<td>Academic divisions/departments</td>
<td>19</td>
<td>70%</td>
</tr>
<tr>
<td>Chief Academic Officer’s office</td>
<td>8</td>
<td>30%</td>
</tr>
<tr>
<td>Finance</td>
<td>7</td>
<td>26%</td>
</tr>
<tr>
<td>Other, please specify</td>
<td>6</td>
<td>22%</td>
</tr>
</tbody>
</table>

45. Does your institution have a standing “technology committee” or similar group?

<p>| | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>21</td>
<td>78%</td>
</tr>
<tr>
<td>No</td>
<td>6</td>
<td>22%</td>
</tr>
<tr>
<td>Total</td>
<td>27</td>
<td>100%</td>
</tr>
</tbody>
</table>

46. If your institution does have such a group, what positions are represented on the committee? Check all that apply.

<table>
<thead>
<tr>
<th>Position</th>
<th>Yes</th>
<th>78%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Faculty</td>
<td>18</td>
<td>86%</td>
</tr>
<tr>
<td>Networking/Infrastructure support</td>
<td>14</td>
<td>67%</td>
</tr>
<tr>
<td>Chief Information Officer (CIO)</td>
<td>9</td>
<td>43%</td>
</tr>
<tr>
<td>Chief Financial Officer (CFO)</td>
<td>2</td>
<td>10%</td>
</tr>
<tr>
<td>Instructional Technology Manager/Director</td>
<td>16</td>
<td>76%</td>
</tr>
<tr>
<td>Media Specialists</td>
<td>15</td>
<td>71%</td>
</tr>
<tr>
<td>Instructional Technologists</td>
<td>13</td>
<td>62%</td>
</tr>
<tr>
<td>Campus Facilities Manager</td>
<td>5</td>
<td>24%</td>
</tr>
<tr>
<td>Chief Academic Administrator (Provost, Vice President)</td>
<td>8</td>
<td>38%</td>
</tr>
<tr>
<td>Academic Dean</td>
<td>12</td>
<td>57%</td>
</tr>
<tr>
<td>Other, please specify</td>
<td>3</td>
<td>14%</td>
</tr>
</tbody>
</table>

47. Do you believe your campus effectively coordinates with all involved departments and offices for your electronic classroom projects?

<p>| | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>16</td>
<td>62%</td>
</tr>
<tr>
<td>No</td>
<td>10</td>
<td>38%</td>
</tr>
<tr>
<td>Total</td>
<td>26</td>
<td>100%</td>
</tr>
</tbody>
</table>
48. What time of the year do classroom installations typically take place? Choose one.

<table>
<thead>
<tr>
<th>Time of Year</th>
<th>Count</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Summer</td>
<td>10</td>
<td>37%</td>
</tr>
<tr>
<td>Weekends</td>
<td>1</td>
<td>4%</td>
</tr>
<tr>
<td>Between semesters or terms</td>
<td>6</td>
<td>22%</td>
</tr>
<tr>
<td>Year-round</td>
<td>10</td>
<td>37%</td>
</tr>
<tr>
<td>Other, please specify</td>
<td>0</td>
<td>0%</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>27</strong></td>
<td><strong>100%</strong></td>
</tr>
</tbody>
</table>

49. Does your institution have “swing rooms” (temporary rooms, not necessarily equipped with technology) that are available for classes to use when other rooms are taken off line for equipment installation or servicing?

<table>
<thead>
<tr>
<th>Response</th>
<th>Count</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>8</td>
<td>32%</td>
</tr>
<tr>
<td>No</td>
<td>17</td>
<td>68%</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>25</strong></td>
<td><strong>100%</strong></td>
</tr>
</tbody>
</table>

50. Do you contract with an AV Integrator or Engineer for electronic classroom design?

<table>
<thead>
<tr>
<th>Response</th>
<th>Count</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>6</td>
<td>24%</td>
</tr>
<tr>
<td>No</td>
<td>19</td>
<td>76%</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>25</strong></td>
<td><strong>100%</strong></td>
</tr>
</tbody>
</table>

51. Do you contract with an AV Integrator or Engineer for electronic classroom installation?

<table>
<thead>
<tr>
<th>Response</th>
<th>Count</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>11</td>
<td>42%</td>
</tr>
<tr>
<td>No</td>
<td>15</td>
<td>58%</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>26</strong></td>
<td><strong>100%</strong></td>
</tr>
</tbody>
</table>

52. If you contract with an AV Integrator or Engineer for any purpose, at what stage of the design or installation process do you begin using their services? Choose one.

<table>
<thead>
<tr>
<th>Stage of Process</th>
<th>Count</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>During an initial needs assessment phase</td>
<td>1</td>
<td>10%</td>
</tr>
<tr>
<td>After needs assessment but before design begins</td>
<td>3</td>
<td>30%</td>
</tr>
<tr>
<td>After design but before formal specifications are written</td>
<td>2</td>
<td>20%</td>
</tr>
<tr>
<td>We do the design and write the specifications, but hire an Integrator for installation</td>
<td>4</td>
<td>40%</td>
</tr>
<tr>
<td>Other, please specify</td>
<td>5</td>
<td>33%</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>15</strong></td>
<td><strong>100%</strong></td>
</tr>
</tbody>
</table>

53. Are you required to bid out any phase of electronic classroom projects?

<table>
<thead>
<tr>
<th>Response</th>
<th>Count</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>14</td>
<td>52%</td>
</tr>
<tr>
<td>No</td>
<td>13</td>
<td>48%</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>27</strong></td>
<td><strong>100%</strong></td>
</tr>
</tbody>
</table>

54. If you bid out electronic classroom projects, which parts do you put out to bid? Check all that apply.

<table>
<thead>
<tr>
<th>Part</th>
<th>Count</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Initial Planning/Consulting</td>
<td>0</td>
<td>0%</td>
</tr>
<tr>
<td>Design</td>
<td>0</td>
<td>0%</td>
</tr>
<tr>
<td>Specification Preparation</td>
<td>1</td>
<td>6%</td>
</tr>
<tr>
<td>Installation</td>
<td>8</td>
<td>50%</td>
</tr>
<tr>
<td>Other, please specify</td>
<td>7</td>
<td>44%</td>
</tr>
</tbody>
</table>
55. Who does the electrical work for your electronic classroom projects? Choose one.

<table>
<thead>
<tr>
<th>Option</th>
<th>Count</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Campus personnel</td>
<td>16</td>
<td>59%</td>
</tr>
<tr>
<td>Electrical contractor hired by your institution</td>
<td>7</td>
<td>26%</td>
</tr>
<tr>
<td>Electrical contractor hired by an AV Integrator</td>
<td>1</td>
<td>4%</td>
</tr>
<tr>
<td>Other, please specify</td>
<td>3</td>
<td>11%</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>27</strong></td>
<td><strong>100%</strong></td>
</tr>
</tbody>
</table>

56. Who does the data/network wiring for your electronic classroom projects? Choose one.

<table>
<thead>
<tr>
<th>Option</th>
<th>Count</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Campus personnel</td>
<td>17</td>
<td>63%</td>
</tr>
<tr>
<td>Contractor hired by your institution</td>
<td>7</td>
<td>26%</td>
</tr>
<tr>
<td>Contractor hired by an AV Integrator</td>
<td>0</td>
<td>0%</td>
</tr>
<tr>
<td>Other, please specify</td>
<td>3</td>
<td>11%</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>27</strong></td>
<td><strong>100%</strong></td>
</tr>
</tbody>
</table>

57. Does your institution have a "standards document" that outlines the requirements and details for all electronic classrooms?

<table>
<thead>
<tr>
<th>Option</th>
<th>Count</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>5</td>
<td>19%</td>
</tr>
<tr>
<td>No</td>
<td>21</td>
<td>81%</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>26</strong></td>
<td><strong>100%</strong></td>
</tr>
</tbody>
</table>

58. If yes, what is the name of the document?
7 Responses

59. If yes, who wrote the document (position or committee, NOT individual names)?
7 Responses

60. How often is the standards document updated?

<table>
<thead>
<tr>
<th>Option</th>
<th>Count</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Annually</td>
<td>1</td>
<td>14%</td>
</tr>
<tr>
<td>Every Two Years</td>
<td>0</td>
<td>0%</td>
</tr>
<tr>
<td>Every Three Years</td>
<td>0</td>
<td>0%</td>
</tr>
<tr>
<td>Other, please specify</td>
<td>6</td>
<td>86%</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>7</strong></td>
<td><strong>100%</strong></td>
</tr>
</tbody>
</table>

61. Who approves and authorizes changes to the standards document (position or department, not individual names)?
6 Responses
62. What does the standards document address? Check all that apply.

<table>
<thead>
<tr>
<th>Item</th>
<th>Count</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Electrical requirements</td>
<td>2</td>
<td>29%</td>
</tr>
<tr>
<td>Wiring/Cable specifications</td>
<td>2</td>
<td>29%</td>
</tr>
<tr>
<td>Conduit</td>
<td>2</td>
<td>29%</td>
</tr>
<tr>
<td>Equipment placement</td>
<td>4</td>
<td>57%</td>
</tr>
<tr>
<td>Projector placement</td>
<td>4</td>
<td>57%</td>
</tr>
<tr>
<td>Minimum equipment specifications</td>
<td>4</td>
<td>57%</td>
</tr>
<tr>
<td>Specific equipment brands/models</td>
<td>3</td>
<td>43%</td>
</tr>
<tr>
<td>Projector brightness</td>
<td>2</td>
<td>29%</td>
</tr>
<tr>
<td>Projector contrast ratio</td>
<td>1</td>
<td>14%</td>
</tr>
<tr>
<td>Classroom furniture type/style</td>
<td>2</td>
<td>29%</td>
</tr>
<tr>
<td>Lectern design and construction</td>
<td>3</td>
<td>43%</td>
</tr>
<tr>
<td>Lighting</td>
<td>2</td>
<td>29%</td>
</tr>
<tr>
<td>Window treatments</td>
<td>1</td>
<td>14%</td>
</tr>
<tr>
<td>Screen size and type</td>
<td>2</td>
<td>29%</td>
</tr>
<tr>
<td>Wall finishes</td>
<td>0</td>
<td>0%</td>
</tr>
<tr>
<td>Floor finishes</td>
<td>0</td>
<td>0%</td>
</tr>
<tr>
<td>Other, please specify</td>
<td>3</td>
<td>43%</td>
</tr>
</tbody>
</table>
Appendix I

Community College Personnel Survey Open-Ended Responses

Question 2: What common name do you give to “electronic classrooms” on campus?
Other, please specify.
  • Classroom of the Future
  • Smart Multimedia Classroom
  • Learning College Classroom

Question 3: How many electronic classroom installations do you have on campus?
Include classrooms at all locations if you have multiple campuses.
  • 4
  • 45
  • 20
  • 26
  • 46
  • 26
  • 100
  • 23
  • 67
  • 200
  • 100
  • 60 or more
  • 22
  • 80
  • 46
  • 106
  • 124
  • 90
  • 100
  • approximately 260
  • 49
  • 150
  • 10
  • 40
  • 132

Question 4: How many support staff positions (FTE) do you have to support all electronic classrooms?
  • 2
  • 0
  • 1.5
  • 2
  • 1
  • 3
  • 4.5
  • 5
  • 2
  • 4
  • 3.9
  • 3.5
  • 20

Question 5: Are your support personnel dedicated to electronic classrooms or do they have other duties as well? Give 2-3 examples.
  • IT (Computers)
  • all computers on campus
  • ITV, Department Administration
  • Delivery of Audio Video equip. & data projectors
  • multimedia assistance, IT help desk tickets,
  • One runs the Multi-Media Learning Center
  • content development, coordinator, iTunesU
  • media scheduling, equipment dist., event media
  • desktop support for admin and instruction, 2000 PC
  • event recording (video), maintenance on smart tech
• A/V duties not associated with instruction
• IT support, help desk
• Laboratory assistants
• Delivery of rolling multimedia carts, PA systems
• Desktop support, video conferencing, mobile equip.
• Help Desk/IT and instructional television support
• Satellite downloads, audio setup for media events
• Help desk, installation of hardware, software inst
• Media support, supervising student workers
• Desktop support services across all campuses
• Event setups, repair, media circulation

Question 6: What types of daily activities are conducted by the electronic classroom support staff?
• Troubleshoot, work with equipment vendors
• Faculty are responsible for the above activities
• Not all stations are electronically monitored,
• Answer calls as they arrive
• Large circulating inventory of equipment
• Basic troubleshooting
• Training faculty and adjuncts
• General oversight and maintenance, training
• None
• I do not check daily
• Software updates
• Troubleshooting and training
• Clean LCD filters and general maintenance
• None on a daily basis
• Not daily, but as problems arise

Question 8: Who conducts the training for electronic classrooms on your campus?
• Mandatory training by Instructional Designer for the college
• Tech trainer
• Instructional Technology Specialist; Instructional Technology Coordinator
• Instructional Designer and Trainer
• Instructional Services assistants and managers
• Media staff: Media Technician Lead, Media Technician Supervisor, Media Repair Technician, Photographer ii
• Faculty and staff development with AV employees
• AV Technician
• Multimedia Equipment Technicians, Multimedia Services Supervisors, Student technicians
• Voluntary only training by training specialists, instructional technologists, and media specialists
• Voluntary training conducted by one of the support staff and the instructional technologist who is a faculty member
• Coordinator Media Services
• Instructional Technology Support Specialist
• Manager of Media Services
• Professional development group
• Senior instructional designer
• Media Technology Analyst
• Director, Media Systems
• Media Specialist, Librarian, Microcomputer Support Specialist
• Coordinator A/V Services
• Voluntary, Instructional Equipment Tech I, Instructional Technology Specialist II
• Instructional support staff
• Library Media Specialist
• Coordinator Instructional Media Services & IMS Technician
• Technical staff

Question 9: What type of student seating is typically used in electronic classrooms?
Other, please specify.
• All of the above
• All of the above

Question 11: If wireless access is included, how is it used? Other, please specify.
• All of the above
• None
• Public access to the Internet

Question 15: What is the typical screen installation position in an electronic classroom?
Other, please specify.
• varies by location
• Front Center or Angled
• white board, no screen
• both front center and off center

Question 16: What projection screen format is typically installed in electronic classrooms? Other, please specify.
• don't know
• old rooms -4/3 & new rooms 16/9
• Not sure

Question 17: What type of projection screen do you typically use in electronic classrooms? Other, please specify.
• Smartboard
• All of the above depending on age of system
• White board
Question 18: What type of “teaching station” is included in electronic classrooms? Other, please specify.
- stool chair included
- Tables
- L-shaped 40" tall instructor's desk
- table with portable desktop lectern

Question 20: What provisions are included in electronic classrooms to meet ADA requirements? Other, please specify.
- Special portable stations used as needed
- Adjustable chairs
- Only a few teaching station height
- some student stations

Question 21: Which of the following equipment source or instructor-managed components are mounted in or placed on the teaching stations? Other, please specify.
- speakers
- laptop connect for laptop
- SMART Sympodium
- Document cameras not in computer labs
- doc cam and touch panel in about 10% of rooms

Question 22: Which of the following control equipment components are mounted in or placed on the teaching station? Other, please specify.
- varies slightly, Videoconferencing rooms separate
- Crestron control system in some rooms
- Not on the actual presentation station
- Only installed in approx. 10 classrooms
- CC decoder for lcd projector
- a wide variety of installations are in operation

Question 23: What is the typical location of the teaching station in the classroom? Other, please specify.
- varies depending on the classroom
- Side depends on doors, but always off center front
- Left or right depending on room
- varies depending on location
- Varies
- Both left and right depending on room layout
- we have no consistency
- left and right of center depending on room layout
- diagonal from the classroom door
- left or right depending on room
Question 25: If you lease any of the classroom equipment, which items do you lease? Other, please specify.
- None
- None

Question 26: Which of the following security options do you use in electronic classrooms on campus? Other, please specify.
- Classrooms are locked when not in use
- Some buildings have keycard
- "Screamers" - sonic alarms
- Locked Door - Key
- Wired alarms on projectors
- Chief security projector mounts
- Alarm device (Luxor)

Question 27: What new technologies are you exploring and anticipate using in future installations of electronic classrooms?
- Smart lecterns
- Smart boards, audience response systems, lapel mics
- Tegrity
- Controllers, smart boards,
- Video podcasting
- Symposium, electronic white board, streaming video
- SMART "clicker" technologies
- Tablet PCs compatible with overhead projectors when swiveled; wireless slates that allow an instructor to be free from the workstation;
- Software such as Tegrity
- Wireless projectors
- Classroom capture
- Symposium
- Recording (lecture capture)
- HD Video and document cameras
- Electronic whiteboard/tablets
- We have just installed plasma screens in new building
- Student response modules (eInstruction and other brands)
- Microphone capability

Question 29: If you provide multiple levels of installed classrooms, how many levels exist? Other, please specify.
- N/A
- We install any equipment that meets specific needs

Question 30: What name do you give to each level of installed classroom? Provide your name for each level used at your institution.
- See Table 33 in Chapter 4
Questions 31-34: Typical setup for each classroom level as indicated by the institution.
  • See Appendix J

Question 36: What type of classroom control system do you use in most electronic classrooms? Other, please specify.
  • Are currently exploring Creston
  • Not sure of the brand
  • Use the remotes of the projector, DVD/VCR, present
  • controls on equipment or remotes

Question 38: If the answer to the above question (is there an auto-off feature on the classroom controls), what are the typical hours of active operation for your electronic classrooms?
  • 8 am to 10:00 pm
  • 7:30 am to 10pm
  • Auto off 11pm
  • varies widely
  • NA
  • 7 am to 11 pm
  • until 10:30 or 11:00 pm
  • Ours turn the projector off when it hasn't been used for I think a half hour
  • 7:30 am-10:30 pm
  • 7 am-10 pm, auto off programmed for 2 hours of inactivity

Question 40: What staff members are capable of viewing such a centralized monitoring system? Other, please specify.
  • Will be, department supervisor and media staff
  • Media services staff
  • Help Desk

Question 42: What is the name of the campus department that coordinates the designing, planning, and installation of electronic classrooms?
  • IT Information Technology
  • IS & ed Tech
  • Information Technology
  • IT Department
  • IT Division (Network and Instructional Services)
  • Media Services
  • Media Services
  • Integrated Technology Services Division
  • Multimedia Equipment Services and Support
  • Educational Technologies/Classroom and Event Tech.
  • Flexible Learning Options
  • Media Services
• media, IT, and Center for Learning Innovation
• Information Technologies
• IT
• Media Services
• collaborative
• Media Systems
• IT
• IT and Academic Resources
• A/V
• Instructional Media Center
• Instructional Support and Development
• There is no planning
• Instructional Media Services
• Learning Resources
• Technology Services and Support

Question 43: What is the name of the campus department that provides technical support for electronic classrooms?
• AV Audio Visual
• IS & Ed Tech
• Information Technology
• IT Department
• Instructional Services
• Media Services
• Media Services with Information Services for PCs
• Integrated Technology Services Division
• Multimedia Equipment Services and Support
• Educational Technologies
• Flexible Learning Options & Help Desk
• Information Services
• IT
• Information Technologies, Media Services
• IT
• Media Services
• Media Services
• Media Systems
• IT
• IT
• A/V
• Instructional Media Center
• Instructional Support and Development
• Multimedia Learning Center, IT
• Instructional Media Services
• Learning Resources
• Technology Services and Support

Question 44: What other departments are involved in electronic classroom projects? Other, please specify.
• IT division
• All above have input
• Academic Computing and Multimedia Services
• All departments
• Library, Multimedia Learning Center
• Computer Services

Question 46: If your institution does have such a group (technology committee), what positions are represented on the committee? Other, please specify.
• Library, Support Staff
• Access Specialist
• Employee group based (i.e. classified faculty, etc.)

Question 47: Do you believe your campus effectively coordinates with all involved departments and offices for your electronic classroom projects? Why or why not?
• We are a small college that is growing, and now only have two full time individuals for smart technology installation and maintenance, which limits the size of our expansion.
• IT does not always communicate activities that impact instructor station services
• While we do have very inclusive technology committees the multimedia classrooms do not get funneled through those committees.
• Because it is under my control and I see to it that we have collaboration with Academic and Administrative areas.
• We work with academic units, deans, and vice presidents across all campus locations to prioritize classroom technology needs.
• Updates are not driven by instructional needs. Currently, administration decides when to update and allocate funding...
• Could do a better job at soliciting input for proposed changes
• Good communication exists among them.
• Main person in charge does not want to be bothered by input. Prefers to hire contractor and let the contractor make all the decisions. Very hands off and very secretive.
• Remember we are in education business
• Too difficult
• It is always better to use a team effort in coordinating the planning of electronic classrooms.
• We solicit needs prior to purchase and provide training, and immediate response to service calls. User surveys reflect a high degree of satisfaction with services provided.
• Absolutely not. This campus just blows willy-nilly into purchasing equipment with no rhyme or reason and then on one knows who is supposed to support it.
• All are included in the planning and implementation process
• Because it is necessary in order to do the project. Most decisions must be made by the department faculty. If they are not involved the room will not be used effectively.

Question 48: What time of the year do classroom installations typically take place? Other, please specify.
  • No responses received

Question 52: If you contract with an AV Integrator or Engineer for any purpose, at what stage of the design or installation process do you begin using their services? Other, please specify.
  • For new buildings we contract for design/install
  • only on new buildings and after needs assessment
  • NA
  • None
  • Standing contract, budget more important than installation

Question 54: If you bid out electronic classroom projects, which parts do you put out to bid? Other, please specify.
  • Based on a dollar amount not function
  • Recently able to establish "piggyback contract"
  • purchasing; in new bldgs, all of the above
  • NA
  • Equipment purchase
  • Equipment

Question 55: Who does the electrical work for your electronic classroom projects? Other, please specify.
  • depends if new building or retro
  • New buildings - general cont. Existing - campus
  • Depends on project

Question 56: Who does the data/network wiring for your electronic classroom projects? Other, please specify.
  • combination of campus personnel and contractor
  • Again varies if new construction or retro
  • Depends on project

Question 58: If yes (having a standards document), what is the name of the document?
  • IT Standards document
  • electronic instructor station specifications
  • Classroom Design Standards
  • Standards - Learning College Classrooms
  • NA
• Rooms are retrofitted and need customized attention
• Classroom Technology Standards

Question 59: If yes (having a standards document), who wrote the document?
• Tech Consultant
• Media personnel
• Deputy Director, Academic Computing & Multimedia Services, Technology Planning Committee, Technology Consultant hired by college
• Vice President of Instructional Support
• NA
• NA
• NA
• Instructional Media Services and the Technology Committee

Question 60: How often is the document updated? Other, please specify.
• as needed
• review prior to any purchase, at least annually
• as needed
• NA
• NA
• NA
• As needed

Question 61: Who approves and authorizes changes to the standards document (position or department).
• Media Supervisor - funding it is another matter
• Deputy Director, Academic Computing & Multimedia Services & Technology Planning Committee
• Technology Committee
• NA
• NA
• College Council and the President

Question 62: What does the standards document address? Other, please specify.
• Equipment, does no specify brands or configuration
• n/
• n/a
## Appendix J

### Community College Electronic Classrooms

**Responses for Equipment Listings for Levels of Rooms (Question 30)**

<table>
<thead>
<tr>
<th>Level 1 Equipment Listings</th>
<th>Level 2 Equipment Listings</th>
<th>Level 3 Equipment Listings</th>
<th>Level 4 Equipment Listings</th>
</tr>
</thead>
<tbody>
<tr>
<td>Institutions Reporting 4 Levels of Rooms</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Computer, DVD, speakers, Smartboard, document camera, control panel or remote, ceiling mounted projector, printer</td>
<td>Camera and switching equipment</td>
<td>2 Smartboards, 2 projectors, computer with DVD, laptop station, digital overhead projector, wireless microphone, wireless control</td>
<td>Digital videoconferencing classroom</td>
</tr>
<tr>
<td>Computer, DVD, Smartboard, document camera, projector, Extron</td>
<td>Video conferencing equipment, PA</td>
<td>Sympodium or Smartboard, DVD/VHS, switching equipment, document camera, audio support, microphones</td>
<td>Screen, DVD/VHS, projector, document camera, computer, instructor workstation, computers for students</td>
</tr>
<tr>
<td>Smartboard or Sympodium, computer, projector, VHS/DVD, audio system</td>
<td>Projector, instructor lectern, DVD/VHS, document camera, switching equipment</td>
<td>Wall control panel, computer, document camera, multimedia lectern, multiple cameras, editing capabilities</td>
<td>3 screens, 3 projectors, sound system, switchers</td>
</tr>
<tr>
<td>PC, DVD, VHS, document camera, projector, wireless capability</td>
<td>TV, DVD/VHS, projector, remote control with laser pointer and mouse controls, speakers, computer, laptop connection, switchbox for computer selection, Extron control box</td>
<td>Screen, DVD/VHS, projector, document camera, computer, instructor workstation</td>
<td>Spectrum Link 42” instructor workstation, computer, wireless mouse, closed-caption decoder, ceiling speakers, projector, document camera, wireless microphone, Barix Instreamer for iTunesU recording</td>
</tr>
<tr>
<td>Level 1 Equipment Listings</td>
<td>Level 2 Equipment Listings</td>
<td>Level 3 Equipment Listings</td>
<td></td>
</tr>
<tr>
<td>----------------------------</td>
<td>----------------------------</td>
<td>----------------------------</td>
<td></td>
</tr>
<tr>
<td>TV, VCR, DVD, document camera, projector, screen, computer, switching equipment (switch box or Crestron)</td>
<td>Computer, document camera, multimedia lectern with all equipment mounted inside, computer, DVD/VHS, switcher, mixer, amplifier, document camera, speakers, Sympodium</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ceiling projector, computer, DVD/VHS, Power Amp switcher, document camera, closed-caption decoder</td>
<td>Screen, DVD/VHS, projector, laptop connection</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Computer, laptop connection, document camera, DVD/VHS combo, Extron control, Epson LCD projector with closed-caption, auxiliary RCA input, campus network connection, Crestron control in larger rooms</td>
<td>Projector, sound system, laptop connection, DVD/VHS</td>
<td>Computer, projector, document camera, videoconferencing equipment</td>
<td></td>
</tr>
<tr>
<td>Computer, Smart Carte, projector, college network access</td>
<td>Sit-down workstation, computer, DVD/VHS with remote control, remote mouse, document camera, sound system, Pixie controller, projector</td>
<td>Distance learning and two-way audio/video, Polycom VSX 8000 series, 2 cameras, 2 ceiling microphone arrays, AMX color touch panel, 3 projectors, document camera</td>
<td></td>
</tr>
</tbody>
</table>
### Institutions Reporting Two Levels of Rooms

<table>
<thead>
<tr>
<th>Level 1 Equipment Listings</th>
<th>Level 2 Equipment Listings</th>
</tr>
</thead>
<tbody>
<tr>
<td>Portable computer and projector</td>
<td>Computer, printer, projector, DVD player, document camera, speaker system, switcher, lectern, cable management</td>
</tr>
<tr>
<td>TV, document camera, DVD/VHS, projector, remote control w/ laser pointer and mouse control, speakers, computer, laptop computer connection, switchbox for computer selection, Extron control box</td>
<td>Computer, projector, document camera, DVD/VHS</td>
</tr>
</tbody>
</table>

### Institutions Reporting One Room Level

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Computer, document camera, multimedia lectern, no wall control panel</td>
<td></td>
</tr>
<tr>
<td>Projector, computer, DVD/VHS, overhead projector</td>
<td></td>
</tr>
<tr>
<td>Computer, document camera, projector, audio/video</td>
<td>Projection screen, DVD/VHS</td>
</tr>
<tr>
<td></td>
<td>Touch panel with remote management and monitoring, computer, document camera, DVD, VHS, ceiling speakers, projector, screen</td>
</tr>
<tr>
<td>Media cart with projector, computer, DVD/VHS, speakers</td>
<td>Standup workstation, computer, DVD/VHS with remote control, remote mouse, Pixie controller, projector</td>
</tr>
<tr>
<td>Computer, printer, projector</td>
<td>Computer, DVD/VHS, document camera, projector</td>
</tr>
<tr>
<td>Computer, projector</td>
<td>Computer with DVD drive, projector</td>
</tr>
<tr>
<td>Computer with DVD drive, projector</td>
<td>SP Control panel, DVD/VHS, document camera, speakers, closed-caption decoder, Kramer automatic switcher, projector, screen</td>
</tr>
</tbody>
</table>
Appendix K

Faculty Survey Results

1. My primary academic division (the division that oversees the course(s) I teach) is:

<table>
<thead>
<tr>
<th>Division</th>
<th>Count</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Business Technologies</td>
<td>11</td>
<td>11%</td>
</tr>
<tr>
<td>Center for Innovative Technologies (formerly Information and Engineering Technologies)</td>
<td>19</td>
<td>19%</td>
</tr>
<tr>
<td>Health and Public Safety</td>
<td>24</td>
<td>24%</td>
</tr>
<tr>
<td>Humanities and Sciences</td>
<td>48</td>
<td>47%</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>102</td>
<td>100%</td>
</tr>
</tbody>
</table>

2. How many years have you been involved in teaching at the college or university level?

<table>
<thead>
<tr>
<th>Years</th>
<th>Count</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Less than one year</td>
<td>1</td>
<td>1%</td>
</tr>
<tr>
<td>1-3 years</td>
<td>10</td>
<td>10%</td>
</tr>
<tr>
<td>3-5 years</td>
<td>12</td>
<td>12%</td>
</tr>
<tr>
<td>5-10 years</td>
<td>17</td>
<td>17%</td>
</tr>
<tr>
<td>10-20 years</td>
<td>35</td>
<td>34%</td>
</tr>
<tr>
<td>20-30 years</td>
<td>23</td>
<td>23%</td>
</tr>
<tr>
<td>More than 30 years</td>
<td>4</td>
<td>4%</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>102</td>
<td>100%</td>
</tr>
</tbody>
</table>

3. How long have you been on the faculty at Cincinnati State?

<table>
<thead>
<tr>
<th>Years</th>
<th>Count</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Less than one year</td>
<td>6</td>
<td>6%</td>
</tr>
<tr>
<td>1-3 years</td>
<td>14</td>
<td>14%</td>
</tr>
<tr>
<td>3-5 years</td>
<td>25</td>
<td>25%</td>
</tr>
<tr>
<td>5-10 years</td>
<td>11</td>
<td>11%</td>
</tr>
<tr>
<td>10-20 years</td>
<td>37</td>
<td>36%</td>
</tr>
<tr>
<td>20-30 years</td>
<td>5</td>
<td>5%</td>
</tr>
<tr>
<td>More than 30 years</td>
<td>4</td>
<td>4%</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>102</td>
<td>100%</td>
</tr>
</tbody>
</table>

4. Indicate the classroom (Building and Room) to which this survey applies.

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<thead>
<tr>
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<th>Count</th>
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<tr>
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</tr>
<tr>
<td>Main 149</td>
<td>6</td>
<td>6%</td>
</tr>
<tr>
<td>Main 152</td>
<td>2</td>
<td>2%</td>
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<tr>
<td>Main 253</td>
<td>1</td>
<td>1%</td>
</tr>
<tr>
<td>Main 266</td>
<td>3</td>
<td>3%</td>
</tr>
<tr>
<td>Main 302</td>
<td>1</td>
<td>1%</td>
</tr>
<tr>
<td>Main 341</td>
<td>0</td>
<td>0%</td>
</tr>
<tr>
<td>Main 354</td>
<td>4</td>
<td>4%</td>
</tr>
<tr>
<td>Main 367</td>
<td>5</td>
<td>5%</td>
</tr>
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<td>Main 374</td>
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<td>3%</td>
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<td>HPB 08</td>
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<td>5%</td>
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<td>HPB 10</td>
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<tr>
<td>Course</td>
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<td>ATLC 223</td>
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<td>ATLC 231</td>
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<tr>
<td>ATLC 313</td>
<td>1</td>
<td>1%</td>
</tr>
<tr>
<td>ATLC 320</td>
<td>3</td>
<td>3%</td>
</tr>
<tr>
<td>ATLC 321</td>
<td>3</td>
<td>3%</td>
</tr>
<tr>
<td>ATLC 323</td>
<td>3</td>
<td>3%</td>
</tr>
<tr>
<td>ATLC 324</td>
<td>5</td>
<td>5%</td>
</tr>
<tr>
<td>ATLC 328</td>
<td>2</td>
<td>2%</td>
</tr>
<tr>
<td>ATLC 330</td>
<td>1</td>
<td>1%</td>
</tr>
<tr>
<td>ATLC 352</td>
<td>3</td>
<td>3%</td>
</tr>
<tr>
<td>ATLC 405</td>
<td>2</td>
<td>2%</td>
</tr>
<tr>
<td>ATLC 407</td>
<td>2</td>
<td>2%</td>
</tr>
<tr>
<td>ATLC 410</td>
<td>2</td>
<td>2%</td>
</tr>
<tr>
<td>ATLC 427</td>
<td>1</td>
<td>1%</td>
</tr>
<tr>
<td>ATLC 430</td>
<td>2</td>
<td>2%</td>
</tr>
<tr>
<td>ATLC 433</td>
<td>1</td>
<td>1%</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>98</td>
<td>100%</td>
</tr>
</tbody>
</table>

5. Including your current course(s), how many different courses have you taught in electronic classrooms at Cincinnati State?

<table>
<thead>
<tr>
<th>Range</th>
<th>Number</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>1-3</td>
<td>40</td>
<td>39%</td>
</tr>
<tr>
<td>4-6</td>
<td>23</td>
<td>23%</td>
</tr>
<tr>
<td>7-9</td>
<td>10</td>
<td>10%</td>
</tr>
<tr>
<td>10 or more</td>
<td>29</td>
<td>28%</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>102</td>
<td>100%</td>
</tr>
</tbody>
</table>

6. I specifically request that my classes meet in an electronic classroom.

<table>
<thead>
<tr>
<th>Response</th>
<th>Number</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>60</td>
<td>61%</td>
</tr>
<tr>
<td>No</td>
<td>39</td>
<td>39%</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>99</td>
<td>100%</td>
</tr>
</tbody>
</table>

7. Have you had a course meet in an electronic classroom where you never used the installed equipment?

<table>
<thead>
<tr>
<th>Response</th>
<th>Number</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>23</td>
<td>23%</td>
</tr>
<tr>
<td>No</td>
<td>79</td>
<td>77%</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>102</td>
<td>100%</td>
</tr>
</tbody>
</table>
8. If you answered Yes to question 7, what was the PRIMARY reason for not using the equipment during class?

<table>
<thead>
<tr>
<th>Reason</th>
<th>Count</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Did not know how to use the equipment</td>
<td>3</td>
<td>14%</td>
</tr>
<tr>
<td>Did not want to be bothered with the equipment</td>
<td>1</td>
<td>5%</td>
</tr>
<tr>
<td>Did not need to use the equipment</td>
<td>9</td>
<td>41%</td>
</tr>
<tr>
<td>Did not want to be in an electronic classroom</td>
<td>0</td>
<td>0%</td>
</tr>
<tr>
<td>Equipment was not functioning</td>
<td>4</td>
<td>18%</td>
</tr>
<tr>
<td>Other, please specify</td>
<td>5</td>
<td>23%</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>22</strong></td>
<td><strong>100%</strong></td>
</tr>
</tbody>
</table>

9. In your opinion, what equipment or features should be included in an electronic classroom? Choose ALL that apply.

<table>
<thead>
<tr>
<th>Equipment</th>
<th>Count</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Computer</td>
<td>91</td>
<td>96%</td>
</tr>
<tr>
<td>Hookup for instructor's laptop PC</td>
<td>70</td>
<td>74%</td>
</tr>
<tr>
<td>Projector</td>
<td>90</td>
<td>95%</td>
</tr>
<tr>
<td>Internet Connection</td>
<td>89</td>
<td>94%</td>
</tr>
<tr>
<td>Video Recording</td>
<td>22</td>
<td>23%</td>
</tr>
<tr>
<td>Video Playback</td>
<td>66</td>
<td>69%</td>
</tr>
<tr>
<td>Document Camera</td>
<td>78</td>
<td>82%</td>
</tr>
<tr>
<td>Audio Playback</td>
<td>53</td>
<td>56%</td>
</tr>
<tr>
<td>Audio Recording</td>
<td>21</td>
<td>22%</td>
</tr>
<tr>
<td>Wireless Internet</td>
<td>43</td>
<td>45%</td>
</tr>
<tr>
<td>Two-way Videoconferencing</td>
<td>11</td>
<td>12%</td>
</tr>
<tr>
<td>Lighting Control</td>
<td>85</td>
<td>89%</td>
</tr>
<tr>
<td>Window Darkening Shades</td>
<td>69</td>
<td>73%</td>
</tr>
<tr>
<td>Other, please specify</td>
<td>21</td>
<td>22%</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>95</strong></td>
<td><strong>100%</strong></td>
</tr>
</tbody>
</table>

10. What installed equipment or source do you use MOST of the time in this classroom?

<table>
<thead>
<tr>
<th>Equipment and Source</th>
<th>Count</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Computer and projector for PowerPoint or other software presentation</td>
<td>55</td>
<td>58%</td>
</tr>
<tr>
<td>Computer and projector for Internet browsing</td>
<td>7</td>
<td>7%</td>
</tr>
<tr>
<td>Input for your own laptop PC and the room projector</td>
<td>2</td>
<td>2%</td>
</tr>
<tr>
<td>VHS or DVD video playback and projector</td>
<td>8</td>
<td>8%</td>
</tr>
<tr>
<td>Document Camera and projector</td>
<td>23</td>
<td>24%</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>95</strong></td>
<td><strong>100%</strong></td>
</tr>
</tbody>
</table>

11. Do you use PowerPoint for most in-class lectures?

<table>
<thead>
<tr>
<th>Response</th>
<th>Count</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>52</td>
<td>55%</td>
</tr>
<tr>
<td>No</td>
<td>42</td>
<td>45%</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>94</strong></td>
<td><strong>100%</strong></td>
</tr>
</tbody>
</table>
12. The projection screen(s) should be located:

<table>
<thead>
<tr>
<th>Location</th>
<th>Count</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>At the front center of the room</td>
<td>54</td>
<td>57%</td>
</tr>
<tr>
<td>Off to one side on the front wall</td>
<td>19</td>
<td>20%</td>
</tr>
<tr>
<td>In a front corner of the room</td>
<td>10</td>
<td>11%</td>
</tr>
<tr>
<td>No preference</td>
<td>7</td>
<td>7%</td>
</tr>
<tr>
<td>Multiple Locations (please specify locations)</td>
<td>4</td>
<td>4%</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>94</strong></td>
<td><strong>100%</strong></td>
</tr>
</tbody>
</table>

13. Would you prefer a wireless keyboard and mouse to the traditional hard-wired type?

<table>
<thead>
<tr>
<th>Preference</th>
<th>Count</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>50</td>
<td>56%</td>
</tr>
<tr>
<td>No</td>
<td>40</td>
<td>44%</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>90</strong></td>
<td><strong>100%</strong></td>
</tr>
</tbody>
</table>

14. Do you prefer a teaching station/lectern designed for:

<table>
<thead>
<tr>
<th>Style</th>
<th>Count</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Standing</td>
<td>42</td>
<td>41%</td>
</tr>
<tr>
<td>Sitting</td>
<td>2</td>
<td>2%</td>
</tr>
<tr>
<td>A combination of standing and sitting</td>
<td>51</td>
<td>50%</td>
</tr>
<tr>
<td>No preference</td>
<td>7</td>
<td>7%</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>102</strong></td>
<td><strong>100%</strong></td>
</tr>
</tbody>
</table>

15. Please rate the following statements using the scale of Strongly Agree(5), Agree(4), Neutral(3), Disagree(2), or Strongly Disagree(1) as they relate to the room you indicated in question 4. You must rate each item.

<table>
<thead>
<tr>
<th>Statement</th>
<th>Strongly Agree</th>
<th>Agree</th>
<th>Neutral</th>
<th>Disagree</th>
<th>Strongly Disagree</th>
</tr>
</thead>
<tbody>
<tr>
<td>The electronic classroom is easy to use</td>
<td>33</td>
<td>47</td>
<td>15</td>
<td>6</td>
<td>1</td>
</tr>
<tr>
<td>The equipment control system (touch panel) is easy to use</td>
<td>36</td>
<td>47</td>
<td>13</td>
<td>5</td>
<td>1</td>
</tr>
<tr>
<td>The placement of source equipment (PC, VHS, DVD, Document Camera) is satisfactory</td>
<td>38</td>
<td>34</td>
<td>20</td>
<td>5</td>
<td>5</td>
</tr>
<tr>
<td>The placement of the projection screen or flat panel video display is satisfactory</td>
<td>33</td>
<td>38</td>
<td>14</td>
<td>12</td>
<td>5</td>
</tr>
<tr>
<td>The projected or displayed image is bright enough to see without dimming the lights</td>
<td>6</td>
<td>20</td>
<td>24</td>
<td>39</td>
<td>13</td>
</tr>
<tr>
<td>There is sufficient control of room lighting</td>
<td>15</td>
<td>31</td>
<td>23</td>
<td>25</td>
<td>8</td>
</tr>
<tr>
<td>The acoustics in the room (spoken word and audio playback) are satisfactory</td>
<td>32</td>
<td>46</td>
<td>20</td>
<td>4</td>
<td>0</td>
</tr>
<tr>
<td>The window treatments in the room are satisfactory for controlling outside light</td>
<td>16</td>
<td>26</td>
<td>34</td>
<td>17</td>
<td>9</td>
</tr>
<tr>
<td>The lectern and equipment arrangement facilitates using the installed classroom technology</td>
<td>24</td>
<td>41</td>
<td>23</td>
<td>8</td>
<td>6</td>
</tr>
<tr>
<td>During instruction, multiple technologies are used in this electronic classroom</td>
<td>42</td>
<td>40</td>
<td>7</td>
<td>8</td>
<td>5</td>
</tr>
<tr>
<td>The equipment in the electronic classroom enhances my teaching experience</td>
<td>65</td>
<td>23</td>
<td>11</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>The equipment in the electronic classroom</td>
<td>56</td>
<td>32</td>
<td>13</td>
<td>1</td>
<td>0</td>
</tr>
</tbody>
</table>
16. Does teaching in an electronic classroom detract from your teaching experience in the room?

<p>| | | | | | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>7</td>
<td>7%</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No</td>
<td>91</td>
<td>93%</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>98</td>
<td>100%</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

17. If you answered yes to the above question, please indicate why you believe your teaching experience is negatively affected.
Check all that apply:

<p>| | | | | | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>I waste too much time with the equipment</td>
<td>5</td>
<td>62%</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>A smaller amount of material is covered in class</td>
<td>0</td>
<td>0%</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>I feel overwhelmed by multiple types of presentation devices</td>
<td>1</td>
<td>12%</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Other, please specify</td>
<td>5</td>
<td>62%</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

18. If you noticed any recurring difficulties with the classroom technology, what were they?
Check all that apply.

<p>| | | | | | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Slow Internet speed</td>
<td>13</td>
<td>16%</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Inferior image on the screen</td>
<td>20</td>
<td>25%</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Room lights too bright on the screen</td>
<td>26</td>
<td>32%</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Unable to control light from windows</td>
<td>22</td>
<td>28%</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Poor sightline to the screen</td>
<td>8</td>
<td>10%</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Equipment control system unreliable</td>
<td>15</td>
<td>19%</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Unreliable source device (computer, VHS, DVD, document camera)</td>
<td>17</td>
<td>21%</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Poor placement of instructor teaching station</td>
<td>23</td>
<td>29%</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Other, please specify</td>
<td>27</td>
<td>34%</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

19. What, if anything, is missing from the electronic classroom that you would like to have?

53 Responses

20. Based on your experiences in this classroom, what changes, if any, would you recommend for future electronic classrooms that will enhance the teaching and learning experience?

62 Responses
21. If you have other comments based on your personal experience in an electronic classroom, please include them here.

| 34 Responses |
Appendix L

Faculty Survey Open-Ended Responses

Question 8: If you answered “Yes” to question 7 (about not using the installed technology) what was your primary reason for not using it during class. Other, please specify.

- Class materials were not developed to take advantage
- some of all the above
- equip didn't meet my needs
- Two sections, same course, one electronic, one not--two preps
- Didn't know it would be available--just added

Question 9: In your opinion, what equipment or features should be included in an electronic classroom. Other, please specify.

- Classroom Response Device receiver; telephone
- Classroom Response System receiver, telephone
- Ability turn off computers will master switch
- Proper desks for teachers and students.
- overhead projector for books, transparencies
- wipe off board, video screen
- Human Factors consideration for work stations!
- Need to use others listed.
- Screen blanking technology on student machines
- Screen blanking technology on student machines
- screen control of student PC’s
- Remote mouse. ability to switch between two source
- remote mouse...see later...
- PowerPoint software
- TV, VCR, ability to play cd's
- student response system
- a way for students to interact with the computer
- Interactive Student "signalers" for data collection
- audio and video recording capabilities, eg Logitech

Question 12: The projection screen should be located…Multiple locations (please specify locations).

- Where there is no glare
- I need the projection screen & white board space
- Front center and front corner
- Front center and Front corner
- I need the projection screen & white board space
Question 15: The electronic classroom is easy to use.

- Except that the wire for the Classroom Response System is taped to the floor and repeatedly comes loose and presents a tripping hazard. Would like to be able to remotely advance PowerPoint slides.
- Some of the DVD equipment in some of the rooms can be a bit challenging.
- Don't like placement of document camera or computer tower.
- Some instructors forget or don't know how to shut-down the system which makes my login process longer.
- This particular classroom is great. Others I've used have been less convenient.
- It must be fairly easily if I was able to figure it out on my own!
- The equipment was non functional since the beginning of the Winter Term. However, I was able to use it for the first time 6th or 7th week of once a week course.
- not trained in all aspects of use of the equipment
- Once you're instructed on the use of the equipment
- I use the classroom as an example of bad human factors design in my lectures.
- Various pieces have not worked.
- It is a reasonable balance, but multiple power switches, mute controls, source controls, opening and closing doors, reaching to floor to plug in flash drives, etc is off-putting. BC
- When it works it is easy. It is hard to trouble shoot. I have had fairly good response time for help. It is aggravating though
- It is once you learn it, I had to ask a student how to use it the first time I taught in the room.
- This room in ATLC is really tricky. The podium is in front of the screen and you have to be skinny to fit in there. Then you are standing in front of the screen when you put anything on the doc-cam... The screen covers most of the board so can't do anything else.
- There are some options that I wish were available. I wish that I could make the screen go blank without having to turn the projector off (to write on the board or discuss something). Sometimes that audio doesn't work correctly, etc.
- I have no problem with this class room.
- Computer is often shut off, takes time away from class when I have problems with log on, etc. Should improve as have more opportunity to use
- Its easy to use, gives me flexibility, and makes my lectures come alive. I use the smart classroom in conjunction with blackboard, providing the students a battery of notes as well as sample problems.
- I don't know how to use all of the equipment in the room
- We need to remind all instructors to log off when they finish a class.
- The video projector is mounted crooked on the ceiling. this drives me absolutely bonkers. Although I have reported it, it has not been rectified.
- Every room is a little different. I don't like that you sometimes have to touch the screens before you realize they are 'on' to see what you need to see.
- It's a dream, and the assistance is great, too, in case of a rare problem.
- If I can work electronic equipment, anyone can.
• Generally easy; occasionally "buggy" equipment.
• except when something doesn't work. Then phone calls are made and time is wasted.
• "I allowed the students to navigate the FYE online radio buttons to help the students less familiar with the Internet get a feel for navigating the class assignments, syllabus, discussion board, etc. I was not able to do that this time because every time a new student signed on it asked for the Internet Explorer preferences; needed to set up Microsoft Word, etc. so I just stopped."
• The light bulb burned out on the projector twice.
• Sometimes the machinery can be downright disagreeable. Most times I have been able to get the helpdesk to assist in correcting problems. (Which they do quite well)
• I'd give a four, except that the computer tower and equipment is under the podium. To use media requires crawling around on the floor.
• Counting Clermont, I have used as many as 4 systems in a quarter, which can make me awkward at doing things quickly. Short instructions on laminated card at podium would be divine.

Question 15: The equipment control system (touch panel) is easy to use:
• It was difficult to use at first.
• There should be some mechanism for having the projector turn off automatically because some instructors forget to do so.
• Non functional for the most part and it took too long to fix
• not trained in all aspects of use of the equipment
• Same comment as above
• When it's functioning properly, it's great, when it does nothing, and gives you no feedback about what's wrong, it's terrible.
• Not responsive...delayed.
• The labels for the buttons lead me to press the wrong button sometimes. Ex Mute to stop the background buzz. I'm getting better. BC
• Again, once you are shown what to do.
• For the most part, that is self-explanatory and is easy to use. I still wish there was a black screen button.
• It is easy to use.
• Not difficult, but in the wrong place for the way I use the video equipment, which is to project short clips which require multiple cuing.
• Takes a little bit to figure out mute, etc.
• Any one who has a problem with the controls needs to find a boot heal to look for directions. Obviously that person is highly technically challenged !!!!!!!!!!
• Sometimes, I get confused by it. The screen is typically black unless it is touched. I have finally figured this out, only this term. Previously, I concluded that the screen was broken.
• Some rooms they are very visible ..ex. ATLC 301 while other rooms not so such as M 266
• The touch panel in ATLC 305 DOES NOT work! Have reported it several times, ITS has tried to fix but it is not. You have to do it manually from the actual equipment.
• Not all controls are intuitive; but once learned, the controls are easy to remember.
• Sometimes I had to wait extended periods of time when navigating from the computer to the document camera and projector. It was also hard to get it to acknowledge that I was ready to cut it off. I would push the buttons more than once and it would take a long time before it would ask me if I was ready to cut the system off.
• The document camera was supposed to come on and did not. I had to call for IT who turned it on and back off several times to make it work correctly. They said it was preset.
• Again, incompatibility drives me crazy.

Question 15: The placement of the source equipment is satisfactory.
• Difficult to see the controls on the VCR/DVD without sitting on the floor. Document camera tends to block view of projection screen.
• Difficult to insert CD in drive (hardly any finger room); don't like having to pull out Needs to be to the side.
• would like to see the computer stand located almost anywhere except in the front and center of the class room
• document camera is an older version - and it is not possible to slide papers up, without running into the stem of the equipment (camera). as a result I have to fold my papers to demo the lower halves of them. and the zoom controls on the camera do not work well at all.
• The document camera is too low. It is hard to read or write on, where it is. The screen for the pc is at a bad distance. I wear reading glasses and it is at just a location that the glasses do not work.
• While the current location works, it could be better for accessing the dvd/vhs, maybe moved up for those with bad backs!
• Awful! Who were these stations designed to accommodate? No real person can effectively use this equipment without severe constraints, and a high level of discomfort.
• Need to kneel on floor to troubleshoot VHS and DVD.
• I find the location un handy and dark. I suspect anyone with mobility issues would be in a much worse condition. I hope that is not me in a few years. BC
• Smaller room and I can't be with students in group or talking in class without having to get behind the desk
• That placement is ok, but it sometimes blocks the view of the board.
• Everything is with in reach and easy to get to.
• The lectern with source equipment could be moved out a bit more from the front wall. Otherwise it’s in a great position.
• In some classrooms it is great and in some it is terrible. In 303 ATLC it is great.
• The equipment in 305 ATLC is right in front of the screen and the projector is tilted.
• I often have to get down on my knees to figure things out, such as the VCR controls. Sometimes the main power is switched off. I have to get down on the floor, often to "try" to figure out the problem.
• Document camera is too low. I get on my knees to write on it.
• I like it off to the side.
• Too much stooping required-- not easy to insert CD, video tape, etc.
• I did not know there was a VHS there.
• Same as above. Not easy or dignified to crawl around on the floor. Also, seeing the tape/dvd player and controls is difficult because lighting is inadequate on podium.

Question 15: The placement of the projection screen or flat panel video display is satisfactory.
• Sometimes it is difficult for short people to reach if there are problems turning equipment on and off.
• Cannot adjust it. We (faculty) come in different shapes & sizes.
• Screen is too small to be seen by students in back part of room.
• Yes, the screen is in the center which is appropriate so that all students may see equally well.
• I use the whiteboard often, and would rather the projection screen be off to the side so that I don't have to keep raising and lowering it. My only concern would be whether students could still see it as well.
• Gets in the way for the students in front of class.
• Needs to be to the side.
• would like to see the projection screen located in a corner of the room rather than in the front and center of the room
• blocks the white board.
• I like to use the blackboard during my use of the document camera. As situated now, the screen covers up too much of the blackboard area.
• Helps me see who is actually paying attention when watching the video!
• Students sometimes have trouble viewing the bottom portion of the screen over their individual workstation monitors, and end up turning them sideways to see. This prevents them from trying things on their own while following the lecture.
• off center would be better. It is awkward to have to keep putting the screen up and down to use the board. Only a small area is visible both at same time. BC
• OK. Not really easy to use the board.
• "Location is fine but it completely covers the white board. This is a problem because there is only one white board."
• Terrible. It’s right in the center, so if I ever have to cross the room or point to something on the screen, I get blasted with light.
• It would be nice for the projection screen to be off to the side, so I can write on more of the board.
• Being in the center of the front it minimizes the ability to also use the whiteboard.
• Sometimes I wish I could have the board down and not cover up my notes at the same time.
• In too many rooms, there is substantial glare on the screen--the color washes out.
• Need more board space than just the small "wings" to the side of the screen.
• I like the big, wide screen and the large white board. I also like the fact I can project on the white board.
• covers the whole chalkboard
• The screen completely covers the blackboard.
• It is fine, front and center. I seem to recall that the screen is marred in some fashion. Of course, I am typically looking at the monitor.
• I like it because the students can see better. But I cannot use the board without raising the screen up and down.
• I cannot use the board in this room.
• In ATLC room 305, the screen is too close to the lectern.
• do not like location in center of room
• OK most of the time, but not when I want to write on the board and also show projected image--very little writing space on the sides of the screen.
• Previously, I thought that the projection screen should be to the side of the room to permit use of the board for writing, but in some cases I do prefer to project forms and graphing axises on the whiteboard allowing me to draw the graph for the students.
• It would be nice to use white board with projection.

Question 15: The projected or displayed image is bright enough to see without dimming the lights.
• But it's no problem to dim the lights -- except you have to walk to the back of the room to do so.
• Some dimming is required, depending on what is being projected.
• But lights are easily dimmed.
• It could be better. The last thing you want to do in an eight AM class is dim the lights!
• I always need to dim the lights for my presentations, particularly as I am showing slides of artwork.
• In 307, shades are needed. Without them, students often can't see the displayed image due to excessive light.
• depends on the amount of sunshine outside of the windows
• no, not always. and often it fades completely. ugh!
• I always have to dim the lights to display the image on the screen
• This is where room darkening shades would come in handy! Or some way to automatically darken the current windows so you don't have to rely on students to close the blinds!
• No...could be much brighter. Always have to shut off all the lights, and draw all curtains during day classes.
• I've had problems with projector not responding to commands.
• I have to turn off all front lights and dim the classroom next to off. Ambient light is an issue. BC
• Front spot lights need to be dimmed. Rest of room can be on.
• They are not good even with dimming the lights
• It’s pretty good. I wish the color were a little richer. I always have to turn the lights off to make sure the screen is clear.
• It shows up much nicer if I dim the lights just in front of the screen.
• The lighting in there has been hard to master, I am still not sure I understand.
• Usually have to turn off front lights, takes more time
• The only lights I dim are the ones focused on the display screen. The rest of the lights in the room are left on full blast. Note to maintenance: the light on the right side of the room focused on the display board needs to be replaced. It is burned out.
• I am showing art images. I always turn the lights out. Often the sunlight coming in the shades presents a problem.
• It is okay when projecting onto the screen. It is not possible to project onto the chalkboard without dimming the lights.
• I had to go to two different people to get the bulb changed in M 266 as students could not see the screen even with the lights off and the shades drawn. I had been in M 276 and had been able to see the screen fine with the lights on so I knew the bulb was not satisfactory in the projector.
• Not on a sunny day.
• The lights need to be dimmed and the shades (defective) need to be lowered.
• Sometimes the sun is bright in that room, requiring the shades to be pulled in the afternoon.
• Always have to darken the room in order to see screen.
• Most of my students feel some dimming helps the images on the screen to stand out better and yet plenty of light for note taking.
• Sometimes yes, but many times I'll dim to generate greater contrast.
• See item below.

Question 15: There is sufficient control of room lighting.
• Would like more options.
• Would like the lighting controls to be on the lectern.
• I like having the controls on the lectern.
• This room could use front light dimmers instead of just on/off.
• One thing I love about the room is that I can control the lighting to allow for viewing of slides and so that the students can take notes.
• Would like to dim the lights in the front of the classroom without dimming the lights in the rest of the classroom. I teach an 8 a.m. class and my students will fall asleep once the lights are out.
• We usually turn off the lights in the front, near the screen, in order to see it better.
• There are some lights that just don't seem to be bright enough even with the ability to set them at various degrees of brightness
I felt that the lighting was insufficient when not using projection equipment.
I wish there was a dimmer switch (for the lights) rather than just on/off. is there?
When I dim the lights, the podium control works fine.
The panel on the instructor lectern is sufficient to control the lighting
Honestly, who designed these things? They work about half the time, and when they do, only two or three of the 5 different levels work.
adequate, but if the bulb dims it may be a problem. BC
Actually there are lots of lights out in each panel - not sure why - not really a tech choice I'm guessing
front light should be more dim
I had evening class in there so the windows weren't a big deal for me...not sure what happens in the day
Just the light switch. It isn't a problem to use, but I also teach at UC and they have the automatic controls at the teaching station and that is a lot of fun.
I agree, I like the touch controls on the lectern.
It’s great. I feel like Mr. Wizard !!!!!!
only light switches are by the exits, instructor is on the opposite side of the room
Light switches are only in the back of the room, instructor is at the front.
Refer to above. Although I can control the lights, sometimes I wish that I could make the room darker.
NO. The lighting was built for on and off systems in many of the classrooms. I can diminish the front room but would much prefer rooms where I can dim all lights to the degree appropriate for the outside sun. In rooms with no windows this is less of a problem but still needs some adjustment ability.
A switch is unavailable in the classroom.
Most of the time have to go to the wall control to dim.
The lighting in my particular room seems to be dim in certain corners, and there doesn't seem to be anything I can do about it.
Numerous lighting control buttons have no obvious functionality-- why do I need 14 separate buttons to control the lights?
When all the lights in the room are working ...
blinds don't always/are sometimes jammed
It would be nice to be able to dim the lights at the station instead of walking to the back of the room.
I know of no other control other than to walk to the back of the room and dim the lights.
There is NO control of lighting in this room, other than the room on/off switch. Lighting controls as in other smart rooms have never been enabled (although the lighting control panel is attached to the podium).

Question 15: The acoustics in the room (spoken word and audio playback) are satisfactory.
But, ATLC 324 is smallish.
did mostly lab work in that room
Room 354 is too long and it does not have enough board space
• No needed comments
• The fans from the ventilation system sometimes make it difficult to communicate.
• My students seem to be able to hear me easily.
• They are super. there is no talk back or echo.
• OK except when computer sound setting has been changed-- often requires multiple "trial and error" attempts to get sound.
• I rarely use these features in this classroom.
• Camera fans are loud for beginning speakers.

Question 15: The window treatments in the room are satisfactory for controlling outside light.
• The room I teach in has no windows.
• No windows in this room.
• I teach at night.
• Sometimes too bright in the room, even with blinds closed.
• Not applicable for HPB 08
• I would prefer windows slightly darker or tinted.
• The blinds are usually in disrepair. When I can get them to lower, they do not block enough of the outside light to allow my students to see the images I am projecting. It has been a problem for me multiple times and causes anxiety for the students during tests, as they are expected to answer questions about the images being shown.
• N/A Windowless room
• The blinds are really wide, and a little unwieldy, but I usually just leave them where they are.
• The blinds rarely work. It is awful.
• The blinds are not working.
• 307 is not ok as indicated above. 233 is ok usually but could benefit from better shades.
• inadequate when the sun shines directly onto the windows in that room
• never paid attention
• It depends what time of the day your class is held.
• After I adjust the vertical blinds, it gets dark enough in the room
• They work, but I'd like to be able to push a button and lower or raise them.
• They are okay, but they don't block out enough light when the sun is on that side of the building. Solid, opaque curtains would be better.
• No windows.
• The silver surface of the blinds reflects a good deal of light when tipped even though the main beam of light is blocked. BC
• No windows
• I have no problem blocking out the outside light.
• Not in the rooms I have used.
• no windows
• no windows
- no windows
- No windows.
- need better shades.
- N/A for this room - i.e. no windows
- I typically turn the shades "backward" to block out sunlight. This is satisfactory.
- N/A - No Windows.
- Some rooms have blinds that the students have moved a lot and the windows and blinds are quite large so they are prone to breakdown but most work okay.
- Fair
- It's time for an update in easy-to-use shades.
- Depends on the light outside.
- Windowless classroom
- See item above-- have to completely shut blinds on bright days or screen image isn't clear enough.
- blinds are sometimes jammed
- I never tried to control any outside light.
- I never adjusted the window treatments, just dimmed the lights.
- No exterior windows in this room-- only a couple of small windows that let in hallway lighting.

Question 15: The lectern and equipment arrangement facilitates using the installed classroom technology.
- It's OK, but at an odd angle to the side.
- Don't like pulling out document camera; difficult to insert CD.
- The lectern is to the side which I believe is an absolute; I find it difficult to work in rooms that are not situated in such a way.
- I would like it in the middle of the front of the classroom and not so high. If a student sits on the side of the classroom where the lectern is they can't read some of the things I write on the chalkboard
- better in room 445 ATLC than in other smart rooms
- see number 3 above.
- The classroom needs an additional board. There is only one board and it is covered by the ceiling screen.
- After my comments on the distance of the PC screen and height of the document camera, all else is ok
- No problem with the current equipment
- Again, I don't know who these stations were designed for, but it certainly wasn't for a human being. Sitting, standing, kneeling...nothing seems to provide you with proper ergonomic considerations when using these lecterns. Again, this is why I use it as a poor example in Human Factors class.
- I feel chained to the lectern.
- In order to use the lectern I have to be at one side of a large room. Hence, I need a remote mouse - have to keep moving back and forth. Other arrangements would put me in front of screen....I'm not sure I see how to do it. Just not a lectern lecturer
• ? Not sure what this means. I had to answer a 1 so that I could submit.
• I don't really understand this question.
• See comment about control panel
• I would LOVE to be able to advance my PowerPoint from around the room so I don't have to return to the lectern.
• The placement of the lectern in this room is terrible.
• It is fine, off to the side. I have taught in one class room where the lectern was in the way of the projection. ATLC 231 is great compared to that room.
• Yes, nothing seems to be disappearing so the equipment is there and very dependable.
• The lectern in 305 should be placed in the corner. Where it is now, there is barely any room to stand in front of the screen.
• The lectern is too close to the screen.
• OK, but document camera (when open) makes it difficult to access podium from both sides-- students coming up front to give presentations have to "walk around" the podium.
• For the most part it is satisfactory, but there are some configurations that one must stand on his/her head to plug-in USB devices or troubleshoot a connection.
• This room is configured with "conference table" style seating. The podium rather far away from the table, so it's one room where I'd prefer wireless controls that I could use while seated at the table with students.
• Lectern is well located but as stated in previous comments, the installed technology is not. The computer monitor screen set into the podium is difficult to see because of the distance from the user. In classrooms with the monitor on a movable neck work much better.

Question 15: During instruction, multiple technologies are used in this electronic classroom.
• PowerPoint, Internet, document camera, DVD, VCR at various times.
• PowerPoint, Internet, videos, DVD, sound files.
• We use access to blackboard, the document camera, the white board, and the audio/visual equipment.
• I use PowerPoint presentations as well as internet resources.
• I only use the document camera.
• I usually use just the document camera and the light dimmer.
• not fully trained to utilize all the technology available in these rooms
• just doc camera
• I use the document camera and the pc during class. I show e-mail files, websites, and live streaming of events.
• I use the pc, doc cam and screen when needed
• When they work. Often use all.
• But can't do them at same time - have to shut off the PowerPoint to get the doc-cam photo to display and then takes a little time to move back to PP. The doc-cam zoom in this room only works form the panel - that is problem when I elect to sit - I have to stand up to do the readjusting.
computer and internet
I'd like to and do flip back and forth but really can't use multiple ones just one at a time.
I will use my laptop and the classroom computer at the same time during lecture.
Not for me.
mostly projector, used VCR once
The control panel makes the switch over easy and rapid from one source to the other
PowerPoint, internet, and VCR tapes. Occasionally DVD.
I need the white board and it is covered up.
Yes. I love it. I can go from a video to power pt. to a CD and overhead all in the same class!! My only problem one day was trying to run an online video. it kept stopping and starting.
The document camera meets our needs adequately.
I use multiple technologies frequently-- but not in every class session.
Especially the document camera to demo calculator operations.
I tend to use PowerPoint and live internet most in this room. . . because of courses taught in this room, I probably use viewer technologies than in other smart room. 419 is the "lab" for most of my "lecture/lab" classes.

Question 15: The equipment in the electronic classroom enhances my teaching experience.
I enjoy using the technology.
I rely on it heavily. I should request a "smart room" all the time.
I enjoy finding new ways to use it.
It would work a lot better if students actually checked blackboard. As is, I try to eliminate handouts, but students complain about having to access them online.
I could not teach art history without the computer and projector equipment.
The potential is there, but the problem of controlling the light from outside hinders the experience.
It's much easier to show high quality images from students using the document camera as opposed to using overheads. The camera also allows me to display student work and comment on it.
I think it could, but I am not fully trained to use it all.
Adds a lot to the teaching environment. Really addresses boredom issue by having multiple delivery systems.
It helps when students have questions on their blackboard assignment. I can just pull it up on the internet for them!
When it works.
It can be used as a strong teaching tool, but I'm a firm believer that a good teacher should be able to use whatever is available and shouldn't need to rely on technology.
I am able to show products to my students to better identify what I am talking about with the electronic classroom.
• I would highly agree that I teach better at Cin State than UC because of my electronic abilities.
• Not really.
• I can use pictures much easier than old overhead system
• I know I'm good. But I would not be as good as I am without these multimedia aides. It makes my life so much easier as an instructor.
• Absolutely.
• I love having all the tools available.
• Really like all the options provided by the set up we have.
• The electronic classrooms permit me to expand the amount of material I cover in less time.
• It definitely helps!

Question 15: The equipment in the electronic classroom enhances the students’ learning experience.
• They love the multimedia. This is the Sesame Street generation, after all.
• They use it too for presentations.
• They enjoy the multimedia capabilities.
• Again, it would be better if they took some initiative.
• The students come away with a much better appreciation of art after being able to see it clearly projected.
• The potential is there, but the problem of controlling the light from outside hinders the experience.
• I don't know if it does because I only use the document camera to project diagrams/tables from the text book.
• Whenever utilizing more senses of the student in a learning environment, the longer the retention of the material. As long as the practical application is the basic goal and can be accomplished through electronic means and media, I am all for it.
• It appears to me it does. It allows them to see first hand some of the issues that we are discussing
• To an extent, but I don't like relying on them watching a presentation, they might choose that time to fall asleep.
• Unless I can't get it to work or am delayed in getting it to work. Then they grow restless. When it's working it's wonderful.
• Student like the video / visual stuff
• Because it is a tool and is used to enhance the students' learning experience I believe that it works well. But, again, I don't believe that good teaching NEEDS technology. But it can be used effectively.
• If they have a better visual then they can have a better understanding.
• Not in my classes.
• Some may prefer that I only use the board so they are forced to take complete notes.
• It sure does. And I use it to full advantage .... even waking them up on occasion. It enhances my flexibility to present the material in a variety of formats, one of which will touch every student.
• sometimes it allows the students to drift off and not pay as much attention because they are less "active" in the learning process
• some love it, some are just okay with it
• not sure - good question - please let us know how the students respond
• Without a doubt.
• I believe images, sounds, etc. help the visual and auditory learner and help keep the students' attention and interest.
• Much better to be able to use multiple media and have instant internet examples available.
• it is a hope and feeling although no real quantification or such has been studied
• I hope the student experience is better!
• Because of the technology, I can bring visuals to the classroom to more vividly convey information. For instance, in Intro to Poetry, I can put up photos from the Internet of the Isle of Innisfree, the retreat used as the subject for the poet's work of that name. Also, I can play a recording of the poem, The Lake Isle of Innisfree by Yeats, which allows the students to hear the poet's cadence and pronunciation. This creates a situation where the students can compare my recital and their own with the poets. As a result, minds are engaged. Another example would be when students this term made group presentations about classic movies. To do this they explored every aspect of the films. They equipment permitted them to present power point presentations to their fellow students, making their discussions easy to follow. Additionally, they used DVDs to key up key scenes from the movies or to pause a scene and discuss a technical aspect, such as lighting or camera use.
• They appreciate having me use it.

Question 15: Using the electronic classroom allows for more effective instruction.
• It makes it much easier to engage the students, and to address different learning styles.
• Allows instructor to meet diverse learning needs of students with different learning styles.
• I can tailor presentations to each class for unique learning experiences.
• I recently played an audio clip for my students that I had heard on NPR and that illustrated a concept we had discussed in class. I love it that I can do that!
• No guarantee.
• Allows me to make available to the students a diverse delivery of media.
• The use of the Smartboard and all the other items are beneficial, only if there are supplies markers and cleaning supplies located somewhere in the room to use them!
• I'm not sure how to measure the effectiveness that is influenced by the technology
• Same comments as above.
• Things flow more smoothly in the electronic classroom.
• For myself, no. I'm better off with a VCR/DVD player and monitor.
Takes time from class when I have a problem, time to warm up, etc. Will improve as I have more opportunity- this is the first time I have used
See above comments
Absolutely. I have taught my course from a cart in a non-electronic room. It is a nightmare!
It is still up to the students.
Students have commented that seeing their written papers overhead for viewing has benefited their learning.
See previous comments.
unless it doesn't work
Especially during calculator instructions. Previous technology would only allow the viewing of the output on the screen, not the key strokes to create it.
The expanded resources, Internet, video and audio, and document cameras enable me to bring materials into the class otherwise impossible or done with great difficulty and expense (duplicating). It also allows me to work with student papers for discussion, which I never did previously.
It helps immensely.

Question 15: Using the electronic classroom allows for better organization and more effective use of time to deliver course materials.
- I can show them where things are in Blackboard, how to access materials, etc.
- Usually, unless I am fumbling with the blinds.
- I like the fact that I can use the actual textbook and no longer need to fiddle with overhead transparencies. That way when I project something from the text book I can tell the students exactly which page they can refer to in their books.
- I can see how that should be true.
- I think it aids in organization. I plan each step in the class presentation and indicate in my notes what and when I show items on the document camera or internet
- When I use the equipment it definitely is more beneficial to my lectures. I don't however, depend solely on it!
- Same as above
- Right now, as I am new at it, makes me seem less organized, I fear
- Flexibility. that's the name of the game. I review my slide presentation before lecture and move the slides around to fit the mood of the class and what I want to focus on that day
- Completely true!
- Takes more time to raise and lower lights and screen. I watched Larry Gache to the same thing. Up and down lights, screen, etc.
- Yes, one image of a condition can be worth a thousand words.
- It takes a long time to log on and open the system.
- Electronic classroom doesn't make me any more organized, but it does give me more options for using class time.
- one doesn't affect the other
• It's easy for me to plan to do or discuss too much and get side-tracked...e.g., go from one site to another on the Internet
• As long as the equipment is working sufficiently.
• It takes time for the computer to come on and get to the website. That is not a more effective use of time.
• I'd don't think there's any particular relationship between the smart room and my teaching preparation/presentation. . . other than my assumption that the smart features will be accessible when I need them.
• It definitely helps focus the class on the material.

Question 15: Students who attend class in an electronic classroom have higher grades than those who attend class in a traditional classroom.
• I think students adjust to the style of the teacher.
• I have no data to substantiate this, but I believe it to be true.
• I'm unsure of this. But, they have to use technology in my class (Blackboard) to get notes, grades, etc.
• Unsure, but I suspect this is true.
• This is the first term that I'm using smart classrooms, therefore, I don't have any reference yet.
• I have no idea about this.
• I could not really say as I have only used electronic classrooms.
• I cannot answer this one since I never really looked at this specifically. Generally I have a similar mix of grades in all of my classes
• I don't know about that. I think that if the student is into the information and studies they will do better no matter the technology. I believe that the instructor can make a difference though.
• I have little basis for comparison, as my teaching experiences are still limited. I do think that they find the classroom time more interesting, and I hope that translates into better retention.
• I have no idea as to grades. There are far too many other variables to make any such comparisons meaningful
• That has not been my experience. It really depends on the type of learner exposed to the electronic media whether or not the student can thrive. I can see how some types of students could experience stimulus overload which could prevent optimal results.
• I don't know
• I have not noticed a difference in grades.
• I don't have any data that supports that statement either way
• Traditional teaching methods have worked just fine. I didn't have these things when I was a student at Cincinnati State and my grades didn't suffer.
• Cannot evaluate.
• I have no data on this. I was forced to answer and I'm not sure how I should skew the data?
• I have no idea
• No data
• Don't have the ability to compare.
• This I can not comment on, I have only taught for UC in atlc 309
• I have compared some classes in the past and have seen improvement in students that have been taught in a smart room
• Don't know
• I don't know.
• no comparison for this question - i.e. N/A
• I would say that this is very accurate.
• No Opinion.
• Cannot objectively state this but can state that students say the various techniques help their learning.
• I am really neutral on this question. If a student wants to learn, they don't have to have anything.
• Not sure.
• I haven't done a scientific comparison. But, I will.
• I don't know. It has been a long time since I haven't taught in a smart classroom
• My personal experience doesn't suggest any relationship between grades and classroom style.
• never tested this hypothesis and have ONLY used "enhanced" class rooms
• no such relationship
• I do not find student performance to vary based on the equipment I use...its how effectively I plan class sessions and how involved. committed the student is.
• It depends on how much time they spend studying and doing the work.
• Not so if they don't do the work. Some students have to leave to go to work and do not have Internet access at home.
• No definitive answer. Have not analyzed this.
• I don't have any data that would support this statement.
• I'm not certain. Overall, I'd assume not in humanities courses. The number of lower and failing grades has remained the same. These grades resulted from causes beyond the classroom, not turning in assignments or missing classes because of personal issues. At the top end (A or B grades), I would think the students would do as well without the electronic classroom. I would, however, hope, that the technology might have some role in helping a student to move from a C or D to a B or C on some occasion. I just don't know how to measure this. In these courses, my goal is in learning and appreciation, which I do believe the electronic classroom allows for. But this generally will not improve the grade. In writing courses, I think the technology might contribute to increased grades because the technology allows for instruction that will directly impact improvement on graded areas, composing and drafting papers.
• I do not have statistical information to accurately answer this.
• Students get distracted by having the computer in front of them and often are doing emails and other things when they should be listening during instruction time.
• Not sure
Question 15: The college should convert all standard lecture classrooms into electronic classrooms.

- It's the 21st century!
- YES! UC is a totally equipped campus now, we should catch up.
- The rooms have been extremely beneficial to me.
- I absolutely think every classroom should have electronic technology!
- I do not believe all of our eggs should be in one basket. If the computer is down for any reason, the instructor is done.
- You must have this system in order to utilize PowerPoint presentations. These are definitely the wave of the future
- Yes, a very valuable commitment to the learning environment. Students now days, expect the use of technology
- I think every instructor should be able to have the option of using a smart classroom with the installed equipment.
- But ONLY if ergonomics and anthropometrics are taken into consideration before installation of any more electronic classrooms
- Because our society is heading toward using more technology, I think it might be helpful. It really needs to be all or none though. Because, sometimes you set up a class for an electronic classroom and then the next time you teach it, you get assigned to a regular classroom and then you have to redo your teaching strategy. Pretty annoying.
- The technology could be a huge selling point for new students.
- Yes !!!!!!!! Yes !!!!!!!! Yes !!!!! Let's not wait until next year to get it in the budget. Let's do it NOW. The room that needs it the most right now is MAIN 194
- more is better, but not all instructors will use it. It does restrict my ability to use the projector, if I am assigned to a room without it. But I have been a frequent user of the media carts.
- not everyone wants/needs the technology
- It's easier to teach, saves time and students get a better understanding.
- Well, I am not sure how many instructors use this technology, but I feel that I would not teach the course without it.
- These are students of technology and this should be a basic.
- Yes, It is no longer possible to get overhead transparencies.
- More flexibility in assigning classes; more encouragement to use the technologies-- both are good!
- Some teachers just won't use new technology; they're teaching remedial skills or something traditionally taught with lecture or discussion
- Only if all teachers want to use them.
- Not unless all teachers want it.
- With the advance of technology it continues to become an imperative.
- The more smart rooms, the better!
- Often I will have three sections of one course. If all three are not scheduled in electronic classrooms, I would have to have two completely different lessons. In this case, the electronic rooms would cause greatly increased preparation time.
The option of attempting to locate electronic classrooms for those instructors desiring them creates an increased burden for staff who do scheduling. In departments, such as College Reading & Basic Writing, and Communication Skills (my areas), which run over sixty sections each term with at least twenty instructors, 80% adjunct, who change by the quarter, the scheduling becomes an immense, if not impossible task.

- budget permitting

**Question 15:** Overall, I am satisfied with my teaching experience in an electronic classroom.

- I love using the electronic classrooms!
- There is so much more that I can use but I am just an adjunct and as far as I know, I don't get paid extra to go above and beyond what I am doing to take the time to learn and then revise my course to include this technology.
- I really need to learn more about the equipment available. That has not been "encouraged" much by my particular department.
- the document cameras can be very uncooperative sometimes. I have had to call for help with them several times.
- Yes, I feel my classes are enhanced with the electronic classroom. I have taught at another school without such technology and it does make a difference.
- Must maintain the equipment. Require instructors to take a short course on using the equipment.
- Because it is the state of the art. By the way ... I doubt what we have is the state of the art
- They're a God-send !!!!!!!! Where were they when I was in college !!!!!!!!!!!!!
- Yes.
- I insist on being scheduled for electronic classrooms!
- I would like the equipment to be checked before each quarter begins to make sure it is operational.
- This was the worse experience, as I had to change all my plans for the days when the light bulb for the projector did not work on several occasions. When IT came they just said the bulb needed to be changed. I had to change my lesson plans on at least three occasions.
- I insist on smart rooms for all of my classes.
- I prefer using an electronic classroom.

**Question 17:** If you answered yes to the above question (does teaching in an electronic classroom detract from your teaching experience), please indicate why you think your teaching experience is negatively affected. Other, please specify.

- can be too impersonal
- I've developed back problems using the lectern.
- The podium etc. takes up too much room
- When the equipment is not working properly.
- Students are not attentive to instructions
Question 18: If you noticed any recurring difficulties with the classroom technology, what were they? Other, please specify.

- Classroom response system wire is problematic.
- Annoying blinking "RGB" box on the plasma screen.
- None that I can think of.
- Issues with accessing the Virtual Lab.
- Problems only with carts that are brought in room
- Sometimes locked.
- VHS setting is at L1 or L2, Someone placed it at 5
- Sometimes it is hard to focus the document on the
- Handicap accessible workstation location.
- Boot up time for computers often > 5 minutes
- Boot time for computers often > 5 minutes.
- Project not always aligned properly w/screen.
- Lighting controls difficult.
- Control system too cumbersome for my uses.
- Screen covers whole chalkboard.
- None.
- None.
- Poor maintenance / replacement of lights in class.
- Some instructors fail to log off.
- DVD does not work consistently.
- Screen is dirty.
- Hard to see graphing calculator on screen.
- Computer work stations not working.
- Internet explorer keeps reloading every time used.
- No control of lighting at all!
- No problems.
- Kind of crammed in behind lectern.

Question 19: What, if anything, is missing from the electronic classroom that you would like to have?

- No.
- Ability to remotely advance PowerPoint slides so that I am not tied to the lectern.
- More flexibility w/ the screen on the desk computer. Easier access to loading & controlling DVD functions.
- Phone at lectern; ability to advance PowerPoint slides from a distance.
- A laser pen! And another board for writing on it, because the screen covers most of the one which we have in the classroom.
- Newer computers would be nice. The one in 266 can be a little cranky.
- Can't think of anything.
- Possibly a remote control to advance slides in a PowerPoint presentation without having to stand at the desk.
- Comfortable seating for instructor.
- Is there any way to keep the projector on but not have the light projecting on the screen and I can raise the screen so that I can use the chalkboard to write notes for the students?
- NO
- I like a document reader.
- A better sitting station. There is no room for my legs, if I decide to sit down. I have to work sideways when sitting down.
- Not familiar enough with what all is actually available
- newer doc camera
- nothing
- very complete
- The use of a laser pointer, the ability to change presentations from a remote location rather than on an attached mouse or keyboard; allows for walking around
- Better control of lighting.
- Ergonomics, better lighting control, faster computers capable of handling installed software without constantly crashing.
- Nothing as of now but would like to see wireless.
- Screen control of student machines. (Blanking, sharing instructor or student) BC
- screen control of student machines
- see above responses
- wireless network
- No
- Ability to do multiple things at once. Computer hooked to white board
- option to make the screen go to black screen...unless the screen were put to the side. Then, wouldn't really need to go to black screen. As it is now, if I want to write on the board, I have to put the screen up and turn the projector off or else get in hit in the face with a beam of light.
- The ability to see what the students are doing on their computers
- A remote control way to advance the PowerPoint.
- Would love to have handheld response pads for students to answer questions! Would engage students better
- Instructors that know how to operate the units effectively !!!!!!!!!!!!!
- A way for students to respond to questions or show their understanding of concepts electronically
- a way to advance PowerPoint slides away from the lectern,
- a way to advance PowerPoint slides remotely so I don't have to return to the podium and can be free to walk around
- Nothing.
- Nothing.
- a camera with audio recording - something like the logitec camera ...
- Remote for the PowerPoint Presentations
- This classroom (HPB 08) has a chalkboard (not a whiteboard). This makes it difficult - though not impossible - to see my handouts and notes (when projected on the chalkboard).
• Podium too small for all my books etc.
• A projection screen controlled electrically
• Interactive Student data collection system for surveys, etc.
• Room light control from the teaching station.
• a wireless control so that I can walk the classroom and click to the next slide without needing to be at the lectern.
• Other than better lighting control, can't think of anything I need for teaching that is not already in the electronic classrooms.
• audio/visual recording capabilities, e.g. logitec camera with audio capabilities ...
• Instructions
• Can't think of any missing elements at the moment.
• It is fine as it is.
• mini-instruction sheet as mentioned above
• Laser pointer
• Some labels or instructions for different controls, connections

Question 20: Based on your experiences in this classroom, what changes, if any, would you recommend for future electronic classrooms that will enhance the teaching and learning experience?
• PowerPoints. Access to the Internet in the classroom.
• With the exceptions noted above, I think this room has a nearly ideal setup.
• Ability of student to use laptops all over campus.
• Have all equipment, including document camera, always out and available. Provide sufficient room for instructor materials on the lectern.
• Having another board.
• I would like the ability to turn off all computers during the lecture portion of a class. Students can answer email, shop or do other classes during lectures.
• Have an integrated unit with the central control panel. That's great.
• Better control of lighting in the room when using the overhead projector.
• Ability to better control lighting
• Be sure the screen is far enough away from the windows to help avoid glare from outside light.
• I believe students take better notes with electronic classrooms. The lighting in room is important
• Pay the adjuncts extra pay for development and training to use the equipment.
• They will have to keep current with technology. May be nice to have equipment to record and podcast.
• Maintenance, and teaching instructors how to use them. Many times I go into the classroom and things are not working correctly because previous instructors have not closed things down or logged off computers.
• Too many teachers are not aware of how to use the equipment and they leave them on or never log off.
• just to get all the class rooms wired
• Nothing
• maybe a microphone to speak to the students who have attention problems
- Better sitting arrangements. Make it easier to control the lights.
- I would like to see the equipment in the rear of the class room. The instructor gets a better and clearer view of what the students are actually seeing. If electronic media is used with personal interaction with the instructor or other students, the equipment is NOT an interference.
- newer doc camera
- I suggest you put the screens off to one side. In most rooms the screen totally blocks the white board - so you have to choose either the screen or the white board.
- All electronic classrooms should have multiple whiteboards.
- I am pleased with the classroom environment in this room. The openness of the room is very pleasing. All the glass can have an effect on the light in the room, but it is worth the effort to tame it down when needed. With just a few of the minor adjustments that I have addressed, I would not change anything to any great degree
- Put in new lighting controls.
- None
- Just the installation of room darkening shade button located on the lectern for convenience!
- same list as my response for question 19
- As stated previously...a mini course for faculty. I think some of my peers who use the classroom before me are "messing things up."
- consider different location of computer for easier access to ports and drives, DVD, Tape etc. Change screen location. Better ambient light control BC
- Students plug into the computer and run at same time White board the records on the computer...??? I'm sure lots of other stuff I don't even know about - like the electronic survey responses that students can do in the classroom.
- "Make sure there is still available white board space that can be used while the projector is in use."
- Remote control for changing slide presentation because you have to manually use the keyboard and can not move around during lecture
- see above
- "Make sure the screens are not in the center of the room or have a black screen button.
- Make them all the same so that you don't have to relearn the system if you go into a room that is slightly different.
- The most annoying thing is that if the teacher before you forgets to log out, then the computer is locked and you have to turn off the computer and restart it. I wish we didn't have to log in."
- Having the ability to write on the board so everyone can see while the screen is down would be nice.
- Class on how to use all of the equipment correctly, small so teachers can get 1 on 1 time to practice.
- leave adequate board space for instructors to use the chalkboard simultaneously
short orientation, hands on- I did not have any electronic classrooms until now, so did not get intro
establish a central data base for different departments on the 'Z' that all instructors in the department can easily access. This is a way to begin to standardize the knowledge package we are presenting to the students.
have stations for students. Much like the cyber laboratory.
definitely do NOT cover up the chalk/white board
Do not cover the black/white board with the screen
Don't know
Make sure that lecterns and equipment are placed sensibly.
Accessible height of equipment for control, especially for instructors with disabilities. Fortunately, I haven't had this problem. But, often I need to get down on the floor to see the controls and the spaces are cramped.
"1.) These rooms should always have whiteboards.
2.) These rooms should have whiteboards that extend across the entire front of the room; this would allow me to write notes, etc. on the sides of the projected images (when the screen is being used)."
OK as they are.
A device so you can change slides without staying by the podium. I do not like to stand behind it. It separates me from discussion with the students.
I need board space and the ability to use the screen.
A wireless mouse for mobility
To not be totally dependent on a remote for use of the equipment; always have a back-up manual control.
Room light control from the teaching station.
All recommendations were covered in previous questions.
ditto - audio/visual recording capabilities, e.g. logitec camera with audio capabilities ...
Get the Internet Explorer to stop setting up every time a new student uses it. Set the preferences at a higher level for all users.
The rooms should be checked between quarters to make sure all equipment is working properly.
Build podiums/controls that accommodate a variety of heights and variety of physical conditions! All of our current podiums are built for people taller than I am, and all require a lot of bending down to use VCR, CD/DVD player, and disk drive of PC . . . it's hard on my arthritic knees to do all that bending.
Better arrangement of podiums. I think this is occurring in newer rooms.
I have no suggestions.
Have computers available for students to use when they are done with the instruction part. Some how have a sitting area where teaching instruction can take place and students focus on learning and then have them move to the computers to do hands on work.
Question 21: If you have other comments based on your personal experience in an electronic classroom, please include them here.

- My worst experience has been in ATLC 307. There is no shade or blind on the window and the screen is positioned so that the light is directed straight at the screen. If blinds or shades will not be installed, the screen should at least be moved to another wall in the room. The pillar in the center of the room also limits the choices for set up. In my experience, which has included approximately 10 different smart rooms, ATLC 307 is absolutely the worst.
- For the most part the electronics rooms are the way to go. If they function right, otherwise valuable teaching time is wasted.
- It is not an electronic issue but I hope that you think about the use of whiteboards instead of chalkboards when setting up future smart classrooms.
- I was selected for room 445 ATLC, but this room was NOT available for selection in question #4.
- none
- Overall, very pleased with the experience
- Regular checking and maintaining of PCs. Tutorial for students not familiar with PCs.
- Survey is for room 445 ATLC
- I love it when it works!
- rm 445 BC
- Lack of computer skills and the regular use of the "smart room" in order to feel comfortable with the various tools. Training would be helpful.
- Getting the audio to play is always an issue. I have wav files and allows have a volume control problem. Why can't I access the HPS nas drive from there if it is my setting that are being loaded?
- I am not a typical user of these rooms. For my approach to teaching, it is important to have some NON-smart rooms.
- Sometimes I see the students getting lazy during my PowerPoint lectures because I post them on Blackboard, so they zone out and don't write down the embellishments I give in class.
- more positives than negatives
- There are some which need work. Larger screens and poor placement and construction of lecterns. The one on the 1st floor of the Health building (down the long hallway, last classroom on the left) needs a lot of work. I had problems with it not operating effectively about half the time. Also there is a computer hook-up in the pressure lab in the main building. Tie it into the system and bring in a screen. I don't like to use overheads ... no color ....no pizzazz in the slides ... they just don't come alive like the presentations do.
- Most textbooks come with a companion web site which the student must pay to use if they buy a used book. Most if not all of these students don't pay for the service and therefore miss out on this learning opportunity. The college should work with these suppliers to find a way for all students to have access to these web sites.
• some students daydream more because the lights are dimmed and much of the information is in the textbook, so PowerPoint is not always a good thing
• None.
• None.
• It's easier to teach, saves time and students get a better understanding.
• n/a
• In general the electronic classrooms aid the teaching and learning experience and they are a pleasure to use.
• I would like an overhead projector in addition to the document viewer. This would allow me to project two images at the same time.
• None
• The NAS drive access is really helpful so there is no need to bring in a laptop.
• "I love the document reader and always request to have a room in which one is included, and I am "mechanically challenged"(smile).
• The podium is not build for shorter-than-average instructors. I never use the chair because I'd have to "leap" in and out of it. Also, I often use keyboard by touch only because I need to be close enough to see the screen (for instance, typing URLs for internet access) and can't get close enough to see if keyboard is fully extended. Build podiums for short instructors who use reading glasses, please!
• audio/visual recording capabilities, e.g. logitec camera with audio capabilities ...
• Since I teach a survey course in mass media--history, inventions, social impact-- I feel that being fully wired is essential.
• Have some hands on training session for how to use the equipment.
• No WI-FI!!! In rooms with computers the students play with them instead of listening to the lecture. With WI-FI they'll be accessing the net from their phones and PDA's.
• All comments above refer to ATLC 419.
# Appendix M

## Student Survey Results

1. My primary academic division (the division that oversees the course(s) I teach) is:

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<th>Division</th>
<th>Count</th>
<th>Percentage</th>
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<tbody>
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<td>Business Technologies</td>
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<tr>
<td>Center for Innovative Technologies (formerly Information and Engineering Technologies)</td>
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<td>19%</td>
</tr>
<tr>
<td>Health and Public Safety</td>
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<td>24%</td>
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<tr>
<td>Humanities and Sciences</td>
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<tr>
<td><strong>Total</strong></td>
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2. How many years have you been involved in teaching at the college or university level?

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<tr>
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</tr>
<tr>
<td>More than 30 years</td>
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<td>4%</td>
</tr>
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<td><strong>Total</strong></td>
<td><strong>102</strong></td>
<td><strong>100%</strong></td>
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3. How long have you been on the faculty at Cincinnati State?

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<td>More than 30 years</td>
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<tr>
<td><strong>Total</strong></td>
<td><strong>102</strong></td>
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4. Indicate the classroom (Building and Room) to which this survey applies.

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<td><strong>Total</strong></td>
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5. Including your current course(s), how many different courses have you taught in electronic classrooms at Cincinnati State?

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</tr>
<tr>
<td>7-9</td>
<td>10</td>
<td>10%</td>
</tr>
<tr>
<td>10 or more</td>
<td>29</td>
<td>28%</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>102</strong></td>
<td><strong>100%</strong></td>
</tr>
</tbody>
</table>

6. I specifically request that my classes meet in an electronic classroom.

<table>
<thead>
<tr>
<th>Response</th>
<th>Count</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>60</td>
<td>61%</td>
</tr>
<tr>
<td>No</td>
<td>39</td>
<td>39%</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>99</strong></td>
<td><strong>100%</strong></td>
</tr>
</tbody>
</table>

7. Have you had a course meet in an electronic classroom where you never used the installed equipment?

<table>
<thead>
<tr>
<th>Response</th>
<th>Count</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>23</td>
<td>23%</td>
</tr>
<tr>
<td>No</td>
<td>79</td>
<td>77%</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>102</strong></td>
<td><strong>100%</strong></td>
</tr>
</tbody>
</table>
8. If you answered Yes to question 7, what was the PRIMARY reason for not using the equipment during class? Choose one.

<table>
<thead>
<tr>
<th>Reason</th>
<th>Count</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Did not know how to use the equipment</td>
<td>3</td>
<td>14%</td>
</tr>
<tr>
<td>Did not want to be bothered with the equipment</td>
<td>1</td>
<td>5%</td>
</tr>
<tr>
<td>Did not need to use the equipment</td>
<td>9</td>
<td>41%</td>
</tr>
<tr>
<td>Did not want to be in an electronic classroom</td>
<td>0</td>
<td>0%</td>
</tr>
<tr>
<td>Equipment was not functioning</td>
<td>4</td>
<td>18%</td>
</tr>
<tr>
<td>Other, please specify</td>
<td>5</td>
<td>23%</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>22</strong></td>
<td><strong>100%</strong></td>
</tr>
</tbody>
</table>

9. In your opinion, what equipment or features should be included in an electronic classroom? Choose ALL that apply.

<table>
<thead>
<tr>
<th>Equipment</th>
<th>Count</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Computer</td>
<td>91</td>
<td>96%</td>
</tr>
<tr>
<td>Hookup for instructor's laptop PC</td>
<td>70</td>
<td>74%</td>
</tr>
<tr>
<td>Projector</td>
<td>90</td>
<td>95%</td>
</tr>
<tr>
<td>Internet Connection</td>
<td>89</td>
<td>94%</td>
</tr>
<tr>
<td>Video Recording</td>
<td>22</td>
<td>23%</td>
</tr>
<tr>
<td>Video Playback</td>
<td>66</td>
<td>69%</td>
</tr>
<tr>
<td>Document Camera</td>
<td>78</td>
<td>82%</td>
</tr>
<tr>
<td>Audio Playback</td>
<td>53</td>
<td>56%</td>
</tr>
<tr>
<td>Audio Recording</td>
<td>21</td>
<td>22%</td>
</tr>
<tr>
<td>Wireless Internet</td>
<td>43</td>
<td>45%</td>
</tr>
<tr>
<td>Two-way Videoconferencing</td>
<td>11</td>
<td>12%</td>
</tr>
<tr>
<td>Lighting Control</td>
<td>85</td>
<td>89%</td>
</tr>
<tr>
<td>Window Darkening Shades</td>
<td>69</td>
<td>73%</td>
</tr>
<tr>
<td>Other, please specify</td>
<td>21</td>
<td>22%</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>95</strong></td>
<td><strong>100%</strong></td>
</tr>
</tbody>
</table>

10. What installed equipment or source do you use MOST of the time in this classroom?

<table>
<thead>
<tr>
<th>Equipment</th>
<th>Count</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Computer and projector for PowerPoint or other software presentation</td>
<td>55</td>
<td>58%</td>
</tr>
<tr>
<td>Computer and projector for Internet browsing</td>
<td>7</td>
<td>7%</td>
</tr>
<tr>
<td>Input for your own laptop PC and the room projector</td>
<td>2</td>
<td>2%</td>
</tr>
<tr>
<td>VHS or DVD video playback and projector</td>
<td>8</td>
<td>8%</td>
</tr>
<tr>
<td>Document Camera and projector</td>
<td>23</td>
<td>24%</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>95</strong></td>
<td><strong>100%</strong></td>
</tr>
</tbody>
</table>

11. Do you use PowerPoint for most in-class lectures?

<table>
<thead>
<tr>
<th>Response</th>
<th>Count</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>52</td>
<td>55%</td>
</tr>
<tr>
<td>No</td>
<td>42</td>
<td>45%</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>94</strong></td>
<td><strong>100%</strong></td>
</tr>
</tbody>
</table>
12. The projection screen(s) should be located:

<table>
<thead>
<tr>
<th>Location Description</th>
<th>Count</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>At the front center of the room</td>
<td>54</td>
<td>57%</td>
</tr>
<tr>
<td>Off to one side on the front wall</td>
<td>19</td>
<td>20%</td>
</tr>
<tr>
<td>In a front corner of the room</td>
<td>10</td>
<td>11%</td>
</tr>
<tr>
<td>No preference</td>
<td>7</td>
<td>7%</td>
</tr>
<tr>
<td>Multiple Locations (please specify locations)</td>
<td>4</td>
<td>4%</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>94</strong></td>
<td><strong>100%</strong></td>
</tr>
</tbody>
</table>

13. Would you prefer a wireless keyboard and mouse to the traditional hard-wired type?

<table>
<thead>
<tr>
<th>Preference</th>
<th>Count</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>50</td>
<td>56%</td>
</tr>
<tr>
<td>No</td>
<td>40</td>
<td>44%</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>90</strong></td>
<td><strong>100%</strong></td>
</tr>
</tbody>
</table>

14. Do you prefer a teaching station/lectern designed for:

<table>
<thead>
<tr>
<th>Design Preference</th>
<th>Count</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Standing</td>
<td>42</td>
<td>41%</td>
</tr>
<tr>
<td>Sitting</td>
<td>2</td>
<td>2%</td>
</tr>
<tr>
<td>A combination of standing and sitting</td>
<td>51</td>
<td>50%</td>
</tr>
<tr>
<td>No preference</td>
<td>7</td>
<td>7%</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>102</strong></td>
<td><strong>100%</strong></td>
</tr>
</tbody>
</table>

15. Please rate the following statements using the scale of Strongly Agree(5), Agree(4), Neutral(3), Disagree(2), or Strongly Disagree(1) as they relate to the room you indicated in question 4. You must rate each item.

<table>
<thead>
<tr>
<th>Statement</th>
<th>Strongly Agree</th>
<th>Agree</th>
<th>Neutral</th>
<th>Disagree</th>
<th>Strongly Disagree</th>
</tr>
</thead>
<tbody>
<tr>
<td>The electronic classroom is easy to use</td>
<td>33</td>
<td>47</td>
<td>15</td>
<td>6</td>
<td>1</td>
</tr>
<tr>
<td>The equipment control system (touch panel) is easy to use</td>
<td>36</td>
<td>47</td>
<td>13</td>
<td>5</td>
<td>1</td>
</tr>
<tr>
<td>The placement of source equipment (PC, VHS, DVD, Document Camera) is satisfactory</td>
<td>38</td>
<td>34</td>
<td>20</td>
<td>5</td>
<td>5</td>
</tr>
<tr>
<td>The placement of the projection screen or flat panel video display is satisfactory</td>
<td>33</td>
<td>38</td>
<td>14</td>
<td>12</td>
<td>5</td>
</tr>
<tr>
<td>The projected or displayed image is bright enough to see without dimming the lights</td>
<td>6</td>
<td>20</td>
<td>24</td>
<td>39</td>
<td>13</td>
</tr>
<tr>
<td>There is sufficient control of room lighting</td>
<td>15</td>
<td>31</td>
<td>23</td>
<td>25</td>
<td>8</td>
</tr>
<tr>
<td>The acoustics in the room (spoken word and audio playback) are satisfactory</td>
<td>32</td>
<td>46</td>
<td>20</td>
<td>4</td>
<td>0</td>
</tr>
<tr>
<td>The window treatments in the room are satisfactory for controlling outside light</td>
<td>16</td>
<td>26</td>
<td>34</td>
<td>17</td>
<td>9</td>
</tr>
<tr>
<td>The lectern and equipment arrangement facilitates using the installed classroom technology</td>
<td>24</td>
<td>41</td>
<td>23</td>
<td>8</td>
<td>6</td>
</tr>
<tr>
<td>During instruction, multiple technologies are used in this electronic classroom</td>
<td>42</td>
<td>40</td>
<td>7</td>
<td>8</td>
<td>5</td>
</tr>
<tr>
<td>The equipment in the electronic classroom enhances my teaching experience</td>
<td>65</td>
<td>23</td>
<td>11</td>
<td>2</td>
<td>1</td>
</tr>
</tbody>
</table>
16. Does teaching in an electronic classroom detract from your teaching experience in the room?

<table>
<thead>
<tr>
<th></th>
<th>Yes</th>
<th>No</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>7</td>
<td>91</td>
</tr>
<tr>
<td>No</td>
<td>91</td>
<td>93</td>
</tr>
</tbody>
</table>

17. If you answered yes to the above question, please indicate why you believe your teaching experience is negatively affected.

Check all that apply:

- I waste too much time with the equipment | 5 | 62%
- A smaller amount of material is covered in class | 0 | 0%
- I feel overwhelmed by multiple types of presentation devices | 1 | 12%
- Other, please specify | 5 | 62%

18. If you noticed any recurring difficulties with the classroom technology, what were they?

Check all that apply.

- Slow Internet speed | 13 | 16%
- Inferior image on the screen | 20 | 25%
- Room lights too bright on the screen | 26 | 32%
- Unable to control light from windows | 22 | 28%
- Poor sightline to the screen | 8 | 10%
- Equipment control system unreliable | 15 | 19%
- Unreliable source device (computer, VHS, DVD, document camera) | 17 | 21%
- Poor placement of instructor teaching station | 23 | 29%
- Other, please specify | 27 | 34%

19. What, if anything, is missing from the electronic classroom that you would like to have?

53 Responses

20. Based on your experiences in this classroom, what changes, if any, would you recommend for future electronic classrooms that will enhance the teaching and learning experience?

62 Responses
21. If you have other comments based on your personal experience in an electronic classroom, please include them here.

| 34 Responses |
Appendix N

Student Survey Open-Ended Responses

Question 5: I prefer to take a course that meets in an electronic classroom. Why or why not?

- because it allows everyone to view the same page at the same time
- I feel that whether or not the classroom is electronic is impertinent. Without a competent instructor it doesn't matter what type of classroom students meet in.
- I think that working on a computer is a lot easier.
- Better facilitates the lecture.
- Any class is fine with me. As long as I get taught.
- It is easier to follow along and actually see what the instructor is talking about using the equipment.
- visuals are important to my learning
- More time efficient. more opportunities for variety in the classroom.
- It gives you an option to have more visual aides.
- I like how big they are, but don't necessarily care about anything else because I learn best from lectures
- Because it easier to read the board and take notes usually.
- Because it's better for the instructors to be able to show different things on the overhead instead of writing on the board.
- it is helpful when displaying items that can not be seen from the front of the classroom.
- I like doing things the old fashioned way. You also don't have to worry about computer problems.
- It makes it easier to convey ideas.
- I prefer electronic classrooms because of the comfort of the classrooms and the variety in which the teachers and students use the tools for more dynamic learning.
- They usually have a table and chair detached (I HATE THE CONNECTED DESK AND CHAIRS) with the ability to see the information being taught in newer standards.
- The equipment makes it easier to understand information since they can put anything on the screen.
- Helps the student better understand the instructor notes.
- helps with visual learners, which I am
- it really doesn't matter to me. as long as the teacher can easily convey the material
- Because power points and other electronic visuals help me learn. I tend to get better grades when there are visuals to aid in classroom lectures.
- It is easier for the instructor to present visuals with larger classes. In health related classes visuals are imperative.
- The multimedia variety helps the learning process.
- Because it's easier to learn and able to learn how some of the technology works.
• I learn better with in-person instruction
• It doesn't really matter.
• I enjoy working on computers
• It gives the teacher opportunity to show us things on the projector. Seeing helps me learn.
• they provide a greater variety of learning materials.
• more space and accommodating to students, not restricted seating for heavier people
• PowerPoint has many advantages over a chalkboard, like diagrams and being easier to read overall.
• I think the access to computer makes for a much better classroom environment.
• seating arrangements and space available for student
• If the equipment is already there, the instructors will use it & visuals make it easier for students to learn.
• I feel that the added interaction helps with learning.
• The electronics in the classroom make things go a bit smoother
• Electronic classrooms promote the use of PowerPoint. In my experience instructors at this school tend to simply read the slides instead of teach the material
• I don't need any
• Because it makes any and all demonstrations easier.
• It's just better for presentations and helping students learn in an audio/visual way.
• visual learner
• doesn't make a difference
• I don't necessarily have a preference and electronics sometimes shut down at the wrong times.
• only if it is relevant to the course information.
• having the visual is a big help
• I like the conveniences of electronic class rooms
• I am pretty much open as to where I learn. I do prefer on hands training.
• I prefer them because I like visual aids; computers and projectors allow the instructor to make a better visual presentation, as opposed to writing in chalk on the blackboard.
• Because of the equipments - they make learning much better
• Because it allows for the professor to utilize a variety of methods and media to clarify curriculum.
• There was a lot of visual aid that assisted in my learning.
• I'm a visual learner.
• Large desk space, visual aids help tremendously
• It's air conditioning and more comfortable chairs
• It's better to learn from.
• it's handy.
• Yes, because I like having PowerPoint presentations.
• Yes, because it makes learning much easier to comprehend.
• The electronic classroom keeps my interest.
• offers instructors a variety of presentation methods, so classes could be more interesting
• I like the computers the teachers use to teach with
• It is not important
• the technology allows the professor to display information and slides. Also, internet accessed information is also available for display.
• It's definitely much more convenient. By that, I mean that it's much easier to follow lecture (PowerPoint) and to give presentations and such. Also, if there's something that needs to be answered quickly, the internet helps.
• I feel the visual aids enhance the environment.
• It was hard for the teacher to get the information to show clearly on the screen. I sat in the front row and was having problems reading. I think it would be a great tool if the teachers had more training on and it was a phone call away.
• able to learn more from internet and videos also presentations. Different aspect is shown.
• Don't matter to me
• Helps when accessing the internet.
• Teacher can use electronic equipment to better present important information.
• for convenience
• I like to have the visual aids, such as PowerPoint, it keeps me more interested in the class, and more able to process the information
• because we check email, do blackboard assignments and things of this nature.
• The technology in the electronic classroom helps me to learn more efficiently.
• I like the hands on and since I am going into computers it is much easier for me to learn.
• Because there are more options as far as ways to teach information
• allows the instructor a better range of options for presenting material
• because there are more options and resources for teachers and students to use when learning or teaching
• I can make better grades in classroom that are electronic because I can display my abilities.
• Easier to read overhead than different writing on the board.
• I think it's a very helpful learning tool.
• make class participate easier
• its nicer
• "The use of the computers make it easier.
• It is easier to follow along with the instructor.
• I like electronic classrooms. It is better when I can see what the teacher is doing on the calculator. I also like how we can view handouts w/o them being on an old fashion overhead.
• It's easier in AVP.
• well, it does help when you need to look up research during class. almost all my classes needed a projector.
• The lecture notes are displayed.
• I like a hands on classroom.
• I believe the classes are more interactive, and the instructors can utilize more resources than just lecturing.
• If the teacher needs the equipment, the course should be assigned to an electronic classroom. This does not mean that I believe every classroom should be electronic!
• If the instructor needs it, I want them to have it. I do not expect every classroom to be electronic nor for every instructor to use the electronics that may be available.
• because I don’t care. As long as I get taught
• The class information is better presented using the Wolfvision document camera or projector. Using this equipment makes for better time management when presenting information.
• It is easier to see things on the big screen vs. teacher writing on the board and you can get online to look up things
• overhead makes it easier for examples to be given and saves on time
• I prefer it when the notes we copy are typed. It makes them more readable. I like the demos in the different kitchens. We all can see wherever we sit.
• No, because I prefer hands on and actually being the room with other students. Also at the same time it would some time be a little easier to meet electronically

Question 6: When scheduling my courses, I look for courses that will meet in an electronic classroom. Why or why not?
• just try to find course at the right time
• See above response.
• I find it easier to work on computers.
• While it's nice, it is not a "need."
• I look for whatever fits my schedule.
• I register for classes that fit my schedule the best and are program requirements.
• it provides the teachers with multiple means of conveying his/her subject matter
• I just look for the classes I have to take.
• I choose courses that are in my field
• I never thought about it.
• Because honestly I just want to get my classes over with.
• Had never occurred to me.
• the time that the class is scheduled is more important.
• I didn't know they were marked that way.
• I think I will more in the future. I don’t have a computer at home so it is difficult for me to get to one when I have assignments due on blackboard or something.
• I do look for courses that teach in electronic classrooms for the same reason as the comfort level is great and the variety in which the teachers and students can use the tools for a more dynamic learning experience.
• More concerned about the course and the time it meets, rather than all the "bells and whistles"
Because most of my basic classes are in the older part of the building and I think they should all be the same.
I don't know which classrooms are electronic.
Because it doesn't matter were the classroom is located.
I enjoy class and get more out of it when there's a smart classroom for me to be in.
Once again the importance is the course not the class room
I would if I could, however... I'm taking classes that are in my major and our schedules are picked out for us.
I have a time constraint and must take courses when available regardless of environment.
Being restricted to the times in which I can attend classes, I primarily schedule to accommodate the time slot not if it is an electronic classroom.
It's not a real big deal to me if the classes are electronic classrooms, so I just chose classes that I need.
I'm personal, I like interacting with a human
It doesn't really matter.
I just go to the class if it is required for my major.
Who the teacher is depends on my choice of a course
I do not know all of the rooms that are or are not electronic.
it must fit my schedule first--where is there any indication that a course is taught in an electronic classroom?
I choose courses based on my program's requirements, and usually there is only one or two sections to choose from.
I don't care that much, plus I don't know all the rooms.
I don't really pay attention to the classroom b/c most of the time they are TBA anyway.
I like instructors to use visual aides.
I take my courses based on the need to fulfill degree requirements.
I take classes that I need to graduate regardless of what classroom they are in
I don't have course options. My courses are only offered at one time once/year
because the course material is more important than the room.
I worry more about learning and not the methods of how they teach, so long as I can understand.
not always that important for my learning
I simply register for courses that I need to complete for my major.
I don't really know too much about computers so I guess I don't understand the extent of use of computers in classroom unless it is an OT class
it makes the classroom learning more enjoyable
I usually attended in traditional class room settings.
No I do not, I keep myself open to learn new ways and techniques.
I just sign up for whatever classes I have to take, regardless of location. Most of the classes in my program use electronic classrooms anyway.
I don't! I courses that I need to take now in order not wait for a longer time and also consider "who" is teaching that courses.
• Because I assume the professors will be assigned classrooms that meet their teaching needs.
• I assumed that I would have the same room, and I did.
• I keeps me focused on what I need to accomplish in my particular field.
• I don't know how to look for electronic rooms
• I take what is offered.
• Because it doesn't matter.
• No but only because I didn't know that you had privy to this type of room/lecture.
• No, but only because I didn't realize you had this option.
• I took the courses that I had to, those classrooms were mostly in my field.
• it's not a priority. getting in the requirements is a priority no matter where they meet
• I look for courses that will meet my scheduling needs. I work full time.
• I like the smart classrooms, but I am not going to forego taking a class if it doesn’t meet in one of them.
• I don't have an option. I have a specific courses that are only offered by one teacher each term. What room it's in is what room I get.
• Given the same class, I would rather have an electronic room for the added value brought to the learning environment.
• I never think to do this. Working in a regular classroom is fine with me.
• I look for what I need to complete my major.
• Don't rely on in.
• Instructors can request equipment.
• Classroom type isn't that important.
• not a necessity
• I don’t really pay attention the room numbers
• This was my first experience in the electronic classroom setting and because it was a good experience I will try to find classes there in the future.
• I am an evening student and classes sometimes are limited. Because of this I have to take what is available to get my required courses done.
• my main criterion is time of class, not location
• I do not really pay attention to the room number if it is a electronic classroom it is a bonus
• I generally don't schedule courses in electronic rooms because my main focus is being considered for the course that is needed for my career.
• I just look for the courses I need.
• I didn't know you could look for courses that meet in electronic classrooms.
• It simplify material that is given
• most of the time I don't have a choice
• I don't care that much, also lack of knowledge of classrooms.
• My classes were only offered at one time (DMS program)
• No. I only search for classes that are available, not based on electronics.
• Doesn't matter too much.
• It all depends on the class.
• This isn't that important to me.
• I take what I need to fulfill my criteria.
• Usually time is the biggest factor when scheduling online courses.
• It doesn't matter to me whether the classroom is electronic! What matters is the teacher, their teaching style and knowledge of the material. If the teacher needs/wants an electronic classroom, I expect that they are assigned one.
• I do not choose classes based upon the equipment in the room. I choose classes based upon the instructor. If the instructor needs/wants an electronic classroom, I expect that they are assigned to one. I do not expect every instructor to use electronic classroom nor do I expect every room to be electronic.
• I only care about what times are available
• The classes that I have to take are mandatory course requirements and I don't have the luxury of choosing which room I will be in. I’m sure that 99.9% of the students choose the class time based on their schedules and not electronics.
• I take the classes I need regardless of the room they are in but it would be great if all the rooms were electronic
• don't pay enough attention to classrooms just teachers
• I mostly have labs, so those classrooms are all electronic. I don’t know what to expect with other courses.
• I schedule according to time

Question 9: If you answered Yes to question 8, what is the primary reason given by the instructor? Other, please specify.
• never gave a reason; don’t think needed to b used
• n/a
• needed to convey work in the form of speech
• Was not needed at that time.
• n/a
• N/A
• She used it very often.
• they used it
• Instructor did not want to acquire the new skill.
• Did not want to acquire the new skill to use
• instructor used the old fashion video camera

Question 11: In your opinion, what equipment or features should be included in an electronic classroom? Other, please specify.
• Everything was OK
• Telephone for emergency
• Large desks
• the adequate whit or blackboard for the instructor
• overhead or magnifier
• I don't know - not for me to decide
Question 15: The projection screen should be located… Multiple locations (please specify).
- because students heads are in the way.(sometimes)
- Maybe set up for the side boards
- Front and both corners

Question 16: The placement of the projection screen or flat panel video display is satisfactory.
- again sometimes you cannot see because there will be a students head in the way
- I would agree. if you cannot see past the projector then I feel that it is your responsibility to move your seat.
- All students should be able to see the projection screen with the obstruction of the podium.
- Can't see the bottom of the screen from other than the front rows.
- We never used one
- great placement
- instructor often had to pull down a screen that blocked class notes written on the board
- With the setup of the room, there wasn't really a better suited place.
- none
- It is out of the way when needed but can be difficult for the teachers to write on the white board behind the screen. Maybe it can be off center.

Question 16: The projected or displayed image is bright enough to see without dimming the lights.
- we turned the lights off anyways.
- The room had to be dark making it difficult to take notes.
- not all TIMES
- n/a
- There are a lot of windows in the room; maybe that also had something to do with it.
- It was difficult for the teacher to get the lighting together.
- I think it is better when the lights are dimmer but it depends on if the teacher knows what they are doing.
- The room did not get dark enough for all images to been seen easily

Question 16: The instructor has sufficient control of the lights in the room.
- yes she did. but there should be a switch by the projector to not waste class time to walk over to the door to turn them off.
- I could always see well...
- Enough light for note taking is important for the older student like myself.
- In order to dim the lights, she has to walk to the back of the room or ask a student.
- The instructor often could not dim the lights from the podium, but had to use the wall switch
- none
• can only turn on lights on one half of room (side by side) not front and back.
• The blinds didn't work
• The students where her lighting control. She was in front of room, light switch is in the back of room. Room would not get dark enough for all images.
• One wall separating the classroom with the hallway is completely glass and there is no way of darkening or obscuring it.

Question 16: The acoustics in the room are satisfactory.
• Never heard them
• Never used this stuff
• Na
• Na
• None
• When the temperature in the classroom is okay the spoken work and audio playback is good. When it is hot and need to open the window it is not so good because of the mechanical units on the roof right outside the classrooms.
• The door has to be closed because the hallway is very noisy

Question 16: The type of student furniture in the room is satisfactory.
• it would be nicer to have wider tables to spread books and notes out during lecture
• it is very uncomfortable for longer classes
• Seating for larger students should be considered.
• I hate the connected chairs and desk, you don't have enough room and I feel like a child.
• the chairs are extremely uncomfortable, especially when viewing a presentation and at long periods of time
• filthy chairs
• more rooms should have this type of seating with no restrictions to the person's weight/size
• Desks are very uncomfortable.
• n/a
• Chairs should be adjustable in height. For those of us who are not tall, it is uncomfortable to have to reach up to the tall tables while in a chair designed for someone taller that sits low.
• The tables in that room roll too easily. Every time someone else in the row moves at all, the whole table rolls and everyone in the row has to adjust.
• none
• Very uncomfortable!
• Yes, having those tables and moveable chairs provides plenty of room for you to work. I HATE THE SEATS IN HPB AUDITORIUM (HPB 02/04?) I just needed to add that all of us complain about that room.
• Nice chairs and tables on wheels.
• the stadium room seating is very conducive to learning, nice and comfortable for prolonged periods of time
Question 16: The window treatments in the room are satisfactory for controlling outside light.
- I would like to see a photo darkening film so it automatically adjusts to outside lighting
- did not have a window in my room
- No windows in this room
- Didn't have any windows
- no windows are in this room
- na
- not applicable - no windows in this room
- There were no windows in the room
- No windows in the classroom
- There were no windows besides the door.
- no windows
- The blinds would often not come down without a struggle and on a sunny day often did not darken the room enough
- Some shades in the room were broken and could not be controlled sufficiently
- They were standard mini blinds. They did their job, but there's always room for improvement.
- This was an interior classroom with no windows to outside the building
- none
- Window tint on classroom windows would help. (I am a professional window tinter) I would be happy to give you a quote!
- The blinds NEVER worked correctly!!
- we had no windows
- Window shades need help.
- The wall between the room and the hallway should have shades that could be closed to control light and distractions.

Question 16: The instructor’s lectern and equipment arrangement facilitates using the installed classroom technology.
- The instructor could not see the screen easily in order to make lesson selections utilized by the course computer program.

Question 16: The equipment in the electronic classroom enhances my learning experience.
- multi-tasking is a must for lecturing
- better visual aides are brought to classes with the electronics
- Didn’t do anything electronic
- it enhanced it but my teacher was awesome also
- n/a
- none
- I like it when teachers use this tool. I also like it when they choose to use blackboard. I wish more teachers would.
• I can learn with or without the electronics. The electronics can make class a little more interesting.
• In this case, the teacher read the PowerPoint presentation which we also had a copy of - it didn't enhance anything for me, it was boring. The PowerPoint could have been better used as a prompt for the lecture. I can read and did not need the instructor to read to me.
• The instructor has notes, PowerPoint, pictures, videos that can be shown at anytime which makes learning more efficient. Also allows us to take in more information in different ways while in class.

Question 16: I learn more in an electronic classroom than in a standard classroom.
• Absolutely, the visuals and info searches on subjects covered make it easy for the instructor to web browse
• Only if the professor uses the equipment
• This depends on the instructor and his/her methods of teaching WITH the use of the technology classroom.
• It depends on what class it is, for this class it was very helpful.
• Weird question, how could you make the comparison?
• Instructor uses the equipment as a crutch instead of a tool.
• n/a
• How much I learn really depends on the instructor and how they present the material
• A GOOD, EFFECTIVE instructor with a blackboard and chalk is better than a boring instructor with gadgetry and Power Points. But a good instructor who can also integrate the technology can't be beat.
• none
• No real change in my learning exp.
• The type of classroom does not make the learning experience. How the instructor uses the equipment does. I don't expect to learn more based upon the classroom.
• Same as above, I am able to view the information being taught in different ways. I am a visual learner and this helps me learn the content of the course.
• The information presented is the same just in a different format
• All my classrooms were electronic but not all the electronic was used by the teachers.

Question 16: Having a class in an electronic classroom helps me to stay more focused on the instructor's lessons.
• not all the time
• This depends on the instructor's methods and the subject's WITH the use of technology.
• n/a
• Again it depends more on the instructor, not the equipment
• An instructor reading Power Point slides is no more interesting to me than one who just reads the text.
• none
• In this case, it bored me to tears.
• This keeps the information that is being presented much more interesting

Questions 16: I expect a higher grade for a course that meets in an electronic classroom.
• from myself
• that has nothing to do with it... its how well you know the material when a test is given.
• No, technology enhances the teaching method it certainly does not teach the subject, it does enhance the learning experience, but I can expect a higher grade.
• n/a
• The facilities in the classroom have very little bearing on the amount of work I put into the course, which is what controls the grade I receive.
• none
• This depends on if the student studies or not. I disagree.
• My grades are determined by how I perform in the class, not by the tools available (or not) to the instructor.
• I get straight As anyways

Question 16: The instructor uses multiple technologies in the electronic classroom.
• Chef Lasorella pulls data from her ppt and web browser to explain subject matter document reader, computer, internet, projector, lighting controls.
• there were many options for her to choose from when presenting material
• no
• none
• In this case, yes. Not in all cases.
• We used every aspect of the equipment provided in this classroom. Especially when the students had to give presentations.
• One time she was unable to use the video projector, so we did not see it. She used power point most often

Question 16: The instructor effectively uses instructional technologies in an electronic classroom.
• I had two instructors that used the equipment to full advantage in this room.
• Some students used the electronic classroom to give a speech.
• none
• Most of the time. Sometimes there are problems with the document camera when it comes to displaying graphing calculators on the screen.
• Not completely effectively.
• Very knowledgeable with equipment and efficient.

Question 16: Instructors using electronic classrooms to deliver course materials are better organized.
• They can be, but I've known some that are less organized.
• This statement is too generalized and biased- I cannot comment. There are certainly unorganized teachers using electronic classrooms.
• n/a
• Place of the classroom does not make the an instructor - an organized instructor will always be organized regardless of the place and location of the class
• Not necessarily. It depends on the instructor as a person and how they prepare the course materials. They can use the electronic classroom and still not be organized.
• I really can’t say but it is easier to share information electronically if everybody understands how to use the equipment.
• In this case, the materials were well organized; however, because they WERE the majority of the material presented, I could have just as easily read it myself and not have gone to class to be read to.
• Yes, they come to class with the content ready to be presented and it also keeps them on task.
• not necessarily- some just don’t take advantage of what is available

Question 16: The College should convert all standard classrooms into electronic classrooms.
• if monies are available the answer is yes, you could also link up other classrooms together at the same time if needed
• I think that it would be beneficial for both the students and the professors
• It depends on how many instructors need electronic classrooms, but if there are many, then scheduling would be more flexible if all classrooms were electronic.
• I guess I haven’t experienced an electronic classroom yet... should I be taking this survey??? Hmm..?
• I do agree that the technology should be available for the instructors to utilize.
• Not all standard classrooms require the use of electronic facilities- it depends which course.
• I'm in favor of having the technology available everywhere, as long it is the instructors' choice on when and how to use it.
• Not all classes would benefit in the same ways. Enough electronic rooms should be available for the courses which require them.
• Only if the teachers have a 2 day training and continued training on the equipment. Some information for the students regarding this new technology would be great. Ex. How does being in a smart room enhance your learning?
• some classes it is not needed
• Some rooms don't need electronic settings. Sometimes it’s better to just be in a standard classroom.
• Absolutely NOT!
• This would benefit everyone teaching and taking classes.
• Teacher who will not use the electronic equipment should have their lectures in a room that is not equipped. That would save money because not all rooms have to be electronic.

Question 16: Overall, I am satisfied with my learning experience in an electronic classroom.
• n/a
- Electronic classrooms need to install camera hook ups.
- The electronics more likely took away from my learning experience in this case.
- Yes, the electronics have advanced learnings.

Question 18: If you answered yes to the above question, how does having a class in an electronic classroom detract from your learning experience? Other, please specify.
- There was no problem
- Na
- n/a
- NA

Question 19: If you noticed any recurring difficulties with the classroom technology, what were they? Other, please specify.
- Screens need cleaning from time to time!
- couldn't connect my laptop the projector.
- no problems were experienced
- N/A
- auto focus wouldn't work correctly
- not applicable
- none
- none
- none
- There was no problem
- software usability
- dvd and video controls from mounted station.
- Occasionally there was a problem getting volume.
- teacher not knowing how to use the equipment.
- None

Question 20: Based on your experiences in this classroom, what changes, if any, would you recommend for future electronic classrooms that will enhance the teaching and learning experience?
- N/A
- better way for everyone to view screen in a full classroom.
- I would make the station moveable instead of stationary. that way the professor could do with he/she wishes with it and not be forced to work around it.
- dimmers on the lights
- Move the instructors teaching station
- don't really know
- Yes, I had an experience where the entire projection of the screen was 30 degrees turned to the right which made us all turn our head 30 degrees to read the material.
- Teachers should not rely exclusively on these electronics. A great teacher uses all the technologies which includes the old fashion way of learning...Taking notes!!!!
• To teach the instructors on how to properly use the equipment and maybe a simple "how to" manual in each room.
• It was pretty good, the instructor knew how to use the equipment and it always functioned.
• Quicker connection times, and more reliable touch-screens for the multi-media controls.
• none. the technology seems up to date
• I liked this classroom and its electronic features. I would make no changes to this individual classroom.
• Have all instructors well trained on the equipment and teach them how to use the equipment to its fullest potential with video or internet access for example.
• no changes are necessary
• Put in window shades that are easier to put up and down.
• equipment working properly
• I was satisfied with everything.
• Wireless internet access
• none
• lighting and need to reboot are the biggest issues.
• More control over natural light, faster Internet.
• Make sure that the technology is running properly and educate everyone as much as possible.
• We used the PRS in our classroom (which I had to PURCHASE) yet we did not use it often. We should have used it daily.
• Better lighting control and more reliable document camera
• Encourage instructors to use the equipment for supplementing the material instead of a script for them to read.
• none
• Move the Elmo out of the way of the screen, move the podium away from the screen.
• I don't think there is really any real advantage to having an electronic classroom. I felt the same as if I were in a normal classroom, just with a PowerPoint presentation, projector and computer. I feel like I'm able to learn with or without extra technology.
• no comments
• Don't base all of your lectures or learning equipment with technology because it doesn't work all the time.
• I thought it worked great
• I recommend a balance between both electronic and traditional classrooms.
• n/a
• Video conferencing.
• As long as the equipment works well, electronic classrooms are great. Sometimes our instructor had problems getting the computer to work.
• Instructor-centralized control system, during lecturing or showing some slides can control the other pcs.
• Make sure the equipment is in top notch condition and working properly. A lot of time is wasted while the instructor tries to get the equipment to work. Better control of light from the windows; the venetian blinds just don't do the job. Podium placement needs to facilitate the instructor's ability to see the screen for inputting instructions for the computer program.
• Yes, but how much is tuition going to go up
• none
• Give instructors classes on how to use equipment AND blackboard
• To re-locate or install the screens in a better position or bigger so that you don't have to move your head around to see what is on the screen just because of the person sitting in front of you.
• I would say that the lighting in some rooms are terrible because the outside light that's comes through the shades and if I could change that I would.
• Make sure the software needed for the class is already installed and working properly so the students do not spend the first class setting them up.
• teachers utilize these great ways of teaching with the computers
• Move the Dry Erase board to a central location. It was difficult to write and keep turning to left to see the board
• I would recommend better light control from windows.
• None. I think the current setup works fantastically.
• I suggest teachers have more training on. Involve the students sending out emails letting us know what is a smart room and the benefits of having.
• none
• better seating
• Needs Updated
• No recommended changes.
• none
• Just the writing board.
• Make sure the instructor is fully aware of how to operate equipment in electronic classrooms so that time will not be wasted trying to figure things out.
• I would find some other way to display the material so that the images and projections are clearer.
• finding a way to better regulate the light from windows in the room
• Better light control, i.e. dimmers and window shades
• overall, it has been a good experience with the exception of the student seating areas.
• I would keep screens at the center of the room and I would keep the dry erase boards in stead of chalk boards.
• Students should have time to practice on equipment used in electronic classrooms to successfully complete their presentation.
• To use the overhead viewer instead of writing stuff on the board, takes less time and easier to see and understand.
• None that I can think of.
• Better shades
• none
• The Teacher is the real key.
• none
• Better control of light from windows
• The campus has come a far way in innovation and it's appreciated, but the images projected need some improvement.
• I understand that teachers are trained on how to use the equipment but it appears that they are still unsure on how to effectively use the equipment. Maybe a follow up class or classes should be given.
• Having the school IT people be more helpful to the teachers

• better lighting, and sound, light buzzing
• don’t have the classroom in a place where the windows don’t have shades.
• no changes at this time.
• It isn't the hardware! It's how the instructors leverage the hardware to ENHANCE the learning experience.
• none
• Room lighting, Temperature control
• include a stepped floor for the line of sight to be perfect.
• nothing
• Make sure all windows can be obscured.
• none
• none that I can think of

Question 21: If you have other comments based on your personal experience in an electronic classroom, please include them here.
• N/A
• A lot of students surf the net during class, and this can be distracting.
• Having computers in the rooms I feel can be distracting because other students surf the net instead of paying attention to class but all the other digital media would be wonderful.
• some teachers didn't know how to operate the equipment, sometimes the old equipment was replaced with the electronic while it wasn't running.
• In at least one class period in all my courses that were held in electronic classrooms, there has been a time where the teacher had to call someone in to help him/her figure out how to use something on the computer. I think the teachers should perhaps be trained more on how to use the electronic systems in their classrooms.
• I learned how to do a presentation on PowerPoint.
• I prefer electronic classrooms because they do aid in learning because I am a visual learner more than any other means of learning.
• the seating is GREAT, all classrooms should at least get rid of the small desk/chair combos - these do not fit most students.
• All classrooms should be electronic and ALL teachers should be trained and expected to use them.
• Document camera rarely worked correctly. If lighting wasn’t perfect, the image would never stay focused.

• none
• I think that these type of classrooms are great to learn in and they kept me interested in the lectures, rather than in normal classes I would probably sleep during lectures.
• I better understand and grasp the concept so much better.
• I love learning in an electronic class room and I would love all text books to become electronic. I all for an electronic world.
• My favorite part of the electronic classroom is being able to pull up something from internet project something onto the erase board and write on board while the image is on the board. it really helps
• I found that being in an electronic classroom is most rewarding.
• none
• I like them!
• overall I think they are great. They also seem to help the teacher out.
• I had at least 5 classes in electronic classrooms - there is a vast difference in how the instructors leverage the hardware. Some use it to great advantage for the students, some want to use it and don't know how, some have excellent ability to integrate PowerPoint, internet search and video into their lectures.
• none
• Make sure instructor has knowledge of the equipment.
• none
• I think that it just depends on the instructor. Some have more experience with technology therefore, the class flies by when they know what they are doing. Where as other instructors are better off without the electronic classroom.
Reference List


