



**State of Arizona
Office
of the
Auditor General**

PERFORMANCE AUDIT

**ARIZONA
UNIVERSITIES'
SPACE UTILIZATION**

**Report to the Arizona Legislature
By Douglas R. Norton
Auditor General
October 1997
Report # 97-16**



DOUGLAS R. NORTON, CPA
AUDITOR GENERAL

STATE OF ARIZONA
OFFICE OF THE
AUDITOR GENERAL

DEBRA K. DAVENPORT, CPA
DEPUTY AUDITOR GENERAL

October 27, 1997

Members of the Arizona Legislature

The Honorable Jane Dee Hull, Governor

Dr. Frank H. Besnette, Executive Director
Arizona Board of Regents

Dr. Lattie Coor, President
Arizona State University

Dr. Clara Lovett, President
Northern Arizona University

Dr. Peter Likins, President
University of Arizona

Transmitted herewith is a report of the Auditor General, A Performance Audit of the Universities' Space Utilization. This report is in response to a June 10, 1996, resolution of the Joint Legislative Audit Committee.

This is the first in a series of reports to be issued on the university system in response to the requirements of A.R.S. §41-2958. The report addresses ways in which the universities can better manage the existing space on their main campuses. Specifically, each university can improve the use of classrooms, which currently hold classes, on average, less than 60 percent of each day. Not only does this use fall below the Board of Regents' current guidelines regarding utilization of classroom space, but these guidelines may themselves be set too low to ensure classrooms are adequately used. The Board of Regents should continue its efforts to develop new classroom utilization standards and hold the universities accountable for increasing their use of classroom space. Additionally, as the universities take steps to increase classroom use, they should focus on some of the most expensive rooms, those equipped with instructional technology, which are also underutilized. One way to improve classroom use would be for the universities to schedule more classes through central scheduling offices and more fully automate their scheduling function.

As outlined in their response, the universities agree with all of the findings and recommendations.

My staff and I will be pleased to discuss or clarify items in the report.

This report will be released to the public on October 28, 1997.

Sincerely,

Douglas R. Norton
Auditor General

Enclosure

SUMMARY

The Office of the Auditor General has conducted a performance audit of space utilization at Arizona's universities. This audit was conducted pursuant to a June 10, 1996, resolution of the Joint Legislative Audit Committee, and is the first in a series of four performance audits of the universities performed in response to the requirements of A.R.S. §41-2958.

Arizona's three universities, Arizona State University (ASU) in Tempe, Northern Arizona University (NAU) in Flagstaff, and the University of Arizona (UA) in Tucson, maintain a total of over 23 million gross square feet of space on their campuses. This includes classrooms and laboratories, offices, residence halls, athletic facilities, dining halls, and student recreation centers. Although the universities manage their space differently, they could all improve the way they use and monitor their facilities.

Universities Need to Improve Classroom Utilization (See pages 7 through 13)

Arizona's universities can improve their use of classroom space. On average, each university schedules classes in its classrooms less than 60 percent of the day. This represents average use for all classrooms; the universities use their classrooms significantly less in the early mornings, late afternoons, and on Friday afternoons. Further, this use (between 25 and 28 hours per week out of the 50 hours possibly available, Monday through Friday, 7 a.m. to 5 p.m.) falls below the Board of Regents (Board) standard that recommends classrooms be used 30 hours per week. However, even if the universities met the Board's guidelines for classroom use, the guidelines may not ensure classrooms are adequately used. Some regents and private sector representatives, upon reviewing the Board's guidelines, concluded that they should be revised to encourage increased use of classrooms. Further, stricter guidelines would reduce or eliminate the universities' need for additional classroom space.

By using their existing classrooms more often, the universities may be able to serve more students, convert underutilized classrooms into other types of needed space, or prevent or delay construction of new classroom space. The universities, in conjunction with private sector volunteers, are discussing raising the classroom utilization guidelines and identifying methods to increase classroom use. However, the Board of Regents should ensure new standards are developed and hold the universities accountable for increasing their use of classroom space. Further, the Board should consider how the universities are utilizing space when reviewing their requests for classroom construction.

Utilization of Technology-Enhanced Classrooms Can Be Improved

(See pages 15 through 19)

Arizona's universities are taking steps to increase classroom use, but should focus more on some of the more expensive rooms, those equipped with instructional technology. The 3 universities currently maintain 70 classrooms equipped with at least an instructor computer, and have plans to build more rooms equipped with computers, laser disc players, in-class Internet access, and/or sophisticated projection equipment. These technologies can augment traditional instructional techniques, but classrooms equipped with these items can cost nearly twice as much per square foot to construct than traditional classrooms.

Although instructional technology classrooms and laboratories are among the most costly on campus, both NAU and UA currently use them, on average, fewer than the 30 hours per week required under the Board of Regents' classroom utilization guidelines. NAU, UA, and ASU use their classrooms equipped with at least an instructor's computer 22, 27, and 30 hours per week, respectively. Although certain inherent characteristics of the technology can result in low usage, such as additional time needed to set up equipment, other factors, such as inefficient scheduling practices, are within the universities' control. Each university should take steps to increase the use of these specialized classrooms. In order to accomplish this, the universities need to first identify all classrooms equipped with instructional technology. Additionally, the universities should determine this technology's effectiveness and the extent to which it is needed on each campus.

Improved Scheduling Processes Could Enhance Utilization of Classroom Space

(See pages 21 through 25)

Currently each university schedules classroom use differently. While NAU allows its academic departments to control all classrooms, UA and ASU schedule the majority of classrooms through a central scheduling office. However, all three could increase classroom use by scheduling more classes through central offices. For example, classrooms scheduled centrally at UA held classes 29 hours per week, compared to only 18 hours per week of classes in departmentally controlled classrooms. Additionally, centrally scheduling classrooms makes it easier for academic departments to share needed classrooms, produces more accurate information for managing space, and provides a central contact point.

To further improve classroom scheduling, the universities should consider more fully automating their scheduling functions. Universities can use software programs to assign classes to available classrooms that match instructors' preferences. These programs allow universities to increase the efficiency of their scheduling processes by eliminating the need

to manually schedule classes each semester. ASU and NAU are considering whether they should fully automate their scheduling functions. UA, which already owns an automated scheduling program, is working to identify ways to more effectively use it.

**Universities Should Fully
Implement Best Practices
in Space Management
(See pages 27 through 30)**

In addition to increasing classroom utilization, the Arizona Board of Regents and the universities can further strengthen their space management practices, which ensure the efficient use of university facilities. First, NAU needs to improve its space inventory. In contrast to ASU and UA, NAU does not conduct regular reviews of all of its inventory data, and its inventory records do not reflect the departments assigned to use each room. Second, the Board of Regents and the universities should review and possibly revise the State's guidelines used to identify how much space each university needs for offices, research labs, and libraries. These guidelines, which establish, for example, that faculty should have 140 square feet of office space, may overestimate space shortages. Finally, each university should adopt additional space management techniques that help determine appropriate space allocations. Techniques available include comparing space allocations by college or department, conducting in-depth space audits of departments, and allocating space based on productivity factors, which help determine how well space is used.

(This Page Intentionally Left Blank)

Table of Contents

	<u>Page</u>
Introduction and Background.....	1
Finding I: Universities Need to Improve Classroom Utilization	7
Universities Do Not Meet Classroom Use Guidelines	7
The Board of Regents' Guidelines Need to Be Revised	9
Universities Should Improve Classroom Use	11
Recommendations.....	13
Finding II: Utilization of Technology-Enhanced Classrooms Can Be Improved	15
Instructional Technology Enhances Classrooms at Higher Cost.....	15
Instructional Technology Underused	16
Several Factors Contribute to Low Utilization Rates	17
Universities Need to Increase Use of Technology-Enhanced Classrooms.....	18
Recommendations.....	19

Table of Contents (cont'd)

	<u>Page</u>
Finding III: Improved Scheduling Processes Could Enhance Utilization of Classroom Space	21
Classroom Scheduling Process Differs at Each University	21
Scheduling More Classes through Central Offices Will Increase Classroom Use	22
Computerized Scheduling Improves Efficiency and Effectiveness.....	24
Recommendations.....	25
Finding IV: Universities Should Fully Implement Best Practices in Space Management	27
NAU Needs to Improve Its Room Inventory Data	27
Space Guidelines Should Be Reviewed	28
Universities Should Adopt Additional Space Management Practices	28
Recommendations.....	30

Table of Contents (concl'd)

	<u>Page</u>
Tables	
Table 1: Arizona's Public Universities Space Inventory Fall 1996.....	2
Table 2: Arizona's Public Universities Classroom Use Fall 1996.....	8
Table 3: Arizona's Public Universities Analysis of Classroom Space Needs Fall 1996.....	11

(This Page Intentionally Left Blank)

INTRODUCTION AND BACKGROUND

The Office of the Auditor General has conducted a performance audit of space utilization at Arizona's universities. This audit was conducted pursuant to a June 10, 1996, resolution of the Joint Legislative Audit Committee, and is the first in a series of four performance audits of the universities performed in response to the requirements of A.R.S. §41-2958.

Arizona's three universities operate under the governance of the Arizona Board of Regents. Arizona State University (ASU) in Tempe is the largest, with 42,463 students enrolled as of fall 1996. The University of Arizona (UA) in Tucson had 33,504 students during the same semester, and Northern Arizona University (NAU), in Flagstaff, had 19,605 students enrolled. State appropriations to the universities' main campuses for fiscal year 1997-1998 were over \$745.7 million. Of this amount, the Legislature appropriated \$314.6 million to ASU, \$305.7 million to UA, and \$125.4 million to NAU.

Arizona's Universities Support Large Campuses

Arizona's three universities maintain extensive physical facilities. Their campuses comprise over 23 million gross square feet of space with an estimated replacement value of over \$3.5 billion.¹ This includes classrooms and laboratories, offices for faculty and administrative staff, residence halls, athletic facilities, dining halls, and student recreation centers. Table 1 (see page 2), provides information on the total acreage, gross square footage, and total assignable space (excludes walls, hallways, restrooms, etc.) available at each university's main campus and ASU West.

In order to maintain, renovate, and expand their campuses, the universities annually develop five-year plans detailing proposed capital projects. The Capital Improvement Plans (CIP) contain information about new construction projects, building renovations, and infrastructure improvements, as well as cost estimates and funding sources for these projects. The universities' 1999-2003 CIPs include projects totaling more than \$745 million. The universities fund their plans through general fund appropriations, bond proceeds, grant monies, and donations. In 1996, the Legislature approved over \$245 million in new bonding authority for the university system, which will fund numerous capital projects. The university system last received bonding authority in 1988 and only a small portion of the authorized bonds remain unissued. Thus, many projects have remained on the five-year plans as ideas only.

¹ The universities determine estimated replacement values using construction cost guidelines developed for the Board of Regents by a private consultant.

Table 1

**Arizona's Public Universities ¹
Space Inventory
Fall 1996**

	ASU	ASU West	NAU	UA ²
Acreage	763	300	738	671
Gross square footage	8,032,935	600,870	4,193,786	8,294,482
Net assignable space ³				
Classrooms	352,813	54,581	161,827	267,919
Classroom laboratories	438,713	11,778	150,011	365,621
Research laboratories	484,045	12,794	76,901	673,324
Libraries	300,795	50,612	153,546	342,355
Offices	1,178,949	120,587	386,505	1,181,239
Residence halls	1,080,025	0	964,866	672,809
Other ⁴	<u>1,316,088</u>	<u>66,074</u>	<u>901,022</u>	<u>1,110,156</u>
Total assignable space	<u>5,151,428</u>	<u>316,426</u>	<u>2,794,678</u>	<u>4,613,423</u>

¹ Main campuses only.

² Does not include UA's College of Medicine.

³ Refers to all space that can be used for instruction and other purposes. It does not include space such as walls, hallways, and restrooms.

⁴ Includes athletic areas, health care facilities, lounges, recreation facilities, and other space that does not fit into any of the other categories.

Source: Arizona Board of Regents' 1997 Annual Space Inventory and Utilization Report and 1996 Building Inventory Report.

Universities' Space Subject to an External Review

In recent months, the issue of space management has come under greater scrutiny. In 1996, both the Joint Legislative Budget Committee (JLBC) and the Office of Management and

Budget (OMB) staffs expressed concerns with the universities' plans to spend monies generated by the Board of Regents' new bonding authority. Both offices requested additional information, including the current utilization of university facilities, in order to recommend approval of the plans.

In October 1996, the Arizona Board of Regents requested a private sector review of the universities' capital development process. The Committee for External Review of University Capital Assets (Committee) was subsequently formed. At the Board's request, the Committee toured each campus and reviewed several topics related to the universities' capital assets, including bonding and the universities' debt capacity, the capital development process, future enrollment growth projections, deferred maintenance, and the use of existing university space.

After three months of study, the Committee presented 28 recommendations to the Board of Regents. According to the Committee, implementing these recommendations will require the commitment of substantial Board and university resources. For example, the Committee recommended that the Board:

- Prioritize major capital projects on a system-wide level rather than by each campus;
- Spend more time reviewing proposed construction and renovation projects prior to granting project initiation approval;
- In conjunction with OMB and JLBC staff, review the current building renewal formula; and
- Hire an outside consulting firm to review deferred maintenance needs at each university.

In addition to these areas, the committee also expressed concerns with the use of existing university facilities. Specifically, the Committee focused on improving the utilization of classrooms, recommending a follow-up review in order to identify methods to increase classroom use.

Since receiving the Committee's report, the Board has taken steps to implement many of the Committee's recommendations. For example, the Board submitted a revised, more comprehensive plan for the use of bond monies, required additional information from the universities in their Capital Improvement Plans, and hired a consultant to review deferred maintenance needs. Regarding the utilization of space, the Board established a follow-up work group, including four members of the Committee, to review the Board's guidelines for the use of space and identify ways to increase classroom use.

Space Management Differs at Each University

Space management plays an important role at a university, helping to ensure that all capital assets are effectively and efficiently used. The substantial resources that have been invested in university facilities, and campus size and complexity, make space management a particularly important facet of university management. Each university currently manages the use and allocation of its capital assets differently.

- At ASU, the seven full-time equivalent staff in the Academic Facilities unit provide oversight for the university's space. The unit's responsibilities include scheduling classes into classrooms each semester and preparing classroom utilization reports, maintaining an inventory of all rooms on campus, and reviewing departments' requests for additional space.
- At NAU, one employee dedicates half her time to space management functions. Previously, NAU maintained a space management department with four full-time staff. However, the university reduced this function in 1993 in order to streamline its administrative structure. Currently, NAU's activities are limited to maintaining records regarding current space, and providing minimal assistance to departments requesting space. At NAU, academic departments schedule their classes into classrooms allocated specifically for their use.
- At UA, the 10-person Office of Space Management performs certain space management functions. This group maintains an inventory of current space and prepares utilization and space management reports. The unit also performs other duties, including the university's acquisition, sales, and leasing functions. In addition to this unit, the University also uses a Space Committee, comprised of faculty and administrators, which performs several functions, including assigning space to departments and assisting departments in better managing their existing space. Four staff within the Registrar's office schedule classes into classrooms at UA.

Scope and Methodology

This audit focuses on how the universities can better manage the existing space on their main campuses. Aspects of space management reviewed include the universities' efforts to monitor allocations of space to individual departments, classroom scheduling practices, and the extent to which classroom space is used. Further, the audit team reviewed in more depth how much the universities are using classrooms equipped with instructional technology.

ASU West and ASU East were not included in this audit due to time and resource constraints, which were compounded by the distinct differences in the use and

management of space at these facilities versus the main campuses. These campuses will be reviewed in other upcoming performance audits of the universities.

Several methods were used to address the issues in this audit, including:

- Interviewing faculty, staff, and administrators at all three universities and the Arizona Board of Regents regarding classroom scheduling and space management practices and the use of instructional technology in classrooms;
- Analyzing space utilization reports and figures that the Board of Regents and the universities provided and conducting an analysis of classrooms equipped with instructional technology;
- Conducting site visits to verify the presence and use of instructional technology equipment in selected classrooms, and to perform limited test work on inventory records;
- Attending 8 meetings of the Committee for External Review of University Assets and the follow-up Work Group on Space Utilization; and
- Interviewing officials from 12 other universities to document their classroom scheduling and space management practices.¹

This report presents findings and recommendations in four areas regarding the need for Arizona's universities to:

- Increase the utilization of existing classroom space and recommend revisions to the Board of Regents' current classroom utilization guidelines;
- Increase the utilization of classrooms equipped with instructional technology;
- Improve their classroom scheduling functions through increased centralization and automation; and
- Expand their current space management efforts by improving their space data, reviewing existing space guidelines, and implementing additional space management

¹ The following universities were contacted: University of California at Berkeley and Los Angeles, University of Florida at Gainesville, University of Wisconsin at Madison, University of Texas at Austin, Texas A & M University, University of Washington, California State University at Fresno, Bowling Green State University, Ohio University at Athens, George Mason University, and Old Dominion University. Selection criteria included size, Carnegie classification, land grant history, peer status, and Arizona universities' recommendations.

practices.

This audit was conducted in accordance with government auditing standards.

The Auditor General and staff express appreciation to the administration, staff, and faculty at ASU, NAU, UA, and the Arizona Board of Regents, and the Committee for External Review of Capital Assets for their cooperation and assistance throughout the audit.

FINDING I

UNIVERSITIES NEED TO IMPROVE CLASSROOM UTILIZATION

Arizona's universities should take steps to increase the use of their existing classroom space. On average, each university schedules classes in their classrooms less than 60 percent of the day, and classrooms are used significantly less during evening hours. Further, no university meets the State's guidelines for classroom use, but even if they did, these guidelines may not ensure classrooms are adequately used. By adopting stricter guidelines and increasing classroom use, the universities can serve more students, convert ineffective classrooms to other needed uses, or possibly avoid construction of classroom space.

Universities Do Not Meet Classroom Use Guidelines

Arizona's universities can improve their use of classroom space. Each university does not meet the Board of Regents' (Board) guidelines for the number of classes that should be scheduled in rooms and the percentage of seats that should be occupied within these classes. Additionally, the universities significantly underutilize classrooms at certain times during the day.

Classroom utilization low—Although ASU's, NAU's, and UA's utilization rates differ, all fail to meet the Board's guidelines in at least one aspect. Classroom use is generally measured by the average number of hours classes are scheduled per week and the average number of seats occupied during these classes. In 1993, the Arizona Board of Regents adopted guidelines for classroom use based on those developed by the Council for Educational Facilities Planners, International, an organization representing elementary, secondary, and postsecondary educational facility planners. The Board's guidelines state that classes should be scheduled in classrooms at least 30 of the 50 hours available per week between 7:00 a.m. and 5:00 p.m. Monday through Friday, or 60 percent of the hours available. Additionally, a minimum of 60 percent of the seats should be filled within these classes, resulting in 36 percent of seats filled weekly. As can be seen in Table 2 (see page 8), no university meets the first standard, and NAU also fails to meet the second.

The classroom use represented in Table 2 represents average use for all classrooms; the universities use some classrooms considerably more than 30 hours per week, and use others only a few hours per week. UA annually publishes utilization information for each classroom on campus. While certain rooms at UA are heavily used, the University

schedules fewer than 10 hours of instruction in 18 classrooms. Only 2 classes, for a total of 6 hours per week, were offered in one 30-seat classroom in UA's Education building during the fall 1996 semester. Additionally, only one class, for 3 hours per week, was offered in a 75-seat classroom in the Nursing building.

Table 2

**Arizona's Public Universities
Classroom Use
Fall 1996**

	Hours Per Week Between 7 a.m. and 5 p.m.	Percentage of Seats Filled
Arizona Board of Regents' guidelines	30	60%
UA	25	64
NAU	26	51
ASU	28	62

Source: The Arizona Board of Regents' 1997 Annual Space Inventory and Utilization Report.

Classroom use varies by hour—The universities use their classrooms significantly less in the early mornings, late afternoons, and on Friday afternoons. For example, in the fall 1996 semester, ASU scheduled classes in fewer than 30 percent of its rooms between 7:00 and 8:00 a.m. on Monday, Wednesday, and Friday. Similarly, NAU scheduled classes in fewer than 40 percent of its classrooms before 10:00 a.m. on Tuesday and Thursday. In contrast, during the peak hours of 9:00 a.m. to 3:00 p.m., these universities often use more than 80 percent of their classrooms.

Classroom use further diminishes after 5:00 p.m. and on the weekends, time periods which are not included in the classroom use guidelines. ASU, NAU, and UA use, on average, 20 percent, 12 percent, and 16 percent of their classrooms between 5:00 p.m. and 10:00 p.m. Monday through Friday, respectively. Further, each university uses between 2 and 6 percent of its classrooms on Saturday between 8:00 a.m. and 12:00 p.m.

To increase use at off-peak times, universities can implement policies designed to distribute their classes more evenly throughout the day. UA prohibits its departments from

scheduling more than 7 percent of their classes in any time slot. Additionally, the College of Social and Behavioral Sciences at NAU restricts departments from offering more than 35 percent of their classes between 9:00 a.m. and 1:30 p.m. Other universities have similar rules. For example, the University of California at Berkeley restricts departments to scheduling only 70 percent of their classes between 9:00 a.m. and 3:00 p.m. The University of Texas at Austin allows departments to use only a certain number of classrooms each hour based on how many classes the department offers compared to the total number of classes offered by the university. Ohio University at Athens requires departments to schedule 15 percent of their regular undergraduate classes at either 8:00 a.m. or 12:00 p.m. Another 15 percent must be scheduled at or after 3:00 p.m., and 15 percent must meet on Friday.

Additional classroom use not documented—The universities’ current utilization figures may not reflect the total classroom usage at each university. In addition to regularly scheduled for-credit classes, each university uses classrooms for other events, such as study and review sessions, faculty meetings, and student meetings. According to the universities, these events are important aspects of learning and should not be curtailed by increased use of classrooms for regular classes. However, the extent classrooms are used for these activities is not known because the universities do not regularly collect and report utilization data for these events. The only information available regarding the use of classrooms for other events is a 1990 ASU study which concluded that special events used approximately 4 percent of available classroom time, or three hours per week in each classroom.

The Board of Regents’ Guidelines Need to Be Revised

Arizona’s guidelines, while similar to other states, fail to encourage sufficient use of classroom space. Further, because the guidelines define rooms as “fully utilized” at a relatively low usage level, they may lead the universities to overestimate classroom space shortages.

The Board’s guidelines should be strengthened—While the majority of states with guidelines require levels of classroom use similar to Arizona’s, a few states have adopted stricter standards and/or include evening usage. Since 1970, California recommended universities use their classrooms 75 percent of the time, including both day and evening hours. However, in 1990, California determined that while this use was too low for day use, it was not reasonable to expect this level of use in the evening and recommended revising the guidelines. The University of California system now recommends using classrooms at different rates depending on the time of day. Thus, between 8:00 a.m. and 12:00 p.m., classrooms should be used 80 percent of the time. The rest of the day, from 12:00 p.m. to 5:00 p.m., classrooms should be in use 64 percent of the time. Finally, during the evening, classrooms should be used 40 percent of the available time.

Also using higher standards, Utah recommends that its universities schedule classes 75

percent of the time out of a possible 45 hours, but allows the universities to determine which 45 hours out of the week to schedule. Virginia and Texas also include evening usage in their guidelines. Further, California, Utah, and Texas also recommend filling more seats than Arizona, between 66 and 71.4 percent, compared to the 60 percent Arizona recommends.

However, if evening use were added to actual day use for Arizona's universities, NAU and UA still do not meet the Board's standard, much less those of Texas, Utah, California, and Virginia. When evening hours are included, ASU, NAU, and UA used their classrooms 33, 29, and 29 hours a week, respectively. In contrast, in Virginia, where a higher standard is in effect, several universities use their classrooms more often. In fall 1996, 8 of Virginia's universities used their classrooms more than 33 hours per week (the highest use in Arizona). In fact, Virginia's George Mason University used its classrooms 44 hours per week.

Several people in Arizona also believe the current guidelines warrant revision. During a September 1996 Board of Regents meeting, some regents expressed concern with the guidelines. One regent stated that the 60 percent classroom use standard was too low and that the universities should consider increasing it to 80 percent. Another regent also felt the current guidelines were outdated and new ones should be developed that encompassed day, evening, and weekend use. It was during this meeting that the regents decided to seek a private sector review of space issues at the universities. The resulting Committee for External Review of University Capital Assets (Committee), after three months of study, concluded that classroom use can and must be improved at all three institutions. The Committee felt that the Board's guidelines appear to be an average of utilization rates nationally and not a goal the universities should be striving to attain.

Guidelines impact need for classroom space—The Board's guidelines may result in the universities overestimating their need for additional classroom space. Classroom utilization guidelines, in addition to setting standards for the use of space, are used in a formula to determine the amount of classroom space needed at each campus. Arizona's classroom usage guidelines, when calculated together with a standard student station size, show that one square foot of space is needed for each weekly student contact hour. In other words, for every student credit hour occurring at one of the campuses, one square foot of classroom space should be available. Based on these guidelines, each university reports a shortage of classroom space on its main campus.

However, if stricter guidelines were used in the formula, the universities could reduce or eliminate the reported shortage of classroom space. For instance, if a guideline requiring using classrooms five more hours per week and filling 5 percent more seats but allowing one more square foot per student was applied to all classroom space, the universities would greatly reduce the space shortage. As shown in Table 3 (see page 11), if the Board adopts these stricter guidelines, ASU and NAU would have more than enough classroom space, and UA's shortage would be almost eliminated.

Table 3

Arizona's Public Universities ¹
 Analysis of Classroom Space Needs
 Fall 1996

	ASU	NAU	UA ²
Based on current Arizona guidelines			
Existing classroom space	352,813	161,827	267,919
Estimated space needs	<u>378,638</u>	<u>166,274</u>	<u>324,091</u>
Surplus/Shortage of space	<u>(25,825)</u>	<u>(4,447)</u>	<u>(56,172)</u>
Based on use of stricter guidelines			
Existing classroom space	352,813	161,827	267,919
Estimated space needs	<u>318,056</u>	<u>139,670</u>	<u>272,236</u>
Surplus/Shortage of space	<u>34,757</u>	<u>22,157</u>	<u>(4,317)</u>

¹ Main campus only.

² Does not include UA's College of Medicine.

Source: Auditor General staff analysis of Arizona Board of Regents' 1997 Annual Space Inventory and Utilization Report.

Universities Should Improve Classroom Use

As their statistics show, Arizona's universities can more effectively use their existing classroom space. Increased classroom use will allow the universities to serve more students, reduce space shortages in other areas, or even prevent or delay the construction of new classroom space. The universities are currently reviewing their guidelines and discussing ways to increase classroom use. However, the Board of Regents should hold the universities more accountable for increasing classroom use, including requiring them to either meet use standards or justify lower use before new classroom construction is approved.

Improved classroom use will lead to additional benefits—All three universities can derive several benefits from increased use of their classroom space. By increasing classroom use, the universities could serve more students or possibly convert ineffective classrooms into other types of space. With expected future enrollment increases, it is possible that more students could be accommodated on the main campuses. However, in the immediate future, reducing the number of classrooms may provide other benefits. Both ASU and UA

plan to renovate older classrooms into other types of space when new classrooms are opened in planned buildings, but this will not decrease the total number of classrooms available. Some existing classrooms, possibly those unable to accommodate new instructional technologies, could be renovated for alternate uses. Further, the universities may be able to prevent or delay construction of new classroom space through increased use of existing classrooms.

The Board should ensure classroom use increases—Recognizing these benefits, and in response to the External Review Committee’s recommendations, the Board of Regents formed a follow-up group charged with developing new space standards. The resulting Work Group on Space Utilization, comprised of four members of the original committee and space management officials from each university, is also discussing ways to increase classroom use. The Work Group is developing new classroom use guidelines for the fall semester of 1999 and then stricter guidelines for fall 2000. For instance, regular classrooms should be used 32 hours per week by 1999 and 35 hours per week by 2000. The Work Group will present its recommendations to the Board of Regents in October.

Once the Work Group presents its report, the Board of Regents should take steps to ensure the universities increase classroom use. Currently, the Board does not hold the universities accountable for meeting the existing classroom utilization guidelines. The Board should strongly consider adopting the Work Group’s recommendations for new classroom utilization guidelines, and require that the universities increase classroom use to meet these guidelines.

The Board could also require the guidelines to be met before authorizing new classroom construction. Virginia requires universities to meet its standards for classroom use prior to authorizing construction of new classroom space. In its 1997 *Guidelines for Higher Education Fixed Assets*, Virginia’s State Council for Higher Education states that “institutions still must use their classrooms or class laboratories in excess of the Council’s utilization guidelines for average hours of weekly use in order to justify the need for additional instructional space to the Council.”

Recommendations

1. Arizona's universities, in conjunction with the Work Group on Space Utilization, should continue their work developing new classroom utilization standards. The universities should also consider expanding the guidelines to include evening usage.
2. The Arizona Board of Regents should consider adopting new standards that the Work Group recommends.
3. Arizona's universities should increase the use of their classroom space in order to meet the current guidelines and any new guidelines adopted by the Arizona Board of Regents.
4. Arizona State University and Northern Arizona University should consider developing university-wide policies to distribute class times more evenly throughout the day.
5. The Arizona Board of Regents should hold the universities accountable for meeting the classroom use guidelines. Further, the Board should consider how the universities are utilizing space when reviewing their requests for classroom construction.
6. To better document all uses of classroom space, Arizona's universities should track and quantify classroom use for all events other than scheduled classes.

(This Page Intentionally Left Blank)

FINDING II

UTILIZATION OF TECHNOLOGY-ENHANCED CLASSROOMS CAN BE IMPROVED

As Arizona's universities take steps to increase classroom use, they should focus more on some of the most expensive rooms, those equipped with instructional technology. Computers, laser disc players, and in-class Internet access installed into classrooms can augment traditional instruction techniques. Each university maintains several classrooms equipped with this technology, but these rooms sit empty for much of the day. Several factors may contribute to underutilization, including inefficient classroom scheduling practices, limited uses for certain equipment, and equipment security problems. In addition to using their existing classrooms more often, the universities need to determine instructional technology's effectiveness and appropriateness.

Instructional Technology Enhances Classrooms at Higher Cost

Classroom instructional technology enables instructors to present class materials to students in a variety of ways. Computers, laser disc players, projectors that make the instructor's computer screen visible to the entire class, and access to the Internet in the classroom are all examples of classroom instructional technology. For instance, auditors watched an introductory science course in which a computer program was used to inform students how many earthquakes had occurred in any given country in the last year. Also, in addition to a traditional lecture in an astronomy class, the instructor showed a short movie from a laser disc depicting the process of a supernova and an image taken from the Internet that depicted an exploding star.

However, classrooms equipped with instructional technology cost more than traditional classrooms. These classrooms may require special seating arrangements, raised flooring to accommodate computer wiring, and additional maintenance costs. According to the Board of Regents Construction Cost Control Guidelines, constructing these types of classrooms can cost nearly twice as much per square foot as traditional classrooms and lecture halls. Further, it can cost up to \$20,000 to equip an instructional technology lecture hall with an instructor computer and a projector.

In addition to the 70 existing classrooms and labs that contain at least a computer for the instructor, each university plans to add more instructional technology equipment. For example, all 33 classrooms in ASU's planned \$35.5 million Mediated Classroom Building

will be equipped with instructional technology costing \$3.3 million. In addition, UA's planned \$20 million Integrated Instructional Facility building also will include classrooms enhanced with instructional technology.

Instructional Technology Underused

Although instructional technology classrooms and laboratories are costly, universities currently underutilize existing space. On average, classes are offered less than 50 percent of the day in instructional technology classrooms and laboratories. This use falls below the State's standard for all classrooms.

Technology-equipped classrooms underutilized—Each university underutilizes classrooms equipped with instructional technology. For the purposes of this audit, classrooms and instructional labs reviewed were those rooms that contained a minimum of a computer for the instructor to use. In addition to computers, many of these rooms also have projectors for displaying computer information onto a screen, or Internet access. To determine how many rooms with these resources exist, UA asked departments to report their instructional technology resources. Auditors contacted each college at NAU for the same information. Only ASU could readily provide a list of such rooms. According to these reports and ASU's supplied list, Arizona universities maintain 70 instructional technology classrooms and laboratories. However, this figure underestimates the number of rooms equipped with some form of technology because many classrooms and labs contain sophisticated projectors or other equipment, but not a computer. Instead, instructors may bring in laptops or multi-media carts to use for their classes.

The universities may be scheduling an insufficient number of classes in their classrooms equipped with at least an instructor computer. The universities report scheduling these 70 rooms, on average, only 45 percent of the time during the fall 1996 semester. Thus, these rooms were not used for instruction for over 27 hours each week between 7:00 a.m. and 5:00 p.m. This low use occurred despite numerous faculty and administrators reporting that they did not have enough of this type of space.

Classroom and lab use below state standard—The universities also failed to meet the Board's utilization guidelines for their technology-enhanced classrooms and laboratories. Of the 70 rooms identified, 45 are classified as classrooms, and 25 rooms at NAU and UA as computer labs. UA schedules its rooms an average of 27 hours a week, while NAU schedules its rooms an average of 22 hours a week. Only ASU meets the guidelines, scheduling its classrooms 30 hours per week. While Finding I (see pages 7 through 13) recommends implementing a higher utilization standard, due to the expense of equipping these classrooms, they should be used more often than traditional classrooms.

The universities also maintain several computer laboratories that are used for class instruction. The Board recommends that class labs be used less often than classrooms since

a certain amount of unscheduled time is necessary for students to complete lab assignments. Class labs that are typically used by disciplines such as business or the social and physical sciences should be scheduled 22.5 hours per week. Neither NAU nor UA currently meet this standard; their computer class labs are scheduled 20 hours and 11 hours, respectively. In addition, NAU does not currently meet the standard for class labs that are typically used by disciplines requiring more lab time, such as engineering and agriculture. The standard for these class labs is 11.25 hours per week. UA scheduled these rooms equipped with computers 14 hours per week; however, NAU scheduled their computer class labs only 4 hours per week.

Several Factors Contribute to Low Utilization Rates

Several factors may contribute to the universities' underutilization of technology-enhanced classrooms. Some of the equipment takes considerable time to set up for class. However, other problems that are more within the universities' control, such as how these rooms are scheduled, may also contribute to lower utilization rates.

- One inherent characteristic of the technology may result in low usage. Since setting up the equipment for each class may take instructors longer than the allotted 10 to 15 minutes between each class session, classes are often not scheduled back-to-back in technology-enhanced classrooms and laboratories. Instructors need time to download information from the Internet, set up laser disc players and projection screens, and organize their materials before class.

In addition, other factors may be more within the universities' control.

- **Classrooms scheduled inefficiently**—University departments may inadequately schedule classrooms equipped with instructional technology. At both NAU and UA, individual departments have primary control over classrooms equipped with instructional technology. These individual departments determine how many courses will be scheduled in their classrooms, which often results in much lower utilization rates. However, ASU centrally schedules most of its instructional technology space. As discussed in Finding III (see pages 21 through 25), classrooms and laboratories controlled by departments are more difficult to monitor and have lower utilization rates. Departments may schedule fewer classes in these enhanced classrooms because they consider only their own department's requests for space.
- **Some faculty resistant to technology**—Some faculty members interviewed during the audit expressed resistance to incorporating technology into their lectures. These faculty members felt that using laser discs and computers in the classroom would not

affect student learning. In addition, some faculty indicated that preparing their curricula for instructional technology lectures takes considerable time. Further, while each university provides training on this equipment, this training may require considerable time.

- **Staff needed to oversee instructional technology**—Instructional technology, which can be easily damaged, often requires staff to operate and maintain the equipment and ensure that it is kept safe. Staff may not be available to support additional classes.

Universities Need to Increase Use of Technology-Enhanced Classrooms

Arizona's universities need to take steps to ensure technology-equipped classrooms are more extensively used. To ensure these rooms are adequately used, the universities need to first identify the instructional technology that is currently available in their classrooms. In addition, the universities should determine the effectiveness of this technology and how much more is needed before they invest in additional technology-equipped classrooms.

Universities need to better track classrooms equipped with instructional technology—In order to increase the use of these classrooms, the universities first must be able to identify classrooms equipped with instructional technology. Without this information, it is difficult to effectively manage or monitor this space. During the audit UA and NAU did not maintain complete information on the instructional technology in their classrooms; specifically, they could not identify which rooms were equipped with at least an instructor computer. ASU, however, tracks this information. Due to its knowledge of which classrooms include technology, ASU can monitor their use and take steps to increase the use of certain classrooms. For example, in one classroom, the computers equipped with an unpopular operating system are being replaced by computers requested more often. The less-used computers will be consolidated with other computers and placed in another classroom.

However, several recent initiatives should provide more information on the extent and use of these resources. First, NAU, after the spring 1997 semester, identified the technology available in each classroom on its campus. Further, as part of its review of classroom use, the Work Group on Space Utilization is looking at how the universities define and track instructional technology resources. Currently, the universities report one utilization rate for all classrooms to the Board of Regents. However, the Work Group is considering whether the universities should separately identify and report utilization for different types of classrooms, such as traditional classrooms and computer classrooms.

Additional study needed—In addition to increasing the use of existing enhanced classrooms, the universities need to determine what additional technology resources are needed and for what purposes. ASU has recently hired a consultant to determine both the type and amount of classrooms the ASU campus will need in the future, including those

equipped with instructional technology. In addition, if the universities begin determining utilization of classrooms by type, including those equipped with instructional technology, they will be able to determine if their current mix of classroom space is appropriate.

Further study is also needed to determine the effectiveness of instructional technology on learning. Some experts argue that there is little research to demonstrate whether or not instructional technology is actually an effective tool. In addition, the issue of technological flexibility is also a critical component. Technology is constantly changing and evolving. Experts argue that universities need to have the ability to reconfigure classrooms as new technologies develop; they should not become restricted to one type of technology. UA has recently applied for a federal grant to study the effectiveness of instructional technology in the classroom setting. The university plans to study this issue over the next five years and will evaluate the current use of technology in the classroom and determine its effectiveness for several different disciplines.

Recommendations

1. Arizona universities need to better identify and track the amount of instructional technology currently available on their campuses.
2. Once identified, the universities need to ensure that these rooms are more highly utilized.
3. Arizona universities should continue to evaluate the effectiveness and appropriateness of instructional technology.

(This Page Intentionally Left Blank)

FINDING III

IMPROVED SCHEDULING PROCESSES COULD ENHANCE UTILIZATION OF CLASSROOM SPACE

The universities should schedule more classes through central offices and expand their use of computer scheduling programs. Currently each university schedules classrooms differently. However, all three could increase classroom use, make it easier for academic departments to share needed classrooms, provide better information to university management, and facilitate the scheduling of special events by shifting more classroom scheduling responsibilities from departments to central offices. Additionally, the universities could further enhance their scheduling processes by expanding the use of computer programs to develop classroom schedules.

Classroom Scheduling Process Differs at Each University

The universities' approaches to scheduling classes and events into classrooms vary.

- At NAU, central administration does not schedule any of its 191 classrooms. Rather, individual colleges set the schedules for the classrooms in their buildings. Faculty opposed two initiatives in the past 6 years to centralize NAU's classroom scheduling function. However, NAU recently purchased schedule 25, a classroom scheduling software program, which will lead to centralized and computerized classroom scheduling in the future.
- At UA, the Registrar's office officially schedules classes and special events into 206 of their 324 classrooms using Schedule 25. The remaining 118 classrooms are scheduled by departments, colleges, or other units.
- At ASU, the Academic Facilities office manually schedules classes and special events in almost all of the campus' 327 classrooms with limited assistance from a computer program. However, 42 classrooms are completely or partially controlled by other units, most notably the Law School and Master of Business Administration program.

Additionally, all three universities allow academic departments and colleges to control instructional laboratories and to determine which classes will be offered and at what time.

Scheduling More Classes through Central Offices Will Improve Classroom Use

Arizona's universities should more fully centralize their classroom scheduling functions. Centralized scheduling offers many advantages, including increased classroom use. At the same time, potential problems can be avoided through careful implementation and stricter oversight of rooms remaining under department and college control.

Centralized scheduling offers numerous advantages—Authorizing central administrative offices to schedule classes and events into classrooms offers numerous benefits. A central scheduling function produces higher classroom utilization rates, makes it easier for multiple academic departments to share needed classrooms, produces better information for managing space, and provides a central point of contact.

- **Better utilization**—Classrooms controlled by central offices tend to be used more often than those controlled by departments and colleges. During the fall of 1996, classes were scheduled in classrooms controlled by UA's Registrar's Office an average of 29 hours per week. In contrast, academic departments and colleges scheduled classes an average of only 18 hours per week in their classrooms. Similarly, ASU reports that for the same period, classrooms controlled by Academic Facilities were scheduled for an average of 29 hours of classes per week, while locally controlled rooms were only scheduled for 21 hours of classes per week.
- **Effective sharing**—Although the universities encourage departments and colleges to share use of the rooms that they control, some classrooms remain underutilized. For example, ASU's Law School controls a large room, the Great Hall, which seats 400 people. During the fall 1996 semester, classes were scheduled only 2 hours per week in this room. At the same time, Academic Facilities was unable to fill approximately 25 requests for large lecture halls. Consequently, the requesting departments were forced to change their class offerings to match available rooms.

Additionally, some colleges and departments circumvent the policies that encourage them to share rooms with other units. The auditors identified several departments at UA that effectively control classrooms, contrary to university policy. For example, the Civil Engineering and Finance departments wrote letters to the Registrar's office requesting that the Registrar's office not schedule any other departments' events or classes into certain classrooms because they wanted to schedule their own special events into those rooms. The Registrar's office complied with the requests, allowing the

departments to effectively control these rooms. In one such room, the department scheduled only nine hours of classes per week during the fall 1996 semester.

- **More accurate information for managing space**—Departmental control of classrooms may also contribute to inaccurate information on classroom use. For example, auditors identified several cases where UA’s Registrar’s office records regarding use of departmentally controlled classrooms differed from the records the departments maintained. For example, the Civil Engineering Department’s records showed a class as having been held on a different day than the Registrar’s records showed.
- **Improved scheduling of special events**—Finally, a central classroom scheduling office provides a single point of contact. University staff, faculty, and students would only have to telephone one office to request a classroom for meetings or special events. In contrast, finding an available classroom under a decentralized system could involve calling dozens of offices, which may control only a few classrooms each.

Careful implementation of centralization can avoid problems—Although centralizing the classroom scheduling function provides many benefits, it should be carefully implemented to avoid potential problems. First, some faculty and staff have voiced concerns that they would be assigned to teach in inappropriate classrooms. However, a central scheduling office can use a computer program that is specifically designed to match faculty needs to appropriate classrooms, as discussed later in this finding. Second, certain classrooms may be more appropriately controlled by departments or colleges. For instance, some rooms equipped with specialized equipment can only be used by certain disciplines. Therefore, the universities will need to develop a formal process to consider department and college requests for exceptions to centralization. However, departments or colleges that retain control of rooms should be required to regularly justify this arrangement.

Other universities successfully schedule classrooms through a central office—Other universities have increased utilization rates and reaped other benefits by centralizing classroom scheduling. For example, Old Dominion University reported that it has “dramatically improved” its classroom utilization rates by moving to centralized scheduling using a computer scheduling program. Similarly, the Ohio University at Athens has found that centrally scheduled classrooms are used more than locally controlled rooms. Eleven of the 12 universities contacted for this audit control most of their classrooms through centralized offices.

Computerized Scheduling Improves Efficiency and Effectiveness

In addition to scheduling more classes through central offices, the universities can improve operations by further automating the classroom scheduling process. The universities are already studying some aspects of automation. However, each could realize additional benefits, such as increased efficiency, by adopting or improving its use of computerized classroom scheduling programs.

Universities considering additional automation—Although the universities currently use a variety of approaches, they are considering the extent to which they should use computer programs to develop classroom schedules. ASU is considering whether they should fully automate their scheduling functions, and NAU recently purchased a computerized scheduling program. Similarly, the Committee for External Review of University Assets recommended that the universities centralize their scheduling function and fully adopt a computerized scheduling program.

While UA already uses Schedule 25, a computerized scheduling program, its staff are working to identify ways to more effectively use the program. They have found that many problems may be related to how UA uses its automated scheduling program, rather than problems with the program itself. For example, the program is used to place only a minority of classroom requests. The majority of requests are still manually scheduled in response to department pressure and other factors. Further, UA may not be using all of Schedule 25's features. The Registrar's office is considering purchasing an auxiliary computer program that will work with the existing system to further improve this process.

Using computer programs to schedule classrooms offers advantages—Using a computer program to schedule classes into classrooms provides several benefits over manual methods. Experts generally praise computerized scheduling for its efficiency. The leading computer programs, for example, can generate an entire university's classroom schedule in minutes once they have been fully programmed and room requests have been entered. Additionally, computer programs help universities to quickly find new locations for existing classes if a classroom must be unexpectedly closed. Further, computer programs may produce more efficient schedules, resulting in higher classroom utilization rates. Finally, using scheduling programs forces university administrators to carefully consider their space policies. Computer software should be programmed to consider priorities and other factors when scheduling competing needs. Therefore, administrators must consciously consider and articulate their space policies and priorities when setting up these programs.

Recommendations

1. The universities should, as a general practice, centrally schedule classrooms.
2. The universities should develop formal processes to consider department or college requests to exempt specific rooms from central control. Departments and colleges should be required to regularly justify all classroom space that remains under their control to ensure that it continues to be used in the universities' best interests.
3. The University of Arizona should continue to study ways to improve its automated scheduling process. For example, the University should consider whether it can reduce the number of manually scheduled classes and special events.
4. Arizona State University should consider fully automating their classroom scheduling processes. Northern Arizona University should monitor the implementation of their automated scheduling software to avoid the problems experienced by the University of Arizona.

(This Page Intentionally Left Blank)

FINDING IV

UNIVERSITIES SHOULD FULLY IMPLEMENT BEST PRACTICES IN SPACE MANAGEMENT

Arizona's universities should strengthen their space management practices to ensure the efficient use of existing university facilities. First, NAU needs to take steps to ensure that its space inventory records are complete and accurate. Second, the Board of Regents and the universities should review and possibly revise the guidelines currently used to calculate how much space each university needs. Finally, the universities can implement comprehensive space management practices recommended by experts and other universities.

NAU Needs to Improve Its Room Inventory Data

As a part of space management, experts agree that space inventories provide universities with critical baseline information. According to some experts, "The key to properly analyzing the existing physical facilities of any institution of higher learning is the establishment of an inventory system containing the proper data . . ."¹ Further, for an inventory to be useful, it should contain a description of all facilities and their use, indicate which units are assigned to use each room, and be updated regularly.

Although all three universities maintain inventory databases, NAU does not conduct regular reviews of its inventory data, and the information in its inventory is less comprehensive than the other universities'. Both ASU and UA annually review inventory records by sending printouts to departments for them to review, and having staff and/or student workers visit rooms to verify their use and characteristics. NAU, however, had not updated its inventory in five years until instructional space was reviewed in 1997. Further, in contrast to ASU and UA's inventory, NAU's inventory records do not reflect which department is assigned to each room.

NAU has recently taken steps to improve its space inventory. First, the University used students to conduct a limited review in the summer of 1997. However, the University does not plan to complete this physical review regularly and only included instructional space. Second, NAU will ask departments to review inventory printouts beginning in the 1997-1998 academic year; however, this will also be limited to instructional space. To ensure the

¹ Bareither, Harlan D., and Jerry L. Schillinger. *University Space Planning*. Illinois: University of Illinois Press, 1968.

accuracy of their inventory, one NAU administrator suggested reviewing the inventory data while completing the University's annual maintenance needs review, which involves physically checking the University's buildings on a three-year rotation for maintenance problems.

Space Guidelines Should Be Reviewed

The universities can also improve their space management activities by reviewing and possibly revising the guidelines used to identify space needs. In addition to setting classroom utilization standards as described in Finding I (see pages 7 through 13), the Board of Regents' space guidelines help universities determine how much space they need for faculty and staff offices, research labs, and other space. For example, according to the guidelines, faculty should be provided 140 square feet of office space, and high-level administrators 180 square feet of office space. However, just as Finding I concluded that the classroom use guidelines overestimate classroom space needs, the remaining guidelines may overestimate universities' other space needs. Each university reports significant shortages in several areas, such as research labs and offices, based on these guidelines. Yet, during ASU's most recent accreditation review, the North Central Association of Colleges and Schools, a higher education accrediting body, commented on the generosity of Arizona's guidelines. Their report stated that "Few institutions meet these space standards, which are generally regarded as generous; and ASU's present space is sufficient and often comfortable for operating the University's programs."

The Board and universities, in conjunction with private sector volunteers, are currently reviewing the existing guidelines. During its review of space issues, the Committee for External Review of University Capital Assets (Committee) concluded that Arizona's guidelines need revision. Although the Committee focused on the classroom guidelines, it also noted that the universities report significant demand for office, laboratory, and research space, and thus, these guidelines also deserve attention. The follow-up committee, the Work Group on Space Utilization, plans to recommend changes to the guidelines by the fall of 1997.

Universities Should Adopt Additional Space Management Practices

The universities could also improve their efforts to monitor space utilization by expanding their current limited practices. Specifically, each university could adopt additional space management tools.

Universities provide ad-hoc space management—The universities' space management

practices are limited. NAU reduced its space management unit in 1993 from 4 FTE to .5 FTE and currently provides only minimal assistance to departments requesting space. As mentioned earlier, ASU and UA conduct an annual physical inspection of all space, but specifically review whether a particular department has too little or too much space only when a department requests additional space. This analysis is not currently completed on a campus-wide or regularly scheduled basis. Similarly, ASU and UA often rely on anecdotal complaints to identify departments that may be misusing space. As a result, the universities cannot ensure that current space allocations are equitable and that space is properly used.

The universities could adopt new practices—In order to strengthen their space management function, the universities should consider implementing more proactive space management practices. Experts, other universities, and Arizona’s universities provide additional suggestions for monitoring and improving space use on campus. For example:

- **Comparing space allocations by college or department**—While the universities use their guidelines and inventory to determine campus-wide space needs, this analysis can be regularly completed to compare space allocations by college or department. This can help space managers identify units with the most critical space shortages and surpluses. The space management unit at the University of Wisconsin at Madison annually compares space by department. ASU’s space management unit is currently creating a computer program to prepare this type of report.
- **Conducting in-depth space audits**—Space guidelines, however, offer only one way to analyze space allocations. Space managers at the University of Wisconsin annually conduct two to three in-depth audits of certain departments’ use of space each year. Departments are selected based on an annual comparison of space between departments or staff judgment. The University’s 1997 audit of its Agricultural and Applied Economics Department included analysis of the department’s existing space allocation compared to Wisconsin’s standards, whether the department’s student enrollment trends supported the current space allocation, and whether the department was appropriately using office and classroom space. The final report, prepared for the University’s top management, concluded that the department could relinquish two floors plus the basement of its building. Although UA currently conducts some space analyses, its reports consider fewer factors than Wisconsin’s audits and are only conducted on an ad-hoc basis.
- **Allocating space based on productivity factors**—Space managers can also use productivity factors to measure how well space is used, specifically classroom space. Finding II (see pages 15 through 19), addresses current classroom usage and efforts to increase utilization. However, universities can subject other types of space to productivity analysis.

The utilization of class laboratories can also be studied to help determine appropriate allocations. Financial productivity measures that focus on revenues generated or costs saved for a given space are appropriate for reviewing auxiliary spaces, such as residence halls or dining facilities, and also research space. Space used for research purposes directly attracts revenues in the form of grants and contracts. The Council for Higher Education for Virginia's 1997 space guidelines include standards for tying research space to dollars generated through research. The ASU College of Engineering uses research dollars generated as one criteria for assigning research space. Further, UA's science colleges also use a similar measure, looking at graduate students supervised, research dollars generated, and publications, when reviewing research space assignments. UA officials are in the process of developing additional productivity measures more applicable to other disciplines and other types of space.

Recommendations

1. Northern Arizona University should implement procedures to regularly verify all space in their inventory database.
2. The Arizona Board of Regents and the universities should continue their work reviewing and possibly altering their existing space guidelines.
3. The universities should take a more proactive approach to space management. As a part of this effort, they should consider implementing additional space management practices, such as:
 - Comparing space allocations for each college or department;
 - Conducting in-depth space audits of selected departments each year in rotation; and
 - Allocating space based on productivity factors.

Agency Response

(This Page Intentionally Left Blank)

Response to Auditor General's Report

The Arizona Board of Regents and Arizona's universities are pleased to present our response to the Auditor General's performance audit of space utilization at Arizona's universities. We appreciate the opportunity to respond to the study's findings.

In general, we concur with the findings and recommendations included in the report. In fact, several of the recommendations appear to be consistent with work group reports commissioned by the Regents. As requested, we have responded to each of the report's recommendations using the four statements from the cover letter that accompanied the report.

Finding I: Universities Need to Improve Classroom Utilization

Recommendation 1.

Arizona's universities, in conjunction with the Work Group on Space Utilization, should continue their work developing new classroom utilization standards. The universities should also consider expanding the guidelines to include evening usage.

Response:

The finding of the Auditor General is agreed to and the audit recommendation will be implemented.

Recommendation 2.

The Arizona Board of Regents should consider adopting new standards that the Work Group recommends.

Response:

The finding of the Auditor General is agreed to and the audit recommendation will be implemented.

Recommendation 3:

Arizona's universities should increase the use of their classroom space in order to meet the current guidelines and any new guidelines adopted by the Arizona Board of Regents.

Response:

The finding of the Auditor General is agreed to and the audit recommendation will be implemented.

Recommendation 4:

Arizona State University and Northern Arizona University should consider developing university-wide policies to distribute class times more evenly throughout the day.

Response:

The finding of the Auditor General is agreed to and the audit recommendation will be implemented.

Northern Arizona University is considering moving classes to various sites on the campus to reduce travel time and increase convenience for students. This would allow for distributing scheduled classes more evenly throughout the day.

Recommendation 5:

The Arizona Board of Regents should hold the universities accountable for meeting the classroom use guidelines. Further, the Board should consider how the universities are utilizing space when reviewing their requests for classroom construction.

Response:

The finding of the Auditor General is agreed to and the audit recommendation will be implemented.

Recommendation 6:

To better document all uses of classroom space, Arizona's universities should track and quantify classroom use for all events other than scheduled classes.

Response:

The finding of the Auditor General is agreed to and the audit recommendation will be implemented.

Finding II: Utilization of Technology-Enhanced Classrooms Can Be Improved

Recommendation 1:

Arizona universities need to better identify and track the amount of instructional technology currently available on their campuses.

Response:

The finding of the Auditor General is agreed to and the audit recommendation will be implemented.

Recommendation 2:

Once identified, the universities need to ensure that these rooms are more highly utilized.

Response:

The finding of the Auditor General is agreed to and the audit recommendation will be implemented.

Recommendation 3:

Arizona universities should continue to evaluate the effectiveness and appropriateness of instructional technology.

Response:

The finding of the Auditor General is agreed to and the audit recommendation will be implemented.

Finding III: Improved Scheduling Processes Could Enhance Utilization of Classroom Space

Recommendation 1:

The universities should, as a general practice, centrally schedule classrooms.

Response:

The finding of the Auditor General is agreed to and the audit recommendation will be implemented.

Arizona State University currently schedules more than ninety-five percent of its classrooms centrally.

Recommendation 2:

The universities should develop formal processes to consider department or college requests to exempt specific rooms from central control. Departments and colleges should be required to regularly justify all classroom space that remains under their control to ensure that it continues to be used in the universities' best interests.

Response:

The finding of the Auditor General is agreed to and the audit recommendation will be implemented.

Recommendation 3:

The University of Arizona should continue to study ways to improve its automated scheduling process. For example, the University should consider whether it can reduce the number of manually scheduled classes and special events.

Response:

The finding of the Auditor General is agreed to and the audit recommendation will be implemented.

Recommendation 4:

Arizona State University should consider fully automating their classroom scheduling processes. Northern Arizona University should monitor the implementation of their automated scheduling software to avoid the problems experienced by the University of Arizona.

Response:

The finding of the Auditor General is agreed to and the audit recommendation will be implemented.

Arizona State University plans to purchase software that will enable the university to fully automate classroom scheduling. The new software will be used to schedule classes for Fall, 1998.

Northern Arizona University agrees that the classroom scheduling process should be automated. Software for this purpose has been purchased, and it will be implemented as part of a new student information system. The approximate date for this implementation is Fall, 1999. The University will monitor implementation carefully in order to try to avoid problems experienced by the University of Arizona.

Finding IV: Universities Should Fully Implement Best Practices in Space Management

Recommendation 1:

Northern Arizona University should implement procedures to regularly verify all space in their inventory database.

Response:

The finding of the Auditor General is agreed to and the audit recommendation will be implemented.

Northern Arizona University has begun a process of systematic verification of all space in the inventory database. This work will be continued and updated on a regular, revolving schedule to ensure the integrity of the data contained in the database for reporting purposes and internal use.

Recommendation 2:

The Arizona Board of Regents and the universities should continue their work reviewing and possibly altering their existing space guidelines.

Response:

The finding of the Auditor General is agreed to and the audit recommendation will be implemented.

Recommendation 3:

The universities should take a more proactive approach to space management. As a part of this effort, they should consider implementing additional space management practices, such as:

- Comparing space allocations for each college or department;
- Conducting more in-depth space audits of selected departments each year in rotation; and
- Allocating space based on productivity factors.

Response:

The finding of the Auditor General is agreed to and the audit recommendation will be implemented.