THE JOHN E. ANDERSON GRADUATE
SCHOOL OF MANAGEMENT AT UCLA

Twelfth Annual UCLA Business School Survey: Computing Budgets and Services

Conducted in Cooperation with the American Assembly of Collegiate Schools of Business

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The authors wish to thank those individuals who took the time to gather the extensive data necessary to complete the questionnaire. Only with their efforts has this survey been made possible. Appreciation is also extended to the business school computing center directors from around the country who reviewed the draft questionnaire.

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Executive Summary

This Twelfth UCLA Survey of Business School Computer Usage addresses the financial and service aspects of the computerization effort. A sample of 240 business schools from 11 countries returned the questionnaire which requested demographic and hardware data, operating and capital budget information, and details on staff allocations for services. Overall, the individuals responding indicated a high degree of confidence (over 70%) in the budget numbers which they reported. This suggests that those reporting budget numbers know what they are spending or plan to spend. Even so, interpreting the data demands caution, given the diversity of the population combined with the self-selectivity of schools willing to share financial data. In light of these caveats, some of the highlights of the survey are presented here in the Executive Summary with supporting details in the body of the report.

To aid in understanding the data, the schools were separated into quartiles based on computer operating dollar per student. This approach allows a more in-depth understanding of the various computerization efforts schools are willing and/or able to undertake.

Business School Computing Budgets

The schools are striving to achieve a balance of physical infrastructure (hardware, networks, and facilities) and staff support (the professionals who enable others to gain greater value from the physical infrastructure). On average, for the 212 schools providing data, approximately $477,600 is spent in support of the computing effort (Table 3). Schools in the first quartile are spending substantially more on average ($1,153,000) while those in the fourth quartiles are spending considerably less on average ($99,600). These expenditure differences are reflected in both the nature and quantity of the hardware resources and also in the level of staff support. The first-quartile schools support a larger and more diverse staff than the other quartile schools, offer a broader scope of services provided by full-time professionals rather than part-time students, and have more equipment per user.

For the schools in the first three quartiles, the total computer budget is allocated roughly 40% to capital and 60% to operational expenditures. However, for the fourth quartile the situation is reversed, with approximately 70% allocated to capital and 30% to operational expenditures. These allocation patterns, combined with the capital budget allocations to computers, networks, and facilities, suggest that schools in the first three quartiles are further along the computerization process than schools in the fourth quartile. Essentially, the survey data suggest that capital requirements diminish as microcomputers become ubiquitous and the facilities have been remodeled and networked. These "one-time" charges are then replaced by the ongoing operating expenses which can become very significant. Specifically, for budget planning purposes, the data from the first three quartiles suggest that for every dollar allocated for capital purchases, one and one-half to two dollars per year should be allocated for ongoing operating expenses.

The survey data show that schools were still spending at about same rate for microcomputers as five years ago (Table 4), even though prices for these systems have fallen. Two factors probably explain this observation. First, the early adopters of the technology may now be upgrading and moving to the more powerful chip sets, spurring another entire round of purchases. Schools should anticipate this reoccurring every couple of years and begin a capital accumulation (reserve) to cover it. Second, more people want or need access to the technology, yet the "trickle-down" of microcomputers does not work in all cases as software incompatibilities make it difficult, if not impossible, to run new software on old computers. Hence additional new systems must be purchased. Surprisingly, the expected emphasis on capital investment in communication and networking systems did not appear. However, because the networks can be added incrementally, much of this cost may be being absorbed as operating expenses.

The operating budget data (Table 3) indicate that staff salaries and benefits consume the largest part of the budget, averaging nearly 60% for most schools. The big differences across the

schools is that first-quartile schools have larger, full-time professional staff rather than relying on part-time student employees. The benefits accrued can be subtle, yet profound. Providing full-time staff means that experience and learning curves can be maximized by people whose "real world" is in fact the business school environment. They are able to develop long-term relationships and become involved in projects which extend across semesters. Student employees, while generally very capable to contribute in the short term, tend to be less involved in systematic problem solving where so much of the benefit of computerization evolves. There is no history, no continuity, and no opportunity for expansion of a given set of ideas. For example, in building course support materials, a faculty member may want a database of corporate information. This type of project is ongoing, requiring updates and maintenance. Student assistant changes with each graduating class require the professor to expend considerable energy to fairly routine, but time-consuming tasks.

Business School Computing Services

The data in this year's survey indicated that schools are continuing to add staff (Figure 6) as the demand for services increases and as "end-user computing" becomes the standard. As individual users are required to deal with the complexity of microcomputer operations (not only having to interact with the operating system and the network, but also file management and backup/recovery problems), the need for local support staff has increased. This need is intensified as a greater number of people (faculty, student, and staff) within each school are expected to perform a wide variety of word-processing, database, and spreadsheet tasks. When mainframes were the only computing resource, the user community was self-selected and able to rely upon a technically-oriented central staff for most situations. Today, with everyone expected to use the computer systems irrespective of personal background, interest, or orientation, more direct and immediate support, both technical and user-oriented, is essential.

As a measure of staff resources, the Annual Surveys have reported a student-per - computing-staff ratio (Figure 6). In 1985 this average ratio was 418 students per staff (for a sample of only 92 schools), while in 1995 this ratio is 302 (for a sample of 171 schools). The average staff at a school in this year's sample is 7.3 FTE (Table 11). How are these staff deployed? Ninety-four percent of the schools indicated that they provide consulting to individual users, while 89% indicated they provide microcomputer trouble-shooting and maintenance support. These two services account for about 50% of the entire FTE allocations at the schools. Additionally, 88% of the business schools have computing staff to provide network support services and 75% have their own trainers, yet another component of the end-user computing environment. All the other services provided, with the exception of the video display, could easily be considered part of the more "traditional" central mainframe service orientation. Business school personnel supporting faculty display of computer output in the classroom , currently available at 58% of the schools, is a new type of service and a direct result of the growing use of computers throughout the curriculum.

Business School Microcomputers

The survey data show that the disparity between schools in terms of number of computers available for students (Figure 2) and faculty (Figure 3) has greatly improved over the past several years. For faculty, the differences across schools have essentially disappeared with the ratios now roughly one computer per faculty member. For students, first-quartile schools have been stable at about one computer for every 10 students for the past several years. Improvements have continued to occur at the fourth-quartile schools, moving from 48 to 37 students sharing a microcomputer in the past two years.

But what of the impact of student ownership and the use of laptop computers? About 25% of the undergraduate programs indicate that microcomputer ownership was recommended and only 1% required ownership (Figure 4). At the MBA level this was 37% and 4%, respectively. Fifty percent of the schools with Executive MBA (EMBA) programs recommend that their

students own a microcomputer, while 25% require ownership. These ownership recommendations and requirements reduce the need for the schools to provide extensive computer labs, and, in essence, shift a large portion of the capital microcomputer budget responsibility to the students.

Microcomputer operating systems are firmly Intel/Windows-based (Tables 5 and 6). As the newer software products which can only be run on more powerful chip sets enter the market, the older 8088 and 286 systems are being replaced by newer technology, dominantly 486, Pentium, and PowerPC-based systems.

Within the business school survey samples over the past 12 years, Apple systems gained market share from the Second through the Tenth surveys going from 5% to 16%. However, during these past two years, Apple has slipped back to 12% (Table 5). This may reflect the development of software compatibility across platforms and thus the loss of the unique advantage of the Macintosh line.

All of first-quartile schools have Windows-based systems, and 79% reported having Apple systems as well (Table 6). These multivendor environments are not as prevalent in the third- and fourth-quartile schools, with the extreme being the fourth quartile where 91% of the schools have Windows and only 45% have Apple systems. Furthermore, the fourth-quartile schools have the greatest proportion of Windows systems which suggests that they were able to initially purchase the newer systems and are not burdened by older, more obsolete inventory.

Open Issues and Concerns

The single most serious concern highlighted by this year's survey is the continuing resource gap between schools. The power of information and communication technologies needs to be used to fight "mental poverty" and to assure that large portions of our society are not disenfranchised. We need to guard against the creation of a cognitive elite, of an informationally mobile class which enjoys the benefits, both material and intellectual, of the 21st century while leaving a vast majority of society behind. We need to make these technological opportunities available to everyone everywhere, so that they can participate in the highly competitive digitally-based business environment of the next century.

A major issue is who is going to pay for all this. Today's political atmosphere of "pay as you go" may be in conflict with the goal for universal access. If as a society we elect to engage in only doing things which are commercially viable, we may create serious long-term problems with regard to not having a work force capable of using and maintaining the infrastructure and the quality of life with which we are accustomed.

In May 1995, the authors orchestrated a three-day American Assembly of Collegiate Schools of Business (AACSB) Strategic Planning for New Technology Workshop at Wake Forest University. School teams consisted of deans, faculty members, and computer staff. In summarizing what was heard as the deans and faculty discussed their goals and concerns, three words came to characterize the workshop: opportunity, optimism, and openness. The participants saw that the various technological options all provide enormous opportunities to enrich our schools and our learning environments. There was a general optimism that we could do more with the various resources at hand, and furthermore, through planning, better use of these resources would lead to new learning opportunities for our students. There was the general feeling that with a plan in hand, new resources would emerge through partnerships with industry. Finally, there was a sense that given the problem complexities, a spirited open exchange of ideas and sharing of expertise would benefit all our schools as we move toward the 21st century.

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1. Introduction

This report, the Twelfth Annual UCLA Survey of Business School Computer Usage, continues monitoring the changing nature of the business school computing environment. The purpose over the past 12 years has remained the same -- to provide deans and other policymakers with a high-level overview and generalized information that may assist them with computer allocation decisions and program plans[1]. The reader is cautioned that this survey reflects what the schools report they are doing and is not an endorsement of what they should be doing.

For the first nine years, the Annual UCLA Surveys reported on data from AACSB accredited business schools in the United States and major Canadian schools. In 1993, because of growing international interest in the North American data and requests for a global perspective, the population was expanded, in spite of confounding issues such as differences in culture and economics, educational structures and traditions, language barriers, funding sources, and governmental policies. Ninety-five schools located in 36 countries were invited to participate in the survey. In 1994, the population was expanded to include the entire AACSB membership, the 678 accredited and non-accredited schools, in addition to the set of international business schools previously identified. This 1995 survey continues with the world-wide population of 95 business schools as established in 1994 and all of the AACSB member schools.

From the findings reported in the 1993 Global Survey, the divergences seen in the international schools are very similar to those within the North American sample. Further, the survey questions regard specific quantifiable variables, with minimal subjectivity. Accordingly, the data are presented from a global perspective, with all of the responding schools treated as if drawn from a homogeneous sample. Regional factors and country of origin are ignored. Detailed information on individual schools is presented in the Appendix. Thus, those readers interested in a specific country, or in regional patterns, can compare the schools in question with the overall trends presented in this report[2].

The First, Second, Fourth, Sixth, Eighth, and Tenth Surveys focused on the hardware, software, and other computer resources of the schools, while the Third Survey gathered information on issues of concern to deans. The Fifth and Ninth Surveys considered business school computerization in terms of process, recognizing that the introduction and use of technology are ongoing and that schools may not only be approaching computerization differently, but also at different rates. The Eleventh (last year's survey) concerned learning technologies, specific applications of computer, communication, and information technologies (such as laptops, e-mail, teleconferencing, multimedia, distance learning, and virtual library) used in support of the educational process.

This Twelfth Survey, as the Seventh, focuses on the business schools' capital and operating budgets. Additionally, the computer-related services are broken into categories to provide an indication of resource allocations to distinct user groups.

Throughout this report, where appropriate and available, comparable data from the previous surveys are also included. It must be stressed, however, that these surveys do not comprise an exact longitudinal study. There is variation in the sample from year to year, as well as the major population expansion as described above. The comparisons among years and the subsequent implication of general trends are, therefore, confounded by the changing samples. Details of the annual sample demographics, together with a summary of the focus and population changes, are summarized in Table 1 in Section 2.

The separate sections of this report present descriptive interpretations of the data. In Section 2, Profile of Participating Schools, the sample demographics are described. Additionally, a summary of the major findings is presented from the perspective of a total profile as well as from

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[1] Copies of past *Annual UCLA Surveys of Business School Computer Usage* can be obtained for US$30 each from Computing Services, Anderson School at UCLA, Los Angeles, CA 90095-1481; fax 310-825-4835. Additional copies of the *Twelfth Survey* are US$50 each.

[2] Interested researchers can access the datasets set via anonymous FTP from agsm.ucla.edu in the directory /pub/surveys/survey1995.

a comparative perspective across quartiles. The third section, Budgets, breaks out the capital and operating budget by categories. The fourth section, Hardware Infrastructure, summarizes the microcomputer, laptop, mini/mainframe, and student ownership data. The fifth section, Services, presents details regarding the provision of computer services as well as the allocation of these services across the various user groups.

The Appendix presents individual school information such as the type of school, student full-time equivalent (FTE) enrollments, faculty FTE, the computer budgets, computer dollar per student, and student-to-staff ratios.

2. Profile of Participating Schools

This year's questionnaire was sent to the entire membership (705 schools) of the American Assembly of Collegiate Schools of Business (AACSB), and to 95 schools from 36 countries originally identified for inclusion in the 1993 UCLA Global Survey of Business School Computer Usage. The Appendix identifies the 240 (30%) business schools that responded.

The three-page survey questionnaire comprised four distinct sections: demographics, business school hardware, business school computer-related financials, and business school service provision. Approximately 65% of the schools identified their deans, associate deans, or directors of computing services as the person in charge of coordinating the survey responses .

2.1 Demographics

Table 1 uses percentages to compare the demographics of the 240 business schools in this year's sample with data from all of the previous surveys, except the First (only 30 schools sampled) and the Third (which addressed deans' issues only). In spite of the changes in the population, as well as the respondent sample differences, the percentage of public and private schools has stayed very stable across the survey years. The percentage of private schools is consistently between 29% to 33%. Recently, the public schools have shown more variation, with the addition of the "no data" category. The percentage of schools with only undergraduate programs has increased, most notably within the last two years with the inclusion of all the AACSB member schools. This year's sample shows the largest set of undergraduate-only schools to date, 14%. The corresponding decrease is in the number of business schools offering both undergraduate and graduate programs. The number of schools with graduate-only programs remains rather constant, around 10%.

The earlier surveys show a rather even spread of schools across the four size categories. However, in the 1992 and the 1993 surveys, there was a distinct increase in the percentage of schools with student enrollments between 1000 and 2000 together with a decrease in the percentage of schools with less than 1000 students. In the last two years, however, the trend has reversed with a major increase in the smaller schools. This year 43% of the schools have FTE enrollments of less than 1000 students, the largest percent seen in any of the size categories throughout the 12 years of the surveys. Correspondingly, the two largest size categories, those with over 2000 students, have the smallest percent representations to date.

The geographic region percentages not only show the point of expansion to the global sample, but also emphasize the continuing major representation of the North American business schools.

This year's survey, the Twelfth (1995), like the Seventh (1990), collected data regarding details of the financial resources being used to support the business school computer environment. Again, it is stressed that any longitudinal comparisons between these two sets of financial data must be made with a clear understanding of the changes in the samples contributing to the data. From Table 1 it can be seen that this year's sample is 65% larger than that of the Seventh and includes schools drawn from the expanded population of foreign and all AACSB members. Additionally, there are more schools with undergraduate only programs and fewer with both undergraduate and graduate programs. There are also more schools in the smallest size category, and fewer in the larger size categories.

Table 1
Demographics of Participating Schools
(percent of schools)

	Second 1985 N=125	Fourth 1987 N=128	Fifth 1988 N=175	Sixth 1989 N=163	Seventh 1990 N=145	Eighth 1991 N=166	Ninth 1992 N=178	Tenth 1993 N=180	Eleventh 1994 N=353	Twelfth 1995 N=240
Type of school: Public	69%	67%	68%	68%	70%	68%	71%	71%	66%	62%
Private	31	33	32	32	30	32	29	29	31	32
No data									3	6
Degrees offered:										
Undergraduate only	2	2	2	3	3	5	6	6	11	14
Undergraduate & graduate	86	85	88	89	86	86	86	81	74	77
Graduate only	12	13	10	7	9	7	6	10	9	8
No data				1	2	2	2	3	6	1
Student enrollment (FTE):										
Less than 1000 students	22	25	24	22	23	22	18	18	34	43
Between 1000 and 2000	22	27	21	26	28	29	33	34	26	28
Between 2000 and 3000	26	24	23	20	20	20	20	19	16	15
More than 3000 students	30	24	32	31	27	27	27	26	17	12
No data				1	2	2	2	3	6	2
Geographic region:										
US/Canada	100	100	100	100	100	100	100	83	92	227
Europe								7	4	6
Asia/Australia								6	2	2
Latin/South America								3	1	3
Africa/Mid-East								1	1	1
Focus:	What	What	Where	What	Budgets	What	Where	What	NewTech	Budgets
Population:										
AACSB accredited/Canadian	241	264	264	269	274	276	288	293		
International								95	95	95
AACSB membership									678	705

It is interesting to note, however, that one similarity between the Seventh and the Twelfth Surveys is the response decline from the previous year's survey. This may possibly be attributed to the sensitivity of the schools' financial data and the considerable effort required to gather the financial data by the requested categories.

2.2 Profile summaries by total and quartiles

This survey presents the data from two perspectives, first as a total aggregate for all of the schools responding to a particular question and then as quartile divisions. The quartile data give a more detailed representation of the data's distribution across the schools and were established based on the ratio of computer operating dollars per student. This ratio is calculated by dividing each school's total computer operating budget by its total student FTE. The computer operating budget is the sum of the dollar amounts each school entered for the eight computer operating budget categories. The student FTE is the sum of the undergraduate, MBA, and Ph.D. enrollments. The quartile breakouts were determined by a frequency distribution, with 53 schools in each quartile. This quartile breakout is used throughout this report, thus; school quartile membership of 53 remains constant throughout all of the tables and discussions. The number of schools in the total aggregate will vary, depending upon the schools providing data for the particular item under discussion.

Throughout this report, the tables in each section present the data as an aggregated total in the first column. Then, in the second through fifth columns, the corresponding data for the computer dollar per student quartile breakouts are presented. Utilizing this format, Table 2 provides a summary of the major findings in this survey, presenting the sample from the perspective of a total profile as well as a comparative perspective across quartiles.

In considering the data in Table 2 and all subsequent tables where the data are presented by quartiles, the reader should note that the first-quartile schools (based on the dollar-per-student definition) are demographically very different from the schools in the other three quartiles. Essentially all the MBA only programs, a substantial number of private schools, and the largest percentage of schools with FTEs less than 1000 students are in the first quartile. In contrast, schools the other three quartiles offer both undergraduate and graduate degrees and are dominantly public institutions. The largest percent of undergraduate-only programs are found in the fourth quartile.

By their nature, MBA programs are different from undergraduate programs. And further, with a greater expectation that their students learn to exploit leading-edge technology there is a higher resource burden placed on these schools. Thus, when interpreting the data, the reader should consider the focus niche and programmatic needs of the schools, and not just assume that all schools are simply spending all they can. Rather, they may be spending what they need or choose to. Most schools would like to provide more if the resources were available.

The first row in Table 2 shows a mean computer operating budget dollar per student of $237 for the 212 business schools providing the requisite data (computing operating budget and student enrollment). The quartile columns show, in contrast, that the business schools in the first quartile spend an average of $711 operating budget dollars per student, the second quartile $156, the third quartile $68, and the fourth quartile $15. On average, the 53 business schools in the first quartile are spending over 47 times the amount per student as the schools in the fourth quartile, about 11 times the amount per student as the schools in the third quartile, and about four-and-a-half times the amount per student as the schools in the second quartile. Although the range of operating dollars per student is very narrow for the fourth quartile, it becomes progressively wider for the third, second, and first quartiles.

The lower third of Table 2 summarizes the infrastructure that the schools are able to achieve with their differing mean computer operating budget dollars per student. For the 238 business schools providing data, there is an average of 221 microcomputers owned by the schools, being used by their students, faculty, and administrative and computer staff. In comparison, the business schools in the first-through-fourth quartiles provide an average of 358, 253, 182, and 134 microcomputers, respectively. The student microcomputer densities are also quite varied. For

Table 2
Business School Computer Financials, Demographics, and Infrastructure
by Total and Computer Dollar-per-Student Quartiles

	Total	Quartiles 1st N=53	2nd N=53	3rd N=53	4th N=53
Financials	**N=212**				
Computer dollar per student (mean)	237	711	156	68	15
(range)	(1-2649)	(241-2649)	(94-238)	(38-93)	(1-37)
Computer operating budget (mean)	297	754	284	122	27
Student FTE (mean)	1679	1329	1806	1836	1746
Demographics	**N=240**				
Type of school: percent public	62%	38%	77%	86%	69%
Degrees offered:					
Undergraduate only	14%	8%	8%	6%	30%
Undergraduate & graduate	77	64	92	92	70
Graduate only	8	28		2	
Student enrollment (FTE):					
Less than 1000 students	43%	59%	32%	26%	44%
Between 1000 and 2000	28	25	36	34	26
Between 2000 and 3000	15	9	19	25	15
More than 3000 students	12	7	13	15	12
Infrastructure	**N varies**	**N varies**	**N varies**	**N varies**	**N varies**
Microcomputers					
Average per school (mean)	221	358	253	182	134
Students per micro density (mean)	27.3	11.6	31.7	30.8	40.2
Faculty per micro density (mean)	1.1	1.0	1.3	1.2	1.1
Mini/mainframe ownership (schools)	57	23	16	11	2
Computer support staff FTE (mean)	7.3	10.7	7.6	3.9	4.3
Staff salaries/benefits: full-time (mean)	40.6	48.1	40.1	35.6	26.5
Staff salaries/benefits: part-time (mean)	18.7	21.6	17.2	20.8	12.4

the total, on average, just over 27 students share access to a single microcomputer. At the first-quartile schools just over 11 students share a single microcomputer, at the second-and third-quartile schools between 30 and 32 students share a single microcomputer, and in the fourth-quartile schools 40 students share a single microcomputer. There is little variation with faculty microcomputers, with both the total and all of the quartiles showing that most every faculty member is provided a microcomputer.

Continuing with the hardware infrastructure, this year's data show that 57 business schools reported owning their own mini/mainframe computers. The quartile breakouts indicate that close to 70% of this ownership is concentrated in the first and second quartiles.

Regarding the service infrastructure, 179 business schools reported having full-time and/or part-time staff, with an average of 7.3 full-time equivalent (FTE) staff per school. However, again the schools in the upper two quartiles have the larger computer staff counts on average, 10.7 and 7.6 respectively, and the lower two quartiles about four FTE computing staff each. The individual full-time and part-time staff salary means (including benefits) indicate a pattern of higher-to-lower average salaries across the quartiles.

In general, Table 2 shows the middle two quartiles quite similar in demographics, beginning to separate distinctly with regard to the hardware infrastructure, and then very distinctly with regard to the staff infrastructure, where the third and fourth quartiles become more similar. This pattern suggests that the difference in computer operating dollar per student of $156 for the second quartile and $68 for the third quartile becomes a function of the number of computer staff provided for support services. The schools in the fourth quartile, which have the largest percent of undergraduate only programs, fewer public schools than the middle quartiles, and generally smaller student FTEs, appear to allocate most of their resources to the microcomputer side of the hardware infrastructure. The first quartile separates distinctly from the other three in almost all of the categories, demographic as well as infrastructural.

3. Budgets

The survey questionnaire requested estimates of the amounts spent between July 1, 1994, and June 30, 1995. There were four categories within the computing capital budget, designated to consist of items with list values greater than $2000. The computer operating budget had eight separate categories. Additionally, the business schools were asked to indicate the degree of confidence in the amount entered for each budget category. A five-point Likert scale response format was used, ranging from a very low level of confidence of 20% or less to a very good level of confidence of 81% or more. The mean responses for all categories ranged from 4.0 to 4.7, with an overall confidence response mean of 4.25 for all 12 categories. In general, the respondents indicated over 70% confidence in their overall budget responses.

Table 3 displays resource allocation distributions and means for the capital, operating, and total computer budgets. These data are presented as the total for the 216 business schools providing data, and for the 53 schools within each quartile. In order to standardize for the schools which did not have an entry for a particular budget category, the raw data means were weighted to reflect the number of schools providing data. For example, 201 business schools reported a mean budget amount totaling $125,000 for the first category, complete microcomputer systems. As these 201 schools represented 98% of the total 206 providing capital budget data, the mean amount of $124,080 was multiplied by the weighted factor of 0.98 and shown as $121.6 ($121,598 rounded to the nearest thousand). These weighted means, summing very close to the raw data total capital and operating budget means, were used to establish the standardized resource allocation distributions.

3.1 Computer capital budget

The computing capital budget consisted of items with list values greater than $2000, broken into four distinct categories: complete microcomputer systems (including CPU, monitor, disk drives), mini/mainframe systems, communication equipment (including PBX, network bridges, and cabling), and facility renovation (including power, A/C, funiture, projectors, etc.).

As can be seen in Table 3, the major portion of capital resource dollars was allocated to the purchase of complete microcomputer systems. The total set of 216 business schools allocated 66% of their capital resources to the purchase of these systems. The quartile breakouts show the second and the third quartiles spent even more, 77% and 78%. In contrast, both the first and the fourth quartiles allocated less, only 58% for the first-quartile schools and 61% for the fourth-quartile schools.

Comparing the distribution for all four categories allows greater understanding of the focus of the schools, as a total set and by quartiles. In general, the total set of 216 business schools that provided data for the capital budget categories, on average, spent about $186,000 on their hardware infrastructure. The total schools' primary concern appears to be with establishing a strong microcomputer infrastructure, 66% of the capital budget allocation, and then getting that infrastructure networked, 16% of the capital resource allocations. Mini/mainframe equipment and facility renovation each are allocated, on average, 9% of the capital budget.

However, comparison of the quartile distributions shows apparent differing emphases

Table 3
Business School Computer Budgets
by Total and Computer Dollar-per-Student Quartiles
(percents and weighted means)

	Total N=216		Quartiles 1st N=53		2nd N=53		3rd N=53		4th N=53	
	%	$000	%	$000	%	$000	%	$000	%	$000
Capital budget										
Complete micro systems	66	121.6	58	232.5	77	152.0	78	67.0	61	44.1
Communication equip	16	30.3	17	69.1	15	30.1	10	8.6	20	14.6
Mini/mainframe systems	9	17.1	14	56.0	4	7.6	6	5.5	1	0.7
Facility rennovation	9	16.6	10	41.3	4	8.0	6	5.3	18	13.0
Capital Total		185.6		398.9		197.7		86.3		72.3
Operating budget										
Full-time staff salaries	48	139.6	51	384.9	47	133.0	37	44.7	20	5.4
Part-time staff salaries	13	38.5	10	78.9	14	38.7	25	30.2	29	7.8
Hardware maintenance	11	31.5	11	80.8	10	29.6	11	13.2	11	3.1
Software	9	25.8	8	62.0	10	29.8	8	10.2	13	3.7
Supplies/consumables	7	19.2	7	54.5	5	13.9	6	7.5	9	2.4
Network/communication	6	16.2	5	39.9	6	16.5	6	7.0	7	2.0
Data/info services	5	15.9	5	38.2	6	17.7	6	7.1	8	2.2
Travel/training	2	5.3	2	14.8	2	5.0	1	1.7	2	0.7
Operating Total		292.1		754.1		284.2		121.5		27.3
Capital budget	39	185.6	35	398.9	41	197.7	42	86.3	73	72.3
Operating budget	61	292.1	65	754.1	59	284.2	58	121.5	27	27.3
Total Computer Budget		477.6		1153.0		481.8		207.8		99.6

among the quartiles. The first-quartile schools, in comparison to those in the other three, are allocating the least amount to microcomputers and the most to mini/mainframes. The emphasis of both the second- and third-quartile schools appears to be the establishment of their microcomputer infrastructure. Mini/mainframes and facility renovation take a lesser priority. In contrast, the fourth-quartile schools spend more than the first-quartile schools on microcomputers and more on connectivity and facility renovation than any of the other three quartile schools, indicating a position in an earlier phase in the computerization life cycle. Further, the mini/mainframe part of the business-school-owned hardware infrastructure appears to be of little importance to the schools in this quartile.

3.2 Computer operating budget

The middle portion of Table 3 gives the total and quartile breakouts for the computer operating budget categories. The 216 business schools spend just over 60% of their operating budget on full-time and part-time staff salaries and benefits. The percent allocation follows almost exactly across the first three quartiles, 61%, 61%, and 62%, respectively. However, even though schools in these three quartiles are allocating about the same amount of staff, the full-time/part-time categories change systematically, with the first-quartile schools putting more emphasis on full-time staff, and the second and third quartiles progressively less. In contrast, the fourth-quartile schools are allocating 49% of their operating budget on computer services staff, and utilize more part-time than full-time staff.

The categories that receive the next level of focus are hardware maintenance and software, 11% and 9% for the total schools. Looking across each of these categories, hardware maintenance is essentially the same while the fourth-quartile schools are allocating a greater proportion to software purchases and licenses. Supplies/consumables, network/communication, and data/information services are again more consistent for the first three quartiles than for the fourth-quartile schools which indicate allocating more on these three categories. Travel/training resource allocations are consistent for both the total and the quartiles.

Looking down the operating budget distributions to compare quartiles, except for the staff salaries, there is less difference between the quartiles than for the capital budget distributions. This suggests that the schools must provide fairly "standard" operating services irrespective of the phase of computerization or how much is available to be spent. However, the impact of these same "fixed cost" items appears as a larger distribution for the fourth-quartile schools which have a lower operating budget than those in the other quartiles. For example, software packages (such as Excel, Lotus, SAS, or JMP) cost essentially the same for all business schools. Similarly, data services (such as Dow Jones, Nexis, and ABI Inform, whether accessed on-line or by CD-ROM) cost essentially the same for all schools. Thus basic services consume a larger portion of the fourth quartile operating budget that the first quartile. The large sums spent at the first-quartile schools may reflect more variety of software and services and/or more access (passwords) for any one given service. Those schools with greater resources are able to provide more access points so that each student can spend more time exploring and learning to gain added value from these on-line resources.

3.3 Total computer budget

The total computer budget is the sum of the means of the capital and operating budgets. For this sample of 216 business schools, the emphasis is on the operating budget rather than the capital budget, with an average of 61% allocated to operations and 39% to capital expenditures. This same pattern remains consistent for the first three quartiles, but shifts dramatically for the fourth quartile, with 27% allocated to operations and 73% to capital expenditures. This considerable emphasis on the capital budget again supports the suggestion that the fourth-quartile schools are at an earlier phase in the computerization process than the other three-quartile schools and are concentrating on establishing their basic physical infrastructure.

3.4 Longitudinal comparisons

Table 4 compares the budget distributions for both the Seventh Survey data (1989-1990 academic year) and the Twelfth Survey data (1994-1995 academic year).

Looking at the capital budget, the emphasis in distributions remains on microcomputer systems. Major differences, however, are changes in emphasis away from mini/mainframes (total, second and third quartiles) and toward communication equipment (total, first and fourth quartiles). The fourth-quartile schools remain constant in allocating little or no resources to mini/mainframe systems. Facility renovation allocations remain about the same for the total set of schools and the first quartile, but reverse in the remaining three quartiles, with the greatest change seen in the fourth-quartile schools, with a shift in emphasis from 3% in the Seventh Survey to 18% in the Twelfth.

Considering the operating budgets, staff salaries and benefits have remained as the primary resource allocation between the two longitudinal sets of data, but show consistent increases, between six and nine percentage points, between the Seventh and Twelfth Surveys. In contrast, hardware expenses have decreased between eight and 23 points, perhaps reflecting the high-quality, more reliable systems now on the market. The rest of the operating budget categories show less change, with the supplies/consumables decreasing slightly and network/communication increasing.

Over the five years, the capital and operating budget relationships have stayed the same, with more emphasis on the operating than on the capital budgets for the total set of data and for the first three quartiles and the reverse for the fourth quartile. However, the capital budget has increased consistently, from between four to 18 percentage points, with the greatest increases seen in the first and fourth quartiles.

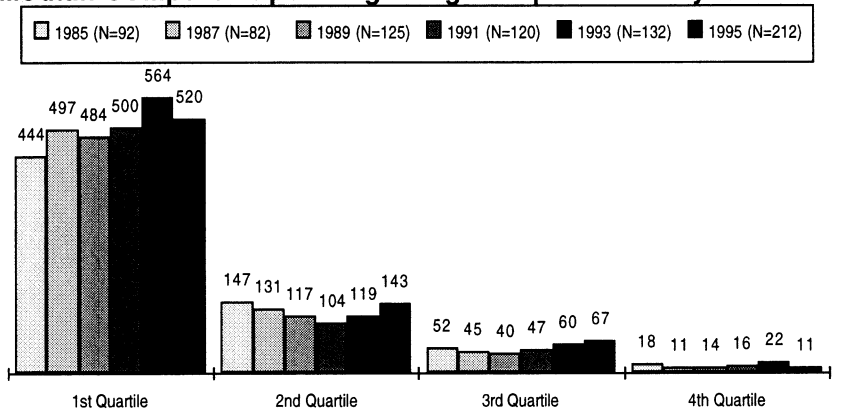
Table 4
Longitudinal Comparison of Computer Budget Distributions by Total and Computer Dollar-per-Student Quartiles (percents and weighted means)

	Total		Quartiles							
			1st		2nd		3rd		4th	
	7th	12th	7th	12th	7th	12th	7th	12th	7th	12th
N =	131	216	33	53	33	53	33	53	32	53
Capital budget										
Complete micro systems	64%	66%	67%	58%	52%	77%	65%	78%	83%	61%
Communication equip	13	16	7	17	17	15	15	10	14	20
Mini/mainframe systems	16	9	14	14	23	4	17	6	0	1
Facility renovation	8	9	12	10	8	4	3	6	3	18
Operating budget										
Staff salaries	52	61	52	61	55	61	54	62	41	49
Hardware maintenance	29	11	34	11	22	10	19	11	22	11
Software	5	9	4	8	8	10	5	8	13	13
Supplies/consumables	6	7	4	7	9	5	9	6	11	9
Network/communication	2	6	2	5	1	6	7	6	2	7
Data/info services	4	5	3	5	4	6	5	6	10	8
Travel/training	1	2	1	2	1	2	1	1	1	2
Capital budget	27	39	18	35	35	41	38	42	55	73
Operating budget	73	61	82	65	65	59	62	58	45	27
Total Computer Budget	$386	$478	$848	$1153	$391	$482	$192	$208	$103	$100
% change		24		36		23		8		(3)

In total dollars, the 216 schools and those in the first three quartiles have increased their budgets over the five years, an average of 24% for the total set of schools, and 36%, 23%, and 8% for the first-through-third quartiles, respectively. The fourth quartile shows a decrease of about 3.4 %.

A final longitudinal perspective of the quartile data is given in Figure 1, which presents the median computer operating dollar-per-student FTE over a period of 10 years. This view of the data shows a stable pattern of differences in computer dollars spent by the quartiles, with the first-quartile schools spending almost four times as much per student as the second, eight times as much as the third, and 50 times as much per student than the fourth-quartile schools. These ratios have held quite consistent, not only over time, but also over changes in the samples and populations.

Figure 1
Median Computer Operating Budget Expenditure by Quartiles



4. Hardware infrastructure

4.1 Microcomputers

Table 5 presents the historic data as separated by model in the previous surveys, then collapsed for the Twelfth Survey. This year the microcomputer data were collected by operating system categories only (Apple, DOS only, DOS/Windows, UNIX, and other), instead of by model and vendor detail as in the first 10 surveys. This categorization collapse was necessitated because the number of different makes, models, and configurations had become very difficult for the

Table 5
Microcomputer Operating Systems at Business Schools
(number and percent of systems)

	Second 1985 N=119		Fourth 1987 N=82		Sixth 1989 N=135		Eighth 1991 N=143		Tenth 1993 N=164		Twelfth 1995 N=239	
Vendor	**n**	**%**	**n**	**%**	**n**	**%**	**n**	**%**	**n**	**%**	**n**	**%**
Apple												
Mac Plus, Classic	457	5	925	5	2165	7	3412	10	3255	8		
Macintosh II					444	2	868	2	1387	3		
Mac IICI							977	3	1729	4		
Mac FX & Quadra									274	1		
Total Apple	457	5	925	5	2609	9	5257	15	6645	16	6260	12
DOS only												
HP Vectra 286	40	0	349	2	1194	4	1328	4	1133	3		
IBM AT, PS2 50,60	259	3	1194	7	1827	6	4916	14	6604	15		
IBM PC/XT, PS2/25	5120	54	7509	45	9286	30	6543	19	3169	7		
Unisys	544	6	593	4	881	3	731	2	329	1		
Zenith 150	411	4	1791	11	3923	13	1484	4	908	2		
AT&T 286					1043	3	550	1	227	1		
Clones 286					1055	3	2303	6	2708	6		
Clones 8086					2714	9	2070	6	1362	3		
IBM PS2/70,80					2393	8	2545	7	2173	5		
AT&T 6300							678	2	280	1		
Zenith 286							722	2	438	1		
Total DOS only	6374	67	11436	69	24316	79	23870	67	19331	45	9212	18
Windows												
HP Vectra 386					632	2	886	3	1509	4		
Clones 386							2650	8	6518	15		
Zenith 386							760	2	999	2		
AT&T 386									546	1		
Clones 486									3286	8		
Dell 386									224	<1		
Gateway 386									213	<1		
Gateway 486									479	1		
IBM PS/90									358	1		
ICL 386									290	1		
Total Windows					632	2	4296	13	14422	33	35678	68
UNIX Workstations					316	<1	355	<1	553	1	1150	2
Other	2725	28	4364	26	3183	10	1805	5	2038	5	350	<1
TOTAL	**9556**	100	**16725**	100	**31056**	100	**35583**	100	**42989**	100	**52650**	100
Average systems per school	80		131		193		217		239		220	
Percent change			63%		48%		12%		10%		(8%)	

schools to keep separately. For instance, the Tenth Survey reported that 34% of the schools had more than 11 different models, with some schools having over 20. Additionally, the distinctions between the different microcomputers had become fuzzy and lost most of their importance with greater compatibility.

Looking at the operating system percentages, the largest change is the decrease in the DOS-only operating systems, from 45% in the Tenth Survey to only 18% in the Twelfth. A corresponding increase is shown in Windows systems, from 33% to 68%. Apple systems decreased to 12% market share.

The 239 business schools that provided microcomputer data reported owning a total of 52,650 systems, an average of 220 microcomputers per business school. This is an 8% decrease from the 239 microcomputers per school as reported in the Tenth Survey. This decrease is most likely explained by the increase in smaller schools participating in the survey (from Table 1), bringing the overall average down.

Table 6 presents the operating systems data by total sample and computer operating dollar-per-student quartiles. The largest percent of DOS-only operating systems isseen in the third-quartile business schools, 27%, the largest percentage of Apple operating systems in the first quartile, and the largest percent of Windows operating systems in the fourth quartile, 70%. This again supports the suggestion made earlier that the business schools in the fourth quartile are in the earlier phases of computerization. By entering later they can acquire the latest operating systems initially, rather than having to replace their older operating systems as funds become available and software demands become critical.

Table 6
Microcomputer Operating Systems at Business Schools
by Total and Computer Dollar-Per-Student Quartiles
(number of schools and percent of systems)

	Total N=238		Quartiles 1st N=53		2nd N=53		3rd N=53		4th N=53	
	n	%	n	%	n	%	n	%	n	%
Apple	156	12	42	16	43	11	35	7	24	13
DOS only	160	18	35	12	35	20	40	27	35	15
Windows	227	68	53	68	52	68	51	64	48	70
UNIX	85	2	28	4	26	<1	19	2	8	2
other	47	<1	13	<1	15	<1	15	<1	4	<1
Total microcomputers	52,650		18,976		13,407		9,628		7,082	
Average per school	221		358		253		182		134	

Table 7 displays the breakdown of how the various operating systems are distributed across the user groups. The total number of operating systems is less than that shown in the previous two tables because some schools did not provide the breakdown by user group. In the first column, 211 schools reported that they allocated an average of 45% of their microcomputers to student/public users. Similarly, 233 schools allocated 32% to faculty use, 229 schools allocated 21% to staff, and 182 schools allocated 2% for use as network servers.

Looking across the table, Windows-based systems were reported by 227 schools, accounting for a total of 34,623 (68%) of the total systems. DOS-only and Apple systems were reported by about the same number of schools but showed differing percentages of the totals, 18% and 12%,

Table 7
Business School Microcomputer Operating Systems by User Groups
(number of schools and percent of systems)

	Total N=238		Windows N=227		DOS only N=160		Apple N=156		UNIX N=85		other N=47	
	n	%	n	%	n	%	n	%	n	%	n	%
Student/public	211	45	186	48	96	40	101	42	36	24	14	45
Faculty	233	32	217	32	129	32	141	31	50	45	15	17
Staff	229	21	210	19	102	26	101	26	24	8	11	12
Network servers	182	2	133	1	38	2	46	1	53	23	26	26
Total systems	51,200		34,623		9212		6168		847		350	
Percent	100		68		18		12		2		<1	

respectively. Analyzing these three most popular operating systems, the largest percentage of the newest systems, Windows, is distributed to students, with staff having the Apple or DOS-only systems. Forty-five percent of the UNIX systems with a more complex operating system and little application software is allocated to the faculty. For network servers, the data indicate that schools select UNIX and other operating systems (for example, NT and OS/2).

4.2 Laptops

The Tenth Survey pointed out that even though the popular press had been indicating that laptops were the fastest growing segment in the computer market, the survey data did not support that view in relationship to business school systems. The laptop data from the Twelfth Survey, presented in Table 8, continues to support this position. There was a slight decrease both in average number of laptops owned by the business schools as well as in the percent of schools reporting laptop ownership. Again, as suggested in the Tenth Survey, this suggests that, if the school is purchasing microcomputers, desktops are more appropriate than laptops. However, some schools are shifting the public access microcomputer ownership responsibility, whether desktop or laptop, to the students.

Data to differentiate between DOS-only and Windows laptop operating systems was not available, thus Table 8 consolidates these two categories. Apple laptops increased from 15% to 19%, whereas the DOS and Windows systems decreased correspondingly from 85% to 81%.

Table 9 shows that the majority of school-owned laptop systems are Windows-based and are issued to faculty. Seventy-eight percent of the schools are purchasing laptop systems for any user group.

4.3 Microcomputer and laptop densities

Table 10 summarizes the distribution of the business-school-owned microcomputers and laptops across user groups. The discrepancy in total number of microcomputers among Tables 5 - 7 and Table 10 occurs because Table 10 includes both microcomputers and laptops, that is, all micro systems available to the users. The distribution pattern is fairly consistent across the quartile business schools, with allocations from 44% to 49% of the systems to their students. Consistency is also shown in the allocation of about 2% of the microcomputers as network servers. The remaining microcomputers are allocated about evenly between the faculty and administrative and support staff for the first-quartile schools. However, schools inthe other three quartiles show a greater allocation to faculty than to staff.

Table 8
Business-School-Owned Laptops by Operating Systems
(number and percent of systems)

Vendor	Fourth 1987 N=82 n	%	Sixth 1989 N=135 n	%	Eighth 1991 N=143 n	%	Tenth 1993 N=164 n	%	Twelfth 1995 N=188 n	%
Apple					29	1	463	15	661	19
DOS and Windows										
Compaq	151	9	315	7	292	9	250	8		
Hewlett-Packard	1076	66	3226	69	1602	49	22	1		
IBM	226	14	236	5	218	6	286	9		
NEC	28	2	29	<1	20	1	35	1		
Other	49	3	126	3	133	4	201	6		
Tandy	7	<1	113	2	126	4	17	<1		
Toshiba	13	1	153	3	227	7	760	24		
Zenith	77	5	502	11	637	19	572	18		
AST							165	5		
Compuadd							19	<1		
Dell							128	4		
Everex							16	<1		
Gateway							15	<1		
Olivetti							210	7		
Subtotal	1627	100	4700	100	3255	99	2696	85	2756	81
Total	1627	100	4700	100	3284	100	3159	100	3417	100
Average systems per school	19.8		34.8		23.0		19.3		18.2	
% schools with laptops	64		83		86		91		78	

Table 9
Business-School-Owned Laptop Operating Systems by User Groups
(number of schools and percent of systems)

	Total N=188		Windows N=164		Apple N=86		DOS only N=83	
	n	%	n	%	n	%	n	%
Student/public	123	31	33	35	15	31	11	8
Faculty	128	56	149	52	79	56	69	76
Staff	91	14	63	13	28	13	19	16
Total systems	3355		2278		654		423	
Percent	100		68		19		13	

Table 10
Business School Microcomputers and Laptops per User Groups
by Total and Computer Dollar per Student Quartiles
(percent and number of systems)

	Total N=238		Quartiles 1st N=53		2nd N=53		3rd N=53		4th N=53	
	%	count	%	count	%	count	%	count	%	count
Student/public	45	24,564	45	9,037	44	6,217	45	4,432	49	3,542
Faculty	33	18,262	27	5,323	34	4,793	39	3,921	40	2,841
Staff	20	11,045	26	5,140	21	2,945	14	1,376	10	731
Network server	2	1,043	2	414	2	282	2	225	1	60
Total microcomputers		54,914		19,914		14,237		9,954		7,174

Historically, the surveys have presented two ratios to provide further understanding of business school utilization of microcomputers. The first ratio, student-per-microcomputer, is calculated by dividing the total student FTE (undergraduate, MBA, and Ph.D.) by the number of the business school's microcomputer desktops and laptops available for student use. This density measure thus reflects the number of students who share access to a single microcomputer. For example, a student microcomputer density of 37 is interpreted as 37 students sharing access to a single microcomputer system. The second ratio, faculty-per-microcomputer, is calculated by dividing the faculty FTE by the number of the business school's microcomputers available exclusively for faculty use. As these ratios do not include any microcomputers or laptops that might be owned privately by the students or the faculty, the actual number of students or faculty who share access to the microcomputers is probably lower (i.e., better) than reported.

Figures 2 and 3 show the ratios historically for the student and faculty density quartiles. It is stressed that those quartile data are based only on the quartiles as established by the density ratio distributions and are not the same as those established by the computer dollar-per-student quartiles. In the summary table, Table 2, the student and faculty density ratios are given for the computer dollar-per-student quartiles.

In Figure 2, the median student-per-micro densities by quartile are 6, 12, 20, and 37. These density ratios all indicate a continual decrease overtime, that is improvement, in the number of students required to share access to a single microcomputer. Further, the figure, when viewed

Figure 2
Median Student Microcomputer/Laptop Density by Quartiles

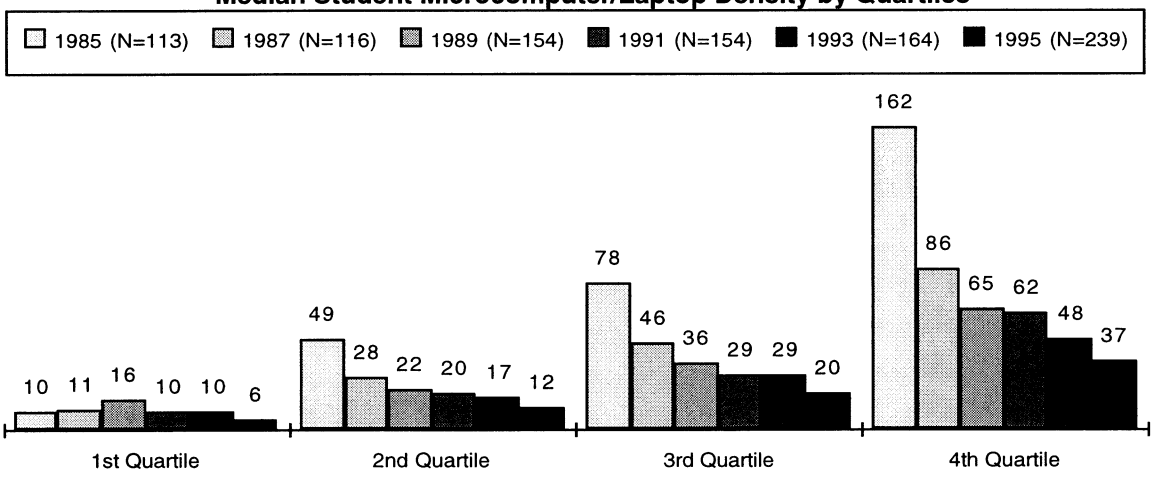
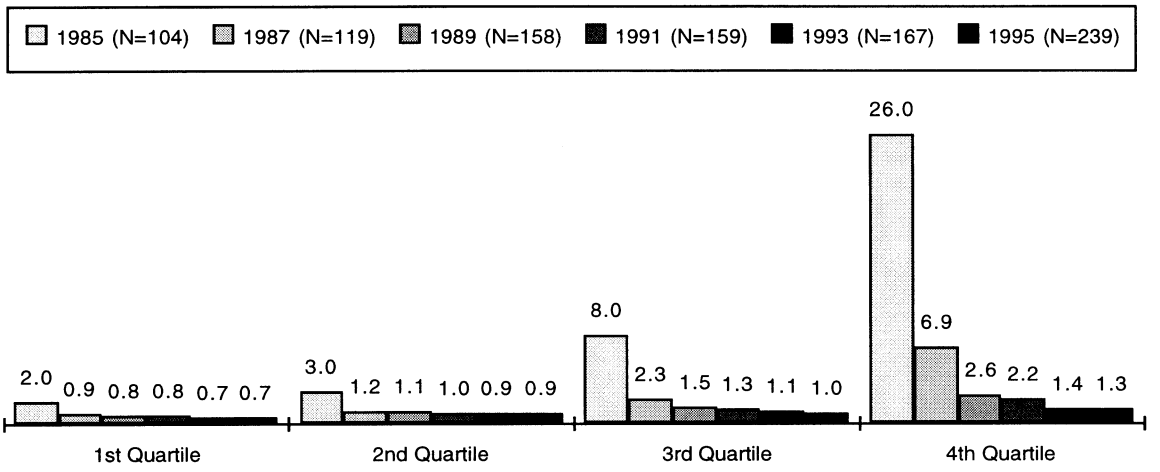


Figure 3
Median Faculty Microcomputer/Laptop Density by Quartiles

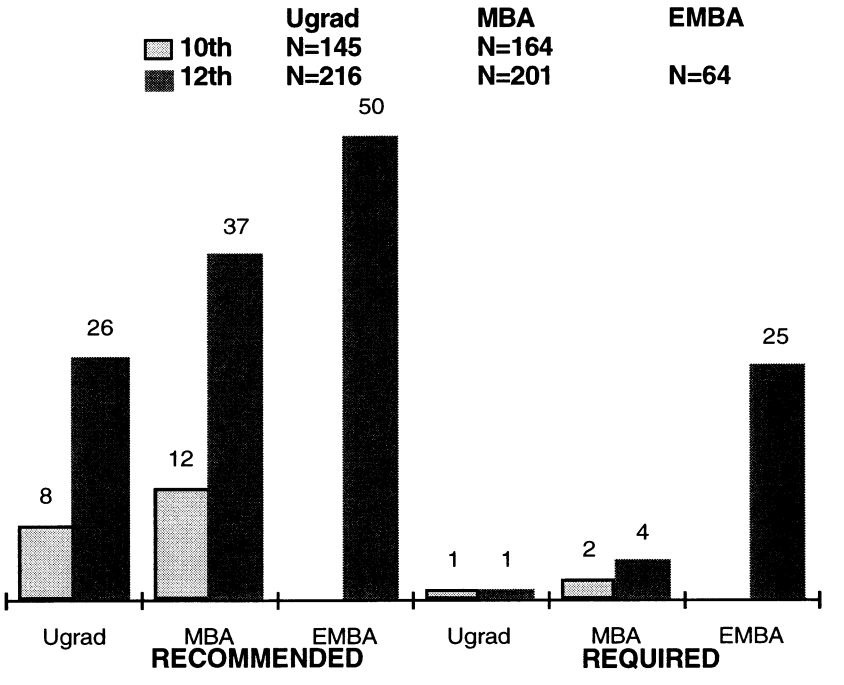


historically, shows a stabilization in the disparity between the quartiles. In 1985, the first-quartile schools showed a density of 16 times better than those in the fourth quartile, whereas since 1991 the disparity has remained about only six times better than the fourth quartile. Figure 3 indicates very little disparity in faculty-per-micro density across the quartiles.

4.4 Student ownership

Three of the survey questions related to student microcomputer ownership as recommended or required by the business schools. Figure 4 summarizes the responses to these questions. For the Twelfth Survey data, 26% of the 216 business schools which offered undergraduate programs recommended microcomputer ownership for their students, whereas only 1% reported requiring ownership. Thirty-seven percent of the 201 business schools with graduate programs recommended microcomputer ownership by their MBA students and 4% required microcomputer ownership. For the 64 schools with Executive programs, 50% recommended ownership and 25% required ownership. Overall, recommended ownership for both the undergraduate and the MBA programs has tripled over the last two years.

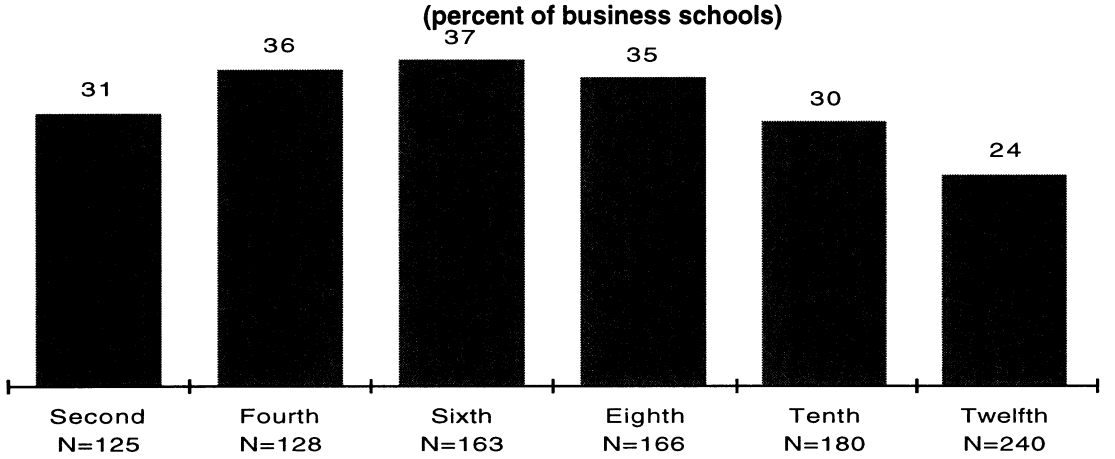
Figure 4
Student Microcomputer Ownership
(percent of schools recommending and requiring ownership)



4.5 Mini/mainframes

Figure 5 shows a historic view of the percent of business schools within each survey sample reporting mini/mainframe ownership. This data indicates that ownership of these larger systems by business schools peaked between 1987 and 1991 (Fourth and Eighth Surveys), with percent ownership of 36, 37, and 35. The 1993 and 1995 samples show a consistent decline of around five percentage points every two years. It must be stressed, however, that mini/mainframe computers are usually found in the schools with a strong emphasis on research and Ph.D. programs. Therefore, this decline may be a reflection of the changes in the sample rather than an actual decline in the percent of schools with mini/mainframe ownership. Additionally, it may be that schools which have owned their own larger systems in the past continue to support them, but few, if any schools, are adding mini/mainframes to their operational responsibility. Indeed, many major research universities are relinquishing their current mini/mainframe systems for clusters of workstations at substantially reduced costs.

Figure 5
Business School Mini/mainframe Ownership
(percent of business schools)



5. Services

The respondent business schools indicated the allocation of their computing staff to nine service categories and then to user groups within each category. This section summarizes these resource allocations. Additionally, data from the demographic full-time and part-time questions are combined with the financial salary data to obtain an indication of computer staff salaries.

5.1 Staff allocations by service category

Table 11 summarizes the responses of the business schools for nine categories of services provided by the business school computing staff. The bottom line in this table shows that 179 business schools provided data for this series of questions and had an actual mean of 7.2 FTE and a weighted mean of 7.3 computer staff. The first column shows the number of schools offering each service, with the corresponding percentage of schools in the second column. The services are sorted by these columns. The third column, actual FTE, is the mean FTE allocated to each service. The weighted FTE column is used to standardize the actual FTE by the number of schools providing each service. For example, 37% of the schools (66) are indicating providing an average of 1.2 FTE mini/mainframe staff support. However, as all schools do not provide this service, the actual FTE of 1.2 is multiplied by the percentage (37) to show a weighted contribution of this particular service to the overall allocation of staff service resources. The last column of Table 11 shows the FTE distributions for the Seventh and Twelfth Surveys.

The service category that received the most emphasis overall in the Twelfth Survey data is consulting to the individual user, provided by 94% (169) of the business schools, 32% of the total allocation of service resources. Microcomputer troubleshooting and maintenance, provided by 89% (160) of the business schools, showed the second highest allocation of staff service resources, 16%. The other seven categories received 11% or less of the staff service allocations: network support, group training, and programming/database administration 10 to 11% each; back-office support and documentation 7%, video/computer display capability and mini/mainframe support 5% each; and data acquisition 3%.

Table 11
Services Offered by Business School Computing Staff

Services	n schools	% schools	FTE actual mean	FTE weighted mean	Staff resource allocations Seventh N=91	Twelfth N=179
Consulting to individual user	169	94	2.5	2.4	21%	32%
Microcomputer trouble shooting/maintenance	160	89	1.3	1.2	19	16
Network support/ operations/backup	158	88	0.9	0.8	11	11
Training to groups of users	135	75	1.0	0.8	9	11
"Back-office" support/ documentation	121	68	0.7	0.5	9	7
Programming/database administration	107	60	1.2	0.7	15	10
Video/computer display capability	103	58	0.7	0.4	3	5
Data acquisition/on-line databases	78	44	0.4	0.2	3	3
Mini/mainframe operations/backup	66	37	1.2	0.4	10	5
Totals	179	100%	7.2	7.3	100	100

Comparison of the last two columns of Table 11, the distributions for the Seventh and Twelfth Surveys, allows a perspective of change in staff service resource allocation over the last five years. In general, the order of the emphasis has remained the same, with the exceptions of programming/database administration and mini/mainframe support. These two categories have both lost five percentage points. This is congruent with the decrease in business school owned mini/mainframes discussed in the hardware infrastructure section and the capital budget changes discussed in the financial section. The other major allocation percent change is seen in the increase of eight percentage points to individual consulting. The remaining service category allocations stayed within three points.

Figure 6 presents a longitudinal view of computing staff support, but this view is by staff density rather than by category. This density was calculated by dividing total student FTE by total computing staff FTE, is based on the median quartile distribution of those calculations, and provides an understanding of the number of students supported by a single computing staff person. Thus, for the 171 Twelfth Survey business schools providing the requisite data, the data from first quartile schools show a median of one computing service staff FTE to support 71

students. In contrast, the data from the fourth quartile schools show a median of one computing service staff FTE to support 1156 students. The same disparity across the quartiles remains as in the other density figures; however, improvement in the fourth quartile is once again seen in contrast to a tendency toward stabilization in the other three quartiles.

Figure 6
Median Computer Staff Support Density by Quartiles

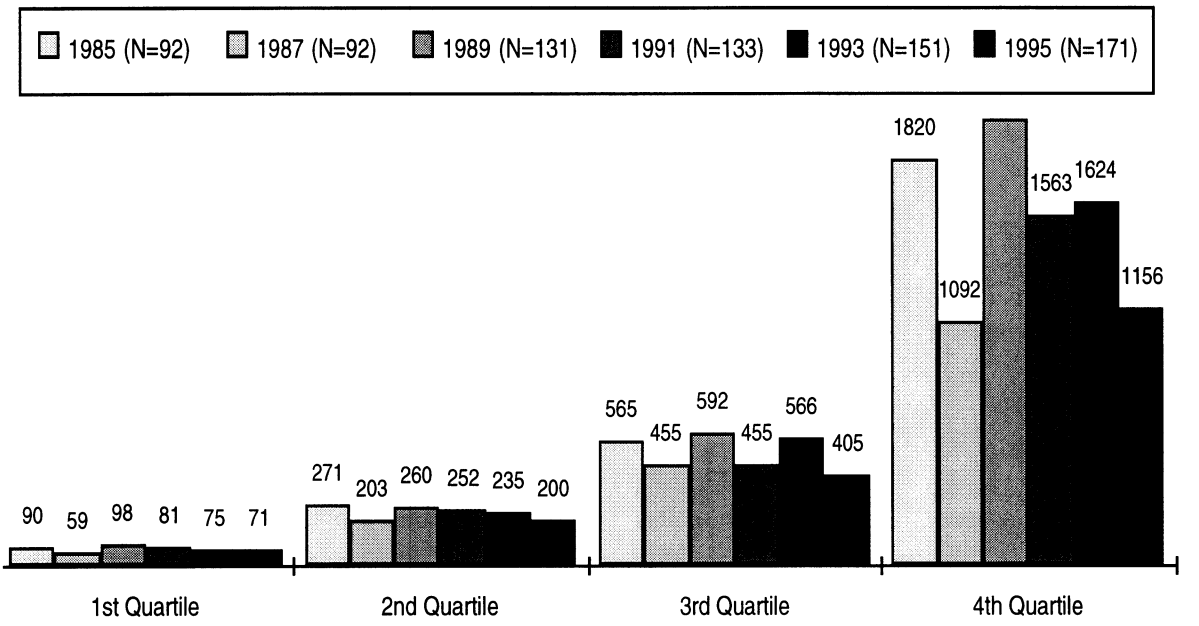


Table 12 offers a comparison of the computer dollar-per-student quartiles with the total sample and to each other, based on the weighted staff FTE. In this analysis, the first quartile's staff resource distribution shows generally more service for all of the categories than the total provides. The second quartile's distribution is similar to the total, with the exception of slightly more individual consulting and training to groups of users.

In contrast, the other two quartile distributions show more deviation. The third quartile is allocating more staff service support to the individual user, 43%, than the total or any of the other three quartiles. It also provides slightly more network communication support but much less programming/database administration and mini/mainframe support. The fourth quartile's distribution shows the least amount of service allocated to the individual user, 27%, but the most, 15%, to group training. This quartile is also providing the most support, 13%, for back-office documentation.

The bottom line in Table 12 continues to emphasize the disparity across the quartiles. The first two quartiles are providing an average of 10.7 and 7.6 FTE computer support staff, whereas the third and fourth quartiles are providing around four each.

5.2 Staff allocations by user groups

The previous view of the staff support services allocations may be considered a "vertical view," comparing the differing emphasis given to each of the service categories. Another view of the data is that given in Table 13, a "horizontal view" by category, looking at the distribution of each service category by user group. The average summary percents at the bottom of this table show that the undergraduates, as a user group, receive the largest percent of staff support, 31%, followed by 24% each to the faculty/Ph.D. user group and the administrative staff. Overall the MBA user group receives 18% of the staff support service allocation, and the Executive programs 3%. It must be stressed, however, that this is an overall view for all of the 179 business schools

Table 12
Services Offered by Business School Computing Staff
by Total and Computer Dollar-per-Student Quartiles
(percents and weighted means)

	Total N=179		Quartiles 1st N=51		2nd N=48		3rd N=44		4th N=24	
Services	**%**	**FTE**	**%**	**FTE**	**%**	**FTE**	**%**	**FTE**	**%**	**FTE**
Consulting to individual user	32	2.4	31	3.3	36	2.7	43	1.7	27	1.2
Microcomputer trouble shooting/maintenance	16	1.2	16	1.7	15	1.1	17	0.7	19	0.8
Network support/ operations/backup	11	0.8	10	1.1	10	0.8	14	0.6	9	0.4
Training to groups of users	10	0.8	9	1.0	12	0.9	8	0.3	15	0.7
Programming/database administration	10	0.7	12	1.3	9	0.7	5	0.2	5	0.2
"Back-office" support/ documentation	6	0.5	6	0.7	6	0.5	4	0.2	13	0.6
Mini/mainframe operations/backup	6	0.4	8	0.9	5	0.4	2	0.1	3	0.1
Video/computer display capability	6	0.4	5	0.6	5	0.4	4	0.2	6	0.3
Data acquisition/on-line databases	2	0.2	2	0.2	3	0.2	2	0.1	3	0.2
Total FTE		7.3		10.7		7.6		3.9		4.3

providing data, and adjustments have not been made for the number of schools participating in the particular programs.

Emphasis on video/computer display capability is seen in both the undergraduate and the MBA programs, with this service category receiving the highest percent allocations for these two user groups. This may reflect the importance of supporting the use of computers in the classroom with monitors, LCD devices, and projection equipment. The highest percents allocated both for mini/mainframe support and programming/database administration are to the faculty/Ph.D. and administrative users. Data acquisition, a research-oriented function, is allocated primarily to the faculty/Ph.D. user group.

5.3 Staff salaries

A combination of the staff full-time and part-time FTE counts from the demographic questions and the computer operating budget responses for the same categories allows calculation of the average computer staff salary including benefits. Table 14 summarizes these findings. For the 134 business schools providing the requisite data, the average full-time staff salary including benefits is $40,600. For the 97 business schools providing the requisite data, the average part-time staff salary including benefits is $18,700. The computer dollar-per-student quartiles show a consistently decreasing salary base across the quartiles, ranging from $48,100 for the first quartile to $26,500 for the fourth quartile. This disparity may be explained in part by the data presented previously, specifically on the bottom line of Table 12, which shows the differing total staff averages across the quartiles. It is reasonable to expect that the quartiles with the higher staff FTE counts will have more management staff positions and thus higher salaries.

Table 13
Services Offered by Business School Computing Staff by User Groups
(actual means and percents)

Services	n	FTE	Percent allocated to: Undergrad	MBA	EMBA	Faculty/ PhD	Admin
Consulting to individual user	169	2.5	37%	18%	3%	19%	23%
Microcomputer trouble shooting/maintenance	160	1.3	36	16	2	19	27
Network support/ operations/backup	158	0.9	34	17	2	19	27
Training to groups of users	135	1.0	32	21	4	13	30
"Back-office" support/ documentation	121	0.7	31	20	3	18	27
Programming/database administration	107	1.2	20	11	1	25	42
Video/computer display capability	103	0.7	46	28	5	17	5
Data acquisition/on-line databases	78	0.4	22	20	4	47	8
Mini/mainframe operations/backup	66	1.2	23	12	1	37	26
Average percent allocations to users			31	18	3	24	24

Table 14
Computing Staff Salaries(including benefits)
by Total and Computer Dollar-per-Student Quartiles
(means)

	Total		Quartiles 1st		2nd		3rd		4th	
	n	$000	n	$000	n	$000	n	$000	n	$000
Full-time salary & benefits	134	40.6	45	48.1	44	40.1	36	35.6	8	26.5
Part-time salary & benefits	97	18.7	27	21.6	33	17.2	26	20.8	9	12.4

Appendix

Individual School Information

SCHOOL	TYPE	UGRAD (FTE)	MBA (FTE)	PHD (FTE)	EMBA (FTE)	FAC (FTE)	STUD/ MICRO	FAC/ MICRO	STUD/ STAFF	CAP $000s	OP $000s	$/STUD FTE
Air Force Institute of Tech	pub	.	89	.	.	38	2.1	1.1	44.5	23	126	1416
U of Alabama	pub	3500	60	50	60	200	18.1	1.6	109.4	500	640	177
Alverno Col	priv	710	.	.	.	17	7.9	1.3	.	.	.	.
Amer Grad, Thunderbird	priv	.	1481	.	51	102	9.1	0.9	77.9	.	.	.
American U (Kogod)	priv	646	448	.	.	66	18.9	0.7	273.5	15	131	120
Appalachian State (Walker)	pub	1896	81	.	.	95	18.3	1.0	123.6	13	141	71
U of Arizona	pub	2985	180	128	.	108	11.7	0.7	299.4	586	569	173
Arizona State	pub	4000	500	100	50	175	.	0.7	766.7	300	455	99
Arizona State West	pub	600	150	.	.	41	62.5	0.8	.	5	50	67
U of Arkansas	pub	2320	128	47	.	97	12.9	1.1	831.7	445	357	143
Arkansas State	pub	.	.	.	.	.	.	.	.	51	102	.
Babson Col	priv	1631	1632	.	.	182	.	.	108.8	931	2837	869
U of Baltimore (Merrick)	pub	859	456	.	.	79	7.6	1.1	164.4	2250	736	560
Baylor U (Hankamer)	priv	2477	184	16	57	128	18.5	1.0	116.4	231	539	201
Boston Col (Carroll)	priv	2270	408	24	.	101	180.1	0.8	.	530	15	6
Boston U	priv	1547	725	82	36	124	18.8	0.9	392.3	100	370	157
Bradley U (Foster)	priv	737	71	.	.	48	11.5	0.7	808.0	48	18	22
Bryant Col	priv	2527	318	.	.	138	8.8	0.9	149.7	315	1400	492
Butler U	priv	600	300	.	.	30	30.0	1.0	.	.	3	3
U Calif, Irvine	pub	.	178	48	201	42	0.9	0.4	28.3	65	581	2571
UCLA (Anderson)	pub	.	625	93	453	99	4.4	0.7	32.6	874	897	1249
Cal Poly, SLB	pub	1800	127	.	30	80	6.9	0.7	214.1	5	292	152
Cal State, Dominguez Hills	pub	842	96	.	45	50	.	1.0	939.0	.	20	21
Cal State, Fresno (Craig)	pub	1724	70	.	.	109	8.5	1.2	598.0	.	164	91
Cal State, Fullerton	pub	4130	203	.	.	130	30.3	1.1	619.0	.	104	24
Cal State, Hayward	pub	3800	700	.	.	120	100.0	2.2	900.0	90	170	38
Cal State, Sacramento	pub	3521	287	.	.	103	42.3	1.1	3808.0	7	82	22
Cal State, SB	pub	1201	220	.	.	79	5.2	0.8	710.5	15	113	80
Cal State, Stanislaus	pub	454	39	.	.	36	19.7	0.9	.	135	48	97
Cameron U	pub	682	42	.	.	23	14.8	1.0	.	.	67	93
Capital U	priv	220	.	.	300	25	.	3.1	.	6	2	9
Carnegie Mellon	priv	600	680	95	.	95	7.1	1.0	114.6	590	658	479
Case Western (Weatherhead	priv	142	862	77	73	89	10.5	1.0	31.8	136	550	509
U Cen Arkansas	pub	1350	40	.	.	40	12.6	0.9	1390.0	125	120	86
Cen Michigan U	pub	2370	488	.	.	83	22.5	1.8	1429.0	158	192	67
Cen State U	pub	100	.	.	.	.	1.1	.	.	75	65	650
U of Chicago	priv	.	2125	100	209	138	23.4	0.5	106.0	134	1400	629
U of Colorado, Denver	pub	291	279	.	.	72	.	1.1	.	50	80	140
Colorado State	pub	1327	411	.	34	68	9.3	0.6	144.8	131	331	190
Columbus Col	pub	525	33	.	.	21	12.7	0.8	139.5	42	102	183
U of Connecticut	pub	887	1180	47	96	82	30.2	0.6	528.5	105	291	138
Cornell U (Johnson)	priv	.	500	18	.	51	10.0	0.8	47.1	85	785	1515
Dartmouth (Tuck)	priv	.	360	.	.	43	2.7	0.6	72.0	270	509	1414
De Paul (Kellstadt)	priv	2200	2423	.	.	255	.	2.6	.	40	7	2
Devry Institutes	priv	13000	.	.	.	1000	4.3	4.3	200.0	2450	3950	304
Duke (Fuqua)	priv	.	660	40	150	73	4.9	0.5	50.0	.	.	.
E Carolina U	pub	558	270	.	.	76	9.4	1.0	103.5	83	212	256
E Tennessee State	pub	1070	161	.	.	65	26.8	0.9	1231.0	39	302	245
E Kentucky U	pub	1131	109	.	.	69	14.4	1.3	413.3	110	78	63
E New Mexico U	pub	600	70	.	.	23	37.2	0.9	.	20	7	10
Elon Col (Love)	priv	533	143	.	.	20	.	.	.	.	.	.
Emory U (Goinzueta)	priv	284	351	.	95	56	9.9	0.9	79.4	80	538	847

SCHOOL	TYPE	UGRAD (FTE)	MBA (FTE)	PHD (FTE)	EMBA (FTE)	FAC (FTE)	STUD/ MICRO	FAC/ MICRO	STUD/ STAFF	CAP $000s	OP $000s	$/STUD FTE
Emporia U	pub	1091	109	.	.	39	32.4	1.1	400.0	6	64	53
U of Evansville	priv	.	.	.	.	18	.	1.0	.	.	.	.
Fairleigh Dickinson U	priv	1050	1114	.	42	143	.	2.7	541.0	45	105	49
Ferris State	pub	2509	.	.	.	93	11.3	1.8	1254.5	17	226	90
U of Florida	pub	1816	240	88	33	116	29.0	0.5	268.0	130	292	136
Florida Intl	pub	2200	400	22	.	129	32.8	1.3	2622.0	42	22	8
Florida State	pub	1600	90	90	.	102	16.2	0.8	148.3	45	242	136
Fort Lewis Col	pub	700	.	.	.	27	14.0	1.0	.	25	6	9
Gannon U	priv	310	60	.	.	25	14.8	1.0	.	64	4	11
Georgetown U	priv	1200	360	.	40	71	16.8	1.0	130.0	169	383	246
U of Georgia (Terry)	pub	3300	.	.	.	.	11.4	.	143.5	400	445	135
Georgia Southern U	pub	2100	.	.	.	86	28.8	1.0	2100.0	70	85	40
Georgia State	pub	4781	2028	148	90	260	.	0.8	632.5	.	.	.
Gonzaga U	priv	564	83	.	.	33	12.0	1.0	323.5	30	123	190
Holy Family Col	priv	277	.	.	.	23	.	1.8	.	3	3	11
Humboldt State	pub	400	20	.	.	14	14.0	1.2	.	15	4	10
Husson Col	priv	1066	.	.	.	18	12.8	1.2	.	.	15	14
U of Illinois, Chicago	pub	2131	305	47	.	109	20.9	0.8	1241.5	130	134	54
Indiana U, Kokomo	pub	350	42	.	.	17	.	1.0	.	.	28	71
Indiana U of Penn	pub	2020	150	.	27	72	20.1	0.8	.	210	6	3
Indiana U, S Bend	pub	300	100	.	.	40	.	.	.	.	.	.
U of Iowa	pub	1000	350	100	70	130	6.9	1.0	181.3	132	567	391
Ithaca Col	priv	605	.	.	.	30	20.2	0.9	201.7	52	51	84
Jackson State	pub	1300	125	.	.	40	23.8	1.0	1425.0	185	35	25
James Madison U	pub	1240	165	.	.	.	20.1	.	702.5	170	181	129
John Carroll U	priv	332	113	.	.	43	10.9	1.0	445.0	21	32	72
U of Kansas	pub	750	131	30	.	60	11.2	0.8	303.7	.	.	.
U of Kentucky	pub	2400	250	75	.	110	56.8	1.0	2725.0	280	224	82
King's Col	priv	567	46	.	.	27	6.8	1.2	55.7	.	.	.
LaSalle U	priv	905	648	.	.	47	.	1.1	.	11	16	10
LaSierra U	.	168	22	.	.	21	.	1.5	190.0	21	47	247
Lander U	pub	350	.	.	.	14	58.3	1.2	.	8	3	9
Lehigh U	priv	892	200	25	.	90	223.4	1.0	1117.0	130	52	47
Lewis-Clark State	pub	500	.	.	.	9	22.7	1.0	.	16	11	22
Longwood Col	pub	476	.	.	.	22	.	0.9	158.7	10	.	.
Louisiana State	pub	1210	262	93	39	104	13.6	0.5	782.5	203	146	93
Louisiana State, Shreveport	pub	425	62	.	.	26	9.4	0.6	.	.	.	.
Louisiana Tech	pub	660	87	56	.	54	5.4	1.0	.	20	49	61
Loyola U, Chicago	priv	1105	364	.	.	78	13.6	0.9	367.3	170	45	31
Lynchburg Col	priv	203	204	.	.	16	0.9	0.8	407.0	166	210	516
Madonna U	priv	452	111	.	19	17	.	1.0	.	.	.	.
Mankato State	pub	1995	114	.	.	83	60.3	1.1	46.9	41	34	16
Marquette U	priv	1334	220	.	.	74	18.5	1.0	388.5	31	122	79
U of Mary Hardin, Baylor	priv	310	13	.	.	17	5.7	0.8	323.0	22	194	601
MIT (Sloan)	priv	100	1230	100	100	160	22.7	0.6	143.0	80	860	601
Miami U (Farmer)	pub	3383	115	.	.	142	30.2	0.9	1749.0	222	184	53
U of Michigan	pub	572	1958	58	5500	169	6.8	0.6	89.2	1099	1677	648
U of Michigan, Dearborn	pub	319	127	.	.	28	14.9	0.8	446.0	187	89	200
Michigan Tech	priv	292	.	.	.	31	8.3	1.2	19.5	42	67	229
U of Minnesota, Duluth	pub	1357	36	.	.	37	.	0.8	.	26	7	5
U of Mississippi	pub	1515	106	61	.	51	13.5	0.9	1682.0	7	56	33
U of Missouri, Columbia	pub	812	120	40	.	55	60.8	0.9	972.0	17	104	107

SCHOOL	TYPE	UGRAD (FTE)	MBA (FTE)	PHD (FTE)	EMBA (FTE)	FAC (FTE)	STUD/ MICRO	FAC/ MICRO	STUD/ STAFF	CAP $000s	OP $000s	$/STUD FTE
U of Missouri, KC (Bloch)	pub	300	600	.	.	.	7.2	.	.	380	217	241
Montana State	pub	900	.	.	.	29	25.0	0.9	.	6	5	6
Monterey Inst	priv	.	149	.	.	12	5.0	0.9	.	50	57	383
Morgan State	pub	1225	85	.	.	42	16.4	0.7	1310.0	.	152	116
Naval Postgrad	pub	.	502	.	.	77	7.2	0.5	167.3	470	245	488
U of Nebraska, Omaha	pub	2730	270	.	40	82	33.0	0.7	750.0	86	163	54
U of New Mexico (Anderson)	pub	940	210	1	50	64	26.8	1.2	230.2	40	137	119
U of New Orleans	pub	3432	674	.	.	130	.	.	586.6	20	125	30
New York U (Stern)	priv	1896	2212	152	176	265	12.0	0.6	72.2	1200	3080	723
Nicholls State	pub	543	82	.	.	35	7.4	0.8	312.5	112	111	178
U of NC, Greensboro (Bryan)	pub	1373	169	.	.	59	70.1	0.8	.	30	10	6
U of NC Wilmington (Camero	pub	1130	66	.	.	55	27.8	1.0	1196.0	37	73	61
N Carolina A&T	pub	1000	.	.	.	.	13.3	.	.	.	.	.
N Carolina Cen	pub	550	45	.	.	47	18.6	1.0	595.0	59	56	94
U of N Florida	pub	1000	210	.	.	55	.	0.9	.	.	.	.
NE Missouri State	pub	1150	17	.	.	32	29.2	1.0	.	40	114	98
NE Illinois U	pub	841	29	.	.	31	.	1.0	.	49	439	505
N Arizona U	pub	2300	77	.	.	60	21.6	0.7	792.3	45	154	65
U of N Colorado	pub	1000	.	.	.	42	10.0	1.0	333.3	70	232	232
N Illinois U	pub	3222	615	25	100	160	27.2	0.9	1931.0	82	275	71
U of N Iowa	pub	2604	103	.	.	69	29.1	0.6	1353.5	204	77	28
N Kentucky U	pub	1846	127	.	.	48	94.0	1.1	.	770	3	2
N State U	pub	20	.	.	.	.	0.2	.	.	110	.	.
Ohio U	pub	1538	175	.	62	60	19.2	0.6	1713.0	210	115	67
Ohio State (Fisher)	pub	1988	306	85	.	113	11.5	0.8	158.6	20	1247	524
U of Oklahoma	pub	2686	194	43	.	82	21.3	0.8	208.8	35	307	105
Oklahoma State	pub	2700	155	100	.	100	28.1	1.1	492.5	100	134	45
Old Dominion	pub	936	204	22	.	83	21.9	1.3	.	300	51	44
U of Oregon (Lundquist)	pub	2100	230	25	.	58	54.8	0.7	336.4	51	180	76
U of Penn (Wharton)	priv	2850	1550	200	200	236	38.3	0.9	76.7	1150	3130	680
Penn State (Smeal)	pub	3768	227	83	.	142	21.0	1.1	407.8	45	347	85
Penn State, Erie	priv	598	138	.	.	28	.	1.0	.	60	13	18
Prairie View A&M	pub	475	35	.	.	19	6.8	1.0	.	31	12	24
U of Puerto Rico	pub	3432	311	.	.	141	29.5	7.4	748.6	76	306	82
U of Puget Sound	priv	300	.	.	.	14	6.3	0.7	.	.	.	.
Krannert, Purdue U	pub	1734	246	133	162	81	8.4	0.7	140.9	250	519	246
Quinnipiac Col	priv	760	88	.	.	58	15.7	1.4	.	30	73	86
Ramapo Col	pub	820	.	.	.	22	16.4	0.8	410.0	60	100	122
U of Richmond (Robins)	priv	329	100	.	.	45	.	1.1	.	.	13	30
U of Rochester (Simon)	priv	.	516	46	187	58	7.8	0.5	70.3	177	702	1249
Roosevelt U	priv	500	180	.	.	42	.	2.6	.	18	1	1
Rutgers U, Camden	.	349	89	.	.	36	29.2	1.1	.	118	31	71
Sacred Heart U	priv	2983	600	.	.	35	.	1.3	895.8	.	.	.
St Bonaventure U	priv	480	187	.	.	21	8.3	1.0	.	25	25	37
St Francis Col	.	200	125	.	.	8	20.3	1.1	162.5	10	.	.
St Johns U	priv	2500	1200	.	.	125	.	31.3	616.7	.	.	.
St Leo Col	priv	200	80	.	.	9	5.5	0.9	280.0	40	87	311
St Mary's Col	priv	548	171	.	187	41	11.4	2.1	.	.	.	.
San Diego State	pub	1500	400	.	75	100	15.8	1.1	633.3	155	225	118
San Francisco State	pub	800	152	.	.	121	7.9	1.0	238.0	136	258	271
San Jose State	pub	2153	86	.	.	106	11.4	1.1	746.3	71	293	131
Sangamon State	pub	1130	216	.	.	38	224.3	1.2	.	34	10	7

SCHOOL	TYPE	UGRAD (FTE)	MBA (FTE)	PHD (FTE)	EMBA (FTE)	FAC (FTE)	STUD/ MICRO	FAC/ MICRO	STUD/ STAFF	CAP $000s	OP $000s	$/STUD FTE
U of Scranton	priv	827	53	.	.	44	29.3	1.8	21.5	.	.	.
Shippenburg U Grove)	pub	1250	.	.	.	49	.	1.0	.	50	2	2
U of S Carolina	pub	1455	724	76	326	139	13.3	7.0	205.0	.	498	221
U of S Carolina, Spartenburg	pub	600	.	.	.	17	20.0	0.9	.	2	6	10
SE Missouri State	pub	910	.	.	.	44	12.8	1.0	.	20	30	33
U of S Calif	priv	3526	755	47	163	216	20.5	1.2	240.4	608	991	229
U of S Colorado	pub	444	36	.	.	24	80.0	1.1	.	3	.	.
S Illinois, Carbondale	pub	1372	121	62	.	57	.	0.9	1555.0	131	66	42
U of S Maine	pub	.	.	.	.	53	.	1.5	.	16	11	.
S Methodist U (Cox)	priv	625	631	.	100	83	8.3	1.1	628.0	17	143	114
U of S Mississippi	pub	1400	100	.	30	72	15.8	0.8	1500.0	41	97	65
SW Missouri State	pub	2723	172	.	.	112	15.8	1.0	.	63	20	7
U of SW Louisiana	pub	1950	160	.	.	65	19.9	1.0	263.8	83	120	57
Stanford U	priv	.	728	96	47	80	5.8	0.6	48.5	390	1368	1660
SUNY, Buffalo	pub	1005	598	46	22	72	11.1	0.9	824.5	186	362	220
SUNY, Stony Brook	pub	350	100	.	3	15	26.5	0.8	450.0	20	34	76
SUNY, Brockport	pub	.	.	.	.	26	.	1.2	.	9	4	.
SUNY, Plattsburgh	pub	782	.	.	.	28	26.1	0.8	782.0	.	1	1
Suffolk U	priv	864	308	.	59	73	15.2	0.9	293.0	165	181	154
Syracuse U	priv	1199	319	20	24	70	769.0	0.7	90.5	23	147	96
Temple U	pub	2926	617	120	43	194	34.2	1.4	281.8	.	212	58
U of Texas, San Antonio	pub	4200	600	.	.	90	192.0	1.1	.	20	87	18
Texas A&M	pub	5700	500	100	.	140	96.9	0.8	1575.0	160	73	12
Texas Christian U (Neeley)	priv	894	200	.	.	51	12.0	1.1	364.7	33	96	88
Texas Tech	pub	3131	340	95	.	59	44.6	0.6	396.2	130	233	65
Towson State	pub	2120	.	.	.	68	30.3	1.2	353.3	40	24	11
Trenton State	pub	840	.	.	.	30	16.8	1.0	.	12	.	.
Tulane U (Freeman)	priv	301	264	16	152	42	4.8	0.6	290.5	60	164	282
U of Tulsa	priv	640	125	.	.	45	19.1	1.0	382.5	250	90	118
US Coast Guard Academy	pub	100	.	.	.	8	1.0	0.6	.	7	3	30
U of Utah (Eccles)	pub	1110	199	36	27	82	10.9	1.0	192.1	151	275	204
Utah State	pub	2275	306	.	.	69	11.4	0.9	198.5	128	149	58
Valdosta State	pub	960	23	.	.	28	17.2	0.6	163.8	90	64	65
Vanderbilt U (Owen)	priv	.	379	12	100	52	7.2	0.6	32.6	363	434	1110
U of Vermont	priv	420	50	.	.	25	24.7	0.8	235.0	.	200	426
U of Vriginia (Darden)	pub	.	480	11	.	90	6.3	1.1	40.9	75	488	994
U of Virginia (McIntire)	pub	650	.	.	.	60	6.5	.	216.7	145	309	475
Virginia Polytech (Pamplin)	.	2423	304	47	.	110	37.0	0.8	.	150	41	15
Wake Forest U (Babcock)	priv	.	199	.	100	28	4.0	0.7	66.3	303	293	1472
Walsh Col	priv	1037	862	.	.	52	9.0	3.3	271.3	300	452	238
Washburn U	pub	939	156	.	.	.	37.8	.	.	5	21	19
U of Washington	pub	1450	450	100	90	100	16.0	1.0	400.0	100	401	201
Washington U (Olin)	priv	592	392	21	94	58	15.7	0.7	91.4	40	442	440
Washingtomn and Lee	priv	140	.	.	.	36	3.8	0.9	140.0	29	59	421
Weber State	pub	2000	.	.	.	50	22.2	0.8	2000.0	25	64	32
W Georgia Col	pub	1000	55	.	.	40	13.7	1.0	1055.0	75	33	31
W VIrginia U	pub	620	147	32	.	73	10.4	0.8	61.5	123	420	526
W Virginia Grad Col	pub	.	150	.	.	12	.	0.9	.	9	10	67
W Virginia Inst	pub	310	.	.	.	22	5.2	0.7	62.0	31	8	26
W Carolina U	pub	701	120	.	.	47	9.5	3.4	.	72	105	128
W Michigan U (Haworth)	pub	3743	318	.	.	94	15.6	0.9	507.6	2	145	36
W Washington U	pub	756	40	.	.	52	12.2	0.9	159.2	171	158	198

SCHOOL	TYPE	UGRAD (FTE)	MBA (FTE)	PHD (FTE)	EMBA (FTE)	FAC (FTE)	STUD/ MICRO	FAC/ MICRO	STUD/ STAFF	CAP $000s	OP $000s	$/STUD FTE
Col of William & Mary	pub	321	321	.	33	51	3.3	0.9	214.0	55	148	231
U of Wisconsin, Green Bay	pub	947	.	.	.	20	39.5	1.1	.	10	8	8
U of Wisconsin, LaCrosse	pub	1450	45	.	.	46	27.7	.	.	45	35	23
U of Wisconsin, Madison	pub	1193	278	88	57	124	14.2	0.7	91.7	.	667	428
U of Wisconsin, Milwaukee	pub	723	259	37	45	75	4.3	0.8	1019.0	1200	192	188
U of Wisconsin, Parkside	pub	217	78	.	.	21	11.8	1.1	.	26	23	78
Woodbury U	priv	300	120	.	.	20	7.8	4.0	32.3	150	245	583
Yale	priv	.	425	12	.	50	4.6	0.5	62.4	100	455	1041
U of Alberta	.	1830	193	46	29	77	25.9	0.5	689.7	91	245	118
U of British Columbia	pub	1250	282	80	.	110	17.3	0.7	403.0	126	73	45
Ecoles d Hautes, Montreal	pub	8397	876	67	.	311	52.5	0.8	373.6	250	1428	153
U Laval	pub	2825	549	63	.	141	20.3	1.3	264.4	165	310	90
McMaster U	pub	1500	330	18	5	55	23.7	0.9	924.0	20	126	68
Memorial U, Newfoundland	pub	800	135	28	.	34	18.2	0.7	481.5	70	137	142
U of New Brunswick	pub	750	75	.	.	38	14.7	1.0	412.5	34	59	72
U of Saskatchewan	pub	1150	118	1	24	78	27.6	1.2	634.5	89	89	70
U of Toronto	pub	800	346	39	24	46	18.0	0.7	395.0	113	163	138
U of Victoria	pub	600	43	.	.	25	107.2	0.8	321.5	.	57	89
Wilfrid Laurier U	pub	1953	209	.	.	113	43.2	1.2	720.7	.	100	46
York U	pub	592	770	47	.	153	26.6	1.9	176.1	327	461	327
Cyprus Col, Cyprus	priv	772	20	.	.	44	11.0	1.1	113.1	45	150	189
U of Warwick, England	pub	638	572	151	222	137	13.1	0.8	170.1	144	394	289
Essec Ecole, PC, France	.	600	1300	60	30	70	15.8	0.7	392.0	2800	818	417
Groupe Esc Lyon, France	priv	800	50	.	70	.	3.9	.	56.7	1195	2252	2649
Institut Superieur, France	priv	1073	101	.	.	144	97.8	2.7	106.7	16	848	722
Manchester, England	pub	.	342	58	.	55	6.5	0.7	40.0	83	213	533
U of Cape Town, SA	pub	.	.	.	.	.	.	.	.	68	108	.
Chinese U of Hong Kong	pub	1190	198	14	47	138	13.0	1.2	350.5	15	141	101
U of Auckland, NZ	pub	3407	312	22	94	65	6.8	0.7	187.1	1500	776	207
ICESI, Columbia	.	2000	500	.	.	90	25.0	9.0	125.0	386	378	151
Ort Uruguay Sch, Uruguay	priv	580	75	.	75	85	25.2	85.0	218.3	42	3	5
ITESM, Monterrey, Mex	priv	5417	1167	17	.	99	7.8	0.6	3300.5	42	11	2