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ABSTRACT

Studied on Information System resources in higher education have traditionally focused on the large research institutions, leaving much unsaid about other types of institutions. This study focused on smaller colleges and universities, institutions with fewer than 5,000 students. Some of the areas studied were finance and budgeting of technology resources. Of the 629 institutions surveyed, 350 provided usable responses. Responding information system administrators perceived that information technology departments have lost ground in the resource expenditure area when compared with expenditures for other institutional resources. This perception may be reality, since the mean information system budget was found to be only 3% of the total institutional budget. Respondent institutions charged computer lab fees less than 30% of the time, with public institutions more likely to charge lab fees than private institutions. Respondent institutions charged technology fees less than 20% of the time, and private institutions were less likely to have such fees. When schools charged technology fees, the distribution of the fee went to departments other than information systems. Some recommendations are made for improving the position of information technology on college campuses. An appendix contains the study tables. (Contains 9 tables and 23 references.) (SLD)

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MIS FINANCE AND BUDGETING ISSUES IN SMALL PUBLIC AND PRIVATE INSTITUTIONS

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Studies on Information System resources in higher education have traditionally focused on the large research institutions leaving much unsaid about other types of institutions. The educational institutions focused on in this study are smaller colleges and universities - institutions with fewer than 5000 students. Some of the major areas studied were the finance and budgeting of technology resources. The author surveyed 629 CAUSE and Educom institutions with fewer than 5000 students in 1996. Of the 629 institutions survey, 350 provided usable responses for this study. The study was differentiated by public and private institutions.

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Introduction

The ubiquitous of computers is an undisputable fact of life as we enter the 21st Century. The wide-spread use of computer resources in government and industry paralleled the development of technology. While computers also existed in the academic arena early on, it is only in more recent years that colleges and universities have come to recognize the importance of providing computing resources to all their constituent groups: students, faculty, and staff. Many of academia's well-known authors have written about the critical nature of information technology to education; for example, Keller (1993) wrote "that institutions that have powerful information technology and capabilities are likely to widen their competitive advantage over the 'have-nots'" (p. 12). Stuckey (1996) and McClure (1996) stated that information resources were not an option, but a necessity in higher education and institutions that did not embrace information technology could find themselves extinct. Alvarez (1996) emphasized that even if institutions maintained the status quo in technology they would be at risk and West (1996) said that institutions that failed to take advantage of technology would find themselves left behind in our market economy.

Even though authors acknowledge the importance of technology to higher education, the question remains as to whether higher education's decision-makers recognize the implications of this new era so aptly called the "Information Age." One of the major problems identified in all types of institutions seems to be a lack of information concerning the annual expenditures for information technology according to Green and Jenkins (1998). This situation is further exacerbated if the institution is small because though the literature abounds with articles concerning the importance of technology to higher education, few references exist that pertain to small colleges and universities and their technology needs. Even fewer references examine the budgeting issues related to technological resources in the smaller institutions.

Literature Review of Finance/Budgeting for Technology

The finance/budgeting issue is the most critical issue facing information system administrators in small colleges and universities. Technology is costly and the long-range benefits that could accrue to administrative services and to the institutions as a whole often remain hidden. Marshall (1991) wrote that information systems would be fully integrated into higher education only "when the costs of computing are incorporated into planning and budgets" (p. 3). He stressed that planning and budgeting for technology were essential. Ernst and Segall (1995) noted that "the problem is that for many institutions, the investments made in new systems are not always integrated with institution-wide strategic directions and needs" (p. 12). McCollum reporting in The Chronicle quoted Jasper as saying that "technology is really not the story. The story is money" (p. A63).

The importance of budgeting as part of the strategic planning process was emphasized by Oberlin (1994) who wrote that "...budgets are the link between plans and actions. They translate strategic plans into the financial resources necessary to implement the plan" (p. 24). One element that is frequently overlooked which has major implications in the finance and budgeting of technology is the proliferation of personal computers in organizations. Unfortunately, the financial accounting community, including accountants within the university environment, seem unable to develop policies for PC investments that often become obsolete in 12 to 18 months but are still functional according to Olivia, Khosrowpour, and Amoroso (1991).

In the rush to client/server networks, many organizations, including educational institutions, were caught unaware of the total cost of ownership of this new computing environment. Kirwin and Younker (1995) reported that the five year total cost of ownership (TCO) for a PC went from $19,296 in 1987 to $41,436 in 1994, an increase of 153%. More recently, Simpson (1997) reported that the Gartner Group averaged the TCO for a Win95 PC in 1997 at $9800 a year or $49,000 across five years. Over 80% of the TCO is associated with end-user operations and support functions; Gartner Group identified end-user operations as the time spent by end-users on non-job related PC activities.

Another chief difficulty associated with the financial costs of technology relates to the fact that end-user computing is so transparent within the organization to seem as if it doesn't really exist. On the other hand, it is ubiquitous, pervasive and wholly necessary in today's computing environment. While computing costs associated with user departmental budgets are difficult to locate or isolate, the budgets of information system departments are centralized and therefore highly visible in an organization. This factor is stressed by Solomon (1994) who noted that costs associated with departmental software are often unknown and that most organizations "...cannot tell you how many of which software packages are installed...what is worse, most of those costs are hidden and not fully understood by management because they creep in so gradually..." (p. 48).

Another startling fact is that while the cost of the centralized information system department budgets has decreased in educational institutions, spending on technology has risen. Decision makers have failed to realize that this situation has occurred because 60% of the information technology expenses are actually outside of the central computer center budget. The true cost of technology goes unrecognized since costs associated with end-user computing fail to appear in either a computer center or a user departmental budget. These costs are well hidden precisely because they are associated with the end-user and such costs are not recognized as information technology expenses. Consequently while the information system department budgets are shrinking the actual cost of technology in the enterprise is increasing, according to Kirwin and Younker (1995).

Apparently most post secondary institutions have failed to create any type of amortization plan for the acquisition or retirement of obsolete equipment, particularly as it relates to PCs. A number of references in the literature refer to the cost of technology as the major "black hole" of the institutional budget (Green & Gilbert, 1995; Oberlin, 1994; Ringle & Smallen, 1995). This budgetary concern was also echoed by Barone (1996) who wrote:

> Technology costs money, lots of money. The up front cost of purchase is just the tip of the iceberg....Expensive or not, value-added or not, technology is an indispensable element of teaching, research and administration on our campuses today. To pay for it, planners and managers, at all levels, must engage in the unpalatable exercise of budget reallocation. (p. 28)

Green and Jasper reported that the 1997 Campus Computing Survey revealed that less than one third of the reporting institutions had a financial plan for technology and that over half of the institutions funded their technology resources with one-time budget allocations. The financial situation and budgetary constraints are even more critical to the small colleges and universities which comprise at least two-thirds of all higher educational institutions. Ringle and Smallen (1995)

highlighted this situation at the 1995 CAUSE conference when they stated that "one of the more important distinguishing characteristics of small colleges is the scarcity of resources they can apply to the pursuit of technology goals" (p. 1-1-2).

Another problem associated with the financing of technology in small versus large institutions was also noted by Ringle and Smallen (1995) who wrote that:

> ...universities have a long history of using technology fees and charge-back mechanisms to fund computing services, and restricting computing access to students in particular courses. These practices are foreign to small institutions which generally finance educational programs through tuition charges and institutional funds. (p. 1-1-3)

Statement of the Problem

In 1996, the author conducted a study of the 629 CAUSE and Educom member institutions with 5000 or fewer students. The budgeting and financing of information system resources was a major focus of the author's study. The 1996 study posed the question "To what extent did private institutions with 5000 or fewer students differ from public institutions of 5000 or fewer students with regard to information system department budgets and institutional budgetary allocations?" Testing took place on the following seven hypotheses:

H_{01}: There are no significant relationships between information system budgets in private institutions and the inflation rate as compared with the same relationship in public institutions.

H_{02}: There are no significant relationships in the total expenditures for information system resources and expenditures for other institutional resources in private institutions as compared with the same types of expenditures in public institutions.

H_{03}: There are no significant relationships in a private institution's giving a high priority to increasing information system department budgets as compared with giving similar priority in public institutions.

H_{04}: There are no significant relationships in the charging of computer lab fees in private institutions as compared with the charging of similar lab fees in public institutions.

H_{05}: There are no significant relationships in budgetary distribution of computer lab fees in private institutions as compared with similar lab fee distribution in public institutions.

H_{06}: There are no significant relationships in the charging of technology fees in private institutions as compared with the charging of similar technology fees in public institutions

H_{07}: There are no significant relationships in the budgetary distribution of technology fees in private institutions as compared with similar technology fee distribution in public institutions.

Methodology

The author's study included the total population of 629 institutions that were members of CAUSE and Educom during 1996. The first two contacts were made by a mail survey to the information system director at each school. Directors that did not reply to the mail surveys were then contacted by email or telephone if no email address was available. A total of 350 surveys were returned and usable for a return rate of 55.6%. The data were analyzed using the SPSS statistical software for Windows version 6.1. Chi-square contingency tables were used to test the significance of the comparative data and Pearson correlations were reported. The .05 alpha level was used as the level of significance for testing the hypotheses. Frequencies were taken on institutional data and correlations were used to determine relationships between variables.

Demographics

Of the 350 responding institutions, 63.7% were private and 36.3% were public, corresponding to the national profile. Of the 629 CAUSE and Educom institutions that were mailed surveys, 62% were private and 38% public. The Chronicle of Higher Education (2000) reported that for academic year 1997/98, 67% of the U.S. institutions of higher education were private and 33% were public for schools with fewer than 5000 students.

A total of 23% of the institutions belonged to either CAUSE or Educom. The lowest total institutional budget was $2.5 million and the highest reported was $163 million. The lowest reported information technology budget was $50,000 and the highest reported was $4.5 million in the author's study. The mean information technology budget was $911,194 for the reporting institutions. The mean institutional budget was $29.7 million. Seven institutions of the 350 respondents did not furnish budget data. Unfortunately no budget data were available for a national comparison.

Frequencies and Correlations

This section covers a summary of findings drawn through simple comparisons of frequencies or percentages and correlations between variables. The respondents in this study closely parallel similar percentages for public and private institutions found in the population of the 629 institutions used in this study, as well as the percentages in the total population of institutions with less than 5000 students. Since the percentages are representative of the wider population based on institutional type, a case can be made that generalizations to these populations are possible for any relationships found between private and public institutions.

Positive relationships were found between several of the variables when the Pearson correlation method was used. When the FTE variable was tested against individual budgetary factors, it was found that if FTE increased so would the total institutional budget as well as the information technology budget. When correlating the two budgets, a positive relationship was found, therefore, the findings suggest that as institutional budgets increase so do information technology budgets.

Research Issue

The research issue concerned the relationship between finance/budgeting allocations and information technology departments in private and public institutions with 5000 students or less to determine if any differentiation existed between the two types of institutions. Seven hypotheses

related to this issue. Chi-square analysis revealed that three of the seven null hypotheses were rejected.

Hypothesis four was found to be significant under chi-square analysis suggesting a relationship existed in the charging of computer lab fees when comparing private and public institutions. Though the finding suggested that few private or public institutions charge computer lab fees, the private institutions are much less likely to charge computer lab fees than their public counterparts. Only 22.5% of the respondents in private institutions indicated that they charged a computer lab fee while 37.8% of the public institutions responded that they did so.

Hypothesis six was found to be significant using chi-square analysis suggesting a relationship in the charging of a technology fee when comparing the private and the public institutions. Though the finding suggested that few private or public institutions charge technology fees, the private institutions are less likely to charge such fees than their public counterparts. Only 14.4% of the respondents in private institutions indicated that they charged a technology fee while 26.8% of the public institutions did so.

Hypothesis seven was also found to be significant suggesting a relationship in the distribution of technology fees when comparing the private and public institutions that charged such fees. The findings suggested that private institutions that have a technology fee were more likely to distribute that fee to their General Fund before allocating it elsewhere. Private institutions with such a fee indicated that 62.5% of the time it was allocated to the General Fund and 25% of the time it was allocated to an information technology department. Public institutions with the technology fee were more likely to allocate the money to other areas 41.2% of the time and to their information technology departments 38.2% of the time. In both the private and public institutions, this implies that the technology departments are unlikely to benefit substantially from the technology fee.

Summary of the Findings Based on the Literature

In regard to the issues of finance/budgeting, Ringle and Smallen (1995) indicated that small colleges and universities do not use technology fees or charge-back mechanisms. The author's findings confirm that technology fees are rarely used in the small institutions, though small public institutions do so more frequently than the small private institutions which bears out statements by Green and Jenkins (1998) that public colleges and universities are turning to students fees to finance technology costs.

It remains to be seen, however, whether the institutions that responded to this study are devoting substantial financial resources to technology as so many authors insist should be done (e.g., Barone, 1996; Gilbert, 1994; Oberlin, 1996). This study suggests that information technology administrators perceive that the IT departments are losing ground financially. Heterick (1994) recently wrote that 5% of the total institutional budget was an adequate level of budgeting for technology. A CAUSE profile study by Munson, Richter, and Zastrocky (1994) found a four percent average IT budget, while the author's study revealed only a mean IT budget of three percent.

Conclusions

1. The findings in the author's study indicated that chief information system administrators perceived that information technology departments have lost ground in the resource expenditure area when compared with expenditures for other institutional resources. It can be

concluded that information technology administrators believe that their departments are not being adequately funded and that this may indeed be a reality since the mean information system budget of the respondents was found to be only 3% of the total institutional budget. This hardly seems adequate when one considers the proliferation of campus computing resources in recent years.

2. The author's findings indicated that the respondent institutions charge computer lab fees less than 30% of the time; however, when lab fees were charged public institutions did so more frequently than private institutions. It can be concluded from this finding that institutions are reluctant to add additional fees even when it means that these fees could be used to expand technological resources to students.

3. The author's findings indicated that the respondent institutions charge technology fees less than 20% of the time; however, the private institutions were much less likely to charge the technology fee. It can be concluded that both institutional types have a reluctance to add more student fees, but that the private institutions with their higher tuition may also be more willing to absorb the costs of technology than are the public institutions. It is conceivable that the private institutions have already factored the cost of technology into their tuition. Other related conclusions could be that public institutions may have tuition caps which force them to resort to fees to raise additional revenue and that tuition increases are unpopular with parents, taxpayers, and students while fees for specific services are more acceptable.

4. The findings indicated that when schools charged technology fees the distribution of the fee went to departments other than information systems. It can be concluded from this finding that institutions may be using technology fees for purposes other than funding information technology resources.

Recommendations

Information technology in higher education merits more research, particularly research that concentrates on small institutions. The author's study has tried to contribute some understanding of the finance/budgeting issue as it related to the application of technology and computer lab fees in institutions with 5000 students or less. Further studies should be undertaken concerning issues of technology in small colleges and universities since so little research is devoted to these types of institutions and yet these institutions make up the majority of higher education. Future researchers should try to determine if institutional budget or size impacts technology issues.

The information system administrators that responded to the author's study appeared to perceive that their departments were losing ground in the institutional budget wars. Future studies could examine more closely when a lack of adequate institutional financing of information systems is endangering the spread of technology on the campuses and impacting the institution's ability to compete in this "Information Age."

Another issue that should be closely examined is the hidden costs of computing. Future studies should closely examine the issue of end-user computing. There is little doubt that such hidden costs could have a major impact on small institutions with limited resources.

Finally, the ubiquity of information technology in our society forces even the smallest institution to provide a computing environment on campus. The important question is not which systems or software to offer, but how to fund technology and how to allocate limited financial resources to cover the costs of the spiraling cycle of constant technological change.

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Appendix
Tables

Table 1
Demographics about the Institutions

Categories	Number of Institutions	Percent of Institutions
Type of Control (n=350)		
Public	127	36.3
Private	223	63.7
Size of Institutions (FTE Student) (n=350)		
0-199	1	.3
200-499	4	1.1
500-999	40	11.4
1000-2499	170	48.6
2500-4999	130	37.1
5000	5	1.4
Total IS Budget (Dollars) (n=350)		
Not Reported	7	2.0
200,000 or Less	18	5.1
200,001-400,000	68	19.4
400,001-600,000	65	18.6
over 800,000	136	38.9
Total Institutional Budget (Dollars) (n= 350)		
Not Reported	7	2.0
10 Million or Less	39	11.1
10,000,001-20 Million	97	27.7
20,000,001-30 Million	84	24.0
30,000,001-40 Million	40	11.4
40,000,001-50 Million	36	10.3
50,000,001-60 Million	20	5.7
Over 60 Million	27	7.7

Table 2
Relationship Between Institutional Types and IS Budget Compared to Inflation Rate

	Matched	Exceeded	Lagged	Don't Know	Row Total
	1	2	3	4	Row %
Public					
Actual Count	16	37	58	16	127
Exp. Count	18	44	50	15	
Total %	4.6	10.6	16.6	4.6	36.3
Private					
Actual Count	34	84	78	26	222
Exp. Count	32	77	86	27	
Total %	9.7	24.0	22.3	7.4	63.7
Column Total	50	121	136	42	349
Column %	14.3	34.6	38.9	12.0	100
Chi-square	Value		DF	Significance	
Pearson	5.11		3	.27605	

Table 3
Relationship Between Institutional Types and IS Expenditures Compared to Other Expenditures

	Matched	Exceeded	Lagged	Don't Know	Row Total
	1	2	3	4	Row %
Public					
Actual Count	35	49	28	15	127
Exp. Count	29	51	28	19	
Total %	10.0	14.0	8.0	4.3	36.3
Private					
Actual Count	46	92	49	35	222
Exp. Count	52	90	49	31	
Total %	13.1	26.3	14.0	10.0	63.7
Column Total	81	141	77	50	349
Column %	23.1	40.3	22.0	14.3	100

Chi-square	Value	DF	Significance
Pearson	3.25	3	.51730

Table 4
Relationship Between Institutional Types and IS Budget Priority Increase

	Yes (1)	No (2)	Row Total Row %
Public			
Actual Count	73	54	127
Exp. Count	79	48	
Total %	20.9	15.3	36.3
Private			
Actual Count	146	77	223
Exp. Count	140	83	
Total %	41.7	22	63.7
Column Total	219	131	350
Column %	62.6	37.3	100
Chi-square	Value	DF	Significance
Pearson	2.68	1	.26242

Table 5
Relationship Between Institutional Types and the Charging of Computer Lab Fees

	Yes (1)	No (2)	Row Total Row %
Public			
Actual Count	48	79	127
Exp. Count	36	91	
Total %	13.8	22.6	36.4
Private			
Actual Count	50	172	222
Exp. Count	62	160	
Total %	14.3	49.3	63.6
Column Total	98	251	349
Column %	28.1	71.9	100
Chi-square	Value	DF	Significance
Pearson	9.33	1	.00229

Table 6
Relationship Between Institutional Types and Distribution of Computer Lab Fees

	Gen Fund	Acad Dept	IS Dept	Other	G.F/ Other	G.F./ Acad	Row Total
	1	2	3	4	5	6	Row %
Public							
Actual Count	25	13	1	7		2	48
Exp. Count	24	15	2	5		2	
Total %	25.5	13.3	1.0	7.1		2.0	49.0
Private							
Actual Count	23	17	5	3	2		50
Exp. Count	24	15	4	5	2		
Total %	23.5	17.3	5.1	3.1	2.0		51.0
Column Total	48	30	6	10	2	2	98
Column %	49.0	30.6	6.1	10.2	2.0	2.0	100

Chi-square	Value	DF	Significance
Pearson	8.85	5	.18241

Table 7
Relationship Between Institutional Types and Charging a Technology Fee

	Yes (1)	No (2)	Row Total Row %
Public			
Actual Count	34	93	127
Exp. Count	24	103	
Total %	9.7	26.6	36.3
Private			
Actual Count	32	190	222
Exp. Count	42	180	
Total %	9.2	54.5	63.7
Column Total	66	283	349
Column %	18.9	81.1	100
Chi-square	Value	DF	Significance
Pearson	8.63	1	.01340

Table 8
Relationship Between Institutional Types and the Distribution of Technology Fees

	Gen Fund	Acad Dept	IS Dept	Other	Row Total
	1	2	3	4	Row %
Public					
Actual Count	6	1	13	14	34
Exp. Count	13	2	11	8	
Total %	9.1	1.5	19.7	21.2	51.5
Private					
Actual Count	20	2	8	2	32
Exp. Count	13	1	10	8	
Total %	30.3	3.0	12.1	3.0	48.5
Column Total	26	3	21	16	66
Column %	39.4	4.5	31.8	24.2	100
Chi-square	Value		DF		Significance
Pearson	18.02		3		.00044

Table 9
Post Hoc Test

Relationship Between Institutional Types and Distribution of Technology Fee Between the General Fund and Other Funds

	Gen Fund	Other	Row Total
	1	4	Row %
Public			
Actual Count	6	14	20
Exp. Count	12	8	
Total %	14.3	33.3	47.6
Private			
Actual Count	20	2	22
Exp. Count	14	8	
Total %	47.6	4.8	52.4
Column Total	26	16	42
Column %	61.9	38.1	100
Chi-square	Value	DF	Significance
Pearson	16.48	1	.00005

(The .05 alpha level was adjusted using the Bonferroni method to .002 alpha level.)

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