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# **Key Information Technology Issues In Higher Education In The 1990s**

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## **Abstract**

The results of a delphi survey of the key information technology (IT) issues facing IS managers in college and universities in the U.S. in the 1990s are reported in this paper. The participants represent 161 colleges and universities that grant at least baccalaureate degrees. The study is similar to those conducted by the Society for Information Management (SIM) and the MIS Research Center (MISRC) at the University of Minnesota which have focused almost exclusively on the private sector, and studies sponsored by CAUSE, a nonprofit association concerned with the use and management of information technology in higher education. The purpose of the research is to identify the key issues facing higher education IS managers in the U.S. in the 1990s. This paper reports that the rank ordering of the key issues for the respondent institutions. The top key issues for research institutions include integrating new technologies into existing systems; improving user access to IS and communications systems; integrating systems and local area networks; managing administrative data resources; developing administrative support systems; establishing an information technology architecture; and improving IS strategic planning. Also reported are the issues on which significant differences exist between research and nonresearch institutions. The results indicate that the most critical IT issue facing public, nonresearch institutions is funding.

## **Introduction**

Several key information technology (IT) issue studies have been reported in the information systems (IS) literature since the early 1980s. Most of these surveys have focused on private sector organizations and IS managers [BALL87; HART86A; HART86B; DICK84]. The key issues in higher education have been reported [NETW93; NIED91], but these studies either have not been comprehensive or have been methodologically weak. The primary objectives of the current study are to identify: (1) what IT management issues are expected to most important over the next few years; and (2) how much consensus exists about the relative importance of specific issues by various classes of institutions. A clearer understanding of the major issues and trends confronting IS managers in higher education is vitally important for assessing current IT conditions and for planning.

## **Research Method**

A delphi methodology was employed for soliciting a list of issues and a brief description of each issue. A mailing list of 589 CAUSEmember institutions was used to target the survey questionnaires to IT administrators and managers in colleges and universities that

at minimum grant baccalaureate degrees. Three delphi rounds were conducted. In each round a list of seed issues and a rationale for each issue was provided. Respondents rated each issue on an eleven-point scale where 1 = not important and 10 = extremely important to their particular institution. A zero (0) indicated that the institution had already resolved the issue. Respondents were free to add or modify issues. The first round survey contained forty-seven seed issues and rationales gleaned from the literature. One hundred thirty-six usable surveys were returned (response rate = 23.1%). Thirty-six of the highest rated issues (mean  $\bar{x}$  6.0) were retained and combined with twenty-three issues submitted by the respondents for the second round survey. One hundred seven-five second round surveys were returned (response rate = 29.7%). The respondents did not suggest any new or modified issues to the second round survey. Twenty-nine issues (mean  $\bar{x}$  6.0) were retained for the third round survey. Respondents also were asked to indicate their relative agreement or disagreement with several statements concerning funding, top management support, the impact of IT problems on academic and administrative performance, and their relative level of optimism that their institution would resolve its key IT problems in the next two years and five years. One hundred sixty-one usable surveys were returned in the third round (response rate = 27.3%). Again, no new or modified issues were offered by the respondents. The respondent institutions were classified using the Carnegie classifications [CARN87].

## Results

The third round respondents represented one hundred-eight (108) nonresearch and fifty-three (53) research institutions, and ninety public and seventy-one private institutions. The regional break down of the represented institutions is as follows: 57 Midwest, 42 Northeast, 40 South, and 30 West. The respondents reported spending, on average, 50% of their time on administrative systems (median = 40%), 25% on academic systems (median = 25%), 15.6% (median = 15%) on telecommunication and networks, and 7.5% (median = 0) on other activities. A listing of the top ten key issues over all respondents is presented in Table 1.

The final survey contained several statements to which the respondents were to indicate their level of agreement or disagreement using a five-point Likert scale. The statements concerned the seriousness of the funding problems, impact of IT on faculty and staff morale, condition of the institution's communication systems, optimism of solving current IT problems in next two years and next five years, and the priority that the top administrators place on IT issues. The results, shown in Table 2, indicate: (1) funding is a serious problem for most institutions (72.7%); (2) a general perception of a lack of top administrative support for IT (77.3%); and (3) a strong pessimism about resolving the institution's IT problems in this decade (91.2%). Strangely, the respondents seem to think that their state legislature places a high priority on IT at their institution (89.3%).

TTests of the mean responses (not shown here) between research and nonresearch institutions between research and nonresearch institutions indicate significant differences ( $\alpha = .05$ ) on issues concerning funding for computer labs ( $p > T = .027$ ), establishing source of continuous funding for labs ( $p > T = .006$ ), developing and implementing

instructional support systems ( $p > T = .044$ ), and funding for IS operations ( $p > T = .001$ ). The means for these issues were higher for nonresearch than research institutions, thus indicating the issue is more important to them. Additionally, research institutions reported that their IT problems are hurting academic programs ( $p > T = .009$ ).

The IT issues on which significant differences exist between institutions classified as "under funding" and "good funding" are shown in Table 3. A response of 4 or 5 on the statement "Under funding for new information technology (IT) is a serious problem at my school" was used to classify an institution as "under funding", a response of 1 or 2 was used to classify an institution as "good funding". Surveys with responses of 3 were excluded from the analysis. As shown, under funded institutions rate funding, planning, and data management issues higher. They also indicate that their communication systems, academic programs, and administrative operations are being negatively affected.

## **Discussion**

This research focused only on identifying the key issues facing higher education institutions in the U.S., and cannot identify why these issues are important or how institutions are dealing with them. No theoretical model was tested or proposed to explain institutional or managerial behaviors or outcomes. However, this research can provide direction for future research.

The results may provide useful information for higher education administrators, IS managers, IS researchers, and public officials responsible for higher education policy making. The results indicate a common set of issues challenging all institutions, as well as some important differences among institutions. The most critical IT issues for nonresearch institutions involve funding which is perceived as hampering the upgrading communications systems, academic computer lab resources, and IS operations. A more serious problem is the impact of IT funding problems on the quality of the academic programs and administrative operations. 40.8% of the respondents think that faculty, staff, and administrators morale are being negatively affected. Over 90% of the respondents reported not being optimistic that their institution's IT problems will be resolved in this decade which indicates that their IT problems are long-term.

Top management involvement and support for IT is one of the most critical factors impacting the successful implementation and operation of information technology in an organization [JARV91; ROCK84]. However, there seems to be a general feeling that top administrators of most higher education institutions do not place a high priority on IT.

Higher education institutions across the U.S. are facing increasing demands for changes in their missions and operation, and greater emphasis on customer satisfaction. While private sector organizations leverage their restructuring and quality improvements efforts with large investments in "infostructure", many higher institutions are cannot or are not. The institutions that are making IT investments seem to be moving ahead into the information age at warp speed and leaving the laggards far behind.

## References

Available upon request.

Longer version of this paper is available upon request.

Table 1: Top Rated of Issues Over All Institutions.

Rank	Mean	Issue
1	8.09	Funding for up-to-date computer resources
2	7.80	Integrating new information technologies(I10)
3	7.70	Improving user access to information and communications systems(I29)
4	7.53	Integrating systems and local area networks(I13)
5	7.51	Making effective use of the data resources
6	7.36	Establishing continuous sources of funding for computer labs(I15)
7	7.29	Distributed access to administrative systems(I5)
8	7.26	Funding and budgeting IS operations (I25)
9	7.21	Establishing IT architecture (I4)
10	7.14	Improving IS strategic planning (I18)

Table 2: Frequency analysis selected opinions

Statement	Response	Frequency	Percent
Under funding is serious problem	Agree	96	72.7
	Disagree	36	27.3
Communications systems need substantial upgrade	Agree	67	57.8
	Disagree	49	42.2
IT problems are hurting morale	Agree	31	40.8
	Disagree	45	59.2
I am optimistic of substantial progress over the next 2 years and 5 years	Agree	10	8.8
	Disagree	104	91.2
Top management support places high priority on IT	Agree	17	22.7
	Disagree	58	77.3

Legislature places high priority on IT	Agree	100	89.3
	Disagree	12	10.7

Table 3: Significant Differences Between Institutions with under Funding and Good Funding

Item	Issue	Class	N	Mean	p> T
I3:	User involvement in administrative systems	Poor	91	7.11	.011
		Good	30	5.43	
I4:	Establishing IT architecture	Poor	91	7.98	.002
		Good	34	5.79	
I9:	Funding for up-to-date computer resources	Poor	96	8.40	.005
		Good	35	7.23	
I13:	Integrating systems and LANs	Poor	91	7.95	.002
		Good	33	6.09	
I15:	Establish adequate and continuous funding for computer labs	Poor	92	7.97	.011
		Good	31	6.39	
I16:	Managing LANs	Poor	91	7.19	.002
		Good	33	5.39	
I17:	Managing administrative data resources	Poor	92	7.36	.011
		Good	32	6.34	
I25:	Establishing funding sources and budgets for IS operations	Poor	96	7.84	.0001
		Good	36	5.92	
I31:	Our communications systems are in need of substantial upgrading	Agree	96	3.55*	.0000
		Disagree	36	2.31*	
I32:	Our IT problems are hurting academic programs	Agree	96	3.07*	.0002
		Disagree	36	2.33*	
I33:	Or IT problems are hurting administrative operations	Agree	96	3.52*	.0001
		Disagree	36	2.50*	

\* average based on 5-point Likert scale