FACULTY PERCEPTIONS OF COMPUTING FACILITIES
(Based on a study of UTC Faculty in 1981)
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Purpose of Study

The University of Tennessee at Chattanooga is very typical of many of the public institutions operating today. It had a history of minimal computing until 1974 when major computer acquisitions were made. Further significant upgradings have been made since then with another major acquisition being consummated in 1978. UTC, therefore, is a model of interest to many concerned with the effects of these computing resources on faculty attitudes towards the curriculum, general educational issues, relevance of current computer facilities, and the entire computing mileau. Hence, other institutions may utilize this model and perhaps the data and analyses presented as a barometer for assessing the impact of instructional/research computing needs, resources, and values at their own institutions.

Background

UTC is a Masters granting institution located in urban Chattanooga, Tennessee, and is a primary campus of the University of Tennessee. With approximately 8,000 students and 250 plus full-time faculty, UTC is primarily an undergraduate institution. Its role within the State of Tennessee is to provide quality education at the baccalaureate level to a largely commuting student body. Students have degree options in the many areas of the Arts & Sciences and the professional areas of Engineering, Computer Science, Nursing, Business Administration, Human Services and Education. Somewhat unusual for a state institution is its private foundation with a $10,000,000 plus endowment which is used to enrich academic areas at UTC.

Included in this enrichment was the acquisition of an HP2000 in 1975 strictly for the use of faculty and students. This timesharing system replaced an IBM 360/30 with RJE capability to a large 360/65 system a hundred miles away. In 1978, UTC purchased a second academic computer system, the HP3000 Series II with funds from a capital development campaign. Currently, the HP2000 and HP3000 are connected to over 80 terminals and provide 63 ports of instruction and research to students and faculty; UTC continues to provide RJE activity to two large IBM 3031's at a remote location.

Methodology

In the spring of 1981, all faculty at the University of Tennessee at Chattanooga were requested to complete a questionnaire concerning their perceptions regarding instructional and research computing. The first objective of this survey was to identify perceptions concerning computing both at a general level for institutions and for majors at large. The second objective was to discover specifics about UTC and individual departmental needs. Previously, two other surveys were conducted dealing largely with these same issues. In 1974, as part of a report to the University of Chattanooga Foundation, Drs. Carney, Davis, Smullen, and Ward, all of UTC, reported similar analyses. In 1978 essentially the same study was replicated by Dr. Smullen.

Although the data reported will refer wherever possible to all three surveys (1974, 1978, 1981), attention will focus on the most current, which is 1981. For purposes of reporting, some departments have been coalesced into larger areas. These four larger areas are the Arts & Sciences; Business Administration and Economics; Engineering and Computer Science; and

Education, Nursing, Human Services, and miscellaneous. Although the data could be tabulated in many ways, this report will largely work with the positive responses "Strongly Agree" and "Mostly Agree", for the major areas outlined.

Responses to Survey

Fifty-seven percent of the teaching faculty responded to the 1981 survey as compared to 54 percent and 69 percent in 1978 and 1974, respectively. Table I shows the responses by area, and it is seen that the dominant areas are Humanities, Physical Science and Mathematics and Business Administration with 22, 20 and 12 percent of the total, respectively. No department or area was vastly under-represented or over-represented in the survey. The continuation of Table I breaks these larger areas into their major components for purposes of detailing the responses.

Computer Usage

Computer usage of the respondents indicates that the number of faculty who have used the computer moderately or extensively in the past has increased from 49% in 1974 and 48% in 1978 to 52% in 1981 (see Table II). The Humanities, Education, and Physical Science and Mathematics declined from 21%, 37% and 67% in 1978 to 19%, 32%, and 59%, respectively in 1981. However, Behavioral Science and Engineering grew from 44% and 55% in 1978 to 64% and 100% respectively in 1981, indicating heavy computer experience for those areas. The area which declined, surprisingly, was Business Administration and Economics, as it declined from 75% to 47% in the same period.

TABLE I

COMPOSITION OF THE GROUP OF RESPONDENTS

		1981	1978	1974
Total Responses		144	125	133
Total Faculty		253	231	194
Percentage Response		57%	54%	69%

By College/School/Division		Number of Responses	% of all Responses	Number of Faculty	Percentage Response
Arts and Sciences	1981	71	49%	142	50%
	1978	65	52%	130	50%
	1974	76	57%	127	60%
Engineering	1981	11	8%	21	53%
	1978	11	9%	11	100%
	1974	7	5%	8	88%
Business*	1981	17	12%	32	53%
Education*	1981	14	10%	29	48%
Nursing*	1981	7	5%	12	58%
Human Services*	1981	14	10%	17	82%

*Data not available for earlier years for these areas.

COMPOSITION OF THE GROUP OF RESPONDENTS IN 1981

By Area:	Frequency	Percentage of All Responses
Humanities	31	21.5
Physical Science & Mathematics	29	20.1
Behavioral Science	11	7.6
Engineering	7	4.9
Computer	4	2.8
Business	17	11.8
Education	14	9.7
Nursing	7	4.9
Human Services	14	9.7
Misc, Unknown	10	6.9
Total	144	100.0

TABLE II

UTILIZATION OF THE COMPUTER BY THE RESPONDENTS

		% Positive Responses by Area				% Responses		
		Arts & Sciences	School of Business	School of Engineering	All Others	Extensive	Moderate	Negligible or No Response
I have used the computer extensively in the past.	1981	42	47	100	31	17	35	48
	1978	37	**	55	**	18	30	53
	1974	38	**	100	**	11	38	51
I plan to use the computer extensively in my future classroom activities.	1981	45	70	91	47	17	35	48
	1978	54	**	64	**	18	50	31
	1974	74	**	100	**	26	54	20
I do not plan to use the computer in my future research.*	1981	58	82	91	70	51	17	32
	1978	49	**	55	**	34	26	41

*Disagreement with this statement has been treated as a positive response. No such question was asked in 1974.

**Not available.

TABLE IIA

PERCENTAGE UTILIZATION OF THE COMPUTER BY 1981 RESPONDENTS
(EXTENSIVE OR MODERATE POSITIVE RESPONSES ONLY)

By Area:	Past Usage Responses	Future Classroom Responses	Future Research Responses
Business, Economics	47	71	71
Physical Sciences, Mathematics	59	55	55
Engineering, CPSC	100	91	91
Behavioral Sciences	64	64	64
Education,. Et al	32	46	46
Humanities	19	29	29

This can be explained, in great part, by the fact that the 1978 survey included Computer Science with Business while the 1981 survey included Computer Science with Engineering.

The faculty projections of future computer activities in their respective classrooms indicated that both the School of Business and the School of Engineering will in the future make much more extensive use of the computer in the classroom. The former will grow from 59% to 70% and the latter from 64% to 91%. When asked about the use of the computer in their future research all areas reported positive responses. Over 68% of the faculty indicated they expected to make extensive or moderate use of the computer in future research as opposed to 60% in 1978. Also noted was the large decrease in the neutral or no response category. The data generally supports the fact that UTC is acquiring either through recruitment or "in-house" training a computer literate faculty who generally are using the computer more and based on these experiences, will utilize it more in the future in both their classroom and research activities. Areas such as Engineering, Computer Science, Behavioral Sciences, and Business are leading this growth.

General Opinions

Faculty at UTC were asked to respond also to general questions concerning their perceptions regarding the computer and its effect upon society and education. Table III shows the data related to these questions.

There has been a small decrease in the positive responses to the statement that computers will improve education. Although in 1981 this proposition was agreed with either strongly or mostly by 86% of the faculty, in

TABLE III

GENERAL OPINIONS

| | | Percentage Positive Responses | | | | All Responses | | | | |
		Arts & Sciences	Busi- ness	Engi- neering	Others	Agree Strongly	Mostly	Neutral NA	Disagree Mostly	Strongly
Computers will improve university education.	1981	85	88	91	90	51	35	9	3	1
	1978	86	96	82	-	56	34	8	2	0
	1974	59	54	100	-	35	25	41*	1	1
Computers create an impersonal society.**	1981	55	59	64	44	20	33	28*	14	4
	1978	52	55	46	-	16	37	24*	18	5
	1974	43	64	57	-	22	28	25*	15	11
Computers are beyond the understanding of typical university undergraduates.**	1981	90	82	100	96	54	38	1	6	2
	1978	79	86	82	-	38	43	6	7	5
	1974	78	92	100	-	53	31	11	4	1
The computer is as important a resource as the library.	`1981	47	88	82	60	29	29	8	19	15
	1978	46	80	64	-	30	31	7	24	10
	1974	28	58	71	-	20	22	15	29	15

*Large Neutral, No answer, or No Opinion response (20% or over)

**Disagreement with this statement has been treated as a positive response.

1978 this issue received 90% positive responses. On the issue of computers creating an impersonal society, 53% of the faculty disagreed. On several such questions disagreement was taken as a positive response. Clearly the faculty feels computers are well within the capability of understanding of typical undergraduates, as 92% responded positively in 1981, up from 81% in 1978. Response to whether the computer is as important a resource as is the library is much less positive. The data analysis indicates 58% of the faculty affirm this in 1981 as opposed to 61% in 1978. However, both the Engineering and Business areas grew from 65% and 80% in 1978 to 82% in 1981 respectively. Not surprisingly, Arts and Sciences disagreed with the library computer issue and affirmed this issue at only a 47% rate.

Computers in the Curriculum

This section deals with faculty perceptions of the use of the computer in specific subject matter areas. The responses to the issue of the necessity for computers in instruction in Natural Sciences and other sciences, the desirability of accessing computers in the Behavioral Sciences, the knowledge of and practice on computers for Business Administration, and the awareness of computing for students in the Humanities have not changed appreciably over the period 1978 to 1981 (see Table IV). That computers are necessary for instruction in areas such as Natural Science, Engineering and Mathematics is agreed with by 89% of the faculty with only small variance among the areas. That instruction for students in the Behavioral Sciences requires access to problem solving via computers is agreed with by 74% of the faculty and is as high as 91% in the Engineering area. Eighty-nine

TABLE IV

COMPUTERS IN THE CURRICULUM

		Percentage Positive Responses					All Responses				
		Arts & Sciences	Busi- ness	Engi- neering	Others		Agree Strongly	Mostly	Neutral NA	Disagree Mostly	Strongly
Computers are necessary for today's instruction in areas such as natural science, engineering, and mathematics.	1981	86	88	91	93		59	30	8	3	0
	1978	89	88	91	-		57	32	6	5	0
	1974	88	84	100	-		56	30	9	1	4
Instruction for students in the behavioral sciences desirably requires access to computers for problem solving.	1981	85	77	91	80		35	39	21*	3	0
	1978	68	84	46	-		43	29	25*	3	0
	1974	79	74	100	-		38	41	17	5	0
Business Administration students must have know- ledge of and practice in the uses of the computer in business applications.	1981	86	100	91	91		60	29	9	1	0
	1978	85	94	91	-		58	30	10	1	1
	1974	80	92	100	-		54	32	12	1	1
Students from the humanities should have an awareness of the influence of computers to today's society.	1981	89	65	91	93		44	44	11	1	0
	1978	88	88	91	-		45	43	10	1	1
	1974	82	92	100	-		40	47	10	3	0
The curriculum of UTC should have more breadth and depth of computer experience available to the students.	1981	44	77	64	58		16	38	38*	5	1
	1978	63	63	55	-		16	46	30*	6	2
	1974	66	78	86	-		29	41	24*	5	1

TABLE IV A

COMPUTERS IN THE CURRICULUM**

Responses of the various areas concerning
the need for computers in their own curriculum
from the 1978 and 1981 surveys.

		Agree		Neutral	Disagree	
		Strongly	Mostly	NA	Mostly	Strongly
Engineering & CPSC	1981	36	27	27	9	0
	1978	–	–	–	–	–
Science & Mathematics	1981	28	14	45	7	7
	1978	68	24	5	3	0
Behavioral Sciences	1981	36	36	18	9	0
	1978	44	44	11	0	0
Business, Economics	1981	53	29	12	0	0
	1978	84	11	5	0	0
Humanities	1981	26	13	32*	13	16
	1978	38	45	14	0	3

*Large Neutral, No Answer or No Opinion (20% or over)

**In 1978 CPSC was tabulated with Business and Engineering with Science.

percent of the faculty believe that students in Business Administration

must have knowledge of, and practice in, computerized business applications.

A robust 88% of the faculty believe that students in the Humanities should

have awareness of computer influence on society. On the issue of whether

the UTC curriculum should have more breadth and depth of computer experi-

ences for students, affirmative responses declined from 62% in 1978 to 54%

in 1981. Although the areas of Business and Engineering showed higher 1981

figures than the corresponding areas in 1978, Arts and Science faculty

affirmed this by only 44% in 1981, a 19% decrease over 1978. This implies

a general satisfaction with computing for this college rather than a de-

crease in interest directed towards computing. Correspondingly, in 1981 as

compared to 1978, even larger numbers of faculty from the areas of Business

and Engineering believed there should be more computing. This obviously

indicates a major need for computing in these areas and a growth of computing.

When faculty were asked about the need for academic computing in their

own departments, a high of 82% in Business felt their department should uti-

lize the computer more in the curriculum than it presently does. The lower

affirmative responses of 42% and 39% from the Sciences and Humanities re-

spectively indicate a general satisfaction with what their areas are now

doing, rather than dissatisfaction with the computer. This indicates a

trend towards maturation in terms of computer utilization in these areas.

Computing Facilities

Table V presents data on faculty perceptions of UTC computer facilities.

Many faculty in 1981, especially in the Engineering and Computer Science area,

TABLE V

PERCEPTIONS OF COMPUTING FACILITIES

	Percentage Positive Responses					All Responses				
		Arts & Sciences	Busi-ness	Engi-neering	Others		Agree Strongly	Mostly	Neutral NA	Disagree Mostly	Strongly
UTC maintains and provides inadequate computer support for academic instruction and research.**	1981	42	53	9	49		15	28	35*	12	5
	1978	48	–	18	–		17	29	43*	.8	3
	1974	32	–	100	–		16	23	48*	11	2
The present computer system and staff is conducive to faculty use for academic projects.	1981	56	71	36	60		19	40	25	10	5
	1978	54	–	55	–		17	38	34*	9	2
	1974	37	–	86	–		1	15	44*	29	10
UTC should provide short training courses for faculty on the computer and the available packages.	1981	85	82	82	96		44	44	9	2	1
	1978	88	–	73	–		47	39	13	0	1
	1974	93	–	71	–		54	38	8	0	1
The computer should be made more available to the faculty and students. +	1981	45	76	73	53		19	35	37	8	1
	1978	59	–	55	–		20	38	33*	9	1
The cluster concept is the most desirable means for providing terminals for student instruction. +	1981	44	47	82	44		15	32	46	6	1
The cluster concept is the most desirable means for providing terminals for faculty research.+	1981	13	12	36	27		4	15	52	17	12
Text processing should be provided by UTC to its students and faculty even if this requires major new resources. +	1981	44	53	73	53		22	26	35	8	8

*Large Neutral, No Answer, or No Opinion response (20% or over).

**Disagreement with this statement has been treated as a positive response.

+No such question was asked in 1974.

perceived computing facilities to be inadequate. Positive responses in this

technical area have declined from 100% in 1974 to 18% in 1978 and 9% in

1981. Otherwise the overall faculty responses have been positive with 39%

in 1974, 46% in 1978, and 43% in 1981 affirming UTC provides adequate

instructional and research equipment.

On the issue that the present system and staff are conducive to faculty

use, the positive responses have grown from 16% in 1974 to 55% in 1978 to

59% in 1981 . Again, as with the previous question, Engineering and Computer

Science with only 36% positive responses perceive it less positively than

do the other departments. The general dissatisfaction noted from Engineer-

ing and Computer Science is believed to be due to the lack of major compu-

ter systems that are local and the perceptions associated with computing at

a remote site.

When questioned regarding short training courses for the faculty, 88%

responded affirmatively with little variation over the respective areas.

This service is well received by the general faculty.

The question "should the computer be made more available to the faculty

and students" was answered "yes" by 54% of the faculty in 1981, down from

58% in 1978. Very high rates of 76% and 73% were seen in the areas of Busi-

ness and Engineering, indicating a perception of greater need in these areas

than in the university as a whole.

UTC utilizes the cluster approach to provide terminals for the students

and faculty. Approving this cluster concept for student instruction was 47%

of the faculty with a group of 46% being neutral. Engineering endorsed this

at a 82% rate. On the issue of desirability of computer clusters for faculty research, only 19% endorsed this concept with the highs ranging from 36% in Engineering to a low of 12% in Business.

Text processing is being introduced gradually in UTC on the HP3000 through the package EDIT2. About 48% of the faculty believe this facility should be offered to faculty and students even if major new resources are required. Areas ranged from a high of 73% positive support in Engineering to 44% in Arts and Sciences. Certainly the UTC faculty are strongly behind the concept of text processing for classroom materials, reports, manuscripts and resumes.

In general, facilities are recognized as better than adequate by most areas of the university with the exception of the School of Engineering. General support for computing facilities and staff, instructional short courses, and text processing was demonstrated. Faculty research is seemingly not served well by the cluster concept but, in all, the computer systems are generally conducive to faculty use.

Emphasis and Rewards

When responding to the statement "your department should utilize computers more than it does now", 61% responded affirmatively in 1981 as opposed to 60% in 1978 (see Table VI). Interestingly, those strongly agreeing increased from 26% in 1978 to 34% in 1981. The area perceiving this need the most was Business with 82% positive responses and the least was 45% in the Arts and Sciences.

TABLE VI

EMPHASIS AND REWARDS

		Percentage Positive Responses					All Responses			
		Arts & Sciences	Busi- ness	Engi- neering	Others		Agree Strongly	Mostly	Neutral NA	Disagree Mostly	Strongly
Your department should utilize computers more than it does now.	1981	45	82	64	78		34	27	26*	7	6
	1978	54	–	46	–		26	34	26*	13	1
	1974	62	–	86	–		30	36	21*	9	4
UTC has a reasonable emphasis on the uses of the computer in its educational pro- cesses.++	1981	38	65	45	44		11	33	46*	9	1
	1978	60	–	64	–		22	38	34*	5	2
	1974	26	–	71	–		11	21	51*	16	1
Within its role as a primarily undergraduate institution, UTC places too much importance on computing.** +	1981	62	82	91	69		35	34	26*	4	1
	1978	69	–	73	–		28	45	18	7	2
Faculty time spent on develop- ing computer uses for the class- room is adequately recognized as a professional activity by the administration.+	1981	18	24	18	16		5	13	42*	24	17
	1978	15	–	27	–		6	12	48*	22	12

*Large Neutral, No Answer, or No Opinion response (20% or over)
**Disagreement with this statement has been treated as a positive response.
+No such question was asked in 1974.
++This question was preceded by "When compared to other primarily undergraduate institutions of its size."

The statement "UTC has a reasonable increase emphasis on the use of the computer in its educational processes", showed overall support declining from 60% in 1978 to 44% in 1981. The area of Business supported it with 65% positive responses; at the other end was the area of the Arts and Sciences which supported it at only 38%. This statistic is clouded by a large 64% undecided or neutral set of responses. Perhaps this is an indication of need for more emphasis rather than a dissatisfaction with the current emphasis as being "too much."

The statement "within its role as a primarily undergraduate institution, UTC places too much importance on computing", is disagreed with by 91% of the Engineering area, 82% of Business, and 62% of the Arts and Sciences. This indicates further that faculty perceive that either the same or more computing is required as opposed to less computing.

With regards to faculty computing activities being adequately recognized as professional activity by the administration, only 18% feel positive about this issue. The strongest response is that of Business which reports 24% positive responses. There is a large 42% neutral response category; this indicates a general perception that instructional computing does not count towards promotion and tenure in the same manner that scholarly writing does.

In-depth Analysis

A second survey was sent to those who were judged to be heavy users or who requested it. This survey asked for specific information regarding satisfaction with the systems, their components, the staff, and their

functions; it contained several open ended questions regarding future desired computer acquisitions. Since this paper is designed for general opinions, most issues in this second survey are not included here.

Thirty-eight of the heaviest faculty users completed the questionnaire. Eighty-four percent were at least satisfied with our present systems. Nearly 53% of those responding felt that the 1981 computing environment (HP3000 and HP2000) was better than the 1978 computer system (HP2000 only). UTC consultants satisfied 90% of the faculty in terms of availability and 89% in terms of helpfulness. Software satisfied 63% of the faculty and dissatisfied 26%. System reliability was viewed favorably by 67% and negatively by 24% of the faculty responding. Relevance of UTC newsletters and helpfulness of UTC manuals were affirmed by 66% and 76% of the respondents, respectively.

The generally positive responses to these issues indicate that the HP 3000 system has been viewed favorably by a majority of its heavy users. Furthermore, the staff activities in terms of consulting, documentation, and overall effectiveness are considered satisfactory or better by a large majority of users. The Office of Academic Computing, which maintains most of these functions, is, therefore, by association viewed as a very positive factor in computing in UTC. The negative responses were mostly from Engineering and Computer Science; these were largely associated with the requirements or needs associated with large scale systems, major software packages in technical areas, and specific operating systems. Hence, Hewlett Packard equipment and software received a general vote of confidence.

Summary

Wide spread approval of UTC's instructional and research computing is voiced by the faculty. Faculty perceptions about societal implications of computing, the necessity for computing in various disciplines and student capacities for learning about computing were very favorable. Nearly all areas generally report affirmative attitudes towards computer associated activities in the curriculum. Minimal back-lash, if any, was evident towards university, area or departmental emphasis on computing. Several departments, namely Engineering and Computer Science, indicated the need for more computing that is probably of the non Hewlett-Packard nature and which is of a medium scale rather than a mini scale. It seems reasonable that the HP2000 and HP3000 have heightened the desire for timesharing, even on major systems, thus negating the perceived worth of remote systems that are largely batch entry.

Support facilities, staff and training were perceived in a positive manner by a majority of the respondents. The HP3000, augmented by the HP 2000 and IBM 370/3031 RJE, has created a viable, stable computing environment for university academic computing. Coupled with this is the Office of Academic Computing Services which has visibly and significantly assisted most academic areas with their instructional and research computing.

A famous economist once stated "Nature has no force as powerful as an idea whose time has come." Academic Computing's time has come and at UTC the idea and its manifestations are growing with adolescent fervor and are approaching intelligent, capable maturity.