PROJECT ATHENA

STUDENT SURVEY FINDINGS

1985-1986

Report No. 5

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This report is part of a series prepared to document the educational impacts of Project Athena in its early years at M.I.T.

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SUMMARY

The survey results reported here focus on the impact of Project Athena on student use of the system and their opinions about it. Building on previous survey efforts, the 1986A results reveal that:

- Eighty-seven percent of M.I.T. undergraduate students use or have used Athena--an increase of 29% from 1985.
- Athena is equally used by males and females, by students in all classes or years at M.I.T., and by students in all types of living groups. These findings are in contrast to male-dominated and senior-dominated uses of other computers at M.I.T.
- Computer use in general has increased to 8.0 hours/student/week at M.I.T. from 7.4 hours/student/week in 1985.
- The increase in use of Athena to 3.3 hours/student/week from 2.3 hours/student/week accounts for much of the general increase in use of computers at M.I.T.
- Student attitudes toward computers and about their own ability to use them, although consistently positive or favorable, are increasingly so.

Student use of Athena is currently more personal (73%)--i.e., for word-processing, communication, data storage, etc.--than required for courses (29%), although a large portion of the word-processing use is for laboratory reports and papers. There have been no significant decreases in use of Athena for any purpose, but there are significant increases since 1985A for:

- word-processing (+30%),
- laboratory experiments (+27%),
- programming (+22%),
- communications (+14%),
- storage (+11%) and
- data analysis (+8%).

There are no significant increases in use of the system for on-line searches, games, problem sets or data entry.

The continuing implementation of current and developing educational software projects may continue to change these relative amounts of use of the system by students for various purposes.

The most severe and frequent problems students report with Athena include:

- crowded facilities;
- a slow system with occasional crashes;
- very poor printers;
- inaccessible (distant) facilities.

Students regard Athena as a service rather than as an experiment. They currently express few expectations about the Phase II workstation environment. Their concerns are overwhelmingly with how easily and well the current system serves them.

Ongoing and future studies will continue to track students' attitudes and experiences with Athena at M.I.T. We will also add one or two comparison institutions to help place M.I.T. findings in a more general perspective.

PREFACE

Hundreds of M.I.T. students and faculty have made specific contributions to our ongoing evaluation efforts and to this survey. Twelve Project Athena Student Consultants and an equal number of Athena users gave lengthy interviews and detailed help. My thanks to all of these people and then to three individuals especially: to Professor Steven R. Lerman, Director of Project Athena, for his unerring conceptual insights and advice; to Beverly Chew of M.I.T.'s Information Services for major assistance with data analysis; and to Charla Scivally for support and help with producing this report.

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1.0 Introduction, Background and Methodology

As one of the more nationally visible and technologically ambitious campus computer projects in the United States today, the implementation and effects of M.I.T.'s Project Athena are of special interest and concern not only to the three key institutions currently involved--M.I.T., IBM, and Digital--but to collaborating, sympathizing, and observing schools and organizations throughout the world. The technical, logistical, political, educational and human challenges posed to Project Athena were unprecedented in scope at the Project's inception in 1983. The focus of this study and the survey research reported here relate to one subset of that challenge, student reactions to the system and their use(s) of this educational resource.

Although still in its early phases in terms of student use, system deployment and configuration, nonetheless sufficient numbers of students are involved (approximately 87% of the undergraduates) and a sufficient mass of terminals deployed (350 public terminals out of an hypothecated 2,000) to let us learn some things about students and the system. Many of the problems students encounter now could be ameliorated with a fully deployed and fully functioning system. Some may not. Nonetheless, as an experiment, Athena must be watched and effects documented as they unfold. The efforts and results reported here deal with student experience with and use of computers in general and in Athena specifically. It covers a period of time from the inception

of the Project as viewed by students (1984-5) to April-May, 1986. Comparisons with data from previous formative survey efforts are referred to when appropriate primarily to highlight significant impacts and trends which are possibly and probably attributable to the availability of Athena.

A primary goal of Project Athena involves bringing computing capability and power to M.I.T. undergraduate education. The work reported here, done in April-May, 1986 is hereinafter referred to as 1986A. This work builds on the baseline data gathered at the same time of year in 1985 (1985A) and some data gathered in October-November, 1985 (1985B). This report continues the series of documents which will assess and track impacts both in terms of student reactions to Athena and to their ultimate uses of the system from 1984 through the projected completion of the Project, 1988.

The survey includes items about computers, computing experiences and attitudes, and patterns of computer use. Originally adapted from a survey developed at Brown University, it has undergone many changes and revisions. The survey was sent to a random sample of 1,235 M.I.T. undergraduates in April, 1986. There were 465 returns by May 1, 1986, the basis of our statistical analyses. Eventually 488 were returned. The response rate was 37% by May 1, 1986 and 40% by June 1, 1986. [It is interesting that our only follow-up attempt, reminder advertisements in the M.I.T. student papers, produced two surveys originally sent to

students in 1985.] This level of response is quite in keeping with previous returns at M.I.T. Given the length of the survey (85 items) this continuing high rate of return from M.I.T. students is exceptional. Many other schools feel they must pay their students for participation to yield equivalent or lower returns.

The quality of the responses once again was exceptionally precise, detailed, and clear. Some of the students who replied to the 1986A survey may have replied in 1985A. There was no control for this possibility, although none of the 1985B students overlapped with the 1986A students. Anonymity was promised and maintained for all respondents. No M.I.T. students were involved with the data in any way. The results reported here are based on the 465 completed returns received by May 1, 1986.

Comparisons of the survey sample were made with the entire M.I.T. student body (undergraduate) in terms of sex, year at M.I.T., place of residence at M.I.T., and Department or Expected Department. In every instance the composition of the survey pool did not differ significantly from the general M.I.T. population. Comparisons of the 1986A respondent pool did differ significantly, however, from the 1985A survey pool. A slightly larger percentage of seniors or fourth year students responded to this 1986A survey (26%) than to the 1985A survey (23%). This slightly higher senior response rate may be a random finding or may reflect greater interest in and experience with current seniors than their

counterparts last year. Significantly more 1986A responding students also came from homes with personal computers than those in 1985A. Given the national proliferation of home computers, this finding is not surprising.

In sum, the students responding to the survey were representative of M.I.T. in general in terms of gender, year at M.I.T., place of residence, and Department or Expected Department. Seventy percent were male, 30% were female. In terms of year at M.I.T., the sample included:

Year 1, 23%
Year 2, 24%
Year 3, 25%
Year 4, 26%

Sixty-eight percent of students responding to the survey lived in dormitories, 25% in fraternities, and 7% in other residences. The 37%-40% response rate is consistent with those of previous M.I.T. surveys and high for this type of research.

The remainder of this paper consists of two major sections:

- a profile of student computer use and attitudes in 1986A at M.I.T.; and
- specific Athena impacts and student reactions to Athena at M.I.T.

Although it is not always possible to separate computer use in general from Athena use definitively, patterns of findings regarding computers in general and/or Athena specifically are fairly clear.

The following report presents a profile of M.I.T. student use and attitudes toward computers in general and of Athena use and attitudes during a one year period, April, 1986-April, 1987. Only shifts or changes significant at the .05 level or beyond for the appropriate statistics are presented or discussed. This report is but one in a series which, in the aggregate, should yield insight into the impact of implementing such an ambitious project as Athena with students in an environment such as M.I.T.'s.

2.0 Computers at M.I.T.--Student Attitudes and Use

2.1 Time Spent with Computers and Purposes

In 1986A, M.I.T. students reported using computers of all sorts for an average of 8.0 hours/student/week. This represents a .6 hour increase from 7.4 hours/student/week in 1985A, and the increase is significant statistically ($F = 2.31$, $p = 0.0195$). Males at M.I.T. spend a reported 9.8 hours/week with computers and females a reported 6.3 hours ($F = 7.13$, $p = 0.0079$). This ratio has not changed in the last year. There do not appear to be significant differences in time spent with computers related to class or year at M.I.T. Departmental variations may exist but cannot be measured reliably given the enormous variations in departmental enrollments.

The distribution of these 8 hours/person/week among various types of computers is presented below for PC use, use of M.I.T. computers (non-Athena), use of Athena, and use of non-M.I.T. computer systems:

A. PC Use

1985 Use	1986 Use
1.9 hours/week	2.67 hours/week

There is a significant increase in PC use ($F = .38$, $p = 0.0596$). Males continue to spend significantly more time with PCs (3.1 hours/week) than do females (1.5 hours/week)

($F = 9.52$, $p = 0.0021$). PC ownership continues to be primarily male, but in no different proportion in 1986 than 1985.

B. M.I.T. Computer Use (non-Athena)

M.I.T. computer use is significantly higher than last year with gender related effects as well as class or year at M.I.T. differences. Both males and females have roughly tripled their use, and seniors are the heaviest computer users at M.I.T. The summary picture of significant changes in M.I.T. computer use is the following:

	1985A	1986A
Hours Used	1.6/person/week	2.7/person/week
Gender		
Males	1.0 hours/week	3.0 hours/week
Females	0.7 hours/week	1.8 hours/week

Year at M.I.T.

	1986A
Year 1	2.9 hours/week
Year 2	1.7 hours/week
Year 3	2.1 hours/week
Year 4	4.0 hours/week

All of these differences are significant at the .03 level or beyond.

C. Use of Athena

The use of the Athena system has increased substantially with variations being related to the growth of the system rather than to sex or class at M.I.T.

Use of Athena

1985A	1986A
2.3 hours/week	3.3 hours/week

There are no significant gender or year at M.I.T. differences in the amount of use students make of the Athena system.

D. Use of Other (non-M.I.T. Systems)

The use of other, non-M.I.T. computer systems has dropped in general from 1.9 hours/student in 1985 to .51 hours in 1986A. Once again, significantly more M.I.T. males use external computer systems than do M.I.T. females.

Given this amount of computer use, we were interested in whether or not students wanted more or less computer-based work. Forty-seven percent said they would like more, 47% opted for the same, and 6% felt they could do with less. These 1986A proportions reflect those of 1985. Students similarly maintain their estimations of the likelihood of their becoming "hackers" (defined as someone who programs for the pleasure of it): 16% felt they were hackers, 8% felt they could become one, and 76% felt they were not hackers.

Beyond the amount of time spent with computers (which is high at other institutions as well) the M.I.T. undergraduate student body is highly computer literate and both experienced and educationally involved with computers. Documenting the extent of this involvement relative to other computer intensive campus schools will be the focus of some future studies and can add insight to these current efforts and findings.

A series of eight questions involving training and use yielded the following student reports in 1985A and 1986A (Survey items 3-13):

Use/Exposure	1985A	1986A
Have taken a CS course	61%	64%
Have taken a non-CS course requiring a computer	60%	60%
Have taken a "mini" computer course	19%	24%
Have taken an Athena Survival Course	18%	18%
Have used a computer in the library	34%	45%
Have used the Athena system	59%	87%
Have used M.I.T.'s other computers	68%	69%
Have worked as programmers or consultants	38%	38%
Have used a PC	84%	88%
Have visited M.I.T.'s Computer Store	26%	27%
Have had own PC or terminal to use at M.I.T.	24%	25%

The statistically significant shifts or changes in reponse arrays to these items indicate increasing computer involvement at M.I.T. Obviously, the shift in Athena use from 59% to 87% in one year is a large increase. There has been a concomitant drop in plans to use M.I.T.'s other computers but not yet in reports of their use. Fewer students, however, plan to take introductory "mini" or Athena Survival Courses next year, perhaps not feeling the need. Use of PC's and ownership of PC's remains about the same.

Eighty-eight percent of M.I.T. students have used PC's and 25% own them. There has been a slight shift in the type of PCs M.I.T. students own. There is a small drop in Apple II series ownership (-37%) and an increase in ownership of IBM PC/XT's (+10%).

Students who do not yet own but expect to buy PC's express a preference for the IBM PC (36%) relative to those opting for the Macintosh (30%), a reversal of last year's stated intentions. The numbers here are so small that they should be regarded as indicating possible trends rather than statistically significant shifts.

In 1986A even more students (92%) have used computers before arriving at M.I.T. than in 1985A (85%), a significant increase. Futhermore, all students at M.I.T. now report having used a computer either before or since coming (100%). This represents another significant shift within a year.

Students estimate their programming skills just as strongly in 1986A as in 1985A; 72% have had full courses in programming with 50% having far more extensive and/or paid experience as programmers.

The obvious question now becomes "What do students at M.I.T. use computers for?". Survey items 15-24 attempt to address this question. Detailed frequency breakdowns appear in the Appendix for these items. A brief listing of uses (collapsing frequencies) shows that in 1985 the most frequent uses of computers by students (in rank order) were:

General Use of Computers at M.I.T.

	1985A	1986A
To write papers, reports, letters, etc.	80%	91%
For writing and debugging programs	57%	58%
For problem sets	51%	58%
For scientific computations or data analysis	51%	56%
To play computer games	49%	52%
To send messages to someone	48%	58%
For data entry	40%	42%
To store personal records	35%	42%
For laboratory experiments	34%	37%
To search on-line data bases	11%	10%

In 1986A significant increases in computer use at M.I.T. involve writing/word-processing, use of computers for scientific computations and data analysis, and for problem sets. The role of Athena in these shifts will be explored in Section 3.

In sum, students at M.I.T. are increasingly informed and experienced computer users. Although men report spending more time with computers than women, these differences do not appear for use of Athena. Similarly use of other M.I.T. computers varies with year at M.I.T. with greatest use in Year 4. This, again, does not appear to be true of Athena. Although used for multiple purposes, increase in use of all computers for word-processing, problem sets, and scientific computation and data analysis has increased significantly in the past year at M.I.T.

2.2 Student Attitudes Toward Computers in General

As with use of computers, student attitudes toward computers are consistently positive and tend to be increasingly so. There were 16 attitudinal statements

(Survey items 36-51) with which students agreed or disagreed. The Appendix displays full responses to these statements for both 1985A and 1986A. There were 5 of the 16 statements where slight but significant shifts occurred during the past year. The thrust of these opinion shifts is as follows:

(Item 38.) Students feel slightly more confident about their ability to use computers in 1986A than 1985A.

(Item 41.) Students feel less strongly that M.I.T. should develop a university-wide network of personal computers.

(Item 44.) Students feel less strongly that computers make it easy to work collaboratively with others.

(Item 45.) Students are less concerned about the vulnerability of M.I.T.'s computer systems to theft and tampering.

(Item 49.) Students tend to disagree more with the statement that because of computerized information systems too many people have access to information about other people.

It appears that M.I.T. students feel more positive about computers and more secure about issues of privacy and vulnerability of information. They feel less positive about a larger M.I.T. system and working collaboratively via computers than they did a year ago although their opinions to both concepts are still quite positive.

3.0 Athena at M.I.T.--Student Use and Attitudes

3.1 Time Spent and Purposes

As mentioned in the previous section, 87% of M.I.T. undergraduate students now use or have used Athena. Twenty-nine percent or 136 of our current sample are taking one or more courses that require the use of Athena. The remaining users are obviously doing so voluntarily, although in many cases their personal uses of Athena are for educational purposes as well, i.e., writing laboratory reports and term papers, which are not "required" uses of Athena.

In a separate pilot study done in 1986, five courses that currently require the use of Athena were selected arbitrarily and brief voluntary checklists given to students on the last day of classes. Of interest in the study, among many variables, was the amount of time that use of Athena represented in these courses among activities such as lectures, reading, laboratories, Athena, and other (e.g., problem sets). In these non-random groups of five different courses, students report spending 24% of all of the time they spent in and on those classes with Athena. Although this finding needs further clarification, it is nonetheless noteworthy. In five courses where 0% was spent on Athena two years ago, 24% is now the average percent of total course time spent with Athena.

Beyond the amount of time spent with computers comes the question of how students spend that time. In order of frequency, the activities for which students report using Athena in 1986A are:

	1985A	1986A
To write papers, reports	35%	65%
To send messages to someone	32%	46%
For problem sets	29%	31%
For writing and debugging programs	10%	32%
To play computer games	25%	30%
To store personal records, memos, etc.	15%	26%
For scientific computations or data analysis	17%	25%
For data entry	14%	16%
For lab experiments	10%	10%
To search on-line data bases	2%	4%

The direction and degree of changes of these activities in the past year indicates increases in personal as well as educational uses of the system. The percentages presented above indicate significant increases in the use of Athena for word-processing, analysis, communications, storage, programming, and laboratory experiments.

There are no significant increases in the use of the system for on-line searches, games, problem sets, or data entry. There are also no significant decreases in any type of use of Athena.

In keeping with the heavy writing/word-processing use, students report related and significant shifts in how they write. Basically they are composing significantly fewer first drafts in longhand or with a typewriter but more often write directly on the computer.

Asking students in yet another way how they were involved with Athena, i.e., as required for courses, as Athena staff, as developers, and for personal use, (Survey items 76-80), we find that personal uses are the heaviest (73%). Thirty-seven percent report that Athena use is required for courses, and a small number (N = 12) are involved as Athena consultants (staff) or as curriculum developers (N = 21). Understanding that personal involvement may include word-processing for courses or for other reasons, communications, storage, etc., we then asked Athena users how often they were involved with running course-specific software, programming, or running applications packages when they used Athena in courses (Survey items 81-84). The following table presents in complete detail current student type and amount of involvement in their courses.

When you use the Athena system in courses, how often are you

	Always	Often	Sometimes	Rarely	Never
81. Running a course specific software	(53)16%	(51)16%	(34)10%	(29)9%	(162)49%
82. Writing all or part of a program yourself	(25) 8%	(45)14%	(30) 9%	(28)8%	(205)62%
83. Running an applications package (e.g., Scribe, Emacs, 20/20)	(53)16%	(75)23%	(37)11%	(16)5%	(149)45%
84. Other	(2) 1%	(6) 4%	(3) 1%	(3)2%	(126)91%

It is apparent that no single type or frequency of involvement with Athena in courses predominates. Although

students are slightly more likely to be running other people's programs than creating their own, they currently report a variety of possible involvements.

In some ways, then, Athena is starting to become or has become the rich or at least the varied resource it was designed to be. Students use it for all intended purposes. Future work relating to the nature of use to amount of use will continue. As Phase II evolves and workstations predominate these preliminary types and patterns of use may shift markedly.

3.2 Attitudes Toward Athena

Given their use of and familiarity with Athena, M.I.T. students were asked to make whatever comments they felt were appropriate about the system, (Survey item 85). These comments are analyzed and presented here in terms of type of comment (positive - negative) as well as focus and level of specificity.

One hundred eighty-eight or 41% of the students who returned questionnaires by May 1, 1986 wrote comments. For the most part these comments were specific and lengthy, especially for Athena users. Non-users, or students not experienced with Athena, who responded to this question were relatively few in number (approximately 20). The comments discussed below, therefore, represent for the most part reactions and comments of actual Athena users and their suggestions for improvements in the system.

In some cases interpretations are augmented by results from 24 interviews held with Athena users and consultants in April, 1986.

3.2.1 The General Athena System

Twenty-six of the respondents felt that the idea of Athena was a good one; seven did not. About 20 of these students did not use or had not used Athena. Athena users, on the other hand, focused on current problems with the system and features they would like to see improved; there were no suggestions that Athena should be dismantled or replaced. It should be noted that student comments and suggestions relate primarily to the system they can already use, i.e. to Athena as it is today and for the most part they view this system as a time-sharing one. Comments on course-specific applications were sparse to nonexistent. It will be interesting in the future to follow whether or not what M.I.T., M.I.T. Information Systems and Athena itself labels as Athena is what, in fact, students think of or refer to. Students seem to think of Athena primarily as their facility (exemplified by W20) for laboratory reports, papers, mail, and other activities. The use of Athena in classes is still a small part of the Athena educational resource which students employ and such course-specific use was not voluntarily discussed in these student open-ended comments.

3.2.2 Frequent Suggestions

Students overwhelmingly (N = 55/188) requested more terminals and less crowded facilities. The number of students waiting until 2:00 or 3:00AM to do their work on Athena are significant in the pool. Coupled with the desire for more terminals in general is the request by 20 users for terminals in living groups, fraternities and dormitories. Fourteen students felt terminals were inaccessible to them, primarily because of distance--not crowding. There seems, then, to be a real crunch on the facilities available and a hope that these facilities will be more equitably distributed from a geographical point of view as the system grows.

Fourteen students suggested more dial-ups--something not in the current planning for Athena.

In addition to problems with the number of terminals (and probably, in the future with the number of workstations,) students have complaints with what they are currently using:

The system is slow	(N = 30)
Loads are too high	(N = 9)
Better working printers are needed	(N = 18)
More equitable and appropriate account space should be given (Students object to EECS students having larger accounts than others.)	(N = 6)

Students are fairly vague about the developmental stages and goals of Athena; they do not generally understand the technical goals and see Athena far more as a service upon

which they cannot reliably depend than an exciting technological and educational experiment of which they are part. A few who are aware of the Project plans and objectives still want the service rather than the "experiment".

Other suggestions and comments to help guide the Athena staff were:

1. Remove the games (N = 10)

   Students feel they take away time and facilities, making Athena more crowded and slower.

2. More on-line and other courses about Athena (N = 10)

   Students would like to have more on-line available help, although the general consensus about consultants was marginally good (five positive comments, four negative comments).

3. Documentation should be shorter/longer (eight negative comments, two positive comments), but in no instance should it be allowed to run out!

4. Unreliability/crashing is a big problem when it occurs (N = 4)

Students felt the implementation of the entire Athena Project was too slow (N = 5) and that many communications about the experiment are too optimistic (N = 2).

Students had suggestions for new software development or packages to be supported. A few felt Athena wasn't sophisticated enough (N = 3) and the same number felt it was too hard for students.

In brief, at this point in time, there are few major surprises in the student comments. The problems of facilities, speed, distribution, etc. are known to all. The students are waiting for them to be resolved. Suggestions for dial-ups, on-line courses, better coordination and communication could be incorporated in staff decision-making. The general sense of these student comments is that they are dealing with a time-sharing system. There is as yet little or no anticipation of what the Phase II workstation environment may bring.

Of interest beyond their comments was the relationship between satisfaction of Athena users and their types of involvement with Athena. Comparing question number 35 (satisfaction with Athena) with Survey items 15-34 (use of computers and uses of Athena), we found that to a slight degree more frequent users of Athena were more satisfied users.

4.0 Conclusions

After a year of tracking and documenting student use of Athena at M.I.T., we find virtually total acceptance of the fact of the system and overwhelming student desire for improvements in facilities, speed, and both number and accessibility of terminals. There are heavy "personal" uses of the system for purposes such as writing and word-processing and communications, which are freely available as well as growing course-related users. Extensive use of Athena in courses also appears to be increasing all types of uses of the system. About 29% of the courses that use Athena use it in lectures either exclusively or as a reinforcement. There are course-related increases in all types of use of the system, e.g., for data collection and analysis, laboratory experiments, etc.

Students view Athena as a resource and service to them rather than as an experiment. As a result, the difficult challenge which will be part of implementing Phase II may result in interim increases in dissatisfaction and unpredictable patterns of use of the system as it evolves.

Turning the system into a workstation environment may cause even more than the current discontent in the process and certainly can impact on the extent and types of Athena use. Similarly, development of more educational, course-related software and appropriate integration of that software in the M.I.T. educational curriculum will probably impact more strongly than any other factor on the uses of

Athena for "educational purposes." Hopefully results from following Phase I implementation would lead one to predict ultimately favorable findings from Phase II. There is a good deal of work to be done, however, to make favorable predictions future facts.

Appendix

A. Findings 1985A and 1986A

PROJECT ATHENA COMPUTER SURVEY

FINDINGS

Please answer the questions by CIRCLING the number of the response that best applies to you. (Answer even if you have not used a computer.)

1. In general, how would you describe your experience in using computers?

1985A		1986A
(325)68%	Positive	(314)67%
(25) 5%	Negative	(18) 5%
(74)16%	Ambivalent	(76)16%
(45) 9%	No strong feelings either way	(50) 5%
(9) 2%	Haven't used computer	(2) 0%

2. How would you describe your feelings about using computers in the future?

(360)75%	Positive	(363)79%
(13) 3%	Negative	(7) 1%
(60)12%	Ambivalent	(50)10%
(40) 8%	No strong feelings either way	(42) 9%
(6) 1%	Don't expect to use a computer	(6) 1%

Please circle one of the following responses for EACH of the questions below:

(1) YES, I have done this;
(2) I haven't done this yet, but I EXPECT TO DO SO in 1985; or
(3) I haven't done this yet, and I have NO PLANS to do so in 1985.

	1985A			1986A	
3. Taken a Computer Science Course	Yes	Expect To	No Plans	Yes	Expect To	No Plans
	(295)	(55)	(134)	(298)	(39)	(128)
	61%	11%	28%	64%	8%	28%

	1985A			1986A		
4. Taken a course in a department other than Computer Science which required using a computer	Yes	Expect To	No Plans	Yes	Expect To	No Plans
	(288)	(59)	(137)	(277)	(60)	(124)
	60%	12%	28%	60%	13%	27%
5. Attended a non-credit "mini-course" on computing	Yes	Expect To	No Plans	Yes	Expect To	No Plans
	(91)	(67)	(325)	(110)	(57)	(295)
	19%	14%	67%	24%	12%	64%
6. Attended an Athena survival course	Yes	Expect To	No Plans	Yes	Expect To	No Plans
	(88)	(115)	(279)	(81)	(64)	(314)
	18%	24%	58%	18%	14%	68%
7. Used the computer in a library	Yes	Expect To	No Plans	Yes	Expect To	No Plans
	(162)	(100)	(217)	(207)	(59)	(195)
	34%	21%	45%	45%	13%	42%
8. Used a terminal linked to M.I.T.'s main computers	Yes	Expect To	No Plans	Yes	Expect To	No Plans
	(323)	(67)	(88)	(318)	(29)	(113)
	68%	14%	18%	69%	6%	25%
9. Used an Athena terminal	Yes	Expect To	No Plans	Yes	Expect To	No Plans
	(288)	(116)	(81)	(402)	(25)	(36)
	59%	24%	17%	87%	5%	8%
10. Worked as a computer programmer or consultant	Yes	Expect To	No Plans	Yes	Expect To	No Plans
	(185)	(34)	(265)	(176)	(24)	(262)
	38%	7%	55%	38%	5%	57%

	1985A			1986A		
11. Used a personal computer	Yes	Expect To	No Plans	Yes	Expect To	No Plans
	(405) 84%	(25) 5%	(55) 11%	(407) 88%	(20) 4%	(36) 8%
12. Visited M.I.T.'s computer store	Yes	Expect To	No Plans	Yes	Expect To	No Plans
	(126) 26%	(72) 15%	(284) 59%	(123) 27%	(65) 14%	(274) 59%
13. Had your own computer or terminal to use at M.I.T.	Yes	Expect To	No Plans	Yes	Expect To	No Plans
	(118) 24%	(31) 6%	(334) 69%	(117) 25%	(36) 8%	(307) 67%

If you answered "YES" to Question No. 13, what kind did you have?

1985A		1986A	
(15)	13% Apple Macintosh	(16)	13%
(28)	24% Apple/Other	(25)	21%
(18)	15% IBM PC/XT	(27)	23%
(20)	17% Other PC	(10)	8%
(6)	5% DEC Terminals	(8)	7%
(5)	4% Other Terminals	(3)	3%
(12)	10% Home Computers	(11)	9%
(8)	7% Other Systems	(0)	0%
(7)	6% Missing	(19)	16%

If you answered "EXPECT TO" to Question 13, what kind do you expect to acquire and when? _____, 19__

(10)	29% Apple Macintosh	(10)	30%
(2)	6% Apple/Other	(3)	9%
(11)	32% IBM PC/XT	(12)	36%
(2)	6% Other PCs	(1)	3%
(1)	3% DEC Terminals	(0)	0%
(0)	0% Other Terminals	(0)	0%
(0)	0% Home Computers	(1)	3%
(12)	4% Other Systems	(0)	0%
(12)	4% Missing	(6)	18%

14. When did you first use a computer?

1985A			1986A	
(411)	85%	Before coming to M.I.T.	(407)	92%
(67)	14%	Since coming to M.I.T.	(444)	8%
(5)	1%	Haven't used a computer yet		

During this academic year, how often, on average, did you use any computer for each of the following purposes?

1985A

	Almost Every Day	Few Times A Week	Few Times a Month	Once a Month Or So	Less Than Once A Month	Not At All
15. For data entry	(8) 2%	(40) 8%	(51) 11%	(26) 5%	(65) 14%	(287) 60%
16. To play computer games	(6) 1%	(32) 7%	(72) 15%	(32) 7%	(95) 20%	(243) 51%
17. To write papers, reports, letters, etc.	(16) 3%	(56) 12%	(150) 31%	(86) 18%	(78) 16%	(97) 20%
18. For scientific computations or data analysis	(12) 2%	(42) 9%	(59) 12%	(54) 11%	(78) 16%	(236) 49%
19. To send messages to someone	(29) 6%	(44) 9%	(62) 13%	(32) 7%	(64) 13%	(252) 52%
20. To store personal records, memos, schedules, etc.	(20) 4%	(30) 6%	(32) 7%	(45) 9%	(43) 9%	(310) 65%
21. For writing and debugging programs	(40) 8%	(92) 19%	(67) 14%	(25) 5%	(53) 11%	(205) 43%
22. For laboratory experiments	(10) 2%	(26) 5%	(32) 7%	(33) 7%	(61) 13%	(318) 66%
23. For problem sets	(13) 3%	(65) 13%	(71) 15%	(47) 10%	(49) 10%	(239) 49%
24. To search online databases for books and journals	(4) 1%	(4) 1%	(9) 2%	(14) 3%	(23) 5%	(426) 89%

1986A

	Almost Every Day	Few Times A Week	Few Times a Month	Once a Month Or So	Less Than Once A Month	Not At All
15. For data entry	(13) 3%	(35) 8%	(59)13%	(25) 5%	(60)15%	(265)58%
16. To play computer games	(6) 1%	(37) 8%	(56)12%	(29) 6%	(112)24%	(222)48%
17. To write papers, reports, letters, etc.	(14) 3%	(91)20%	(156)34%	(111)24%	(48)10%	(42) 9%
18. For scientific computations or data analysis	(10) 2%	(30) 7%	(70)15%	(51)11%	(97)21%	(203)44%
19. To send messages to someone	(32) 7%	(46)10%	(62)13%	(43) 9%	(83)18%	(194)42%
20. To store personal records, memos, schedules, etc.	(18) 4%	(33) 7%	(46)10%	(36) 8%	(59)13%	(269)58%
21. For writing and debugging programs	(33) 7%	(102)22%	(59)13%	(32) 7%	(51)11%	(182)40%
22. For laboratory experiments	(6) 1%	(31) 7%	(42) 9%	(32) 7%	(61) 13%	(287)63%
23. For problem sets	(10) 2%	(70)15%	(61)13%	(47)10%	(81) 17%	(194)42%
24. To search online databases for books and journals	(1) 0%	(4) 1%	(3) 1%	(12) 3%	(27) 6%	(414)90%

Have you used the Athena System

		1985A				1986B			
		YES		NO		YES		NO	
25.	For data entry	(66)	14%	(402)	86%	(79)	16%	(373)	80%
26.	To play computer games	(121)	25%	(360)	75%	(138)	30%	(317)	70%
27.	To write papers, reports, letters, etc.	(170)	35%	(313)	65%	(306)	65%	(150)	35%
28.	For scientific computations or data analysis	(81)	17%	(401)	83%	(119)	25%	(337)	72%
29.	To send messages to someone	(156)	32%	(326)	68%	(216)	46%	(239)	51%
30.	To store personal records, memos, schedules, etc.	(73)	15%	(409)	85%	(120)	26%	(334)	71%
31.	For writing and debugging programs	(113)	23%	(369)	77%	(144)	30%	(310)	66%
32.	For laboratory experiments	(49)	10%	(433)	90%	(73)	10%	(381)	82%
33.	For problem sets	(141)	29%	(341)	71%	(146)	31%	(308)	66%
34.	To search online databases for books and journals	(10)	2%	(471)	98%	(17)	4%	(428)	94%

35. If you use the Athena system how SATISFIED or DISSATISFIED are you with it?

1985A			1986A	
(33)	10%	1. VERY SATISFIED	(137)	9%
(149)	47%	2. SATISFIED	(75)	41%
(71)	23%	3. NEITHER SATISFIED NOR DISSATISFIED	(77)	18%
(25)	8%	4. DISSATISFIED	(78)	18%
(8)	3%	5. VERY DISSATISFIED	(16)	4%
(N/A)		6. DON'T USE ATHENA	(45)	11%

For each of the statements below, circle the number of the response that corresponds most closely to your general opinion. (Answer even if you haven't used a computer yet.)

1985A

	Strongly Agree	Agree	Neither Agree nor Disagree	Disagree	Strongly Disagree
36. Many of my closest friends like to use computers	22%	33%	31%	11%	3%
37. I'm not really interested in learning about computers	1%	7%	10%	44%	38%
38. I feel confident about my ability to use a computer	26%	38%	15%	17%	4%
39. Using a computer makes me (would probably make me) feel uneasy	1%	7%	13%	37%	42%
40. Overall, using computers helps me (could help me) work more	25%	43%	24%	7%	2%
41. M.I.T. should develop a university-wide network of personal computers	39%	31%	23%	3%	3%
42. Using computers in education often results in less personalized treatment of students	4%	18%	38%	32%	8%
43. I prefer mathematics to writing	16%	25%	29%	20%	10%
44. Computers make it easier to work collaboratively with others	3%	16%	58%	20%	3%
45. I'm concerned about the vulnerability of M.I.T.'s computer systems to theft and tampering	8%	26%	33%	28%	5%

1985A

	Strongly Agree	Agree	Neither Agree nor Disagree	Disagree	Strongly Disagree
46. Computers are gaining too much influence over people's lives	5%	17%	27%	41%	9%
47. It disturbs me that a few people in our society know so much about computers, while most people know so little about them	9%	26%	28%	28%	9%
48. Computers can help me improve the quality of my writing	10%	28%	24%	26%	12%
49. Because of computerized information systems, too many people have access to information about other people	10%	33%	34%	21%	2%
50. Computers contribute to the social isolation of students from one another	7%	27%	29%	29%	8%
51. Within ten years or so, computers will be as common as telephones in U.S. homes and offices	20%	46%	16%	15%	2%

For each of the statements below, circle the number of the response that corresponds most closely to your general opinion. (Answer even if you haven't used a computer yet.)

1986A

	Strongly Agree	Agree	Neither Agree nor Disagree	Disagree	Strongly Disagree
36. Many of my closest friends like to use computers	22%	36%	27%	13%	2%
37. I'm not really interested in learning about computers	2%	7%	11%	46%	35%
38. I feel confident about my ability to use a computer	32%	36%	18%	13%	2%
39. Using a computer makes me (would probably make me) feel uneasy	1%	6%	12%	39%	42%
40. Overall, using computers helps me (could help me) work more	25%	49%	19%	5%	2%
41. M.I.T. should develop a university-wide network of personal computers	34%	31%	27%	7%	2%
42. Using computers in education often results in less personalized treatment of students	3%	18%	33%	40%	7%
43. I prefer mathematics to writing	14%	26%	27%	23%	11%
44. Computers make it easier to work collaboratively with others	4%	12%	52%	28%	4%
45. I'm concerned about the vulnerability of M.I.T.'s computer systems to theft and tampering	4%	21%	37%	28%	10%

1986A

	Strongly Agree	Agree	Neither Agree nor Disagree	Disagree	Strongly Disagree
46. Computers are gaining too much influence over people's lives	3%	15%	24%	45%	14%
47. It disturbs me that a few people in our society know so much about computers, while most people know so little about them	6%	24%	35%	29%	6%
48. Computers can help me improve the quality of my writing	11%	32%	20%	26%	11%
49. Because of computerized information systems, too many people have access to information about other people	6%	25%	34%	30%	5%
50. Computers contribute to the social isolation of students from one another	8%	26%	28%	30%	9%
51. Within ten years or so, computers will be as common as telephones in U.S. homes and offices	19%	46%	17%	16%	2%

52. Would you rather use a computer MORE or LESS often than you do now?

1985A		1986A
(250) 53%	More Often	(215) 47%
(22) 5%	Less Often	(25) 6%
(196) 42%	Neither more or less often	(213) 47%

53. On average, how many hours per week do you use a computer during the academic year?

1985A	1986A
Mean 7.4 hours	Mean 8.036 hours/week

Approximately how many of these hours do you spend using:

	1985A	1986A
54. A personal computer?	1.9 hours	2.7 hours
55. M.I.T.'s main computer system?	1.6 hours	2.2 hours
56. The Athena system?	2.3 hours	2.8 hours
57. Another computer system?	1.9 hours	1.9 hours

When you write (excluding brief letter and memos), how often do you:

1985A

	Frequently	Occasionally	Seldom	Never
58. Make an outline first?	(238)50%	(101)21%	(97)20%	(44) 9%
59. Compose your first draft in longhand?	(293)62%	(69)14%	(90)19%	(51)11%
60. Compose your first draft with a typewriter?	(21) 4%	(31) 7%	(91)19%	(180)38%
61. Compose your first draft with a computer?	(130)27%	(77)16%	(91)19%	(180)38%
62. Revise sentences or paragraphs as you write them?	(339)70%	(105)22%	(28) 6%	(9) 2%

1986A

	Frequently	Occasionally	Seldom	Never
58. Make an outline first?	(201)44%	(104)23%	(92)23%	(64)14%
59. Compose your first draft in longhand?	(236)52%	(69)15%	(70)15%	(83)18%
60. Compose your first draft with a typewriter?	(10) 2%	(28) 6%	(56)12%	(363)80%
61. Compose your first draft with a computer?	(176)38%	(96)21%	(68)15%	(120)26%
62. Revise sentences or paragraphs as you write them?	(343)75%	(91)20%	(21) 5%	(5) 1%

63. If a "hacker" were defiend as "someone who designs computer programs mainly for the pleasure and challenge of doing so," would you consider yourself a "hacker"?

1985A		1986A
(90)19%	Yes	(75)16%
(47)10%	Not yet, but I feel like I could become one	(37) 8%
(271)57%	No, but I like to use computers	(280)60%
(70)15%	Definitely not -- I don't like to use computers	(56)12%

64. How would you rate your computer and programming skills?

1985A		1986A
(27) 6%	No experience at all	(26) 6%
(56)12%	Mini-course in computers (e.g., Athena survival)	(58)13%
(171)36%	Full subject in programming (e.g., 1.00, 2.10 or equivalent)	(145)32%
(128)27%	Programming experience beyond a subject	(122)27%
(95)20%	Extensive programming experience	(103)23%

To help us interpret the results of this survey, we'd like some information about your background and your relationship to M.I.T. (These items are optional, but important to us.)

65. How many years have you been at M.I.T.?

	1985A		1986A
	Mean 2.5 years		Mean 2.5 years

66. Your sex:

1985A		1986A
(342)72%	Male	(325)70%
(136)28%	Female	(136)30%

67. Your age:

1985A		1986A
Mean 20.0 years		Mean 20.1 years

68. Your year at M.I.T.:

1985A		1986A
(118)25%	1	(108)23%
(124)26%	2	(112)24%
(124)26%	3	(117)25%
(108)23%	4	(119)26%
(6) 1%	Other	(5) 1%

69. Your native language:

1985A		1986A
(420)88%	English	(427)93%
(57)12%	Other	(31) 7%

70. Omitted

71. Where do you live when at M.I.T.?

1985A		1986A
(312)65%	Dormitory	(310)68%
(128)27%	Fraternity	(116)25%
(39) 8%	Other	(33) 7%

72. Do you (or does your family) have a personal computer or computer terminal at home?

1985A		1986A
(225)47%	Yes	(250)54%
(253)53%	No	(211)46%

If yes, what kind?

1985A		1986A
5%	Apple Macintosh	8%
26%	Apple II Others	29%
21%	IBM PC/XT	21%
17%	Other PCs	11%
1%	DEC Terminals	0%
1%	Other Terminals	1%
25%	Home Computers	21%
4%	Missing	7%

73. Do you expect to use a computer in your future work?

1985A		1986A
(414)86%	Yes	(416)90%
(10) 2%	No	(6) 1%
(55)11%	Don't know	(38) 8%

74. If you have any comments on what you like or don't like about computers (both in general and here at M.I.T.), please write them in the space below.

	1985A	1986B
More courses	(3) 2%	(3) 2%
More facilities	(15)11%	(29)21%
Improve support	(18)13%	(7) 5%
More non-computer science courses	(4) 2%	(0) 0%
More standardization	(16)12%	(4) 2%
Negative social impact	(14)11%	(10) 8%
Extend M.I.T. computing	(7) 5%	(6) 4%
Generally satisfied	(35)26%	(30)22%
Too much emphasis on computers	(13)10%	(7) 5%
Other	(14)10%	(35)26%

We now need some information on the educational implementation of Athena.

75. How many courses are you taking this term where the Athena system is used in lectures?

	1986A
1. 0	(403)87%
2. 1	(52)11%
3. 2	(16) 1%
4. 3	(0) 0%
5. 4	(1) 0%
6. 5 or more	(0) 0%

76. How many courses are you taking this term that require that you use the Athena system?

1. 0	(324)70%
2. 1	(113)25%
3. 2	(19) 4%
4. 3	(2) 0%
5. 4	(1) 0%
6. 5 or more	(1) 0%

How frequently do you use Athena for each of the following?

		Almost Every Day	Few Times A Week	Few Times A Month	Once A Month Or So	Less Than Once A Month	Not At All
77.	Required for courses	(3)1%	(37) 8%	(43)10%	(36)8%	(48)11%	(281)63%
78.	As Athena staff	(6)1%	(1) 0%	(5) 1%	(0)0%	(0) 0%	(433)93%
79.	As curriculum developers for Athena courses	(3)1%	(9) 2%	(3) 1%	(4)1%	(0) 0%	(424)95%
80.	For personal use (e.g. text processing)	(18)4%	(65)14%	(129)28%	(57)13%	(64)14%	(121)27%

When you use the Athena system in courses, how often are you

		Always	Often	Sometimes	Rarely	Never
81.	Running a course specific software	(53)16%	(51)16%	(34)10%	(29)9%	(162)49%
82.	Writing all or part of a program yourself	(25) 8%	(45)14%	(30) 9%	(28)8%	(205)62%
83.	Running an applications package (e.g. Scribe, Emacs, 20/20)	(53)16%	(75)23%	(37)11%	(16)5%	(149)45%
84.	Other	(2) 1%	(6) 4%	(3) 1%	(3)2%	(126)91%

85. If you have any comments on Project Athena, please write them in the space below.

1986A

Good idea - in general positive	26
Athena sucks	7
We need more facilities - more terminals, too crowded	55
System is slow	30
Put terminals in fraternities, living groups, dorms	20
Better working printers	18
Terminals are inaccessible	14
Loads too high	9
More dial-ups	14
Remove games	10
More on-line and other courses about Athena	10
More user friendly system	7
Bigger, more equitable student accounts	6
Implementation of Athena is too slow	5
Communications re: experiment too optimistic	2
Unreliable	4
More unified system - access across clusters	3
Decentralize the system	2
Improve SCRIBE	1
Less UNIX	2
Athena management to be improved	3
Athena too complex for many students	3
Consultants good	5
Consultants bad	4
Documentation good	2
Documentation bad	8
Better graphics	2
Keep Athena facilities clean	4
Develop and add new software	6
Reactions to the survey (5 positive, 3 negative)	

List of Previous Reports

Report Number 1

Cohen, Karen C., "Project Athena Survey Results," 1985.

Report Number 2

Cohen, Karen C., "Project Athena Computer Survey Results," Fall, 1985.

Report Number 3

Cohen, Karen C., "Project Athena Checklist Findings," Fall, 1985.

Report Number 4

Taylor, Edwin F., "Computer Graphics Utilities in Special Relativity," 1986.