Academic Computing Services: MORE than a Utility

Scott Bierman (sbierman@carleton.edu)
Associate Professor of Economics
Chair, Advisory Committee for Academic Computing, 1993 - 1995

Cathy Smith (csmith@carleton.edu)
Director, Academic Computing and Networking Services, 1993 - present
Carleton College

Abstract

The year 1993 saw the birth of a totally new academic computing service organization, and faculty support model, for Carleton College. The result of a campuswide faculty demand for support of information technology use in the curriculum, the model's key elements are: technical support staff with substantial backgrounds and abilities in the disciplines of the faculty with whom they work; faculty "advisors" who partner with the technology staff in supporting faculty technology use; redefinition of "academic computing" as a campuswide, collaborative endeavor; satisfaction of faculty needs as the main arbiter of (a) what support is available, and (b) whether "success" is achieved.

The Carleton experience is consistent with, and validation for, the "quality movement" under way in higher education. "Putting the customer first" has proven an unerring guide in the design of excellent faculty technology support. This experience at the same time is contrary to the current trend toward central technology groups as "utility companies." Carleton has demonstrated that services of a profoundly "value added" nature are eminently and effectively doable by a central computing organization.
In 1993 a totally new academic computing service organization began operation at Carleton College. An earlier organization had proved not to be well suited to keeping pace with campus-wide faculty demand for support of information technology use, particularly in the curriculum. The essence of the approach of the new organization derives from a redefinition of "academic computing" as a campus-wide, collaborative endeavor in which satisfaction of faculty needs is the main arbiter of what support is available and whether "success" is achieved. This emphasis stems from an understanding that the primary mission of the College is to provide the best education to students that financial resources allow.

Prior to 1993 faculty technology support at Carleton – like that at many colleges and universities – was based on the twin pillars of technology standards and the help desk. Implicit in such an approach is the premise that limiting the number and range of available technologies and the activities of support staff is the best, if not only, way to provide technology support. As Carleton faculty increasingly attempted to integrate technology use into their teaching and research, they found this model to be an inadequate match for their needs which were typically discipline-specific and experimental in nature.

In the past two years a new customer-centered support model has been implemented. The model's underlying premise is that embrace of the full diversity of discipline-based needs and tools and establishment of highly personalized and time-intensive relationships between faculty and support staff will profoundly alter the frequency, quality and impact of information technologies use in teaching and research. The fundamental task of the academic computing organization is to understand what it is that faculty would like to accomplish and then to work with the faculty to select and implement the appropriate information technologies that will increase their effectiveness. This requires that substantial academic computing staff time be devoted to understanding the objectives of individual faculty. Since the ebb and flow of dialogue between faculty and academic computing staff is the central characteristic of this model the organizational structure is designed to facilitate communication.

What two years of data have shown is that the new model has proven an unerring guide in the design of excellent faculty technology support. This experience is highly consistent with, and validation for, the "quality movement" in higher education. The Carleton experience is at the same time contrary to the recent trend toward central technology groups as "utility companies". We have demonstrated, in a remarkably short time, that services with tremendous value-added are eminently and effectively doable by a central computing organization.

I. Faculty Technology Use: Then vs. Now

The profile of faculty technology use after two years of the new support model is vastly different than before: skill levels are higher; overall use levels are higher; curricular use is higher.

Skill and Use Levels
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<thead>
<tr>
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<th>None</th>
<th>Limited</th>
<th>Moderate</th>
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<tbody>
<tr>
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<td></td>
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<td></td>
</tr>
<tr>
<td>1995</td>
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<td>4%</td>
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<tr>
<td><strong>Use</strong></td>
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<tr>
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<td>6%</td>
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<td>4%</td>
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<tr>
<td><strong>Use</strong></td>
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<td>1995</td>
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<tr>
<td>1993</td>
<td>91%</td>
<td>6%</td>
<td>2%</td>
<td>1%</td>
</tr>
</tbody>
</table>

**Curricular Use**
Prior to 1993, curricular uses of information technologies – i.e., uses by students in classes in support of specific curricular outcomes – was rare outside of the sciences and mathematics. Since 1993, curricular computing use has burgeoned within the humanities and social sciences: The percentage of faculty making moderate-to-high use of technology in teaching has quadrupled, from 6% to 24%. The percentage using technology in teaching at any level has more than doubled, from 16% to 34%.

The following vignettes are representative of the range, nature and scope of technology-based curricular enhancements facilitated campus-wide by the new faculty support model.

- **Economics**: Students are completing senior thesis projects easily equivalent of masters theses. Original research questions are being explored through analysis of vast data sets.
- **English**: Students are conducting extensive and complex literary analyses through use of electronic texts and sophisticated search engines.
- **Biology**: Students in several mid-level courses are able for the first time to analyze – not just describe – images from light and electronic microscopes through use of image capture and analysis equipment.
Overall, one/fifth of the Carleton faculty have participated in the 2.5 year old "Curricular Computing Grant Program" (more on this program below).

What is most important to see is the change in the overall willingness to experiment with new curricular innovations that use information technologies. The understanding by Carleton faculty that there is help around the corner from technical support staff makes a vast difference in a faculty member's willingness to undertake risky curricular changes. - Scott Bierman

We could have cited “numbers of things” data here, e.g., numbers of computers, numbers of network nodes, numbers of dollars in technology budgets, etc. Such data for Carleton would indeed suggest an “improved faculty technology environment”. They, however, would say nothing about increases in faculty abilities and as such would have little point. - Cathy Smith

II. HOW WE GOT HERE: THE PROCESS OF CHANGING THE NATURE OF FACULTY TECHNOLOGY SUPPORT

The Faculty Task Force on Academic Computing (1992)

In January of 1992 the Dean of Budget and Planning and the Dean of the College called on a group of five faculty, one student, and two administrators to consider computing in the classroom and laboratory, computing in faculty and student research, and computing in academic departments and support services. It was suggested that organizational recommendations would be welcome.

The Challenge: It was understood by all that the College must provide the staff and equipment to make effective use of the opportunities available to enhance the traditional objectives of the College through the use of information technologies. Having said the obvious, the real issue was what organizational structures could be put into place that would increase the likelihood of curricular computing initiatives being employed effectively at Carleton.

It seemed to the task force that the key to getting curricular computing off the ground was to have a structure designed to facilitate communication between faculty and academic computing staff. If faculty could communicate clearly to academic computing staff what their objectives were in their classes, and if academic computing staff could clearly communicate to faculty how information technologies could be used to achieve those goals, curricular computing initiatives would stand a chance. As the task force wrote: A close knit partnership between faculty members and members of the academic computer staff must be nurtured and encouraged. Effective lines of communication must be developed between everyone interested in academic computing. All parties must learn how to utilize the specific strengths that each brings to their joint ventures.¹

The Vision: The emphasis from the task force, therefore, was the establishment of a true partnership between faculty and academic computing staff in which the creation of a curricular computing initiative would come about through a dialogue between the two. This dialogue would require that the academic computing staff have good information regarding the objectives and skills of individual faculty members. Obviously, this dialogue would rarely occur as long as the academic computing organization was a standards based, lowest-common-denominator model. Instead the task force proposed a model whose principal features included: (1) cluster departments

into divisions based on discipline similarities; (2) provide one professional technology support staff for each division; (3) expect that the technology support staff, including a new director, have division-applicable background in teaching and research as well as technical skills; and (4) identify one faculty member from each division to provide peer and pedagogical support to other faculty.

The task force identified absolutely the right model of faculty support. We thank them for their wisdom! – Cathy Smith

Designing the New Academic Computing Cooperative (January - June 1993)

Planning: Cathy joined Carleton as the new "academic computing director" in January of 1993. Over the following six months, a participatory and collaborative process involving groups of faculty, academic staff and students, and all computing staff, was utilized to define what the new academic information technologies organization would be and do. Within two months, the "Initial Planning Document for Academic Computing" was published. It articulated a vision and mission, and the goals and initiatives for the new academic computing endeavor. The specific goals regarding faculty use of information technologies were:  

- Empower faculty to acquire and effectively use information technology for both curricular and scholarly purposes.
- Stimulate innovation in the use of information technology in classroom- and laboratory-based instruction and learning and promote the use of information technology to support the development of new paradigms for teaching and learning.

Staffing and Budget: Based on the Planning Document, staffing and budget requests were developed and submitted. In line with original Task Force recommendations, the staffing request included three staff to serve as the Academic Computing Coordinators for the divisions into which academic departments would be grouped. The staffing request also included 50 hours per week of student work for each Coordinator. A financial model for academic information technologies was developed, and formed the basis for the requested operating budget. A key feature of the financial model was the life-cycle replacement of computer and networking hardware and software. The importance to aggressive and effective faculty technology use of a budget capable of supporting both regular equipment replacement and modest but steady growth in equipment inventories can not be overestimated.

The resulting staff allocation included staff from the previous single campus computing group, and one new FTE. The budget allocation was a combination of an adequate base for year one plus a commitment to build the base over a multi-year period to the levels of the financial model.

Clustering Departments Into Divisions: Cathy, the staff who were to become two of the three faculty Computing Coordinators, and the Advisory Committee for Academic Computing (the committee is described below) spent the Spring of 1993 discussing how the general faculty support model articulated by the Task Force would in actuality operate. First, the three divisions of

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3 The full staffing request, in number of FTE, was: Academic Computing Coordinators, 3; Systems/Network staff, 2; Student Computing Coordinator, 1; Information Coordinator, 1; Director, 1; Clerical/Administrative support, .33. In 1995, a third FTE was added in Systems/Networks. The three Systems/Network staff support all central computers and networks, academic and administrative. One hardware maintenance technician in the administrative computing organization similarly services the entire college.
academic departments were defined. Defining criteria were discipline, curricular and technology use affinities, plus the goal of a reasonably even distribution of clients:

<table>
<thead>
<tr>
<th>Social Sciences, Performance Arts, &amp; Physical Education</th>
<th>Languages &amp; Humanities</th>
<th>Natural Sciences, Mathematics &amp; Art</th>
</tr>
</thead>
<tbody>
<tr>
<td>African/African-American Studies</td>
<td>Academic Development &amp; Support Center</td>
<td>Arboretum</td>
</tr>
<tr>
<td>Asian Studies</td>
<td>American Studies</td>
<td>Art &amp; Art History</td>
</tr>
<tr>
<td>Economics</td>
<td>Asian Languages &amp; Literatures</td>
<td>Biology</td>
</tr>
<tr>
<td>Educational Studies</td>
<td>Classics</td>
<td>Chemistry</td>
</tr>
<tr>
<td>Learning &amp; Teaching Center</td>
<td>English</td>
<td>Geology</td>
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<tr>
<td>Music</td>
<td>German &amp; Russian</td>
<td>Linguistics</td>
</tr>
<tr>
<td>Music &amp; Drama Center</td>
<td>History</td>
<td>Mathematics &amp; Computer Science⁴</td>
</tr>
<tr>
<td>Physical Education</td>
<td>Judaic Studies</td>
<td>Physics &amp; Astronomy⁵</td>
</tr>
<tr>
<td>Political Science</td>
<td>Media Services</td>
<td>Psychology</td>
</tr>
<tr>
<td>Sociology &amp; Anthropology</td>
<td>Media Studies</td>
<td>Dean for Budget &amp; Planning⁵</td>
</tr>
<tr>
<td>Studies in Theater Arts</td>
<td>Modern Language Center</td>
<td></td>
</tr>
<tr>
<td>Women's Studies</td>
<td>Religion</td>
<td></td>
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<tr>
<td></td>
<td>Romance Languages &amp; Literatures</td>
<td></td>
</tr>
</tbody>
</table>

**Defining Support Services:** Then, "every conceivable" support activity and variation on it was analyzed by the group: What benefit did each provide, and how critical was this? What level of the Computing Coordinators' time and effort did each require, and did the "payoff" warrant it? This dialog, by clearly identifying the costs and benefits of all possible support functions, generated a highly realistic set of support services priorities. Three support priorities emerged from this process:

- The ability of Computing Coordinators to spend large amounts of time interacting with individual faculty and exploring technologies on faculty's behalf
- The ability of Computing Coordinators to assist individual faculty with the development and delivery of computing and networking uses in the classroom
- Faculty freedom to choose, and be supported in using, a wide range of software

In light of these priorities, examples of service tradeoffs were:

The Coordinators would often be away from their phones. Faculty expressed a strong desire to be able to interact with professional rather than student computing staff. Conclusion: A "help desk" – where someone is guaranteed to be available to answer telephones during defined business hours – would not be among the set of faculty support services. Resulting service profile: Someone will not always answer the phone, but when the phone is answered, resolution is basically guaranteed.

Formal computer training curricula and good computer documentation require very large amounts of time and effort. Could the Computing Coordinators develop and maintain a curriculum and local documentation and meet the three service priorities? No. Conclusion: Neither a formal computer training curriculum nor a program of local documentation would be among the set of faculty support services. Resulting service profile: Faculty receive individualized "training" upon

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⁴ It should be noted that these two departments each hired one computer support staff some years ago. The Coordinator for the division is nonetheless very active with these departments; the bulk of faculty assistance it met by the departmental support person, however.

⁵ This obviously administrative department is supported by academic computing because it is the office to which academic computing reports.
request. Interactions with Coordinators are the vehicle for much, if not most, learning. Vendor manuals are distributed with all equipment and software, and Coordinators make it a practice to engage faculty with their manuals in consulting situations.

III. THE NEW ACADEMIC COMPUTING COOPERATIVE IN ACTION (JULY 1993 - PRESENT)

The Academic Computing Coordinators
The three Computing Coordinators have the combination of technical and discipline-specific backgrounds defined as ideal during the planning process. One is a Classicist and language specialist; the second, a Political Scientist and quantitative methods specialist; the third, a Physicist, specializing in numerical and laboratory techniques. Our experience has confirmed that, in order for the Computing Coordinators to partner with and support their faculty in the ways and extent envisioned by our model, it is absolutely imperative that they have academic backgrounds, and remain actively engaged in the issues of teaching, learning and research.

Such a staffing approach can present challenges. For instance, these individuals can be hard to find. It can not be assumed that individuals who have been successful in traditional faculty technology support roles will do well in our non-traditional model. Where, then, does one look? We have successfully recruited two Computing Coordinators from the growing ranks of graduate students in love with the possibilities of technology in teaching and research as well as their academic disciplines. The recruitments have taken longer than those of more traditional staff, and have required a high level of active searching and soliciting.

Though the Coordinators are characterized as technical support staff, if required we will sacrifice technical skills to academic ones during recruitment. Whereas an individual can build technical skills over time – and while they do, other staff in the organization can help out – s/he cannot undertake, or redo, an entire career as a student, graduate student, teacher and researcher.

How Academic Computing Coordinators Interact with Faculty

Computer Delivery and Set Up: A Key "Bonding" Experience: The Coordinators and their student assistants set up the computers of their clients. After installing and testing hardware and software in our "bench" area, they then install the system including network connection in the faculty office or lab. At that time or others of faculty choosing, they also provide one-on-one training on the use of the system and application software.

Software "Standards": This seems like a good point to talk about the issue of "software standards". Within budget constraints, the choice of applications software installed on a system is the user’s. What this has meant in practice is:

- Word processing, spreadsheet, file management, presentation, graphics – The range of what faculty currently want and need includes approximately six word processing, three file management, three spreadsheet, two presentation, and three graphics programs.
- Faculty require a large variety of discipline-specific applications. We have successfully met these needs by the process through which departments and academic computing collaboratively determine the computing equipment needed within the department through yearly analysis and planning, and by the establishment of key site licenses.

We acquire and provide assistance with the range of applications needed and used by faculty. Our support philosophy is that simple.
Moving from the prior software standards-based environment to an approach that focuses on what it is that faculty need to be able to do has resulted not in chaos and pandemonium, but rather in faculty having the applications they need and with which they feel comfortable and will achieve new outcomes in their teaching and research.

"Computer Delivery" is therefore a very pivotal occasion for faculty and computing staff to establish what will be an ongoing relationship of highly personal and individualized support. Because the software and hardware being installed has been selected on the basis of faculty needs and preferences, installation is a time of mutual excitement and anticipation, a time when faculty and computing staff begin to explore possibilities together.

**Training:** The Computing Coordinators and their assistants provide one-on-one training to faculty upon request. The request is often the result of a Coordinator suggestion that s/he could show/teach a particular topic or skill. Training content and scheduling is determined by client need; the training usually occurs in the faculty office, on the faculty computer. Small group training has also been utilized for networking topics as networking initiatives usually occur at the department level.

**Curricular and Technology Research:** The question we particularly hope for from faculty is of the form, "Is it possible to...". We earnestly want faculty to express any/all ideas on possibilities for curricular enhancement. Such ideas do not necessarily contain a technology component at the outset. The ideas do provide a basis for discussions between faculty and their Computing Coordinators (and their Faculty Advisors as detailed below). The ideas are poked, prodded, expanded, and clarified. Based on the discussions, the Coordinators may conduct research in a myriad of areas – e.g., what is being done in like courses at other institutions, what technologies may particularly support the curricular goals – through a myriad of resources – e.g., Internet resources, cohorts at other institutions, periodicals, technology vendors, etc. The process is then an iterative one of refinement through successive discussions and information gathering, typically including the hands-on examination of software an/or hardware. When the research process concludes, an idea is sorted into one of a few categories: non-starter; infeasible at this time; great idea; let's pilot it.

**Curricular and Technology Pilots:** A pilot is an experiment: Will the desired curricular enhancement materialize through the introduction of technology use and other changes within a syllabus, and at what costs? Pilots involve at least introductory mastery of a technology by the instructor and some student use as part of their course work. The Computing Coordinator's role is to provide full and direct assistance at every step; faculty training, software and hardware preparation and testing in our student computing environment, student training, and trouble shooting and analysis. (Successful pilots are then systematically integrated into departmental curricula, the student computing environment, and the academic computing budget.)

*It is very important for faculty to have frequent contact with the Coordinator. It is rare that a conversation I have with my Coordinator begins with "Is it possible to...", more often it consists of some seemingly mundane problem that I am trying to jury-rig a solution to. From there my Coordinator will ask me what I am trying to accomplish and twenty minutes later we are embarking on a far more ambitious and intelligent plan of action. Because of the value of these conversations I have made it a point to call on my Coordinator at least once a month whether I*
need her help or not. While these are intended to be social calls they invariably turn out to be extremely productive as well. - Scott Bierman

The Relationship Between Academic Computing Coordinators (ACC) and Other Academic Computing Staff

Student Assistants: Each Computing Coordinator recruits, trains and supervises 3-5 student assistants. Assistants perform the functions and tasks delegated to them by the Coordinators.

Student Computing Coordinator (SCC): The SCC Manages student computing sites. The SCC is solely responsible for generic and general purpose offerings of student sites; the ACCs share responsibility for course- and discipline-specific offerings. The SCC manages and maintains computer classroom facilities; the ACCs train faculty in use of computer classrooms, participate in first classroom session(s), and remain on-call to provide faculty assistance thereafter.

Systems/Network Staff: Systems staff manage central computing resources; ACCs perform account and volume management for their users. Network staff design, manage and maintain network cabling and electronics up to the wall jack; ACCs install network cards in faculty computers, and connect to the wall jack. Network staff select and define standard configurations for network software; ACCs install and support network software on faculty computers.

Information Coordinator (IC): The IC develops local timesharing system documentation for students; the ACCs also distribute this documentation to faculty. The IC manages the campus WWW server and academic computing's web content; the ACCs and assistants develop and maintain academic department home pages. The IC sits on CWIS oversight committee; one ACC also sits on CWIS committee.

Desktop Hardware Maintenance: ACCs attempt to diagnose hardware problems, and effect those repairs which consist of replacing parts. Diagnoses and repairs beyond this are passed to the campus hardware technician (see footnote 3).

Faculty Advisors

There are three "Faculty Advisors for Information Technology" at any time. A Faculty Advisor is intended to be an advocate and counselor for other faculty wishing to make further use of information technologies in their teaching. A Faculty Advisor is not a "technology super person", but rather someone who is comfortable with technology, uses technology in the classroom, and is willing and enthusiastic about talking with cohorts regarding the costs, benefits, and pedagogical issues of curricular computing. One member of the faculty from each division is invited to take on this role. The commitment is a three year one, and a 1/6 course release per year is offered as remuneration. The Director and Computing Coordinators work in close collaboration with the Faculty Advisors. Faculty Advisors are involved in the curricular discussions, research and piloting discussed above:

Curricular Computing Grant Program
The establishment of a competitive faculty grant program was among the very earliest objectives cast for the new academic computing organization. The program was launched in the spring of 1994 with the simple goal: *Curricular Computing Grants are designed to enable faculty to explore, experiment with, and pilot the use of information technologies to enhance their teaching. The goal is the improvement of educational outcomes.* Possible awards include stipends for times when the College is not in session, software, hardware, fees for training, data, etc., and in exceptional cases, course release. Grants have been awarded to 35 faculty in three years; this represents (an amazing) 20% faculty participation rate.

This program has been the vehicle through which most of the curricular computing ideas, discussions, pilots and adoptions have occurred. It is therefore the coalescence point of the goals of the new computing organization, the role of the Computing Coordinators, and the role of the Faculty Advisors.

*The program has provided us with a comprehensive, consistent and ongoing means of curricular innovation. It is not clear that we would have accomplished so much, so quickly, without it.*

- Cathy Smith

*As much as anything the Curricular Grant Program has provided an institutional stamp of approval for faculty to spend time on curricular initiatives. Now, finally, was a recognition that it is time consuming to modify curricula to take advantage of information technologies and that the time spent doing so is valued by the College.*

- Scott Bierman

**Advisory Committee for Academic Computing**

The Advisory Committee for Academic Computing is made up of the academic computing director, the Faculty Advisors, an Associate Dean, one staff member from an important academic support unit, and one student. The Chair of the committee is one of the Faculty Advisors and works closely with the Director to establish an agenda. The committee performs five important functions. First, it provides a venue for discussion concerning long-run information technology planning such as establishing network upgrade priorities, identifying potential needs for additional staff, and developing incentives for curricular technology use. Related to the first function is the second, to set budget priorities. The committee uses information from departments about their long-range plans to help establish the direction of broad categories of expenditures. (It is left to the Director to manage budget specifics, including annual departmental allocations.) Third, it serves as a policy discussion forum. As elaborated elsewhere, all decisions on the basic forms and nature of faculty technology support are set within the committee. Issues such as usage privileges are also determined. Fourth, the committee members are campus-wide advocates of the importance of information technology in the curriculum.

*The Advisory Committee is by no means a “watchdog” group. We are partners and friends, sharing a role in guiding academic information technology development and use at Carleton.*

- Cathy Smith (seconded by Scott Bierman)

**What Faculty Think of Their Computing Support**

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7 Check http://www.carleton.edu/campus/ACNS/CAUSE/cause3.html for a list of the Curricular Computing grants
8 There is a separate advisory committee which focuses exclusively on student computing issues.
You've got a wonderful crew over there and I am so very pleased with the "attitude" of your staff. If everyone on the campus were oriented the way you run your operation we would all love each other and usual conversation would come to an end.

- Charles Carlin, Professor of Chemistry and President of the Faculty

Not only has the creation of ACNS provided me with the support to implement curricular dreams, it has also led to new inspirations that would have been impossible without the stimulating interactions between faculty and ACNS staff. Our academic computing infrastructure seamlessly interweaves the technical and pedagogical strengths of ACNS staff and faculty with incredible curricular outcomes for our students.

- Susan Singer, Associate Professor and Chair, Biology

ACNS has come to our aid much more vigorously and in a more timely way than ever happened under the old setup. It is great to know that we have truly expert people ready to come to our assistance.

- Kirk Jeffrey, Professor and former Chair, History

Adam Smith argued in The Wealth of Nations that division of labor was the prime determinant of a nation's growth. What the economics department has learned is that division of labor, combined with good communication between faculty and ACNS staff who view themselves as partners, is the way to provide the best education to our students.

- Scott Bierman, Associate Professor and former Chair, Economics

IV. WHAT HAS NOT WORKED AS WELL AS IT COULD OR SHOULD?

Handling All Levels of Support
In the first year of the new organization, the activities involved in training and developing the confidence of faculty with low skill levels left the Humanities and Social Sciences Coordinators time for little else. The result was that not as much exploration of curricular possibilities as was envisioned and desired occurred. In year two, we hired a one-year “Faculty Support Intern”, and her presence meant that these basic support activities no longer dominated the two Coordinators lives. While the intern accomplished what we desired – raising the skill levels of large numbers of faculty – we are currently wrestling with the notion that we may need an intern, someone to take care of the “lower, more mundane” support activities, every year.

While faculty generally understand and agree with the notion that the Coordinators need to be “out and about”, it is of course painful for them to have “a crisis” when their Coordinator is not immediately reachable. A seemingly unrelated problem... The Coordinators don’t get/take as much time as they need to read and learn new things. Why? They are never “off line”. The solution, we hope, to both problems will come with the unveiling of Quickline in January of 1996. One of five professional staff will answer the Quickline at all times. Because they know faculty will not be left in the grips of an emergency, the Coordinators will now be able to go off line in order to read and learn.

Old Mind Sets Die Hard
Though there is widespread agreement (dare we say, amazement) that so much has changed so profoundly so quickly, we are periodically reminded that years of attitude setting and settling take a long time to overthrow. A few faculty still do not know that they can get the assistance they want/need. Others are reticent "to impose" on their Computing Coordinator for personal attention.
The needs- and value-based resource allocation process is not necessarily comfortable to those who used to assume that a certain level of resource was automatically forthcoming because of department of discipline. There are occasional, though rare, staff lapses into a "Don't they know we can't do that?" response to a faculty request. *There’s no such thing as too much communication.* - Cathy Smith

**Nothing Succeeds Like Success**
Faculty desire for technology and technology support services has skyrocketed. We continually strive to do more in order that no needs go unmet. This of course is a source of stress, but stress fortunately balanced by our lengthy list of contributions to the improvement of the educational experience at Carleton.

**V. ARE THERE THINGS TO BE LEARNED FROM CARLETON'S EXPERIENCE?**

We believe that our experience definitely offers proof that defining services and success *from the faculty's perspective* results in satisfied faculty, high technology skill and use levels, increased and effective curricular technology use, productive technology use, and high return on institutional investment in technology and technology support resources. Central, campus-wide technology organizations *can* provide value-added, customized services.

What is the relationship of institution size to ability to provide such services? One may assume that Carleton can marshal its faculty support model because it is "small" (approx. 1800 students, 180 permanent faculty). We are small. More to the point, however, is the fact that the College increased professional faculty support staff by 200% (and student staff by roughly 100%) in order to re implement faculty technology support. This is a *very* significant increase in investment. It represents the institutional will to maximally leverage information technologies in the evolution of the curriculum, and the institutional commitment to all faculty that they *will* be empowered to effectively utilize increasingly essential information technologies. We believe: the support-staff-to-faculty ratio upon which our model is operating (1 to 60) can be replicated/approached by institutions of all sizes if the institutional will exists; in many institutions, it is staff re-deployment from decades old service philosophies and staffing models, not increases in staff numbers, that are required; all institutions should adopt a similar model if not for all faculty, at least for those who will otherwise be left out of an academic world that has become dependent on technology use.

How much of our "result" is accounted for by structure? By the individuals working within the structure? We obviously believe that the formal model and organization we are using lead to desired outcomes, and therefore encourage others with similar aspirations to consider adopting similar approaches. On the other hand, it is very clear that we would not have the same outcomes we have without a set of individuals inspired and motivated by, and overwhelmingly committed to, our vision and goals.

After the first year of the new model, we had enough of a "track record" that other institutions desiring to redo their methods of faculty technology support began to seek us out. A number have made site visits; all are adopting at least some of our strategies. A foundation has thought well enough of our new approach to provide grant support.
The value of information technology in the education of college students depends on faculty taking the initiative to alter their teaching methods. Faculty have a good idea of where they would like students to end up but often only a limited notion of how information technologies can get them there. Computing service organizations know what technologies exist but have a limited sense of what specific faculty ultimately want to achieve. Hence computing service personnel must work hard to understand what faculty are trying to achieve in order to be proactively helpful. And faculty must understand that computing service staff are important partners in the goal of providing current and future students with a top-notch education and aggressively seek their advice. Without this partnership and mutual recognition of each other’s role neither the faculty nor the computing organization will effectively implement information technologies into the curriculum.