

Bryn Mawr College Information Services Self-Study
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INFORMATION SERVICES SELF-STUDY

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Preface

Bryn Mawr College made the decision to merge all of the departments that provide support to the academic mission of the College in 2001, and since that point there have been reports, visits to and from other colleges, and ongoing support and encouragement from the Trustees and advice from the faculty, but there has not been a thorough look at the operation of Information Services since it was formed. The idea of reviewing the past seven years of the work of Information Services grew out of conversations initiated by the CIO of the College with the two groups that are advisory to Information Services — the Board of Trustees Information Services Advisory Group and the Faculty Committee on Libraries, Information and Computing (CLIC) — and the plan to conduct a self-study, bring in a visiting committee and make recommendations for future directions developed in the spring of 2008. The timing seemed right, coinciding with the beginning of the term of a new president, just one year after Haverford's new senior administration took office, and initiating the first in what is projected to be a look at the various administrative departments of the College. Over the summer of 2008, the planned self-study became a joint project of both Haverford and Bryn Mawr, through discussions by both Presidents and members of both boards, informed by a proposal that developed at Bryn Mawr at the request of President McAuliffe. The departure at Haverford of its CIO, which leads that College to ask how to organize its future library and information technology services, combined with the increasing interest on the part of both Colleges' boards for closer cooperation made this self-study and visit the perfect opportunity for collecting advice from a distinguished group of visitors about what the prospects for deep collaboration might be between these two colleges' library and information technology operations as a way to lead towards further academic cooperation and collaboration ([Charge](#)).

The deepening financial crisis throughout the country and the world gives this review some urgency. The drive to collaborate more in order to improve services and set the stage for further, deeper academic collaboration at these two colleges becomes increasingly important as all of us struggle with ways to do better in an environment framed by a renewed sense of focus on what matters. Both colleges have had to deal, like all other institutions, with periods of financial constraints and limited resources throughout their histories, and at times these moments have led to intensified collaborations. Bryn Mawr and Haverford, with Swarthmore, have helped to lead the way in collaborative efforts on the library front and Haverford and Bryn Mawr have worked together effectively in such administrative areas as career development, transportation, and in such academic areas as in its joint education program. A key question may be how to continue the distinctive contributions to educating students that each College provides as we might move towards consolidating those administrative operations that work similarly at both colleges. Are the

cultures that support these two distinctive yet connected institutions flexible and sturdy enough to embrace a level of interdependency that would be necessary in order for both to flourish in a relationship unprecedented among liberal arts colleges? At Bryn Mawr, within Information Services, we have needed to learn how to work together, how both to blend and to preserve what is distinctive about how librarians and computer professionals work, how the language learning center, institutional technologists, museum and multi-media professionals can collaborate with one another in order to try to create a whole larger than the sum of its parts. The animating idea behind these various collaborations is a shared vision that what we all do is connected to ideas about learning, teaching and research that themselves derive from our long-standing collaboration with the Bryn Mawr/Haverford Education Program, which works to engage student voice in all of its work. In IS, we think that we are all students, that we ourselves need to be involved in our own further education as we work with and for the campus to foster learning. We look forward to the views of the visiting committee on how we might continue to pursue this vision as we work together with more partners.

Introduction

The mission of Bryn Mawr College's Information Services (<http://www.brynmawr.edu/is>) is to:

SERVE by supporting technologies that benefit teaching and learning.

FOSTER collaborative relationships that advance the curriculum, research, and the mission of the College.

Help BUILD intellectual partnerships that encourage self-reliance and cooperation.

We VALUE

- * faculty, students, staff and their achievements
- * the professionalism of the Information Services department
- * risk-taking and flexibility
- * openness towards change and the possibilities of emerging technologies
- * input and feedback from the community
- * courtesy and respect

Information Services (IS) adopted this vision of inclusion and process in the summer of 2003, a year into its formal launch as an integrated organization providing comprehensive curricular, research and technology support services and programs to the College. Merged from the College's Libraries, Core and Administrative Computing, Visual Resources Center, art and artifacts (and minerals) collections, Language Learning Center, Telephone and Multimedia Services, Information Services' 67.85 full-time equivalent staff¹ supports a community of approximately 1,560 full-time equivalent students (1,360 undergraduate women and a coeducational cohort of 425 graduate students), a faculty of 122 permanent

¹ This figure includes 4 open positions and a 5th opening in Spring 2009; we are meeting our needs for a Web Programmer through consultants; the remainder – senior instructional technologist; telephone services coordinator; visual resources specialist; coordinator of public and instructional services - might not be filled while present economic conditions persist and/or are under review while IS evaluates total program and service needs.

and 15.75 continuing non-tenured appointments and 452 FTE administrative/professional, clerical/technical and service/craft staff.

Bryn Mawr's Libraries, which collaborate intensively with Haverford and Swarthmore in the Tri-College Library Consortium, are highly regarded on campus and in the realm of liberal arts colleges and beyond, for the depth of their collections, in particular for holdings in the Humanities, visual culture, classical and ancient societies, and a superb collection of rare books and manuscripts, especially incunabula. Our librarians have expanded their identity as stewards of physical texts to encompass access and paths to discovery and engagement with a myriad of knowledge resources, whether born digital or represented in virtual surrogates. The College Libraries strive to help to engage the full community in the intellectual and cultural mission of the College. The Mariam Coffin Canaday Library, which is the central collecting point of Humanities and Social Sciences materials and location of the Rare Book Room, houses Language Learning, Writing, and Learning Resource Centers; a 24-hour lounge and popular coffeehouse, and a large, heterogeneous film collection with group viewing facilities. An exhibit gallery and an expanded computer lab may return in conjunction with the College's 125th anniversary celebration in 2010. The Lois and Reginald Collier Library, with journal collections stretching back to the 19th century, today provides office space for two computer technologists (one an open source specialist) dedicated to supporting the activities of the Park Science Building, and may transform itself into the campus Geographical Information Systems (GIS) hub. The Rhys Carpenter Library brings together holdings in art history, classical and Near Eastern archaeology and urbanism with lecture and seminar rooms. The building, an underground addition to the National Historic Landmark M. Carey Thomas Library (now largely faculty office and classroom space), was completed in 1997, and won a prestigious ALA/AIA award for design excellence. The Visual Resources Center, housed and administered in Carpenter, now integrates its activities with the libraries and the work of our new curator and registrar of the College's art and object holdings. In all of these cases, engagement with students and faculty is the goal and the purpose of IS staff work.

Computing at the College, in contrast to librarianship, is a new phenomenon. One hundred years ago, the largest building on campus, now known as the M. Carey Thomas Library, was just completed and it and its successor building, Canaday, now the largest building, continue to stand at the center of the campus. Computing operations started out in a basement of a dorm, and even when a new building was erected partially intended for the purpose – Eugenia Chase Guild Hall – computing stayed in the basement, if this time with a small courtyard that let in some light. Two thirds of the building – all of the above ground space -- was dedicated to classrooms. This is a pattern that was repeated throughout the country – few could foresee the importance of linked information technologies in the 1980s. At that time, computing operations were primarily focused on providing back office support to the College's administration, to the first scientists who were making use of computing in their research, and to librarians who were automating procedures and facilitating access to the first automated indexes to periodical holdings. Everything from the development of a professional identity to the movement of computing from mainframes to the desktop had to be invented from the ground up. The appearance of PCs on one's desk was a change in routine, expanding Ethernet at a dorm-a-year clip was considered a nice goal; and direct connections with the larger instructional goals of the College were not yet on the horizon. Computing's emergence out of the basement and into the consciousness of the College came to Bryn Mawr and

elsewhere in the 1990s, with the implementation of an integrated library system (Tripod, with Haverford and Swarthmore), with the selection and implementation of an enterprise resource system (PeopleSoft) to replace AIMS (the legacy administrative computing system) and working to integrate innovations into the teaching, learning and research life of the College.

If the Libraries' biggest challenge only a few years ago was refining its mission to embrace the digital age, Computing's was to manage expectations that seemed to multiply as quickly as did the speed of each new generation of processors. In the last decade, and six full years since the formation of IS – with the movement of staff across what were before impermeable boundaries leading to more people working to provide service -- the demand remains difficult to meet. Today IS supports the College's Web presence; maintains an Educational Technology Center; works in partnership with the Education Program in a learning collaboration engaging staff and students; strategically co-locates enterprise system personnel in Resources; and supports a total computing footprint that has grown from 700 machines to 1,625, i.e. nearly a computer per-person affiliated with the campus, a figure not accounting for the phenomenon that nearly every one of our 1,560 students also brings a PC from home ([Inventory](#)).

In the past decade, available Internet bandwidth has grown from 5Mbps to 100Mbps and available dedicated Tri-College bandwidth has expanded from 5Mbps to 30Mbps, but as we attempt to bump up this number each year, we know we will continue to have difficulty satisfying community demand for bandwidth and higher network performance. “Smart” classrooms are mostly the rule in our teaching spaces. Video is used throughout the curriculum, and we are working to provide high-speed, sanctioned streaming video matching in quality our success with streaming music via the Variations grant project with Indiana University. Few of our visual culture faculty and virtually none of our students still use slides, but nearly all of our art history and archaeology scholars clamor for ever more high-quality digital images with rich metadata. Demand for student phones has diminished to the point where it is no longer a provided service, but video conferencing is shifting from novelty to a desired core service. IS does not merely “support” the College's Web presence; in our preferred mode of collaboration, we strive to nurture it. In this world, we speak not of ubiquitous wireless on the horizon but of a wireless campus in the making.

The various departments and individuals that now make up the merged organization called Information Services have not only been active in moving forward the instructional, research and administrative interests of the College, but have been active nationally in developing the professional capacity for change. IS has been involved in, helped to shape, or innovated in the following ways:

Frye Leadership Institute: Four members of the staff have been selected to attend this prestigious leadership institute for information professionals.

NITLE, EDUCAUSE and CLAC: Three members of our staff have been named NITLE Fellows and one member of our staff was a member of the Academic Advisory Committee for NITLE in its formative years and another part of a NITLE regional advisory board. Two further members of the staff have been active in developing programs at EDUCAUSE and one is on the CLAC Board.

Andrew W. Mellon Foundation: In the past decade, IS and its predecessor departments have either been the direct recipient, the leader of, or one of a group in consortially-awarded grants totaling: \$1,825,500. These grants include:

Tri-College Instructional and Information Technology (1998-2002) – jump-started digital editing in each library; created summer media initiative at Bryn Mawr partnering students with faculty sponsors and IS staff; and funded the Trico course management system; vendor is Blackboard, hosted at Swarthmore: \$850,000

Talking Towards Techno-Pedagogy and Tri-College Library Collaboration (2000-2004) - a path-breaking 10-college three-year collaborative program with the Bi-College Education Program that introduced to the larger academic community principles developed by the Education Program and is a forerunner of the Teaching and Learning Initiative; the Library Collaboration grant spurred development of Trico digital service initiatives: \$436,500

Tri-College Collection Development Planning (2002-2003)–studied feasibility of collaborative collection development and coordinated management of the three collections: \$89,000

Tri-College Collaborative Collection Management Program (2003-2008)- implemented recommendations of the Planning grant; this funded Trico inventories of physical collections; provided relief staff for bibliographers who developed collaborative collection development models; seeded the Trico image library which became Tripix: \$450,000.

CLIR – Council on Library and Information Resources: A member of our staff is a Presidential Fellow of CLIR and has helped to shape a number of its initiatives. CLIR initiatives include:

CLIR/CIOs Group – This group is a forum for all liberal arts colleges that have merged their library and computing organizations. It helped to sponsor the following Bryn Mawr-led survey:

MISO – Merged Information Services Survey – The only instrument that measures satisfaction with the entire array of services provided to a campus by libraries and computing. It was developed chiefly at Bryn Mawr and continues to be administered from here. Participating institutions contribute \$1,000 each time they conduct the survey.

CLIR Postdoctoral Fellowship in Libraries for Humanists – This CLIR program which has brought 37 new Ph.D.'s into the academy is based at Bryn Mawr in the summer.

CLIR Hidden Collections – Bryn Mawr was a co-recipient of one the larger of the first wave of these prestigious grants and a Bryn Mawr staff member was the chief architect and author of the grant.

Tri-College Process Redesign (2004-2005) Grant – the libraries assessed local and TriCo workflows around the management of electronic information resources and redesigned them into a TriCo process; a model-license patterned on NERL was created and has been adopted by

providers; a symposium of national experts to discuss these initiatives and best practices was convened; an electronic resources management system was purchased.

The experience gained in taking on issues that extend beyond one campus helps IS and members of its staff to meet and take on some of the college-wide challenges that we describe in the next section. The merging of its various components into one unified organization has been helped not only by the engagement in projects of regional and national scope, but also by a number of activities intended to build collaboration and cooperation within IS itself. These began with consultation with the entire staff on how IS was to be organized and how it was to be named. Site visits to Mt. Holyoke and Wellesley in 2002, staff-wide retreats and visits from CIOs from Bucknell and Wellesley, IS-wide get-togethers, use of staff meetings to introduce our individual and collective work to one another, and remembering that the organizational structure remains fluid, ready to change whenever it seemed like it was time to do so, have, we hope, helped to build a creative, flexible and supple team working together in the interests of the College ([Organizational Chart](#)).

College-wide Challenges

In its 1998 re-accreditation self-study, the College identified information technology as the underlying key to sustaining future success in academic support. We find the College in 2009 confronting, with variations, the same challenges noted by visiting committees in 1998 and 2004. These challenges, and our fundamental reflection of them in the IS endeavor, include

- Strategic Thinking – the College has long struggled to settle on its core identity or strategic position relative to resources constraint which was described as an “unsteady financial condition” in 1998, as the difficulty of choosing between “breadth and depth” in 2004, as the need to “balance mission and resources” these past two years. IS this past year engaged the community in a process of Information Services Infrastructure Review (ISIR) that reduced space for individualization but led to strengthening performance and sustainability of core services (<http://is.brynmawr.edu/2008/02/19/coming-soong-new-integrated-e-mailcalendar-system/>).
- Diversity – as the College works out the meaning of genuine pluralism, IS grapples with making choices between privileging superficial preference (e.g. email clients), accommodating principled variation (Microsoft for the many, Apple for the enthusiastic, Linux for the self-reliant) and introducing critical new services (remote software and file access, central backup).
- Governance – Faculty, administrators, Trustees, staff and students have re-envisioned their mutual relations and the Board and faculty have created a new structure for shared governance. For IS, the fundamental question when we review our options is “*who decides?*” Are we enactors, collaborators, arbiters, executives?

Then there are matters that run through previous College committee’s visiting reports that speak of general problems on campus. We strive to contribute actively to solutions to such difficulties as:

- Staff morale – preceding self-studies and responses to them have noted tension among and between IS staff and management, and between IS and campus-wide administration, faculty, students and

staff. Working with the Chief Administrative Officer and Staff Association, and the College's Education Program, IS was active in securing the first in a series of grants from The Andrew W. Mellon Foundation to help launch the Teaching and Learning Initiative (TLI), which puts staff into roles of active learner/teacher with students and with one another. IS created the position of Coordinator of Staff Education two years ago to advance the missions of the TLI and IS through staff teaching and learning collaborations. Aside from coordinating staff-taught technology classes in highly demanded content (i.e. Intermediate topics in Microsoft Excel), the Coordinator also coordinates and supports introductory classes for technologically underserved campus constituencies (such as staff in the Dining Services and Housekeeping departments). This role works closely with staff in most sectors of IS, particularly those in the libraries and in computing.

- Relations with Haverford College – that more could be extracted from coordination and collaboration for both institutions' mutual benefit is a view strongly held by many. Ironically, the success of the Tri-College Library Consortium, which adds Swarthmore to the equation, is held up as the model of what might be, yet our shared IT programs with Haverford, while important, are few. We are certain, however, that any number of synergies exist in our IT shops; that we can advance our strategic position three to five years hence by intensifying our efforts to realize them now; that the financial and leadership climate at both schools supports making this a present priority; that we separately are spending too much of our resources on matters that do not contribute to significant areas in which the two institutions remain distinctive.
- Rule-based computing management – we are moving away from an environment in which IS works through hard and fast rules and towards one that is more customer focused with the easing of such restrictions as the showing of ID's at labs and instituting password resets through a self-service form.

In the following sections we look in more detail at specific IS concerns and options – some addressed more briefly above – and conclude each with a question or questions we ask our reviewers to take up. We also pose a few final questions at the end.

Decision Making

The formation of IS was announced by President Nancy Vickers in fall 2001, following a report from the [Special Assistant](#) to the President for Information Technology and the visit of an advisory committee to the campus. The Special Assistant worked through an interim group called the Senior Advisory Group on Information Technology (SAGIT). A small cluster of liberal arts colleges, including Mt. Holyoke and Wellesley, had already merged the broad functions of the libraries, computing, technology infrastructure and academic support, and we benefited from their examples.

The CIO is also Director of the Libraries and professor of history. He reports to the President and is a member of her cabinet. His senior administrative leadership is drawn from a mix of key top-level managers and practitioners and represents the full range of IS programs and services.

At the time of the merger, the faculty advised the Libraries through a Library Committee, and the director of Core Computing had a similar relationship with the Committee on Academic Computing (CoAc). The directors of Core Computing and the Libraries each reported to the Provost. Throughout the 1990s the head of Administrative Computing reported either to the director of Core Computing or to the College Treasurer/Chief Administrative Officer. A committee of senior administrators, CoAd – convened by the Treasurer and similar to CoAc - regularly met with the head of Administrative Computing. With the formation of IS, CoAc and the Library Committee melded into a single Committee on Libraries, Information Services and Computing (CLIC). Members of CLIC are nominated from the College's academic divisions and discuss a range of matters with the CIO and select IS staff. While CLIC does not steer IS policy its views are important to IS formulation and general direction. Working groups advising IS policy in enterprise and administrative matters include the Chief Administrative Officer's (the roles of CFO and CAO were divided from one another three years ago) informal "Friday gatherings," the Web Advisory Group (WAG), and meetings of College senior staff and Administrative Office Heads. As part of a comprehensive restructuring of the Board's governance processes with the College, the Trustees' created the Information Services Advisory Group. Administrative Computing has its own committee advising structure that consists of an advisory group of senior administrators and a steering committee of super users (staff-designated to this role in most administrative departments).

In response to expressed desires on the part of some faculty for a distributed computing model tied to the disciplines, in 2001 the Special Assistant and a few interested faculty declared "nodes," one each for the Sciences, Social Sciences, Humanities and a fourth for Administrative users who do not report to academic departments. IS designated some of its staff into nodes to serve these divisions. Over the years IS has not staffed the nodes as service organizations independent of its main IT program, although we do have a variety of specialists serving node constituents and currently two staff acting as coordinators of the four nodes. Node coordinators generally act as advocates for their stakeholders and serve as facilitators of issues that need the collaboration of a number of staff. Although faculty are not always organized in ways that facilitate collaboration on resource allocation and mission balance, there have been some signal successes, especially in the sciences, where the faculty department chairs allocate resources together. The result of a long series of conversations was the development of a jointly ratified policy on how IS and the science chairs would allocate funding for technology-related expenses, including a [Service Level Agreement](#) that outlines where responsibility for replacement and support lies. Some in IS and in the larger community are uncertain whether the nodes deliver specific services or primarily function as a conduit by which users might engage IS practice and policy in progressive interaction rather than actor-actor transactions. While there is no doubt that the nodes have helped inculcate a greater user-focused information technology culture, particularly around desktop computing, the future of this structure is uncertain.

IS works with the Trustees' Advisory Group, CLIC, Administrative Office heads, faculty chairs, individual professors, the nodes and peer-to-peer to make decisions that create a sustainable environment that advances the institution's strategic position. For the past several years matters of provision and distribution of library materials (the "knowledge collection") have rarely become an occasion for difficult conversations, although emergent primacy of digital resources has caused some discomfort. Indeed, the last three Tri-College Mellon grant awards either wholly or mostly focused on how we provide

intellectual resources together. Yet allocation of computing resources – from the funding of laptops to choosing which high-volume/site wide academic software to license to autonomy in Web space to the provision of a client relationship management (CRM) system – frequently engage an eclectic amalgam of the College community with different perspectives and no clear path to reach consensus.

Assessment

In spring 2004, two years into its formation, IS developed a campus community survey as part of a broader evaluation gauging whether the reorganization had improved the services for which it was responsible. A team of IS personnel, including an on-staff authority in survey methodology and analysis, crafted an instrument for each of the major clients we serve: faculty, students, and staff. The results of this initial survey identified areas in which services could be improved or re-conceptualized.

With support from the Council for Library and Information Resources about this process, the “Bryn Mawr survey” morphed into the Merged Information Services Organizations (MISO) survey. Although hosted at and coordinated by Bryn Mawr, MISO is now employed across thirty-three campuses; the MISO instrument enables each participating school to learn from the survey data gathered on its campus and in comparison to the larger group of peer institutions. Most institutions undertake the survey in alternating years, and Bryn Mawr’s community has taken the survey in fall 2005 and again in February 2008. The next survey will take place in the spring of 2009 and focus on student satisfaction with a limited set of services.

The fall 2005 survey highlighted very high satisfaction with library services but pointed out the following areas for improvement: telephone services, laptop access, faculty use of Virtual Bryn Mawr (VBM, i.e. self-service functions such as paycheck viewing) and wireless availability and performance. Among actions taken in response:

- The monthly telephone fee and student phone requirement were eliminated. Telephone service requests were incorporated into our central Help Desk ticketing system for better tracking.
- 31 laptops are now loaned through Canaday library and 17 laptops are maintained for sabbatical and conference support, more than doubling what IS lent in fall 2005.
- This summer the VBM login was changed to match the email (Communication Center) password. In addition, departmental budget summary and detail reports were added to VBM.
- Wireless availability has been expanded from all of the libraries, to the entire Park Science complex, some other academic buildings and to the lounges of all dorms, throughout Dalton (the Social Sciences building) and in several other locations on campus. (Availability remains limited due to cost and rapidly changing standards.)

In comparing the [2005 and 2008 surveys](#), we can see how we have improved our services and what we need to concentrate on for this year. We are also able to compare our results to the other liberal arts colleges that have used the survey (which include Wellesley, Middlebury, Bates and Haverford, among others).

Areas of Strength:

- Satisfaction with our library services remains extremely high and rates markedly higher than at our peer institutions.
- There is a significant increase in the use and importance of technologies to faculty, staff and student constituencies. Our student use of technology ranks higher than at peer institutions.
- All constituencies reported an increased satisfaction with spam management, which reflects well on the service we chose for out-sourcing spam protection (Postini from Google).
- Faculty have increased satisfaction with online course reserves (via Blackboard), classroom technology and the Help Desk. Students have increased satisfaction with Blackboard and input into both computing and library decisions.

Areas for Improvement:

- Email services: all constituencies had decreased satisfaction with email services. This finding validated our MISO-independent evaluation process that led to the introduction, in June 2008, of Zimbra, an open source system commercially offered through Yahoo. At the time of this transition, the Bryn Mawr community was using some 15 different methods for checking email, making effective support a difficult proposition. The new environment provides fewer but better options for checking email and strong integration with calendaring.
- Help desk – the survey highlighted the importance of the Help Desk, especially to staff. Although satisfaction has increased among faculty and staff, we still lag behind our peers. We recently converted one Desktop Support position into another full-time Help Desk position in order to have two professional staff members primarily answering the phone. The new incumbent will be in place in early January. This will allow us to resolve more issues at the first point of contact, to gather more information for quicker resolution of issues that need to be referred to a specialist, and to facilitate remote access to desktops, which we will pilot with staff in the spring semester.
- Network speed: Faculty and students had decreased satisfaction with network speed. Our Internet bandwidth was doubled in fall 2007 and will be doubled again by June 2009. Increased use of streaming video and Internet radio has dramatically increased the demand on College networks. The survey identified a similarly large drop in satisfaction among our peer institutions.
- Availability of wireless on campus: A related issue to network speed is increased demand for wireless service. We are working with Haverford and have chosen a vendor for a wireless management system. We hope to significantly increase the wireless coverage on campus, although without dedicated funding, a fully wireless campus, given today's technology options, is a decade away.
- Input into computing decisions: Staff and faculty want more input into campus technology decisions. We are reaching out to stakeholder groups such as Administrative Office Heads, the faculty Committee on Libraries, Information Services and Computing (CLIC) and the student Self-Government Association (SGA) to discuss and foster processes for more meaningful input.

Space

IS works from six buildings – three that it entirely encompasses, Canaday, Carpenter and Guild – and two that it partially occupies – the Park Science Building and Thomas Library and the basement of one of the dorms – along with several other offices scattered around the campus. The libraries dedicate most of their space to physical objects – overwhelmingly books and journals – and Guild to office space, public labs, the core network and server rooms. In the past ten years a number of initiatives involving relatively modest monetary investments have made our spaces more useful and vital. These include but are not limited to a re-imagining of the main floor of Canaday that created a single service point, added yet more computers, brought mass appeal periodicals into the main reading area, greatly pared down the print collection of reference works to the classics and highlighted a first-rate, diversified offering of film; rationalized and consolidated the office spaces of Special Collections librarians and their colleagues responsible for art and artifacts; rearranged staff seating in the Guild Computing Services building to take best advantage of common natural expertise and technical niches; merged separate public computer pools also in Guild; provided a professional workspace for our desktop support technologists; and recently moved the Language Learning Center from a dormitory to Canaday Library.

We believe that the decisive emergence of electronic media and our codependence with Haverford and Swarthmore for the collection and provision of all content resources will permit us to live well within our physical libraries. We are, however, convinced of an ongoing need for continuous investment of ideas and money in making these spaces exciting and crucial loci for our learners. We have needs that were not envisioned in the 1990s, including a space or spaces for GIS project development and teaching; audio-visual production; and digital sandboxes. Depending on what we determine is possible with Haverford and what is necessary for the security of vital academic and administrative data and the services that provide community access to them, we may need to construct a fully-realized datacenter.

Guild is situated next to the newly renovated Dalton social sciences building, with only drywall in between. Finishing this connection could advance the development of useful new spaces. An alternative and perhaps even more intriguing possibility would be bringing all of the Guild staff into Canaday and returning Guild almost entirely (save for the network core built into a small corner of the basement) to the academic program. This would require some further investment in Canaday, but since two of our three libraries – Collier Sciences and Canaday itself – palpably appear to be more the effects of the pre-Information Age than vibrant centers for new modes in pedagogy and research, and the bringing together of mostly all of the staff in one building might lead to new ways of conceptualizing staff roles, the investment might bring multiple rewards.

Learning and Collections

The College Writing Center has been located in Canaday since 1997. Ten years later a broader set of our community transformed the Curriculum Resource Center, created to meet state mandates for students

path-breaking institution. A major international conference and publication is funded by a member of the Friends of the Library Board.

The staffs that provide reference and computing services might continue to see a convergence of their duties. The work that IS has been doing in conjunction with the Teaching and Learning Initiative and the IS Educational Technology Center continues to grow in dimension while the preparation that high school students bring with them is geared more and more to the use of the digital, coupled with developing appreciation of the original and of critical evaluative skills.

Infrastructure

Bryn Mawr's [data network](#) is a classic collapsed backbone design with each of the college's 91 network segments connecting back to a single Cisco 6513 Layer-3 routing switch via Gigabit Ethernet and multi-mode fiber optic cable. The 6513's 76-Gbps backplane provides robust high speed interconnects between the individual network segments and the Internet Gateway. Redundant power supplies, switching engines, and routing engines, provide for a high degree of physical redundancy with most core functions capable of seamless failover. This enterprise class network switch is extremely reliable, with uptimes typically dictated by choice and not by equipment failure.

Each network segment is comprised of a stack of HP ProCurve switches interconnected via copper Gigabit Ethernet and assigned a Class "C", or /24, IP address range. Segments are limited to between 150 and 200 simultaneous connections depending on deployment type. All IP addresses are real; no address translation is used. Addresses are allocated from the College's Class "B" address space of 165.106.0.0/16. The average segment is connected to the 6513 by two strands of multi-mode fiber optic cable and Gigabit Ethernet uplink modules. Network segments such as server farms requiring additional bandwidth or redundant connections use additional pairs and uplink modules.

Currently, a single Internet Service Provider (ISP), Reliance Globalcom – formerly YIPES -- provides Internet and Tri-Co connection services. The service is delivered over vendor-provided single-mode fiber optic cable with Gigabit Ethernet hand-offs. The Tri-Co was an early adopter of long-haul Gigabit Ethernet technology and it has proven an extremely cost-effective and reliable transport solution over the past 8 years. Service disruptions have been rare and limited to short durations. While the physical transport has remained unchanged, except for minor equipment upgrades, Internet bandwidth has been easily and seamlessly increased from an initial 10-Mbps to the current 100-Mbps and Tri-co bandwidth from 10-Mbps to 30-Mbps.

The Tri-College consortium has recently concluded negotiations on and has contracted to lease dark fiber between the three colleges and a Point-of-Presence (POP) in Center City Philadelphia. This [additional fiber infrastructure](#) will provide redundant Tri-College and Internet connections. Directly leasing the fiber, as opposed to paying for bandwidth and transport as with our current provider, allows the Tri-College control over the available bandwidth between the colleges and provides access to inexpensive Internet bandwidth available from Cogent Communications.

Installation of the fiber plant will begin January/February of 2009 and is expected to be available for testing by March/April 2009. Tri-College connectivity and testing is expected to begin in April/May of 2009. The second Internet feed is tentatively scheduled to go on-line in the May/June time frame.

Bryn Mawr will be purchasing an additional 200-Mbps of Internet bandwidth for a total of 300-Mbps. Approximately 200-Mbps of Internet bandwidth will be allocated to ResNet and other public spaces with the rest being allocated to Academic and Administrative uses. An equal or larger amount of bandwidth will be made available for Tri-College traffic, increasing the current Tri-Co bandwidth by at least an additional 200-Mbps.

Internet access is handled by a Cisco 3745 router, which is slated for retirement. The current router is limited to 100-Mbps interfaces and is not capable of handling full Internet routing tables. The replacement will be a Cisco ASR 1002 or 1004 with sufficient processing power and memory to handle the full Internet routing tables and provide multiple Gigabit Ethernet interfaces.

A Packeteer Packet Shaper manages Internet bandwidth on a per host basis. Shaping prevents any one system from consuming all the available Internet bandwidth. No shaping is performed between on-campus networks or the Tri-Co. The current shaper, a model 7500, has limited expandability. A Packet Shaper model 10000 has been purchased as part of the dark fiber project and will be deployed as the project progresses. The new packet shaper has multiple Gigabit Ethernet interfaces and is capable of shaping traffic at full wire speeds.

Rapidly evolving standards and fiscal limitations have restricted widespread wireless deployment. The Park Science Complex, Collier Library, and Campus Center are ~100% covered using Cisco 802.11b (11-Mbps) devices. Guild and Dalton Halls are ~100% covered with Siemens 802.11b/g (54-Mbps) devices. Carpenter and Canaday Libraries are ~80% covered with a mix of Cisco and HP 802.11b and 802.11b/g devices. The residence halls have one or two, depending on size and layout, common rooms with either 802.11b or 802.11b/g coverage. Students are also permitted to install personally owned wireless devices in the residence halls so long as they agree to share access with other hall mates.

The introduction of 802.11n redefines best practices for large-scale wireless deployments. 802.11n provides considerably higher performance than previous 802.11 standards, but introduces significant complexity and cost – higher performance requires significantly more radios for the same coverage area as previous standards. In an attempt to control complexity and maximize purchasing power, Haverford and Bryn Mawr have completed a joint evaluation of enterprise class wireless vendors. Aruba Networks was determined to be the best fit of technology and features to replace and expand our existing 802.11b/g infrastructures with 802.11n.

Bryn Mawr College's voice network is typical of small enterprise PBX installations. [Telephone service](#) is provided to the college via ISDN PRI circuits by Broadview Networks, formerly ATX Telecommunications. An Enterprise class Avaya Definity G3r PBX provides most on-campus telephone service. A mix of analog and digital phones is used across campus with digital phones generally being provided to full-time staff and tenured Faculty upon request. An Octel 250 provides basic voice mail service to staff and faculty.

The PBX was last upgraded in 2000. At that time, two smaller Avaya Definity G3i PBXs were physically merged and upgraded into the current G3r series. The current system spans four large cabinets with one of the four being located at the Graduate School of Social Work and Social research. At the height of use, the college had approximately 2690 active ports and extensions and eight ISDN PRI circuits capable of handling over 180 simultaneous externally routed calls and a practically unlimited number of internally routed calls.

With the near universal adoption of cell phones, the college has seen a dramatic decrease in the use of the PBX with the most marked decline being among the student population. As PBX support costs are based on port count, Telephone Services has been actively working in recent years to reclaim unused ports and extensions. The goal is to reduce the port count, and subsequent maintenance costs to below 2000 ports. The majority of these ports will be reclaimed from the student pool. However, changes to life-safety requirements in recent years have seen a significant reallocation of ports and extensions to lab phones, emergency phones, panic devices, fire and burglar alarms, elevators, and similar uses.

The telephone cable physical plant is in mixed condition. All new wiring installed since 1997, when Networking assumed responsibility for the telephone physical plant, has been installed according to modern best practices. This part of the infrastructure is primarily installed in new or existing conduit and been run point-to-point with no splices. The older portions of the cable plant were inherited from Bell of PA during the breakup of the phone company. As such, the cable plant is primarily direct burial and consists of multiple splices both buried and in buildings. The oldest portions of the cable plant are estimated to be over 80 years old. These sections are replaced as funding and opportunity permits. No exact count of how many community members still rely on the old cable plant has been conducted, but an educated guess would place it at less than 30% of the total community.

An Avaya Octel 250 provides voice mail to staff and faculty. The system was originally sized to service the entire community. It can process 32 simultaneous calls and is licensed for 2000 mailboxes. However, the timing of the deployment coincided with the initial wave of student cell phone adoption, ultimately resulting in the college recording and using student cell phone numbers as primary contact points. There are currently approximately 600 mailboxes on the system, but we estimate that fewer than 400 are actively maintained. A replacement to this system would be scaled accordingly. The system is two years past end-of-life and Avaya no longer provides hardware or software support -- however the system is extremely robust -- if perhaps a bit limited by modern standards. Barring an unrecoverable system failure, we expect to maintain the current system for another 2-4 years.

Long-term, the college will have to move to either a pure VoIP or hybrid PBX solution. The expense of moving to a pure VoIP solution, due to the life-safety issues inherent in spreading the phone system across campus, make a hybrid system a better replacement option at this time. However, the costs for any new PBX solution are considerable. Swarthmore College moved to a pure Cisco VoIP solution at a cost of close to \$1.8 million two years ago. Information Services currently prefers to take advantage of supported Open Source solutions where possible and would look to evaluate a supported version of Asterisk, a commercially supported Open Source PBX solution. Digium, the company founded by the

Asterisk developers, offers several options from software support to full enterprise grade hardware and software deployments.

Systems

The IS Systems group supports 81 [servers](#), of which seven are slated to be retired within four months. The operating system makeup of our servers is 33 Linux servers, 31 Windows servers, five Unix servers, five Mac servers, five Netware servers, and three VMware servers. The actual number of physical servers is less than 81, because some of the servers are virtual machines hosted on our VMware systems.

Bryn Mawr is utilizing Active Directory as its primary directory service. All of our “core” systems are now authenticating against active directory, either as an LDAP server or using Kerberos, and we are working towards modifying some of our other servers to authenticate against our AD environment.

As a result of the ISIR (Information Systems Infrastructure Review) initiative, we have chosen a strategic direction consisting of Active Directory as a central enterprise directory; Windows and RedHat Linux as our server platforms; and Zimbra as our messaging system. In addition, we are consolidating onto fewer systems, due to virtualizing our environment with VMware.

The foundation has been laid to continue these standardization and consolidation measures over the next several months. We have moved from Sendmail with Meeting Maker to Zimbra for messaging and calendaring, while our directory (as well as file and print services) has been transitioned from Netware with EDir to Windows with Active Directory.

In addition to the energy and space savings garnered from the eventual retirement of Netware and Solaris Unix servers, more physical machines are being virtualized into our VMware environment, a direction which will extend the life of our current server rooms which are otherwise quickly reaching capacity. Bryn Mawr College’s first foray into virtualization of production servers entailed moving our blog server, new web server, scanning system, software licensing server, and a specialized management station to VMware “Standard Edition.” While the Standard Edition lacks some of the more advanced VMware features for load balancing and redundancy, such as “Vmotion,” it was suitable to evaluate VMware’s value within our environment. Satisfied that this is the direction we would like to go, we will be virtualizing more existing and new systems into VMware Enterprise in the near future.

The Systems team is comprised of six people. Cross-training of systems administrators is a group priority. Everyone in Systems is expected to have a working knowledge of each technology we are using. To reach this goal with maximum efficiency, there is a “primary” and “secondary” support person for each system. This allows them to develop a deeper understanding of those systems for which they are primary, a practical knowledge of their secondary systems, and knowledge of other systems as time allows. In addition, each team member is required to receive training on key technologies for which they are responsible. This training takes the form of instructor-led courses (preferred when available), computer-based training, or (infrequently) self-study combined with hands on experience.

In addition to the services provided, the Systems support team also manages data backup and recovery using Commvault Galaxy. The backup configuration is a disk to disk transfer, with tape archives made from the data housed on the backup SAN. Seven days of backed up data reside on the backup SAN, providing optimum ease and speed of data recovery.

While our systems are built with several layers of redundancy, and our data backup and archiving is robust, we do lack a comprehensive, enterprise-wide disaster recovery plan. Our hope in the near future is to begin tackling this non-trivial task by investigating our options and related costs for collocation and off site data archiving and business continuity planning.

Enterprise Systems

Administrative Information Systems (AIS) supports the work of the College's administration and revenue streams. The College's Enterprise Resource Planning (ERP) system, PeopleSoft Campus Solutions (version 8.9), replaced AIMS in 2000. Among the modules in use are Community Directory, Personal Portfolio, Learner Services, Learning Management, Human Resources (E&G), Payroll (E&G), Benefits Administration (E&G), Recruiting and Admissions, Student Records, Financial Aid, Student Financials, Academic Advisement, Campus Community, Advancement, Resume Processing, eRecruit, eRecruit Manager Desktop, eDevelopment, eBenefits, ePay and Community Access.

Each of AIS's five staff is aligned with a specific department or departments. Key administrative and revenue stream functions which PeopleSoft and the AIS staff support include:

- Admissions - student recruiting, application management, enrollment processing, applicant self-service
- Financial Aid - all financial aid services including applicant self service
- Registrar - course management, course enrollment, grading, transcript management
- Bursar - Student receivables, billing, tuition management
- Payroll - employee pay, federal/ state /local tax management
- Human Resources - position management, employee tracking, benefits administration
- Development - fund raising, bequest management, gift management
- Alumnae Association - alum tracking and communication, online registration for alumnae events, public facing alumnae search

The AIS group also participates in or leads cross-campus working groups for prioritizing projects, data standards, software direction and planning, and governance.

In 2004 the College, in a process initiated by the Office of the Controller, re-evaluated the utility and appropriateness in functionality of the PeopleSoft Financials components and decided to drop support on some of that product in favor of Blackbaud's Financial Edge software for the General Ledger, Accounts Payable and Grants Management. AIS supports Financial Edge, as it does PeopleSoft.

Although Oracle's purchase of PeopleSoft made Bryn Mawr a retroactive Oracle customer, the College's PeopleSoft installation employs an MS-SQL database. PeopleSoft interacts with the College website by accepting data posted from web forms (e.g. online applications). PeopleSoft also produces output files

which feed the public directory on the website. XML extracts from PS will soon feed department employee listings and the course catalog.

Demand and opportunity to connect ever more ERP data and assets, robustly, with the College's public face – our website – is ever increasing. While the College is committed to retaining PeopleSoft for the foreseeable future, the long-term future direction of Bryn Mawr's ERP will be evaluated in the coming years. We still work in an environment with a number of shadow systems in place and we are concerned about the ability to dedicate a staff person fully to security issues.

Web

Web Services is a newly created group within Information Services. Web Services is led by a manager, two full time staff and outside contractors as needed. Web Services staff collaborate with colleagues in Information Services and the Department of Public Affairs, as well as members of the campus community, to support the College's web presence.

The College's current website design has been live for about six months, superseding a design that went live in January 2004. The College undertakes complete redesigns about every four years, in cycle with the development of new Admissions materials. The current design was created by an outside firm, Electronic Ink, and was modeled on the Admissions Office's print materials.

The campus website uses PHP for scripting and MySQL as its underlying database, although the latter is mostly used in conjunction with the College's blogging application, Word Press. Adobe Dreamweaver templates are used but not used on all sites and pages. Sites that primarily target an external audience, campus blogs and individual course and faculty pages do not always make use of the faculty templates. Content is edited using Adobe Contribute clients, and generally managed by departmental web stewards who are usually administrative assistants.

One primary goal for the future is to leverage the increasing amount of data stored in the campus ERP and provide a baseline structure for campus web stewards to build upon. This project will include significant collaboration with IS' Enterprise Systems and campus administrative staff. The objective will be to not only understand the data being managed, but also the process by which web stewards interact with it at multiple points before it is published to the campus website. To the extent we can better understand these processes, the more effective we will be at supporting not only the website itself but also how web stewards can more effectively interact with the underlying infrastructure.

As part of the most recent redesign, Electronic Ink performed usability research and made recommendations for overall site organization and structure. IS and Public Affairs continue to schedule feedback sessions with members of the campus community on a regular basis.

Collaboration

Solutions to some of the infrastructure challenges Bryn Mawr encounters may only lie one mile to the east. The College's 1998 Self-Study announced receipt of an \$850,000 Tri-College Mellon Foundation grant to provide online course readings, among other digital initiatives. One local legacy of that grant is the Summer Multimedia Development Institute (SMDI), pairing Bryn Mawr students with faculty to develop technology-intensive projects of enduring pedagogical value. But the lasting TriCo impact of this grant was the ultimate adoption of Blackboard as our course management software package. This decision may stand intact for a while – Bryn Mawr faculty and students are growing dependent upon it, even as concerns about it persist and open source alternatives such as Sakai and Moodle emerge. Notable is that this award is really the last example of an extra-library Tri-College grant initiative. This is not to say that Blackboard, which is hosted at Swarthmore, is the exclusive Tri-College technology success, nor to minimize its impact, which is less than that of Tripod's – the College's online library management system – approaches it in scope, complexity and curriculum support. Relative to the numerous shared gains achieved by the libraries – including joint purchase of academic press books, operating a twice-daily books-delivery service between campuses, uniform and reciprocal borrowing, and negotiation of common electronic content deals - the Tri-College accomplishments in software and hardware are limited: SPAM quarantining, Mathematica for the quantitative community, ArcGIS for the spatially oriented, a very advantageous contract for bandwidth. In fact, Bryn Mawr withdrew from a shared staff calendar system as part of a complete reinvigoration of the College's messaging services.

Swarthmore, by virtue of its distance, sympathetic-but-different founding history and financial situation, seems cautious and less inclined to Tri-College technology solutions. But the Bi-Co partnership on IT issues is also not robust. We believe there are numerous opportunities, particularly in support-level staffing and services, for each of us to expand and better afford IT growth through exploitation of these opportunities. These might range from the provision of email, Web services and data security to developing BiCo expertise in specific applications to much deeper collaboration. No doubt this is an undertaking demanding thoughtfulness, sensitivity and patience, but the likely gains far outstrip any bumps likely to be encountered in arriving together at this shared mission. Building a new IT model together is an exciting prospect.

Looking to the Future

We have a number of thoughts about particular ways in which to move IS forward, many of which are mentioned throughout this self-study. In this last section, we would like to highlight some of the more salient of these ideas by bringing them together in one place. Many of these ideas have been recently circulated among the tri-colleges and on campus as we face the fiscal challenges of the present moment, but we also see them as good ideas that should be explored on their own merit. Some are specific suggestions, while others are more general areas in which we want to be able to develop our services:

- Concentrate our efforts and resources on digital materials and rare and unique collections, and deemphasize monographic literature and periodicals in print form.

- Consolidate operations across the three college libraries – acquisitions, circulation, cataloguing, inter-library loan, visual resources, reference services – so that there is only one department head for each service.
- Pare down subscriptions to digital journals that are not used frequently and replace them with a pay-per-use model.
- Move all of the IS staff who are not working in the two branch libraries into Canaday Library.
- Reduce substantially the computer footprint of the College.
- Reorganize IS along lines that more closely respond to the way current and future faculty and students organize their teaching, research and learning by emphasizing a robust web presence.
- Revisit the use of IS services, especially that of enterprise software, by all of the offices on campus and implement a way to teach staff to use these capacities to their fullest.
- Develop the capacity to transition the campus towards storing its electronic data in a logical and secure fashion.

We welcome the opportunity to discuss these ideas.

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