Case Study

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Big Research Support from a Small IT Organization

Montana State University Billings

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Highlights

Related ECAR Research Study: Research Computing: The Enabling Role of Information Technology

Case Study Institution: Montana State University Billings

Issue: Research computing support at small institutions

Solution: Montana State University Billings (MSUB) IT’s early engagement with research projects enables the organization to anticipate research support solutions. Its standard IT environment provides a baseline from which to integrate research support equipment, software, and services. Both practices help MSUB IT to invest effectively in research support resources.

Contact: Michael Barber, CIO, Montana State University Billings, mbarber@msubillings.edu

Montana State University Billings (MSUB) is an MA institution with an enrollment of 3,660 full-time and 1,614 part-time students in fall 2011.1 It is one of the four campuses that compose Montana State University, which also includes MSU Bozeman, MSU Northern, and Great Falls College MSU. Although MSUB faculty members focus primarily on teaching, individual faculty interest and university recruitment efforts have sparked pockets of research activity around campus in such areas as biology, chemistry, allied health, education, and business. Consequently, MSUB’s research and development expenditures totaled $576,060 in FY 2011,2 and ECAR designates the university as a medium research-intensive institution.3

Like many institutions, supporting researchers’ technology needs falls to MSUB’s Information Technology (MSUB IT) organization. For the typical small central IT organization with limited funding, finding the adequate resources to provide requisite infrastructure, equipment, software, and technical support can be especially challenging. But MSUB IT manages to accomplish this effectively through soft skills such as engagement to precisely ascertain a researcher’s technology needs at a project’s start and to explore any solution’s potential institutional benefits. This engagement, along with MSUB IT’s adaptability and responsiveness to

Best Practices

- Strong engagement with researchers
- Baseline technology environment guides research support acquisitions

Benefits

- Develops trust and fosters collaboration between the IT organization and researchers
- Minimizes superfluous investments

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Case Study Inspiration

ECAR’s report *Research Computing Support in Higher Education* noted a correlation between EDUCAUSE Core Data Service (CDS) respondents’ funding model assessment and effectiveness assessments of all but two specific research computing practices. Consequently ECAR consulted the CDS to identify a small university of low to moderate research intensity that provided effective research computing support on a limited budget. MSUB met these criteria.

Researchers’ needs, has cultivated a sense of trust that encourages collaboration between the researchers and MSUB IT, as well as a general sense of satisfaction about research support. In addition, MSUB’s centralized IT environment provides a technology baseline into which research support equipment, software, and services must integrate, thus reducing superfluous investments. Finally, research support is partially underwritten by a funding model that supplements MSUB IT’s operating budget. Together, these practices maximize MSUB IT’s investment in research support while exploiting any broader benefits. To help other institutions experience similar benefits, this case study examines MSUB IT’s underlying research computing support practices.

Background

Many associate academic research activity with highly research-intensive institutions, but teaching-oriented institutions are increasingly delving into research, creating new funding sources and offering an appealing alternative to faculty members who want to engage in both teaching and research. As teaching-oriented institutions boost their research intensity, this impacts the central IT organization, which correspondingly must determine its role in instituting or sustaining research support services. That is no simple task, as research support requires resources (time, personnel, and funding) that are often in short supply, especially at smaller and/or public institutions. As a result, the issue becomes one of stretching finite resources to accommodate this emergent demand.

MSUB IT typifies this situation. It is a small organization with a staff of 16 at a publicly funded institution. Resources are tight. MSUB IT is not a leading-edge adopter of technology, opting instead to evaluate and consider the feasibility, as well as the IT resource and institutional impacts, of adopting any new technologies.

At MSUB, research is an individualized effort, scattered around the campus. There is no formal committee, board, or forum for researchers to coordinate needs or share best practices. MSUB IT supplies every faculty member with a computer (which MSUB IT replaces every four years), as well as access to the MSUB IT’s managed SharedDrive, software applications, and services. This meets most faculty members’ research needs, though a few require additional support for microscopes; for other specialized instruments, software, and services; and for collaborative activities at other institutions. For example, one science faculty member’s research presents data-storage challenges due to his studies’ large image files. Other researchers share data and conduct analysis with their colleagues at MSU Bozeman.

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*I like to teach, so I was looking for a place [like MSUB] that honored and respected teaching as well as research. A lot of research institutions do not.*

—An MSUB faculty member, about his decision to join MSUB
MSUB IT offers support at various points in a research project. There are no staff members dedicated strictly to research computing support; it is interwoven into all staff members’ activities, who then provide support on an as-needed basis:

- **Grant Application Assistance**: To comply with the MSUB grant application process, applicants outline the cost of their research technology needs, which typically involves assistance from MSUB IT. Michael Barber, CIO, usually becomes intimately involved at this point, conferring with the project’s principal investigator (PI) to design an optimal, up-to-date technology solution and to ensure ongoing compatibility and accessibility with the MSUB IT environment. For example, sometimes a PI might request a software application already licensed by MSUB or that might be installed more feasibly in a software-as-a-service (SaaS) configuration rather than on a computer. At this point, Barber tries to determine if there are any broader, institutional benefits to the research support investment. He also reviews campus or local grants (e.g., faculty development grants).

- **Purchasing and Maintenance**: MSUB IT oversees the purchase and installation of the research equipment, associated computers, and software and assists with programming needs. Outside suppliers can’t access the MSUB network or computers without the presence of an MSUB IT staff member. The MSUB IT staff will help researchers maintain their research computers and provide data storage. They will study any relevant documentation before delivery to help troubleshoot issues and contact the vendor/supplier in case of problems.

- **Support**: The first line of defense is the help desk. Researchers call the help desk when they encounter any technology-related problems with their research. According to the researchers, usually the help desk can resolve the problem, especially if it concerns software. If not, the help desk staff member escalates the problem to the appropriate MSUB IT staff member (e.g., the person in charge of networks or the staff member who is most familiar with the researcher’s technology setup). In addition, one MSUB IT staff member is assigned to work with faculty as a matter of course, and he may assist the researcher as needed as part of his normal duties. If needed, the help desk staff, the faculty support person, and other relevant MSUB IT staff will join together to support an issue, but normally problem resolution is a one-person task.

- **Post-Grant**: MSUB IT tracks every piece of purchased IT equipment, regardless of the buyer or funding source. At a grant’s end, MSUB IT redistributes any reusable university property to areas of need, based on the granting agency’s requirements for deposition.
Practices

Even with small staff and limited resources, MSUB IT provides support commended by university researchers. Five practices emerged from the interviews that facilitate the organization’s efforts.

Engagement

One thing that stands out from the interviews is the CIO’s engagement in the MSUB community; he participates in many committees around campus to keep abreast of campus activities and concerns. A former faculty member, Barber works hands-on to ensure that faculty members receive the best research computing support that he can muster, given MSUB IT’s resources. He correlates research support options with MSUB IT’s strategic direction to prescribe optimal solutions that benefit the researcher and the university mutually.

He likes to maintain contact with researchers, too, regularly sending them updates about latest technology trends and information about new equipment and software that may assist their research. He lends new equipment, such as iPads, to allow the faculty to experiment and to understand how it will to work within the MSUB IT environment. Over time, his actions have created a sense of trust with the faculty, which encourages collaborative effort when research-related issues and problems arise.

Engagement extends to the IT staff, too. On a small campus like MSUB, people tend to recognize faces and develop relationships with people across different campus areas. Researchers spoke of creating their own “go to” network of MSUB IT staff, knowing IT staff personally and their individual responsibilities—whether it is servers, network access to Bozeman, instrumentation, or storage—and whom to approach to discuss support requirements and issues.

Funding

Research support requires funds, and this is problematic at MSUB, as the current fiscal situation leaves the State of Montana with limited funding for its higher education institutions. Moreover, MSUB IT’s general operating fund can only offer limited support for research, and so MSUB IT compensates through student fees. Today, MSUB students pay three technology-related fees each semester, two of which help subsidize research support:

- **Equipment fee**: Though this fee primarily supports equipment bound for classroom and lab projects, it can finance research equipment, such as high-power computers, microscopes, and other research equipment that can also be used in the classroom. Faculty members apply for the equipment fee disbursements, which are approved by a committee.

- **Computer fee**: This fee funds the classroom computing resources.

- **Technology replacement fee**: This fee provisions MSUB IT’s network and servers, as well as the faculty and staff members’ computers. Barber allocates the technology...
replacement fee himself, using it, for example, to help ensure the network’s ability to handle the researchers’ needs. Equipment replacement follows a plan based on staffing and replacement cycles.

No specific funding exists for staffing because MSUB IT maintains no dedicated research support staff.

Centralized IT

Since Barber’s arrival in 1998, MSUB has moved to a centralized IT organization, providing hardware and software, networking, infrastructure, services, and desktop support for the entire campus. To ensure everyone on campus is on the same page technologically, MSUB IT maintains a standard technology environment, with everyone using similar computers and software, as well as updating operating systems and applications constantly to maintain a single common version for use across campus.

The standardized technology environment creates a backdrop into which all equipment, software, and services must be smoothly incorporated. Because research support and equipment requests go through MSUB IT, when faculty members need extra hardware and software to support their research, MSUB IT staff members typically purchase it and familiarize themselves accordingly to install and support it.

Scientific equipment and supporting computers sometimes present sticky issues, especially when specifications differ from MSUB IT standards. For example, a microscope or other analytical device might require a computer that differs from MSUB IT’s standard make and model. Sometimes a researcher does purchase equipment independently, which leads to what one person described as “a delicate dance as to whether or not MSUB IT will support it.” In such cases, MSUB IT will work with researchers and even equipment suppliers to try to tie it into the university IT environment.

This strong centralization enables MSUB IT to manage the research computing environment, minimizing the use of shadow systems or rogue equipment that could complicate support or, in the worst case, harm the university’s technology environment. In addition, because the portfolio of hardware and software tends only to include “known quantities,” it is unlikely that a researcher will contact MSUB IT about a problem with an unfamiliar device, service, or software, which would require the IT staff to quickly learn that technology in order to provide service for it. Another advantage to MSUB IT’s centrally supported environment is that it frees the faculty member to focus on the task at hand—research—and not the mechanics of equipment and software installation, maintenance, and support.

Adaptability

As MSUB IT gained experience over time, the organization has recognized that research support requires some give and take. An example is the “delicate dance” noted above, in which case instead of arbitrarily returning the incompatible research equipment, MSUB IT works to integrate it into the standard technology environment. Another example is its “one computer for one faculty” policy. Typically a researcher has a single computer on which to conduct research, and the IT staff is responsible for ensuring that the equipment and software are compatible with the standard technology environment.

IT has to be flexible with the investigators in terms of computing and not place their own demands in a bureaucratic manner on the individual researchers. It should be a collaborative effort.

—Thomas Lewis, Associate Professor, Biochemistry, on adapting to researchers’ needs
single computer satisfies a faculty member’s teaching and research computing needs. But one researcher tested this policy. At first MSUB IT did not understand the extent of his research computing needs and that each of his lab instruments required its own computer. MSUB IT was reluctant to allow a multicore setup in his lab because of network compatibility and computer support issues. But through discussions over time, MSUB IT grew to understand the situation and allowed multiple-computer setups.

Trust and flexibility come into play, where the researchers feel they can directly approach MSUB IT about their problems, and solutions may require some adaptability to IT policies and practices.

**Responsiveness**

As noted earlier, the first line of defense with research computing support is the MSUB IT help desk, and researchers commended the help desk staff’s responsiveness and knowledge. Researchers spoke of the help desk’s openness and willingness to listen, as well as their ability to take that extra step to resolve problems. For example, MSU Billings’s and MSU Bozeman’s firewalls can complicate research data access at the other’s campus. A faculty member recounted multi-hour meetings with IT staff at both campuses to troubleshoot and resolve the problem.

**Next Steps**

These practices may become more imperative because several developments could intensify MSUB’s research activities, which would impact MSUB IT’s research support correspondingly.

**Formalization**

Currently, MSUB’s research is conducted rather informally, driven by individual faculty members’ interest around campus. The arrival of both a new chancellor and provost in the past two years, and a pending hire for a director of the Grants and Sponsored Programs (GSP) Office, could lead to changes in MSUB’s overall research direction. The new administration is reportedly formalizing campus policies and practices, as well as signaling interest in faculty members’ research pursuits. Already a campus committee attempted to restructure the GSP Office, creating a new vice provost position, but lack of state funding stymied implementation. Even so, the incoming GSP director, who formerly worked for the NSF, is presumed to inject new ideas, expertise, and practices into MSUB’s research activities and will perhaps foster a greater sense of community among individual researchers.

All this foreshadows heightened research activity, and thus an increasing number of—and potentially more complex—research support requests for MSUB IT. In addition, more grant applications may impede Barber’s ability to work individually with each PI to develop specific research support solutions. If increased research activity warrants it and can fund it, MSUB IT may want to contemplate assigning a research support IT manager, creating “one-stop shopping” to address all research-oriented technology issues.

**Northern Tier Network**

MSUB IT hopes to connect to the Northern Tier Network (NTN) in 2013, bringing the 10 Gbps research network to the campus. The campus backbone and network are ready to connect, and what remains is addressing last-mile connectivity issues. The NTN connection has the potential
to enhance research intensity and activities, facilitating collaboration with other institutions, especially with MSU Bozeman, which is connected currently to MSUB by a discrete 10 Mbps link. The network would also pave the way for the adoption of high-performance applications and cloud-based research tools, both of which may require MSUB IT’s support.

University Resources

In addition to a faster network connection, MSUB IT may have access to more research computing support resources. The four MSU campus IT organizations enjoy a history of collaboration—for example, sharing a Banner ERP system and jointly purchasing computers and software licenses. MSU President Waded Cruzado’s MSU Integration Initiative (MSUii) strengthens these efforts by striving to transform university operations from four separate organizations into a single organization operating in four locations in order to integrate and streamline operations. The four MSU campus IT organizations are embracing MSUii in a number of ways, such as university-wide report sharing, single sign-on to Banner, server virtualization, and the creation of MSU-wide IT policies and an IT strategic plan.

As far as research, faculty from MSUB and MSU Bozeman already work together, but greater collaboration between the two campuses is coming. MSU Bozeman’s new CIO has committed to a new Bozeman-based research organization to facilitate more research at all MSU campuses. MSU Bozeman is a high research-intensive institution, and the new organization means more resources (e.g., programming, data management, and storage) will become more easily available to MSUB researchers. Barber foresees significant MSUB participation in the research center, especially after its NTN link goes live. One challenge will be funding. Barber hopes to pursue grants but anticipates that some financial support will need to come from his IT organization’s budget.

New Technology and Solutions

MSUB IT’s challenge, like those of other small IT organizations, is constant technological evolution, which creates new ways for conducting research, processing information, and storing information, all of which MSUB IT may play a role in supporting. MSUB IT is evaluating cloud services now, which present new storage and other service options. Mobile technology will be another interesting transition, as researchers begin to operate research equipment with their mobile devices and access data remotely. One researcher noted that a software program already allows him to operate his instruments from home. The one sticking point is access through MSUB’s security firewalls. As continuing research projects gain traction, new needs emerge, too, such as one researcher’s need for a data image management system to track all of his generated data. As time goes on, MSUB IT will have to consider the research support implications of adopting these new technologies and solutions.

Lessons Learned

Several lessons emerged from conversations with the MSUB community that might help other small institutions with their research computing support:

- **Engage the researchers:** Barber likes to work one-on-one with the researchers to discern their needs for their forthcoming projects. This direct engagement enables him to understand their current and future research direction, which, in turn, helps him to anticipate future support needs and their impact on MSUB’s IT direction. Solutions can be
designed with both researcher and institutional needs in mind, creating a win-win situation. His proactive sharing of technology-related information with researchers can influence their future support requirements, too. In addition, this engagement fosters trust and collaboration between the researchers and MSUB IT.

- **Have a research support point person:** At MSUB, researchers consider Barber as the “go to” person to discuss research support needs and strategy, not only because he is the CIO but also because of his genuine interest in research. Not all CIOs share a similar enthusiasm for research, and, if not, assigning a willing lieutenant may be a way to foster similar ties like MSUB IT developed with its institution’s researchers.

- **Have a plan:** Resources are particularly precious in a small IT organization, and it can be fiscally detrimental to expend them in an ad hoc manner. Consequentially, MSUB has master plans that account for developments like larger network capability or equipment replacement to ensure the resources are financed and in place when needed. And in a way, MSUB’s standardized IT environment is like a master plan, too, because it guides MSUB IT’s research support activities. It provides a baseline from which to determine how or whether research equipment, software, and services can integrate into the broader IT environment. This focus discourages makeshift technology solutions, which, in turn, helps lessen MSUB IT’s support burden.

Sometimes a little means a lot, and that is the case at MSUB. Its IT organization has effectively applied the resources at hand to create a support environment that is truly appreciated by its researchers. Going forward, these practices provide a foundation from which MSUB IT can meet the expanding support requirements of the university’s intensifying research activity.

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*“I found that IT has been able to get anything for which I could validate a need. They have helped me a lot in a number of different ways.”*  
—Ken Miller, Professor, Science Education Theory and Practice, on his satisfaction with MSUB IT’s research computing support
About the Author

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Citation for This Work


Notes

3. Research intensity (RI) is the ratio of total research dollars to student FTE. To contextualize MSUB’s research activities, its 2011 RI is $157.39, which is below ECAR’s mean RI of $198.51 for MA public institutions. Institutions of medium RI spend between $1 and $439 on research per student FTE. For more information, see Jacqueline Bichsel, Research Computing: The Enabling Role of Information Technology, Research Report (Louisville CO: EDUCAUSE Center for Applied Research, 2012), 11, available from http://www.educause.edu/ecar.
4. EDUCAUSE Core Data Service respondents indicated the effectiveness of their current research computing strategies and practices in six areas: data management, central IT staffing, central IT support, funding model, planning, and collaborative science approach. Effectiveness ratings for strategy/practice were converted to a numeric scale from 1 (no strategy or practice, and no plans for one) to 8 (effective strategy or practice that is adaptable/scalable). Research computing funding was assessed on a numeric scale of 1 (poor) to 4 (excellent). For more information, see Jacqueline Bichsel, Research Computing, 23–24.
6. The Northern Tier Network is a high-speed, 10 Gbps research network spanning 12 northwest states from as far west as Alaska through Washington, across the Midwest, and as far east as Michigan. For more information, see http://www.ntnc.org/default.htm.