



Optimizing Business Processes at Brooklyn College and The City University of New York

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The mission of the EDUCAUSE Center for Applied Research is to foster better decision making by conducting and disseminating research and analysis about the role and implications of information technology in higher education. ECAR will systematically address many of the challenges brought more sharply into focus by information technologies.

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Preface

The EDUCAUSE Center for Applied Research (ECAR) produces research to promote effective decisions regarding the selection, development, deployment, management, socialization, and use of information technologies in higher education. ECAR research includes

- ◆ research bulletins—short summary analyses of key IT issues;
- ◆ research studies—in-depth applied research on complex and consequential technologies and practices;
- ◆ case studies—institution-specific reports designed to exemplify important themes, trends, and experiences in the management of IT investments and activities; and
- ◆ roadmaps—designed to help senior executives quickly grasp the core of important technology issues.

From its most recent research, ECAR published a comprehensive presentation and analysis of information on business process innovation in higher education in *Good Enough! IT Investment and Business Process Performance in Higher Education*. (Kvavik and Goldstein, with Voloudakis, 2005) The study uses a multifaceted research methodology to collect and analyze quantitative and qualitative data from approximately 350 senior administrative and IT officers.

Literature Review

The study began with a review of the relevant literature on business process innovation in order to define the study's major themes and create a working set of hypotheses to be tested. A significant distinction is made in the literature contrasting "technological" and "administrative" innovation. Technological innovation looks at the adoption of new technologies such as enterprise resource planning (ERP) systems or a course management system (CMS); specifically which technologies are adopted, rejected, or accepted within organizations and reasons or processes that influence successful or failed adoption. The study of administrative innovation is similar, but focuses on the adoption of new business processes or new ways of doing business. Typically administrative innovation lags behind technological innovation, which we have repeatedly learned in ECAR studies of ERP, security, and classroom technologies.

Online Survey

EDUCAUSE staff sent an e-mail with the Web address of the survey and access code information to 1,473 U.S. and Canadian institutions belonging to EDUCAUSE. The respondents were senior college and university administrators from 335 institutions, the ma-

majority of whom are chief information officers (CIOs). Their responses provide a detailed understanding of how higher education is engaged with business process improvement and innovation.

Interviews

We collected qualitative data in interviews with 32 IT leaders and senior administrators who were significantly engaged with business process performance at their institutions. Our purposes were 1) to uncover in greater depth what distinguished institutions that considered themselves exemplars from those who had business processes deemed at risk; 2) to gather additional evidence to support findings from our quantitative data about the importance of employee suggestions in business process innovation; 3) to determine a sharper explanation of what causes business process change; and 4) to gain a better understanding of how institutions managed to improve strategic business processes, which we hypothesized were the most difficult business processes to change.

Case Studies

We conducted this in-depth case study to complement the core study. We assume readers of this case study will also read the primary study, which provides a general context for the individual case study findings. We undertook this case study to examine how Brooklyn College and The City University of New York optimized their student advising process to support its strategic goal to enhance student enrollment and retention. ECAR owes a debt of gratitude to the following people from Brooklyn College: Joan Antonicelli, Registrar; Mark Gold, Director, Information Technology Services; Julie Hegner, Assistant Registrar, Degree Audit; Richard Klein, Title III Project Coordinator; Roberta S. Matthews, Provost; and Cecilia Schneider, Assistant Registrar, Degree Audit,

Record Maintenance. ECAR also thanks the following from The City University of New York: James Anastasio, University Director of Administrative Computing; Claudia Colbert, Director, Project Management Office; Michael Ribaudo, University Dean for Instructional Technology and Information Services; and Olga Vega, DegreeWorks Project Manager. Finally, ECAR thanks Mark Nichols, Software Consultant/Product Instructor, SunGard Bi-Tech Inc.

Introduction

The activities of a college or university can be broken down into dozens of individual business processes. Many business processes are narrowly focused and prescribed within a single campus department. Other processes impact many facets and constituencies of the institution. In the current environment of tight budgets and high customer expectations, higher education institutions are pressed more than ever to manage the portfolio of processes to optimize their benefit to the institution and to realize cost savings where possible. Institutions are also under ongoing pressure to improve services to their clients, to reduce business risk, and to attain overall greater accountability.

With all these processes, it may be difficult for an institution to determine which processes to enhance. ECAR's core study *Good Enough!* suggests that colleges and universities are optimizing their portfolios of processes, choosing to target investments on those processes with strategic implications for the institution. Processes like student advising, degree audit, and recruiting applications have a direct impact on revenue and reputation. The perceived benefits of optimal performance can justify the increased cost of pursuing an ideal solution for these services.

This case study examines business process optimization on different levels. The first part looks at Brooklyn College, one campus

of The City University of New York (CUNY), and its efforts to optimize its student service processes to create a more customer-friendly administrative environment. Online advising is one example of the college's process enhancements, and its potential to help CUNY meet its university-wide enrollment management goals captured the attention of CUNY senior administration. The second part of the case study focuses on CUNY's Office of Computing and Information Services (CIS) Project Management Office and discusses its deployment of an enterprise-wide online advising and degree audit system.

Local Business Process Optimization: Brooklyn College

Brooklyn College of The City University of New York (Brooklyn College or BC) had its unofficial beginnings in 1926 when the Board of Higher Education of the city of New York authorized the establishment in Brooklyn of branches of Hunter College (a women's college) and of the College of the City of New York (men only). In 1930, the two institutions merged, creating Brooklyn College of the College of the City of New York, the first public coeducational liberal arts college in the city of New York.

Today Brooklyn College has three academic divisions—the College of Liberal Arts and Sciences, the School of General Studies, and the Division of Graduate Studies—which offer more than 70 undergraduate and more than 60 graduate majors; advanced certificates; and programs in the humanities, sciences, performing arts, social sciences, education, preprofessional, and professional studies. In spring 2005, the Brooklyn College community consisted of 14,884 students, 520 full-time and 642 part-time faculty members, and 500 staff members.

Headed by Director Mark Gold, Brooklyn College Information Technology Services

Department (ITS) is responsible for most IT functions including administration, network support services, help desk/desktop technical support, mainframe operations, information systems, student computer labs, instructional technical support, telecommunications, client-server database development, and Web support services.

CUNY institutions have typically specialized in different IT expertise. For example, Hunter College and Baruch College were leaders in enhancing the university's student information management system (SIMS). Through the years, Brooklyn College has been a pioneer in creating Web-based and distributed services for the CUNY system. For example, it was the first CUNY college to build its own data warehouse. Other CUNY institutions capitalize on the efforts of their fellow colleges. "We have invested significant resources in making our work available to other colleges," says Gold. "We've actively shared our services, products, and applications with most of the CUNY colleges. Even colleges outside CUNY have asked to use our tools."

Creating a Foundation for Business Process Optimization

Several factors fostered Brooklyn College's expertise in business process enhancement. Brooklyn College is one of the few CUNY colleges that historically has centralized the IT organization; only recently a small portion of faculty support was spun off to the BC library. Gold notes that his IT organization may not be the richest or the largest, but it is very efficient. "While the model of two IT departments is a very common paradigm in the academic world, our centralized organization helps us," he says. "Our resources and efforts are not diluted so we can achieve critical mass to attack a problem area. There are a lot of synergies and cost-effectiveness of scale when you do things together." For

example, when Brooklyn College purchased a Sophos site license for antivirus protection, the centralized organization structure of ITS facilitated the funding and administration of the software. There was no need to coordinate its purchase and maintenance between separate administrative and academic computing organizations. The centralized IT organization makes it easier to effectively leverage this investment throughout the whole campus.

Another factor contributing to Brooklyn College's business process expertise was its transition from a mainframe computing environment. "Over the years, we took a dinosaur and transformed information access into a relatively logically, convenient, cost-effective process," says Gold. When ITS migrated from a mainframe to a network-based system 10 years ago, it made a conscious decision to redirect its resources to a client-server and Web-based infrastructure. ITS phased out the mainframe slowly and used those resources to get a early handhold on PC/server programming. The organization hired a programmer with database expertise who learned about the mainframe infrastructure from the ITS programmers and built a new data warehouse based on Microsoft Sequel Server.

When Brooklyn College transitioned from a homegrown registration system to the less-customized CUNY system, it was a "life-changing experience," Gold says. "Our users had built every possible report that they could ever use. We could not customize reports accordingly in the CUNY registration system. After users thrashed around for a year and a half, we finally gathered the users together to get their input about what they needed if ITS redesigned the reporting capability from scratch—not to discuss their former reporting capability. After thinking about it, most users realized they did not need everything they had previously de-

veloped." So rather than transition the old reports into the new system, Gold and his staff decided to enhance reporting in other ways, based on the following goals:

- ◆ Give users self-service access to the information they need. This also reduced the ITS production load as well as processing delays because previously users had to wait for ITS to generate a simple report out of the system.
- ◆ Give users the appropriate tools. ITS created a graphical user interface to enable users to drill down, manipulate, and picture information. Again, this eliminated information access delays by enabling users to do it themselves. ITS also presented information that users did not know existed in the mainframe system.
- ◆ Reduce CUNY's central processing unit (CPU) load. ITS wanted to retrieve CUNY's systems information every night to reduce the university's mainframe cycle usage during the day. This solution provided timely enough data to meet almost all user requirements.
- ◆ Leverage the local ITS infrastructure to enhance security, printing, remote access, and usability.

During subsequent years, ITS added new fields, new views, and other modifications to its new system based on user feedback. Today more than 300 users take advantage of the system's enhanced reporting capability.

The reduction in centralized report generation enabled ITS to devote resources to enhancing the system itself. "Over the last five, six, seven years we have slowly built up a database client-server group to provide easy-to-use PC, network, Web-based solutions for workflow and information access problems and to leverage our data warehouse infrastructure," says Gold. "Other schools may build an application here and there, but our early

decision to invest resources into creating a large, flexible local data warehouse made it possible for us to build new services aggressively.”

These activities laid the foundation to reach an important institutional goal, as articulated by President Christoph M. Kimmich in Brooklyn College’s 2000–2005 Strategic Plan: “to provide a complement of academic and student support services.” Students had been dissatisfied with the institutional bureaucracy. Since most Brooklyn College students are commuters, they spend limited time on campus. They need fast and efficient student services to minimize time spent away from studies. Additionally, students’ increasing expectation of information-on-demand further enhances dissatisfaction. “When a student is used to getting an answer on Google in five seconds,” observes Gold, “waiting in a line to answer a simple question is unacceptable.”

The receipt in 2001 of a \$1.75 million Title III grant to build a virtual student support center crystallized Brooklyn College’s efforts to improve student services through Web automation and to increase the availability of information to student, faculty, and staff members. The grant funded a project coordinator position to move services online and to build a portal to centralize service access in one Web location and with single sign-on authentication. Over time, ITS added a Java programmer and a half-time staff person to contribute programming and systems analysis to this group, now called the Client Server Database Group. The team began to work with other areas of the institution—such as the registrar and admissions—to build a suite of online services. Throughout the years, the Client Server Database Group has been instrumental in Web-enabling student services and framing the Brooklyn College portal—enhancing the college’s level of service to its various constituencies.

Service Enhancement Activities

One of the Client Server Database Group’s first efforts was to create an online grade submission system. The former process was inconvenient and time consuming, and it required faculty members to fill in circles on a form that was then scanned and processed into the college’s student information system. It took two or three months to process all the sheets, and it required additional personnel during processing. Many Brooklyn College faculty members are adjuncts, so submitting grades required them to make an extra trip to campus. All this made for a delayed delivery of student grades, two to three months after classes ended. It was also hard for students to rectify any improperly processed grades. In addition, Brooklyn College was very sensitive to issues of confidentiality and grade integrity after a breach in the 1970s.

The new system has improved satisfaction because grades are now submitted, processed, and delivered to students faster, in a more secure environment, and at a substantially lower cost to the institution. Grade submission times have improved, spurred by Web displays that actually track which faculty members have submitted grades. Once the grades are entered, the system automatically e-mails the student’s grades within one hour and then downloads them into the student information system overnight. Faculty members submit their grades online, eliminating a special trip to campus. The new system was also designed with security as a paramount concern to avert grade fraud.

After the online grading system’s success, other requests came forward. For example, the Client Server Database Group next tackled online attendance, which directly used or modified various components of the online grading system: rosters, process, and reports. The replication of elements enabled the Client Server Database Group to build this second service in less time—in just six weeks.

Now Brooklyn College departments often proactively invite ITS to redesign a process, such as the process for changing a grade when a student makes up an exam. All the involved parties meet with the Client Server Database Group to discuss the process, its feasibility for an online application, and relevant technical issues. At first, users typically voice the problems and roadblocks to Web-enabling a service. On further discussion, it often becomes apparent that tradition, not legal obligations, molded existing processes and procedures. Once this is understood, the parties proceed to modify the process as well as Web-enable the service.

Today the Brooklyn College Web site offers many online services called WebAdvantage Services. For example students may view their transcripts and grades, build schedules, compute their grade point average (GPA), search for courses by various criteria, and view their degree progress. They can also apply and pay online for pass/fail, F-grade replacement, assessment testing, scholarships, graduate admissions, late withdrawal from courses, and parking permits. These services are available in the legacy Web site and have been consolidated on the college's new single sign-on, identity portal—BC WebCentral. As BC WebCentral becomes the primary resource for on-campus information and online services, the college will retool its main Web site to concentrate solely on marketing to external audiences.

"Certainly compared to other colleges our size, we did a good job of picking the right technology direction at the right time," Gold says. Roberta S. Matthews, provost, agrees: "I think that Brooklyn College has been in the forefront of developing a variety of self-service tools, which has really helped our students see how technology can move their education forward."

Process Redesign Spotlight: Online Advisement

Brooklyn College's registrar, Joan Antonicelli, was one of the first user proponents for enhancing student services when she read about Web-based grading on a registrar listserv discussion in 1999. When she approached Gold about the project, he assigned an ITS staff member to assess the project's feasibility. The recommendation started a partnership in which the two areas—registrar's office and ITS—have worked together on several projects to Web-enable services including grades, class attendance, and the students' declaration of major.

An online advising system specifically grew out Brooklyn College's Title III grant to build a virtual student support center. "One of things we specified in the grant was to create a means for students to learn early about any outstanding requirements for graduation," explains Antonicelli. "One of the harder aspects of my job is to send a 'letter of regret' to a student, which outlines the missing course(s) or credit(s) that prevents him or her from graduating."

ITS, students, and faculty evaluated different options and in 2003 decided to purchase SunGard Bi-Tech's DegreeWorks academic advising and degree audit system. The system offers many advising and auditing capabilities, enabling students and faculty members to access pertinent information and to complete "what if" scenarios if a student is contemplating a change in majors.

Again, a centralized organizational environment helped with implementation. "The school is centralized enough that if something can be done, everyone gets involved," says Gold. "We had tremendous cooperation from the registrar, the provost, and the deans. They evaluated the solution up front and got on board the project." Ac-

ording to Gold, all parties actively engaged in the design process as well, giving their pros and cons.

Indeed, though ITS opted to purchase—rather than build—an advising solution, it did leave an imprint on the system, adding its own front end and making further modifications as requested by users. “We wanted to further refine the product to meet all our needs,” notes Richard Klein, Title III project coordinator. “For example, the registrar stores a tremendous amount of information in the student records, mainly as written comments. We modified the system to process them.”

Information processing is also modified. The advising system extracts the academic coursework from the student’s information system, where it is processed against the degree requirements coded in the catalog. The results are stored on the student’s records in the advising system, where it is viewed on the Web or in a printed format. The system is designed for real-time advising, but it takes time to sort through transcripts and rules to answer specific queries. There were some user concerns about potential processing delays, so Klein designed a solution that migrates all the finished records out of the university’s database each night and stores it in a local database to expedite processing. “The reality is that a student’s records typically do not change radically overnight,” explains Klein, “so this solution is an optimal compromise. The whole point was for the student to get information as needed.”

Klein and his group added other personal touches. They redesigned the entire front end. In response to the faculty and financial aid staff suggestions, they enhanced searching functionality by GPA parameters to determine which students might be in danger of losing their tuition assistance program (TAP) funding. The group reformatted the display of all related courses for each major. In turn, each course is clickable so the student can see a

course description, which the system pulls in from the course description database.

Faculty members and department advisers can access student progress reports, created based on specified criteria. The system has roles-based access, controlled by the registrar, enabling the student, faculty, or staff member to view only appropriate information. In the future, it is planned to add a declaration of major function in the system, which will directly notify the relevant department when a student declares his/her major.

The online advising system enables the registrar’s office to manage data anomalies more efficiently. The system’s Web page interface makes it easier for students to report and to categorize their problems. In the short term, this allows the registrar’s staff to review the student records and correct problems right up front. Customer service is improved also, as the staff now has better tools to address student concerns immediately. “The system is almost like a traffic director, providing a single point of contact for their problems,” says Cecilia Schneider, assistant registrar, degree audit, record maintenance. “That is important because by the time students come to us, they can be considerably frustrated.” If the problem originates in another area, for example a missing grade, the office provides a detailed guide for the student about who to contact and what to do.

In the longer term, today’s student problems will facilitate cleaner data tomorrow by tracking and defining problems. The advising system also tracks the number and types of problems reported by users, helping the registrar identify problem areas, such as the 80 percent of problems relating to exemptions. This helps the registrar to further refine student assistance efforts. “In response to the problem reports, we recently refined the categories of data problems and changed the order that are displayed on the system’s Web page,” says Antonicelli.

Before the fall 2004 roll out, the registrar and the Client Server Database Group piloted the advising system using a randomly selected sample of 3,000 students representing undergraduate, graduate, and transfer students from various majors. The project budgeted funds for marketing, making presentations to the deans and advisers, an informational session at freshman orientation, articles in the student newspaper, and hosting a booth on the campus quad.

From the registrar's view, the advising system offers numerous benefits. Enhanced customer service is one. As Antonicelli notes, "The registrar's office has come a long way in regards to customer service. We used to be perceived as unfriendly, with the answer to every question being 'No!'" Now that students know their graduation requirements early and automatically, Antonicelli has begun to see a reduction in letters of regret sent to students. By handling more problems online, the registrar's staff can focus personal attention on students' complex problems. And there has been little need for additional resources; the registrar's office has hired only one additional part-time staff member to assist with processing student e-mails.

The advising system offers benefits to others areas outside the registrar's office and academic departments. The adult education center, career counseling, and institutional research are just a few of the areas now using it to access information about classes, transcriptions, and GPAs. "Not everyone understands the student information system," explains Klein, "but this system possesses an easy to understand interface."

Provost Matthews explains the benefits of the online advising system. "It provides a roadmap for students on where they need to go, and they understand where they have come from, so they can't get lost," she explains. "Its 'what if' functionality enables students to understand the consequences

of the actions, as for example, the additional courses or time at the college resulting from switching majors. Students can make decisions based upon reality." Department faculty can focus on true advisement—not mundane course verification—during student sessions. The online advising service also offers a new alternative to many commuters, whose nighttime class schedule often impedes scheduling advisement meetings with department faculty.

Both Antonicelli and Klein observed that the online advising system generated interest from their counterparts at other CUNY campuses. Other CUNY registrars and IT departments frequently call them to request additional information. BC staff have hosted several best practices sessions for interested CUNY staff members, detailing resource requirements and sharing project management and implementation tools. The CUNY administration began to express interest, too.

System Process Optimization: The City University of New York

CUNY traces its beginnings to the founding in 1847 of the Free Academy, which later became The City College, the first CUNY College. CUNY now is the nation's largest urban university, with campuses in all New York City boroughs for its 11 senior colleges, six community colleges, a graduate school, a law school, and The Sophie Davis School of Biomedical Education. More than 450,000 degree-credit students and adult continuing and professional education students are enrolled at the campuses. CUNY currently employs almost 22,000 instructional staff and 12,000 staff members.

According to New York State Education Law, CUNY is "supported as an independent and integrated system of higher education on the assumption that the university will continue to maintain and expand its commitment to academic excellence and to the provision of

equal access and opportunity for students, faculty, and staff from all ethnic and racial groups and from both sexes." The law requires CUNY to "remain responsive to the needs of its urban setting and maintain its close articulation between senior and community college units." (The City University of New York, About CUNY) This law has particular significance on CUNY student retention activities, as more than 73,000 students were enrolled at CUNY community colleges in the fall of 2004.

CUNY's CIS office provides centralized technology services university-wide, managing a central network and applications. The network and telecommunications division provides wide area networking services to the entire university and Internet access to all CUNY locations. This unit is also responsible for all telephone services in central office facilities. The administrative and applications group manages internally developed systems including The City University Personnel System (human resources management system), SIMS, centralized admissions, and financial aid as well as licensed applications such as Resource/Schedule 25 and BlackBoard. A data warehouse project scheduled for pilot phase in summer 2005 will be the precursor to an ERP solution for all legacy systems that will be undertaken by the university.

CUNY's centralized network infrastructure promotes a special synergy between the CIS office and the individual colleges. CUNY colleges are always sharing applications and technology locally with each other. As Gold explains, "If I write a system that uses some legacy data and makes it useful in some reporting or queryable fashion, the odds are that another CUNY college has the exact same need. Differences do exist between the community colleges and senior colleges, but we all have the same testing requirements and use the same student and HR systems. It makes sense for us to share." As noted earlier, many institutions use the mainframe programs and utilities of

Hunter College and Baruch College. Brooklyn College is a major source for distributed services applications. The CIS office encourages local cross-pollination by hosting demonstrations and seminars centrally about new technology; one such seminar by Brooklyn College staff introduced the DegreeWorks online advising system to their CUNY peers.

College administrative offices promote university-wide technology sharing also. Staff members from the admissions, registrar, and other administrative areas compare notes at their respective monthly cross-CUNY meeting. "Once the word is out about a 'cool' new application, interested user parties typically contact the appropriate campus to request a demonstration and decide if it is feasible for theirs," explains Joan Antonicelli.

The CUNY culture also encourages the central hosting of technology. Whether it is copiers, vehicles, or an enterprise-wide application, CUNY makes efforts to bring the campuses together to reap the benefits from centralized purchasing and administration. When the CIS office spots a potential enterprise application, it may offer to host it on their network to benefit all the campuses, or it may proactively seed a potentially advantageous application or technology.

For example, when evaluating CMS options, the CIS office seeded the Blackboard CMS at three colleges, providing the required servers and software. Eventually the CIS office determined it would be too problematic for individual schools to purchase and maintain their own versions of CMS, citing lack of consistency in application versions, upgrades, and operating systems, as well as the potential cost. So the CIS office centralized on Blackboard, negotiating a system-wide license. The result is an environment where the CMS resides and is managed within one unified platform, but the individual CUNY colleges retain institutional branding and management practices, thereby bridging the resource dis-

What Is PMI?

The Project Management Institute (PMI), with more than 150,000 members in over 150 countries, is the world's foremost advocate for the project management profession. A vital and forward-thinking organization, PMI is composed of 247 chartered chapters, 16 new potential chapters, 30 specific interests groups (SIGs), and two colleges. PMI sets industry standards; conducts research; and provides education, certification, and professional exchange opportunities designed to strengthen and further establish the profession. PMI advances the careers of practitioners, while enhancing overall business and government performance through documentation of return on investment.

Source: Project Management Institute

parity among campuses. Sign-on technologies are available through the CUNY portal.

In August 2004, the CIS office took an important step toward formalizing the university-wide optimization of enterprise applications and processes when it created the Project Management Office, reporting to the CIO. Director Claudia Colbert explains that "the Project Management Office is trying to look at our portfolio of projects as a way of measuring our investment in reaching the goals and the mission of the university. The CUNY administration wanted to build a discipline to roll out products across the university in a uniform way, achieving cost savings through centralized management." Currently the Project Management Office manages CUNY's CMS and now the implementation of a university-wide online advising and degree audit systems implementation.

Colbert explains that she is "prescribing a business process that describes roles and responsibilities within the CIS office for project management." She is also developing a set of tools and standard project templates, and she has launched an educational effort for her department and CUNY to learn more about

the project management life cycle. CUNY is still adapting to the new project management structure. "It has been a learning experience for myself and my colleagues in bringing a more formalized discipline into a very collegial and collaborative process," says Colbert.

A self-proclaimed "PMI nut" (Project Management Institute), Colbert is using PMI's *A Guide to the Project Management Body of Knowledge* "as my bible for implementing best practices for project management, applying their best practices to CUNY. We are trying to impact project selection—the planning steps, testing, execution, and control. It is very useful to create a consistent benchmark and a consistent way of measuring how well we are doing project to project."

Centralizing the Online Advisement and Degree Audit Systems

It is with this backdrop that CUNY is creating a university-wide online advising and degree audit system. Brooklyn College was not the only CUNY institution to implement an online advisement system. When LaGuardia Community College transitioned to the CUNY student information system, it could not migrate its homegrown degree audit system. It too purchased DegreeWorks and rolled it out in August 2004. Interestingly, LaGuardia used an extract program developed by Brooklyn College to import its data into the DegreeWorks database. Other CUNY colleges began to express interest in a similar system, too.

Concurrently, the CUNY chancellor's office has identified the implementation of enrollment management in general and a 12 percent increase in student enrollment specifically as goals in its 2004–2008 Master Plan:

"In order to better serve students throughout the entire enrollment cycle—recruitment through graduation—CUNY plans over the next four years to develop and implement a new model for enrollment

management across the university. The model will be centered around the creation of an 'enrollment management committee,' which brings together a wide range of student services/enrollment management departments including recruitment, admissions, testing, registrar, bursar, financial aid, new student orientation, academic advising, and academic departments. This structure will allow the development of stronger working relationships between the departments responsible for enrollment services, ultimately offering improved service to our students. The service model implemented by this committee will offer 'one-stop enrollment services' to prospective students across the university, allowing them to access information about admissions, financial aid, testing, registration, tuition, and payment options without having to see a multitude of office representatives."

The enrollment management outcomes include integrating information, improved student service, enhanced academic advisement services, facilitating and streamlining the student transfer process, and enhancing graduation rate. The enrollment management project is written into the goals of each CUNY college president, and each college has a point person to manage this initiative. "There is a high level of expectation, which is supported from the chancellor's and executive vice chancellor's offices," explains Colbert. "Consequently CUNY created the funding and the incentives to make online advising and degree audit tool a university-wide project." So what began as individual campus implementations has evolved into a university-wide initiative.

One of the chancellor's objectives is that all campuses use an online advisement tool so that students, faculty, and staff understand their school's program requirements and to ease students' transfer process from school to school within CUNY. "The goal is

that by December 2006, all the colleges will be in some phase of implementation of an online advisement system," explains Olga Vega, DegreeWorks project manager. "The expectation is that it will dramatically impact student enrollment, as well as increase students' progress rates, transfer rates, and graduate rates through a better understanding of their objectives."

CUNY negotiated a contract with SunGard Bi-Tech for an enterprise implementation of DegreeWorks and is in the process of negotiating a contract for the vendor's TreQ Transfer Articulation System. TreQ automatically articulates transfer courses and credits from student transcripts and applies these credits to an audit to fulfill degree requirements. Credits by examination such as Advanced Placement (AP), college level examination program (CLEP), and military courses can be articulated to course equivalents as well. TreQ uses an articulation database in which courses from one institution are coded as equivalent courses in another institution. The system extracts this information from student transcripts stored in the DegreeWorks database and indicates on the DegreeWorks audit how courses transfer. Students will be able to run "what if" audits to view how their transfer credits will be accepted at different CUNY Colleges.

CUNY is negotiating for additional enhancements to DegreeWorks' centralized application geared to facilitating the goals outlined in CUNY's enrollment management initiative. The DegreeWorks system will generate TAP and Title IV audits based on the financial aid rules, indicating if students can be certified for aid. A student planner will print an audit for each new student that displays the required sequence of courses or programs that must be completed in the first semester or possibly the first year. A GPA calculator will allow students to determine the number of courses and grades needed to improve their

GPA. An advice calculator will help students in academic jeopardy to determine the number of courses and type of grades needed to achieve good academic standing.

The system's tools can serve as recruitment tools as well by enabling transferring CUNY students to investigate programs and to determine the number of credits they will receive for completed courses across different campuses. This helps the student create a timeline for degree completion. "Having a tool that will track this allows us to provide transfer credit articulation information across the board for our community college transfer students and our outside transfer students," says Colbert. "If we can track transfers, it will support our goals to grow our enrollment." The TAP and Title IV audits will help prospective students determine in advance the type of the aid they would receive upon attending CUNY.

The Project Management Office took responsibility for the initiative "because senior administration realized our online advising and degree audit systems would be an enterprise system, so it needed centralized management. The online advising and degree audit systems are so IT dependent, it became critical that this project be managed by a centralized office to ensure the project met its stated objectives and goals set," says Colbert. "We needed a model to ensure that the systems were implemented in the various CUNY colleges with a standard set of guidelines. We also wanted to provide centralized, shared resources so every college does not have to duplicate their own campus resources during deployment."

Vega joined the Project Management Office as the online advising and degree audit project manager in August 2004. She brings a unique perspective and expertise as both LaGuardia Community College's former registrar and former director of the Academic Advisement and Career Counseling Cluster,

enabling her to manage the implementation of the academic requirements and articulate the necessary features for an advisement tool. Her role entails interfacing with the executive sponsors, working with the Office of Academic Affairs to coordinate the implementation throughout all of the campuses, being responsible for the verification and testing of the application, establishing standardized data specifications, aligning academic requirements with practices, and identifying measures of success. SunGard Bi-Tech actually mandates in its contract that the executing organization must designate a project manager for the implementation to be successful. As Colbert explains, "Olga has all of the major challenges and issues on her plate and the responsibility to keep the project moving forward, and to ensure that every college meet its formal implementation deadline."

To accomplish this, Vega believes in a highly structured project methodology. "Roles and responsibilities have to be defined at each level," she says. "People's tasks have to be defined and monitored weekly." Vega uses PMI-based project management techniques to manage individual college implementations and simultaneously identify IT-related tasks for the CIS office to perform during the course of the project. Representatives from the colleges, the CIS office, and the vendor meet biweekly. The project leadership also participates in the CIS office's weekly project meeting. As Vega and her project team progresses with the implementation, it addresses several issues.

Issue 1: Organizational Analysis

While Vega and others work very closely with IT, "it is the campuses, not IT, that are driving this implementation," says Colbert. "It is their commitment, their contract, their dedication, their resources, and their understanding of their content and catalog. The

success is really dependent upon how committed each campus is.”

One advantage of the CIS office’s implementation is that it benefits from the experiences of those CUNY colleges that have executed DegreeWorks. The CIS project team met with the individual colleges up front to discuss their implementations and to gather a list of best practices to apply to the university-level project:

- ◆ Strong executive sponsorship;
- ◆ Significant time commitment of staff over a long period;
- ◆ Clarification of policy issues before the catalog is coded by SunGard Bi-Tech;
- ◆ Early involvement of campus community;
- ◆ Test extensively before releasing the product;
- ◆ Plan to provide support to all users, students, and advisers.

The CIS project team also determined how much time and resources would be needed from colleges and staff participants for a successful implementation. This enabled the project team to create an implementation structure, which categorizes the central and local requirements of the colleges in terms of a “stand-alone” model, a “central-server” model, and a “hybrid” model.

- ◆ The institutions in the stand-alone model have completed or are implementing DegreeWorks locally, minimizing any technical, human resource, and process redesign assistance from the CIS office.
- ◆ Centralized institutions are currently implementing the online advising and degree audit systems in an accelerated fashion. While these colleges have the local resources to handle most user training, catalog scribing, and technical implementation requirements, the CIS project team has worked very closely with them, applying the best practices outlined above to facilitate the implementations. For example, the CIS project team urged

the colleges to review their course catalogs before the implementation started so they could clearly define their catalog requirements up front. This made it easier to implement the DegreeWorks system’s information and rules audit and verification processes. Continuous learning occurs as the colleges and the CIS project team members share their experiences throughout the implementation.

- ◆ Hybrid institutions have not yet started the implementation process. These colleges have the most concerns about deployment because of their large student enrollment and complex academic structures, which complicate scribing, training, and technical requirements. These colleges will require additional technological and human relations support to ensure a successful and timely execution. The CIS project team plans to deploy additional resources to assist with implementation at these institutions.

Issue Two: Process Redesign

“You cannot look at this implementation in isolation,” says Vega. “Each college has to benefit from the resource integration offered by the online advisement and degree audit systems to gain enough effectiveness to meet CUNY’s enrollment management initiative’s objectives.” For example, at several colleges the online advisement and degree audit systems implementation is actually part of a much larger initiative to enhance advisement services in general. LaGuardia Community College not only implemented DegreeWorks, but also hired professional academic advisers and is expanding the structure of the learning community for freshmen. Vega and her project team try to participate in discussions to help the colleges understand how the new system can facilitate their strategic goals.

Another challenge for the project team is helping the colleges rethink their specific

advisement process. “The implementation is more about the catalog and the student data and less about IT itself,” explains Colbert. “It is important that each campus understand its student advisement process and the kind of productivity gains they will achieve by having a system like this. Advisement is not about looking for a piece of paper, but having the information readily available so the student and adviser can concentrate on helping students clarify their educational and career goals.”

Issue 3: Information Accuracy

Curricula are continually changing, and someone has to update these tools on each campus. “Every college is always shocked by the number of incorrect, inconsistent, and vague entries in its catalogs, even though the catalogs are published every year,” says Vega. “We want the database for our online advising and degree audit systems to serve as a repository for accurate academic information.” The CIS project team helps individual colleges prepare for the scribing phase of implementation and plans to provide ongoing support.

Issue 4: Technology

The other issue is technology. In addition to the Project Management Office, the CIS Administrative and Applications Group is integrating the DegreeWorks and TreQ systems into CUNY’s existing IT environment. Another issue is sufficient capacity so that the CUNY technical infrastructure can support all the campuses’ individual activities on DegreeWorks and TreQ. Currently the CIS office is building test models to determine capacity for a full implementation by 2006. The final issue is to ensure adequate support procedures.

The Next Steps

As the centralized online advising and degree audit system implementation continues, the CIS project team is focusing on several areas. An immediate goal is to identify metrics

that will allow the administration to measure the system performance against the CUNY enrollment initiative objectives. One suggested measure is to survey students about their satisfaction with the online advising and degree audit process. In anticipation of supporting the college’s ongoing implementations and maintenance of this system, the Project Management Office has proposed expanding the current project management team to include:

- ◆ The two key customizations of the online advising and degree audit systems that have strategic implications for CUNY’s enrollment management initiative. The financial aid compliance and checking features have significant implications in terms of resolving any TAP compliance liabilities. The system’s support for transfer students is also important as “CUNY has observed an increase in the student transfer population,” says Colbert. A separate customization coordinator would manage these issues directly.
- ◆ As new colleges join the central server model, additional project managers will be hired.
- ◆ A master scribe trainer is planned to build in-house scribing capability to ensure continuous information maintenance of the system and minimize the impact of any personnel turnover.
- ◆ Part-time resources would backfill the registrar offices of local campuses during the system’s implementation process.

One proposed system enhancement is a so-called curriculum planning assistant, which is an enrollment management reporting tool that facilitates academic program planning and budget allocation. The goal is to use the tool to forecast the courses in which students most likely will enroll based on courses students have taken previously to fulfill the same requirements. This feature is expected in the next release of DegreeWorks.

Lessons Learned

Brooklyn College and CUNY staff members outlined several lessons learned. Some of them are general truisms, and others are specific to optimizing business processes:

- ◆ *Learn to say “no.”* Before starting any project enhancement project, Brooklyn College’s Client Server Database Group meets with the users to understand the problem they are trying to solve and determines whether it is even feasible to offer an online enhancement. “Our job is to try to solve a problem, to do it in a way that makes the end user and the servicing department happy, to execute it within our existing resources, and, of course, to create a system that is more convenient and economical than the manual process it replaces,” explains Mark Gold. “Sometime we have to refuse to automate process: if it is not doable and doesn’t help the user—what is the point?”
- ◆ *Start small and build a foundation.* As time has passed, Brooklyn’s ITS department has developed an arsenal of business logic, tools, and codes that it reuses or modifies for each project. “For example, you build an interface once and use it over and over,” says Gold. “After a while it is like a snowball that goes faster and faster.” Gold also advises institutions to automate something really easy first. “People see it on the Web and get used to it,” he says. “Don’t try to do it all at once. Pick a low-hanging fruit.”
- ◆ *Standardization is very important.* Brooklyn College strives to use standard—not flashy—tools whenever possible. These tools get the job done in a secure, reliable way, and are easily supported. ITS has used Java for all its online services, utilizing off-the-shelf tools when available to avoid building from scratch, and it has adopted Microsoft SQL—Structured Query Language. Other CUNY colleges have modified the BC code for Oracle applications.
- ◆ *Focus on users.* It is not about technology. Both Gold and Colbert strongly emphasize the importance of working with the users to understand their processes and, when it is appropriate, to incorporate their feedback. This approach creates project relevancy to user’s job function and enhances buy-in to the new process. “In a terminal environment, everyone was trained to work in a customized environment,” says Gold. “Now users compare the solution to the other applications they use. Your solution needs the same look, security, ease-of-use, and instructions.”
- ◆ *Plan for maintenance as well as online service development.* As the list of online services grows at Brooklyn College, so does the proportion of time that the Client Server Database Group spends on maintenance—up to an estimated 30 to 40 percent of the group’s time. Maintaining courses is a particularly arduous and ongoing process for the advising and degree audit systems. “It is never going to be finished,” says Julie Hegner, assistant registrar, degree audit, Brooklyn College. “For example, our monthly faculty council meetings always generate curriculum changes.” The CIS project team for the CUNY-wide implementation has requested additional resources to address this need.
- ◆ *Good project management is essential.* Both Brooklyn College and CUNY stressed the importance of strict project management and hands-on project managers. Indeed, SunGard Bi-Tech specifies in its contract the need for a project manager to enable a successful implementation. “We did a lot of work, but without a project manager we would not have succeeded,” says Joan Antonicelli. “That person keeps the project going and coordinates issues. The Project Management Office strives to provide the same services for the university-wide implementation.”

Conclusion

Despite the two disparate environments—one campus versus a multicollage university system—several common practices in business process optimization emerge, as summarized in Table 1.

The keys to success are to set institution goals at the onset, to follow strong project management practices during execution, and to assist and to relate to the users throughout the implementation process.

Table 1. Project Optimization Practices

Service Enhancement Had a Direct Link to a Strategic Plan	
Action	All Brooklyn College and CUNY project members are thoroughly acquainted with the relevant strategic plan and the specific goal(s) their projects addressed
Benefit	Members understood the implications of their projects and could focus activities and resources to achieve optimal results
Project Team Members Are Strong Proponents of Formal Project Management Methodology	
Action	CUNY Project Management Office developed tools and project management templates using PMI methodology Brooklyn College developed project management tools for their online advising system project, available for distribution to other interested CUNY campuses
Benefit	Efficient use of time and enhanced project implementation
Two-Tier Project Managers	
Action	Enablers: Both Brooklyn College and CUNY IT groups create supportive environment and appropriate tools Day-to-Day: The actual project managers at Brooklyn College and CUNY are focused on actual day-to-day project implementation, completing their jobs in a very hands-on fashion
Benefit	Enable Brooklyn College and CUNY project managers to focus on their project implementations with minimal distractions
Strong Connection to Users	
Action	Both Brooklyn College and CUNY project teams worked closely with respective user groups to understand their organizational issues, business processes, and requirements Brooklyn College heavily customizes business process tools to address user requirements and feedback CUNY customized implementation plan based upon institutional requirements
Benefit	Reinforced project’s relevance to users’ work activities, promoting acceptance

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