

*University of Northern Colorado*  
*Enterprise Resource Planning (ERP) – A Case for  
Implementation*  
*October 2004*

## Preface

Before outlining the issues pertinent to implementing an ERP (enterprise resource planning, i.e., an integrated administrative system), the project needs to be placed within the context of the broader concern of outsourcing. As a matter of prudent fiscal practice and to maximize focus on fulfilling their mission, organizations should evaluate non-core activities to see if they are carried out more effectively internally or externally.

As part of developing this ERP case, UNC assessed the potential for comprehensive outsourcing of: information technology services, ERP application service provider (ASP), and/or basic business services (accounting, registrar, etc.). As discussed in the recent Business Activity Review (provided to the Board in August) the University has outsourced specific functions within these areas such as Perkins Loan administration, software maintenance and mailings. In other cases, evaluations indicate that it is more effective for UNC to continue providing the service internally.

UNC also met with the Governor's Office of Innovation and Technology (OIT) to discuss outsourcing, financing and next steps for the ERP project. Neither outsourcing nor use of an application service provider appears to be a cost effective option for UNC at this time. However, OIT may be able to facilitate a joint procurement to the benefit of the Colorado Community College System, Colorado State University, and the University of Northern Colorado. Staff from OIT and the independent IT consultant they engaged provided the following information for our consideration:

- In general, the industries for higher education information technology outsourcing and ERP application service providers are immature. This market segment does not yet have enough competition, experience, or economies of scale to offer colleges and universities substantial advantages.
- Higher education ERP systems have a longer life cycle than corporate systems. Thus, where an ASP has merit as an alternative for investing in

an ERP with a relatively short expected life, it is not nearly as attractive for a university ERP with a 15+ year life expectancy.

- One specific drawback to information technology outsourcing/ASP is university access to data necessary for analysis, ad hoc reporting and decision-making. When needs change from those anticipated in the contract, change order costs can escalate dramatically. This is a significant risk as information needs are very dynamic in this era of increased accountability and operating environment volatility.
- When the market matures, it may be advantageous for UNC to reconsider information technology outsourcing alternatives. But, it will be in a better position to do so with a fully implemented ERP, including the associated changes in business processes.
- The independent IT consultant identified by OIT recommended an Educause ERP research bulletin as support for our need to move toward implementation. (Attachment 2)
- As UNC proceeds with ERP procurement, vendor and third-party financing should be considered.

The University has incorporated this guidance into its ERP business case and procurement planning.

## Executive Summary

This case examines UNC's need for an **integrated administrative system (ERP – enterprise resource planning) to replace legacy (existing) campus systems**. For purposes of this document, the ERP includes applications for the following core functions: Student Information, Finance, Human Resources, as well as a portal and other infrastructure necessary for a fully integrated web-based implementation. ERP vendors offer additional system modules that UNC may ultimately want to explore (e.g., grants management and alumni/development) but they are outside the scope of the current discussion.

The University's current systems were selected or developed independent of one another (i.e. "best of breed") and require on-top interfaces for data sharing. They include PeopleSoft 7.5 for human resources/payroll, a homegrown student information system and Financial Records System (FRS) for finance. A fundamental drawback to this best of breed approach is the investment of resources to maintain interfaces among the systems. There are three additional shortcomings:

- PeopleSoft – our human resource/payroll system is unsupported by the vendor
- Data Analysis & Decision-Making – our systems do not support necessary reporting to both internal and external users without significant and time-consuming manipulation
- Aging Infrastructure – the mainframe/IDMS platform is dated technology and vendor support issues must be faced in 2007

The need for replacement of legacy systems was first identified in 1996 by ECG Management Consulting Inc. A series of assessments and other initiatives, including the problematic implementation of PeopleSoft 7.5, has brought UNC to a decision point: Should we implement an ERP?

Clearly the expenditure will be a significant investment for UNC. Hardware, software, implementation services and internal University personnel dedicated to implementation will total approximately \$8 million. While the investment is significant, it will transform core operations.

There will be some cost savings, and those have been conservatively estimated at \$6.4 million over five years, based on comparison with other projects and educated guesses. Additionally, annual costs of \$533K for mainframe operation will be eliminated. **Those benefits, however, do not fully articulate the fundamental increases in productivity and mission-focus that are the ultimate benefit to UNC.** Quantifying those benefits is more difficult, but 5% increased productivity for all employees would mean \$4 million per year reinvested. Implementation of the ERP as configured—with existing business processes modified accordingly—will be critical to productivity increases.

The final Charting the Future report was a map for a journey just beginning. That journey must involve examination of “the many functions and programs [UNC] has taken on, and prioritiz[ing] those to create a university which does those things at which it can be great”. Success on that journey will require the increased productivity, and easier, timelier access to information that is predicated on a fully implemented ERP system. **An ERP will offer the University additional business process functionality that could not be layered on top of the existing disparate systems. These tools will allow UNC to identify opportunities for investment that were foregone in the past.**

# Project Overview

This project would replace legacy campus systems in phases with the ultimate goal of a fully integrated administrative system (ERP—enterprise resource planning).

The overall objective of this project is to enhance the University's core administrative systems through the implementation of ERP software that:

- Provides secure and reliable systems that are easy to use and maintain
- Provides management and decision information when and where needed
- Provides departments the ability to enter and process business transactions and to directly access core administrative data
- Enables data to be entered and edited only once and be shared across the enterprise systems
- Provides additional business functionality
- Provides secure Internet access to the University's administrative systems
- Provides individual employees and students access to a variety of self-service capabilities
- Enables knowledge transfer that will allow the University's staff to support and maintain these systems on an ongoing basis
- Provides a secure environment to support multi-tiered authentication across enterprise systems

The following applications/modules would be included as part of the ERP core:

- Financial Management – General Ledger, Budget, Accounts Receivable, Accounts Payable, Billing, Cashiering, Asset Management, Inventory, Purchasing/e-Procurement, Travel & Expense Management
- Human Resources – Core Human Resources, Payroll
- Student Information – Admissions, Degree Audits, Enrollment, Registration, Financial Aid, Student Accounting, Student Records
- General – Campus portal

The following non-core add-on applications are potential future enhancements to the ERP to be evaluated on a case-by-case basis:

- Facilities Maintenance & Scheduling
- Grants Management – Pre-Award, Post-Award
- Advancement – Alumni, Development
- Library Cataloging
- Business Intelligence/Analytics and Data Warehouse
- Student Housing & Dining

## Current Systems Status

The University of Northern Colorado has several administrative information systems in place—that is a “best of breed” rather than integrated approach. This requires ongoing investment of resources to maintain the data interfaces between the systems which include the following functions:

- Payroll
- Human resources administration
- General ledger and financial statement preparation
- Accounts payable and check disbursement
- Purchasing
- Accounts receivable
- Cashiering
- Student admissions
- Student registration
- Student records
- Financial aid
- Budget development
- Cost accounting

- Web access

The specific software includes: PeopleSoft 7.5 for payroll and human resources; SCT Financial Records System (FRS) for general ledger, payables and purchasing; SCT Billing/Receivables System (BRS) for accounts receivable; an internally developed program for cashiering: Sigma financial aid; an internally developed student information system; and a combination of E-Print, SQL Server, WebFocus and Access for budget development, cost accounting and web access.

In addition to investment in maintaining interfaces, there are three primary concerns related to the ongoing use of our current systems: **PeopleSoft Maintenance; Data Analysis & Decision-Making; and Aging Infrastructure.**

## PeopleSoft Maintenance

The first and most pressing concern is expiration of maintenance on the PeopleSoft package.

PeopleSoft 7.5 retired in 2003 and we now are processing a monthly \$6 million payroll for 3,600 employees on unsupported software. The drawbacks are: 1. Potential for system failure and 2. Implementation of tax, legal and regulatory changes. Information Technology staff assessment suggests that the potential for complete system failure is relatively low. However, over time, operating system and other software platform changes increase the risk. We also believe that we can accommodate foreseeable tax, legal and regulatory changes, but the possibility of incorrect interpretation or inaccurate programming does exist.

In addition, there are implications for user desktop software; problems can arise when PeopleSoft users upgrade operating systems or word processing software.

## Data Analysis and Decision-Making

In recent years, the dynamic higher education environment, as well as increased accountability and funding constraints at the state level, has required growing sophistication and timeliness in financial analysis and reporting. This includes both central analysis by financial services staff and end-user analysis for program management. We have managed this need through the creativity of information technology and financial services staff and the extensive use of "add-ons" like SQL Server, Access and E-Print. More recently we have begun to explore ways to use ODBC tools such as Web Focus to get information to users

There are limitations to these approaches. Substantial training and specialized knowledge is required to access and analyze the information. Newer technologies allow for sophisticated “canned” analytical tools on the end-user desktop so that fiscal information would be readily available and could be more easily manipulated to meet reporting and decision-support needs. Implementation of an ERP would allow UNC to use standardized analytical and reporting tools with vendor-developed documentation.

One specific example is the relatively new Colorado Commission on Higher Education (CCHE) requirement for quarterly financial statements. Clearly, quarterly and even monthly financial statements should be produced for effective management of an organization. However, the legacy financial system (FRS) was designed prior to substantial changes in higher education accounting principles (GASB 34/35). Although it adequately accounts for transactions in a “fund accounting” perspective, it does not easily produce full-accrual enterprise perspective financial statements. The time and specialized knowledge required to perform the manual interventions and overrides to produce quarterly financial statements in accordance with generally accepted accounting principles does not permit timely management decisions.

In order to continue proactively addressing the changing higher education environment, UNC intends to implement activity based costing (ABC) to enhance decision-making. The University is committed to focusing its resources where they matter most, and that means where it makes the most difference to students. To fully realize this goal UNC needs to have current technological tools allowing activity based costing to be implemented and providing greater accessibility to ABC and other relevant information.

## **Aging Infrastructure**

Our financial and student systems currently operate in a mainframe environment on an IDMS (integrated data management system) platform. IDMS was installed at the University in 1985. IDMS is a networked database and not a relational database. While the networked database provides solid response for legacy applications, its structure contributes to the limitations for end user reporting and analytics. Further, as of spring 2007 the mainframe operating system will require hardware upgrades to continue vendor support. This will require UNC to make a \$100K– \$150K expenditure to maintain a system that is not fully meeting our current needs.

## Project History and Assumptions

UNC's business case for an ERP implementation has been evolving since 1996 when ECG Management Consulting Inc. was engaged to evaluate UNC's information technology environment. Its recommendations included the implementation of "more proactive and user-oriented IT functions" and specifically to "replace aging applications and to eliminate systems that were developed and/or are maintained solely by the UNC [IT] staff".

The first step in that direction was the 1997 PeopleSoft implementation of a human resources/payroll solution. The PeopleSoft implementation was not UNC's most successful initiative, culminating in PeopleSoft's decision to essentially abandon the version of the software that UNC was running. However, this was UNC's first taste of the possibilities offered by current technology for administrative software – intuitive user interfaces, relational database, robust querying and analytics etc.

Recognizing the importance of current technology for mission-critical information, UNC engaged in a comprehensive needs assessment for the student information system (currently a 20-year-old home-grown system). Benefits and specifications for registrar, admissions, grades, financial aid and other student information and processes were detailed. The project was then shelved, partly because funding could not be identified and partly because "the" information technology priority became Y2K compliance.

In early 2002, PeopleSoft announced its intent to retire UNC's version of its payroll / human resources software (7.5) and UNC began to explore its options. In fall 2002 a committee of information technology, financial services, human resources and student services staff finalized a proposal for UNC's senior administration. The proposal identified three alternatives: do nothing, replace the payroll/human resource software, or prepare an ERP request for proposal. The third alternative was recommended, but before the proposal could be considered by the administration, Colorado's fiscal situation, and thus UNC's budget, destabilized, effectively shelving the proposal.

As the University went through its comprehensive planning process in 2003, the importance of the ERP question was again obvious. The final Charting the Future report addresses the issue in general terms, concluding that in challenging times, the need for timely information and analysis becomes even more critical. As a result, UNC drafted a Request for Proposal (RFP) for enterprise resource planning software based in large part on a model from another university.

Clearly an ERP is a significant investment of state money and the Board recognized that UNC must have a clear, well-supported rationale before undertaking such an initiative. Therefore, the Governor's Office of Innovation and Technology was asked, and agreed, to assist the University in clearly articulating the project benefits and costs. OIT was also able to engage an independent IT consultant on a *pro bono* basis.

The following benefits and costs were developed by drawing from the prior work done by UNC as well as through more recent unit by unit evaluations. In many cases the anticipated benefits are based on educated guesses about time savings that will accrue from a fully implemented administrative system (time and motion studies were not conducted). Critical to the realization of these benefits will be a "vanilla" implementation of the system and business process redesign to conform to the system standards.

## Project Benefits

As discussed above the goals and benefits of a fully integrated administrative information system are broad. According to Bill Swanton of AMR Research<sup>1</sup> the return on investment (ROI) for an ERP implementation is derived not only from cost cutting and increased business process efficiency, but also ultimately from improving the organization's core operations. This is consistent with UNC's long-term intent of implementing activity based costing. Discussion of UNC's benefits will be in three primary areas: **Information Technology, Basic Changes, and Core Transformation.**

### Information Technology

The bulk of today's administrative applications reside on an IBM S/390 mainframe. After full implementation of an ERP system, this mainframe would be retired. The majority of the software, hardware and license expenses directly related toward keeping the mainframe operational (\$303K) and vendor maintenance of the financials and financial aid systems (\$230K) would eventually be eliminated. This \$533K in savings would offset a portion of the ongoing ERP system hardware and software maintenance costs as described in the project cost section.

Fourteen other IT personnel currently support the legacy administrative systems as follows:

---

<sup>1</sup> *Phase III ERP Benefits: The Art of the Formerly Impossible*; Bill Swanton; April 29, 2004; [www1.amrresearch.com](http://www1.amrresearch.com)

- The IBM OS/390 mainframe has required two (2) FTE systems programmers (\$219K) to address security authentication and authorization, operating system and application software upgrades/patches, and system tuning and performance.
- Two (2) database administrators (\$164K) are responsible for maintaining existing administrative systems databases that reside both on the mainframe (IDMS) and on smaller servers (Oracle and MS-SQL). The database administrators' responsibilities include: database authentication and authorization; database backups and restoration; and of course database installation, upgrades and patches.
- Ten (10) applications analysts/programmers primarily support the following functional areas: student financial aid – one (1) FTE (\$75K); finance and budget – two (2) FTE (\$150K); human resources, payroll and imaging – one (1) FTE (\$82K); room scheduling and course registration – one (1) FTE (\$59K); student records, undergraduate admissions, graduate school and advising – three (3) FTE (\$189K), facilities management, call accounting, ancillary interfaces – one (1) FTE (\$71K) and; Web development – one (1) FTE (\$49K).

This \$1.1 million in personnel, along with associated supply and equipment costs, would be reinvested in supporting the ERP which will offer campus users and students increased functionality.

Again, the key to providing this increased functionality for similar investment of IT personnel is commitment to a “vanilla” implementation, i.e., few customizations and modification of business processes to conform to the ERP configuration.<sup>2</sup>

## Basic Changes

During the implementation phases of the ERP project UNC expects to see increasing ROI in five major categories of basic change:

Productivity – improved processing efficiency due to graphical, windows-based, web-accessed interfaces and a single relational database. Examples include transaction processing in all units such as accounts payable, registrar, financial aid, bursar, etc.

Information – easier, timelier access to information and analysis using current technology by campus-wide users, improving decision making on

---

<sup>2</sup> ECAR Bulletin; Volume 2002, Issue 22; *Enterprise Resource Planning Systems in Higher Education*; Paula King, Robert V. Kvavik; November 12, 2002

a day-to-day basis. Examples include college management of faculty hiring, departmental budget management, and financial aid packaging.

Electronic vs. Paper – decreases in paper, copying, postage, handling and storage costs due to implementation of electronic media. Examples include electronic delivery of student bills and employee timekeeping.

Revenue – technological improvement will in some cases allow for revenue enhancement. For example, the ability to accept ACH payments over the web will improve cash flow.

Customer Service – updated systems will improve services to students as well as employees, vendors, etc. Examples include improved online access to course schedules, ability to change addresses in one place instead of in multiple stand-alone systems.

The hard ROI from these benefits is estimated at \$680,000 in years 1 – 2 and \$5.8 million in years 3 through 5 as the system is fully implemented. External consultants have suggested that the calculations and assumptions underlying these estimates are conservative. The soft ROI, primarily in improved customer service, is not easily quantified. However, soft ROI does include risk avoidance that can be quantified. For example, in the worst case scenario, we might lose the ability to process payroll on PeopleSoft, forcing us to emergency outsourcing at an estimated cost of \$35K per month.

## **Core Transformation**

Core transformation is really what we are trying to achieve with Charting the Future – discovering opportunities, fostering imagination and ultimately investing for greatness. We have the map, but the journey is just beginning. The people at UNC – students, faculty and staff – are critical to the journey, but they must have the tools to work with. An ERP is one of those foundational tools.

It is reasonable to assume that an ERP, with a single database for all mission-critical data and current generation technology will assist us in identifying minimum of 1% of our budget for reinvestment. Based on our current \$120 million budget, each 1% is \$1.2 million a year invested in greatness, and substantially impacting students. This is where the real return on investment will be seen.

## Project Costs

UNC will be in a much better position to estimate project costs after an RFP; preliminary estimates for a five-year project are as follows:

PROJECT COMPONENT	BUDGET ESTIMATE
<b>Hardware:</b> Servers	\$200K
<b>Software:</b> Finance, HR & Student applications with portal	\$1.6 million
<b>Maintenance</b>	\$1.3 million
<b>Vendor Services:</b> Installation, data migration and training	\$2.8 million
<b>Contracted Project Management:</b> "Owners' Rep" and independent verification and validation	\$700K
<b>Internal Costs:</b> IT personnel and subject matter experts (SME) assigned to implementation require backfill of ongoing responsibilities	\$1.4 million
<b>TOTAL PROJECT ESTIMATE</b>	<b>\$8 million</b>

UNC began setting aside funding for an ERP almost 10 years ago and has now accumulated about \$3 million towards the project. The remaining cost of the project would be funded over five to seven years as the implementation progresses. As part of the RFP, UNC intends to request financing information from vendors. Ultimately, funding may drive, i.e. lengthen, the implementation schedule.

## Analysis of Alternatives

The University's management information systems have evolved over time with some of them predating modern computing capabilities. Each system has come into existence as the need has justified the expenditure necessary for that particular system. This has resulted in a "best of breed" environment with each system running on its own database or file set. These systems have been provided by a number of vendors or have been written locally.

The major disadvantage of a “best of breed” environment is that the exchange of data among all the various systems has to be programmed locally and managed continuously. The result is often that data does not flow quickly from one point of contact for a student to another. Data redundancy is also a significant issue in this type of environment. If an address exists in several systems then one is never sure which is the most current until each has been examined in detail. This in turn hampers UNC’s ability to efficiently deliver services in support of its educational mission.

The purposes of the proposed project are as follows:

- Streamline information technology processes by moving away from a “best of breed” environment
- Minimize the exposure associated with running payroll on unsupported software
- Improve our ability to access, analyze and report data both for internal decision support and external requirements
- Address the risks associated with our aging systems.

Our current alternatives include:

### **Do Nothing.**

Clearly doing nothing is always an alternative. It requires no immediate expenditure. However, it does not address any of the concerns associated with our current system. In the long run, it may well prove to be the most expensive option as we continue to fund “workarounds” to our information needs and certainly if we experience payroll system failure.

### **Replace the Payroll / Human Resources System**

This addresses one need: our unsupported PeopleSoft system. However, the selection of a new vendor/software for this purpose either perpetuates our “best of breed” approach or pre-determines the direction for the far more important student system. It also requires UNC to continue maintaining system interfaces and does not address enterprise-wide analysis and reporting needs.

## **Proceed with an ERP Request for a Proposal – Payroll Implementation as a Priority**

This alternative offers a long term, campus-wide perspective. Payroll would be the first priority in timing only. The functionality of the student system and the sophistication of comprehensive data analysis and reporting would be the driving factors in vendor selection. It addresses all the needs outlined above. Although it requires the largest expenditure, that expenditure is an investment with returns in:

- Reducing the resources expended for maintaining system interfaces
- Eliminating duplicative effort to maintain the same data in multiple systems
- Providing additional functionality for business process for users throughout the University
- Improving institutional decision-making and budgeting through easier access to information
- Improving quality and timeliness of external reporting, including potential requirements under the new CCHE performance contract
- Reinvesting personnel time freed up through updated technology tools.

Attachment one (1) provides a three-page project summary for this alternative.

## **Tentative Project Schedule**

The following project schedule is an aggressive time line for complete ERP implementation. Factors driving the schedule include: minimizing the length of time UNC operates PeopleSoft 7.5 unsupported, vendor recommendation that finance/general ledger be implemented prior to payroll/human resources; and the expiration of maintenance on the UNC mainframe in spring 2007.

This schedule may ultimately prove to be too aggressive. Better information will be available as we begin negotiations with vendors. One additional timing consideration relates to the potential of a coordinated ERP procurement with other Colorado higher education institutions.

<u>Project Activity</u>	<u>Target Complete Date</u>
<b>Procurement Activities</b>	
- Issue RFP	30 Oct 04
- Proposals due	1 Jan 05
- Evaluation recommendation	1 Feb 05
- Negotiations/presentation complete	15 Feb 05
- Contract award	1 Mar 05
<b>Implementation Activities</b>	
- Kick-off meeting	1 Mar 05
- General ledger/AP/ procurement	1 Oct 05
- Payroll/basic HR, time tracking	1 Jan 06
- Student information systems	1 Jan 07
o Accounts receivable	
o Financial aid	
o Registration	
o Records	
o Admissions	
- Additional modules (e.g.; self service HR, benefits, budgeting, grants, alumni)	

## Conclusion

We recommend that UNC invest in the implementation of an ERP system. The cost is justified by the strategic value of:

- Increased productivity
- Transformation of core business processes
- Access to essential information for decisions and accountability.

*Michelle Quinn, Assistant Vice President – Finance*

*Tom Gavin, Assistant Vice President – Enrollment Management*

*Gary Hatch, Assistant Vice President – Information Technology*

*Jeanette VanGalder, Director –Administrative Information Technology*