Iowa State University has successfully implemented a new financial management system built around its legacy financial system. The new system incorporates many capabilities needed to meet the challenges of the University’s future. Our challenge was to accomplish this using limited financial resources and in a climate that was geared to gradual rather than radical re-engineering of established business processes. Cost considerations and concerns about the value of purchased package solutions led ISU to undertake a strategy of building on successful, highly integrated, in-house developed systems. The new Financial Management System (FMS) incorporates 7 key features: dynamically linked databases, multiple-year data availability, management-oriented data views, access to information that crosses applications and databases, aides to help locate information, GUI-like navigation, and year 2000 compliance. Future enhancements will be released at 6-month intervals. Critical elements to making this a successful approach were ISU’s 10-year-old commitment to converting major administrative applications to a common relational database platform (DB2), a clear understanding of the increased functional capabilities that were desired, and technical solutions that allowed traditional CICS application screens to use a windows-like navigational approach. As a result of implementing the FMS, at least one major academic department has canceled plans to purchase a computerized, shadow accounting system. The success of this effort demonstrates that well-managed legacy applications can be cost-effectively improved to meet the needs of the future.
Our History: The Past as Platform for the Future

Iowa State University (ISU) implemented its first on-line accounting system, known as the Account Status System, in 1982. The system was a key-sequenced, VSAM-based application that provided sub-second, on-line, terminal access to account balances and two months of transaction detail. The information was updated via a batch process three nights a week. Compared to the batch processing, paper-oriented system it replaced, we felt like we had moved into a whole new world of information and technical sophistication. The system worked well and met the needs of the centralized decision-making environment that prevailed at that time.

In the 1990’s, a number of factors caused us to question our system’s ability to meet the University’s changing financial information needs. The University adopted “block budgeting” which decentralized the financial decision-making processes and switched the focus from financial reporting to financial management. Technology changed rapidly and desktop computing became the “new tool” for financial managers. More data and convenient access became new requirements. Budgets tightened and demands for efficiencies and uniformity increased. The system which had performed so well and seemed so advanced had reached the point where it simply no longer met the University’s financial information needs.

Our Search: To Purchase or Not to Purchase

Our initial efforts to address these needs focused on searching for a purchased software solution. Responding to a state mandate that all three state universities adopt a common budgeting and reporting capability, Iowa State University, the University of Iowa and the University of Northern Iowa submitted budget requests to support the acquisition and installation of a purchased financial management software package. Parallel efforts were undertaken on each campus to assess requirements and seek an appropriate systems vendor. The hope was that a common vendor would emerge from this effort.

In our judgment, a purchased software solution needed to substantially exceed the functionality of our existing system, have a proven track record in institutions similar to Iowa State University, and be well-supported in terms of adaptability to future needs. ISU completed the traditional requirements study and drafted a Request For Proposal (RFP) with the hope that such a system could be identified. The RFP was never issued. ISU staff observed packages in operation at several universities and reviewed responses to the RFP which was issued by the University of Iowa. It became clear that the available packages did not fully address ISU’s requirements. Combined with financial constraints imposed by state funding reductions, ISU decided that the best solution would be to evolve our existing, in-house system to higher levels of performance rather than invest significant money and manpower to acquire and install packaged software. Abandoning the software acquisition effort felt risky in an environment of rapid technological change. However, this financial constraint drove us to look for less costly and more creative solutions to meet our needs and satisfy the demands of our customers.
Our Choice: Build on Our Existing Strengths

Our decision to build on our in-house system forced us to look critically at the strengths and weaknesses of the existing account status system.

In addition to widely available on-line access, a satisfactory chart of accounts, and a project accounting system that could be adapted to the needs of individual departments, the most significant strength of our existing system was the level of control we maintained to make changes as our needs changed. We believed that the ISU community preferred a gradual approach to improving business processes as opposed to wholesale re-engineering. Because the ISU system had been developed in-house under a controlled systems development protocol, the system could be modified by in-house personnel as new needs and opportunities were identified. This permitted many small advances in business processes rather than one cataclysmic leap into new systems and procedures. Since the ISU accounting system functioned as the core of an otherwise decentralized accounting environment, the ability to maintain reliable interfaces with other accounting systems on campus was especially important. We had identified over 1,000 subprograms that would need to be modified if we changed accounting systems. In our current approach, the impact on program interfaces is limited and manageable.

Our requirements study identified significant weaknesses as well. The ever-broadening access to the accounting systems resulted in user needs that were nonexistent when the system was originally designed. These included a desire to view historical information, to tie detail transactions to the on-line accounting summaries, and to generate user-defined reports to satisfy departmental management information needs.

The NACUBO/CAUSE-sponsored conference, “Financial Information Systems: Critical Success Factors,” in February, 1996, was an important catalyst to our thinking as we struggled to find solutions to our accounting systems needs. Figure 1 illustrates the key connections made as a result of the NACUBO/CAUSE advice.

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Recognizing that both technology and user expectations would drive future enhancements to the accounting system, we proceeded to define a set of essential enhancements to existing capabilities and new capabilities which would need to be developed. These included:

- Easier and more widely available access to more data
- Information or data presented in ways that compliment our current business processes and organizational structures
- Navigation and functionality that are consistent with the typical workstation graphical desktop (Windows and MAC)
- Ability to quickly respond to our own changing information needs as well as new technologies adopted by our campus
- Acceptable costs of maintaining data
- User-defined reporting capabilities including data selection and downloads
- Ability to satisfy the state mandate for common budgeting and reporting formats

**Our Solutions: Not One but Many**

Unlike purchased packages that promise a single solution to many problems, our approach required multiple solutions. We have been fortunate to identify a variety of methods and technologies that have addressed our needs.

Faced with the state’s common budgeting and reporting mandate and our own growing internal information needs, we carefully examined how we could best address these needs. The State of Iowa’s Department of Revenue and Finance and the three state universities agreed on a common electronic reporting format. The three universities would provide the state with the required information in a common format while simultaneously retaining their individual abilities to make independent decisions about their own financial information systems. Our accountants and analysts were able to easily develop translation tables and programs to take existing data and format it to meet the state’s information needs. Our understanding and experience with our internally developed system allowed ISU to be the first institution to provide the state with the new information.

The first significant step for meeting the needs of the internal campus financial decision makers was made in December, 1993, with the acquisition of a PC client-server, Windows-based product called Hyperion. This product enabled us to build an application which provides quick and easy access to summarized account data. Managers can look at information from various “views,” run reports, build spreadsheets that dynamically interface with the database, and download data at will.

The experience of building and using the Hyperion application provided valuable input to the next step--designing and building the central server(host)-based Financial Management System (FMS) on a DB2 relational database platform. This system rounded out the core group of relational database business applications (i.e., Payroll, Human Resources, Purchasing, Accounts Payable, Accounts Receivable, Bank Reconciliation, etc.). The FMS incorporates seven key features that contribute to its acceptance and usefulness (Table 1).
### Table 1. FMS SEVEN KEY FEATURES

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<thead>
<tr>
<th>Key Features</th>
<th>Goal</th>
<th>Description</th>
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<tbody>
<tr>
<td>1. Dynamically linked databases</td>
<td>Provide immediate access to information</td>
<td>Changes to the data in one or more databases are immediately available when the data is displayed</td>
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<tr>
<td>2. Access to data across applications and databases</td>
<td>Provide the ability to view information about an account or a transaction even though the data itself may be in several databases and/or multiple applications</td>
<td>For example, payment transaction information is retrieved from the accounts payable, bank reconciliation, and purchasing databases as well as the financial management system in a seamless, single point of view</td>
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![FMS Software Diagram](image-url)
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<tr>
<td>3. Management-oriented data displays</td>
<td>Provide views to data in ways that are most helpful to the client</td>
<td>A number of viewing options allow financial managers to access as much data as possible in ways that meet their individual needs</td>
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<tr>
<td>4. Unique approach to navigating through the application</td>
<td>Provide access to information in a CICS environment through the use of a mouse and function keys</td>
<td>Extensive use of the mouse to point/click enabling the user to move from screen to screen as well as “drill down” to greater levels of detail</td>
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<td>5. Use of an on-line HELP system</td>
<td>Provide on-line help and eliminate the need for hard-copy reference manuals</td>
<td>Compliments the mouse and F-keys by providing field and screen level help as well as drop-down menus to select viewing options</td>
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<td>6. Multiple-year data access</td>
<td>Provide summary level information for the last two completed fiscal years as well as the current year and fifteen months of detail transactions</td>
<td>Data can be accessed not only from the university fiscal year point of view but can also be accessed on a calendar year or federal fiscal year basis</td>
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<tr>
<td>7. Year 2000 compliant system</td>
<td>Provide uninterrupted access to information at the turn of the century</td>
<td>Data as well as the software were designed to function in the year 2000 and beyond</td>
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Table 1. FMS SEVEN KEY FEATURES (continued)
Our Implementation Strategies: Copying is the Sincerest Form of Flattery

Four notably effective strategies used in the implementation process were modeled after successful strategies in commercial software approaches. These strategies included: (1) A Beta-site approach to involving end users/clients in the testing of the system prior to implementation; (2) Required training before users were allowed to access the new system, with training activities stratified to accommodate the large numbers of end users to be trained on the new system; (3) A detailed, easily accessed on-line help facility rather than production of a hard copy user manual; and (4) A “new release” approach for adding enhancements and new functionality.

Eight academic and four service departments were chosen to use the Beta version of the new FMS software and to return feedback regarding navigation and presentation in the new system as well as identifying “bugs” in the new software. Excellent suggestions were received and the test users became active participants in designing improvement to the final FMS release. This approach was an essential element contributing to the very positive reception the FMS system received when it was rolled out to the entire campus.

To ensure that users received the necessary training, access to the FMS was restricted to individuals who had attended a training session. Approximately 500 end users needed training. Since resources were limited, a stratified approach was adopted. Each department was asked to identify one person to attend a hands-on training session. These individuals were expected to act as assisters to other users within their department. Co-instructed by Accounting and ADP personnel, 150 people were trained in 13 sessions (session=1.5 hours). The remaining 350 people were trained in 7 large demonstration-type sessions. During the training period of May to June, 1997, the old system and the new FMS ran parallel so that users could use the old system as a “crutch” while they got used to the new system.

Experience with previous systems implementations showed that hard copy, end user documentation was of questionable value. FMS users were provided with a single-page overview and quick reference handout. All other documentation is available through on-line help screens similar to those provided by commercial software vendors.

New releases to the FMS are planned at six-month intervals. One release will coincide with the change of fiscal year and the other will occur in the January-February timeframe. This approach allows us to make visible progress each time a release is put into production. Training similar to the original implementation training is planned to ensure that users are aware of new features.

Our Resources: Making the Most of What We Have

At Iowa State University, administrative data processing is entirely funded by user charges. A continuing problem is that users’ budgets for data processing are generally consumed by operations and maintenance activities, leaving few resources for new systems development. This problem certainly applied to the financial management system. The decision to build rather than buy did not eliminate the need for additional resources. However, the long-term nature of our development strategy made the resource needs modest by comparison to the “buy” option. These resources were obtained through a combination of a new budget allocation and reallocations within the Controller’s Department budget.

A $150,000 increase in budget allocation was requested and received to support meeting the state mandated requirement for standardized reporting. At the same time, the senior management of the Controller’s Department was reorganized to support the creation of a Manager of Financial Accounting Systems position. This position reports to both Administrative Data Processing and to the Controller. The combination of the new funds and the reorganization supported the creation of two new programmer/analyst positions. Earlier reallocations within the Controller’s area had already created a network support position which was instrumental in several aspects of the FMS development. Additional one-time funding totaling approximately $200,000 was received to fund the acquisition of the Hyperion database software and a network server. The implementation and ongoing maintenance of the Hyperion system is supported by the FMS development budget.
No additional hardware or software has been needed and the incremental cost of operating the new FMS system has been manageable. This latter situation may change as future enhancements are added. It is our intention to request additional support for operations, if necessary, to protect the existing FMS systems development budget for future improvements. Such requests for additional funding should be modest and will be justified by the additional functionality which the FMS system provides. By making small infusions of ongoing support, we hope to avoid massive, one-time investments that are difficult to finance in our current operating environment and appear to compete for resources with more pressing academic needs.

Our Future: FMS Version 1.1 and Beyond

The second release of FMS, implemented in early 1998, included the following new features:

- A capability for departments to enter and track “departmental commitments” which are in process but not yet encumbered or recorded in the accounting system. (e.g., orders to internal service departments or a commitment made to a faculty member for travel funds.)
- An ability to access the FMS application using a WEB browser rather than terminal emulation.
- Additional navigational improvements including new drill downs, more extensive use of point and click capabilities, and more extensive help screens.
- Refinements to purchasing and encumbrance information.

We are considering this to be Release 1.1 of our in-house software. Our plan is to introduce new features and enhancements to the application every 6 months. Planned improvements for July, 1998 include linking to detailed payroll information, linking to information in the Sponsored Programs database, and further WEB interfaces.

Our Lessons Learned: All that Glitters Isn’t Necessarily New

One lesson learned is that it is possible to capitalize on the knowledge base and investment in legacy systems. This can be both cost effective and timely especially in an environment where resources are limited. It is also substantially less stressful in an environment where management is not prepared to make drastic changes to business processes. End users become partners in making improvements which prepare the system to cope with future demands. The pace at which improvements are made can be adjusted to the campus climate and resource commitments. Also, the interaction with clients is more successful as they apply the system’s features to their business processes and help us plan for future enhancements.

Another advantage of this approach is that it vastly simplifies and, in some cases, eliminates the need for reworking interfaces with other systems and subsystems. For example, we estimate that no more than 10% of the 1,000 programs that interface with the FMS had to be modified.

Compared to a purchased package solution, some potential negatives of this approach are: (1) it does not provide as much leverage to force process change, (2) it may take more time to incorporate some of the most current technical advances, and (3) in designing enhancements, we do not have easy access to the large, multi-campus creative pool represented by the user groups of package software vendors.

Although we continue to actively monitor systems implementation efforts on other campuses and to assess the adequacy of our systems in meeting the business needs of the campus, we feel that this has been and will continue to be a successful approach for Iowa State University.