

# **Using Electronic Workflows to Reduce Processing Time and Prevent Errors**

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## **Abstract**

*The University of Tennessee has more than 25,000 active employees across the state spanning more than 400 miles from Knoxville to Memphis and Chattanooga to Martin. Given both the volume of business transactions and logistical challenges inherent in the movement of paper forms through the organization, the university decided to utilize the workflow features of the university's ERP software (SAP's R/3). "E-Forms" are ABAP programs that allow users to request business transactions and have them routed for review and approval based on university policies and procedures. Because the system determines the approval path based on attributes of the transaction (such as accounts charged, policy requirements, etc.) no one has to remember or determine the next approval stop to which the transaction should be routed. In addition, because the forms are pre-populated with existing data and subject to stringent edit checks, the quality of information is greatly improved and the average processing time from request to update in the official records is significantly reduced.*

# **Introduction to The University of Tennessee**

**President:** Joseph E. Johnson

**Executive Vice President:** Emerson H. Fly

**Vice President of Administration and Finance:** Sylvia S. Davis

**Vice President and Treasurer:** Charles M. Peccolo

**Associate Treasurer:** Neal Wormsley

The University of Tennessee (UT) is a statewide higher education system that includes the campuses in Knoxville, Chattanooga, Martin, the Health Science Center at Memphis, a research campus in Tullahoma, and the institutes of agriculture and public service, which serve every county in Tennessee. The University of Tennessee is the state's flagship and land grant institution. The university is the oldest and largest public higher education institution in Tennessee, tracing its beginnings to the founding of Blount College in Knoxville in 1794 - two years before Tennessee became a state.

The statewide university system has about 42,000 students and approximately 25,000 employees. By 2010, the institution's goal is to be recognized as a premier, internationally recognized flagship university system. New performance goals for the system include a renewed vision, increased research productivity linked to economic development, a heightened emphasis on accountability and private support, a strengthened commitment to equity and diversity, and enhanced relations with faculty, staff, students, alumni, government officials, and others. Each entity has established new

standards of accountability exemplified by public scorecards that show progress toward important quality indicators.

A board of trustees appointed by the governor of Tennessee governs the university system. A UT student and faculty member serve one-year terms on the board. The positions rotate annually among the institutions within the UT system. Ex-officio members of the board, in addition to the governor, are the commissioners of education and agriculture, the executive director of the Tennessee Higher Education Commission, and the president of the university.

*Source: The Tennessee Blue Book published by the office of the Tennessee Secretary of State <http://www.state.tn.us/sos/bluebook/online/bbonline.htm>*

## **Statement of the Problem/Initiative**

The university processes literally thousands of business transactions every day in the normal course of educating students, supporting research and running our business operations. In 1999, the university began an implementation project (entitled IRIS) of SAP's R/3 ERP software. Since paper forms must *physically* travel between offices that are sometimes miles apart and the quality of the information on those forms can vary greatly, it was determined that the SAP electronic workflow/approval system could be used to improve data quality and information throughput. During this project, the university examined nearly all of its business processes in an attempt to improve and re-engineer them to function with the new software. Since the implementation of a new system is a major cultural change, it seemed like a good opportunity to introduce a new paradigm for approving the "forms" needed to process daily transactions. The university identified several high-volume transactions in both the Financial and Human Resource/Payroll areas and began implementing approval workflows for them.

## Design

Each e-Form has its own approval workflow path with certain “stops” or levels mandated by university fiscal policy. For some forms, business entities have the flexibility to add new levels and choose from the task types of *Approval*, *Review* or *For Your Information (FYI) Notices* at each level. Approval stops are typically those stops that are required by fiscal policy whereas review stops are those that allow other people within a department or college to check the transaction from an accounting perspective. FYI Notices are documents that are emailed to individuals at specified stops within the workflow path informing them of the purpose and content of an e-Form, but do not request or await their response. A user-maintained database table provides a relatively easy and flexible method of altering approval paths and types as necessary.

To establish the approval paths, the university formed an *e-Forms Approval Routing Committee* consisting of representatives from every campus, members of the offices responsible for the data updated by the form, people knowledgeable or keenly interested in the process, along with the technical expertise required to implement the solution. This committee met weekly to determine the necessary approval levels and types of tasks required to accommodate the business practices employed by the various business entities across the state. The focus was to streamline the number of approvals for each process while maintaining those required by university policies. Business entities were encouraged to use FYI Notices whenever possible because they keep people “in the loop” but do not slow the progress of the form toward its final processing destination. Likewise,

the committee determined the sequence in which approvals must be obtained for each form.

Another important group was the *e-Forms Design Committee* which was responsible for designing the layout of the computer screens used to capture the data, identifying the source of the data, and establishing the necessary editing rules to insure the highest level of data quality. Although a lot of progress was made toward eliminating common mistakes made on each form, the workflows were designed with the ability to *Reject*, *Revise*, and *Resubmit* forms that may have passed the business and edit rules, but were still not satisfactory to an approver. It is very important that committees such as these consist of people who are intimately familiar with the business processes and policies impacted by the e-Forms. The university was fortunate to have committee members with ten, twenty, and thirty years experience in the various offices in which the forms are used. Furthermore, the committee included members of the workflow, security, training and programming staffs to comment on the feasibility and associated development cost of proposed design considerations. Not surprisingly, the lion's share of the cost of implementing the e-Forms was in the area of programming and the supporting information technology infrastructure. Also, a significant investment in time was made to prepare training manuals and self-paced training courses. The primary approach was to "train the trainers" on the various campuses and have them conduct the on-site training classes for their staff.

## **Implementation**

When the IRIS (SAP R/3) Implementation Project went live with the Financial Module in April of 2001, the first approval workflows were implemented: Purchase Requisitions, Financial Accounting Transaction posting (e.g. Invoices, Journal Vouchers, Transfer Vouchers), and Vendor Creation Requests. These transactions are very high volume and widely distributed out to the department level across the entire state. However, their approval paths are relatively simple, as most of them require only a single level of approval - the Department Head. Individual departments were given the flexibility of adding an optional Departmental Review level immediately before the Department Head so bookkeepers would have an opportunity to review transactions after they were entered, but before the Department Heads saw them. Some transactions, such as Invoices classified as entertainment and greater than \$300, also require the approval of the respective Campus Business Officer after the Department Head.

The greatest pitfall we experienced during implementation was the learning curve involved in educating departmental users as to how the approver for their department is identified by the system. It was discovered that some cost centers (i.e. accounts) were associated with departments different from those expected by the departmental bookkeeper. Sometimes these issues resulted from errors in data conversion classification and others were due to simple misunderstandings. Most of these situations were easily and quickly corrected shortly after the initial shock of the transaction being “misrouted” to the wrong or an unexpected approver. The project team distributed spreadsheets with lists of funds centers (i.e. department codes) and requested that each campus identify the

appropriate approver(s) for each one. This effort had a varying degree of success based on the level of understanding that the particular campus had of their organization within the new financial system. Some campuses understood the new system better than others and their initial approval routing was more accurate as a result.

In January of 2002, the university went live with the Human Resources (HR) and Payroll modules of R/3. The initial workflows needed to support the HR/Payroll module (e.g. Employee Time Approval and Effort Certification Approval) were implemented at the same time and marked the first steps toward reducing the number of paper forms in the HR module. In October of 2002, the university began a pilot project to determine the best approach to implementing electronic forms. This project entailed developing the Employee Termination e-Form both as a web-based form and as an ABAP (online R/3) transaction. After successfully developing the Termination e-Form using both platforms, it was determined that the ABAP transaction was the more compatible approach for our technical and user interface requirements. The university released the Employee Termination e-Form in February of 2003, followed by Pay and Funding Changes in June, Additional Pay Changes in July, Recurring Pay Changes in September, and finally Position Create/Change e-Forms in October. With each new form, the associated workflow techniques, edits, and design methodology for development and programming were improved to better meet the user and university policy requirements. Also, because previous forms could be used as reference points, the level of communication among the committee members improved and allowed the project team to move at a swifter pace on latter forms.

## Benefits

The electronic workflow/approval system has resulted in both improved data quality due to the pre-population of e-Forms and the number of edits and business rules checked before the transaction can be submitted and in reduced elapsed processing time for the e-Form to travel between the necessary approval stops. The e-Forms are very popular among the user community because they are easy to use and provide guidance in the form of value lists, help text, and warnings. The development team also took time to include time-saving features such as the ability to create a new form by copying an old one and changing it, and the capability to easily correct and resubmit rejected forms; instead of starting from scratch. A form (i.e. screen) pre-populated with data where one can simply overwrite the necessary values is much less intimidating than a blank paper form or screen. Because the e-Form programs have been written with a consistent interface and employ similar navigational techniques, users quickly adapt to new forms as they are released. Since the approval path is determined by the system based on the attributes of the transaction, pre-determined policies and campus-level choices, no one has to worry about where to send a particular form next or which signatures must be obtained. In addition, the system provides the ability for an approver/reviewer to name other users as *Substitutes* on a permanent or as needed basis. This feature reduces the frequency of bottlenecks due to absences. Whereas a paper form might have lodged on a vacationing Department Head's desk for a week or more, a predetermined colleague can process an e-Form in a much timelier fashion.

The development team has written a report where one can easily determine in whose Inbox an e-Form currently resides and for how long it has been there. In fact, a complete history of who has done what and when is available to provide a full audit trail. There is also a daily reminder process that checks the Inboxes of all approvers and notifies them via email if they have documents awaiting their approval. This feature prevents occasional users from having to remember to check their Inboxes on a regular basis.

Since implementing these e-Forms the university has seen the average processing time decrease in best-case scenarios from a matter of days to hours. During August of 2003, the statewide average processing time for sampled Employee Termination e-Forms from origin through all approval stops and entry into the system was 2 days, 1 hour, and 14 minutes. Many forms were completely processed in a day or less with three being done in just over 6 hours! Pay and Funding Change e-Forms averaged 1 day, 22 hours, and 11 minutes statewide. Unless paper forms were hand-carried or otherwise expedited, they were rarely done nearly as quickly and with the degree of accuracy as we now enjoy.

## **Retrospect**

In hindsight, the university project team might have prevented some initial confusion had it conducted a training session on how to determine the classification and therefore responsible approver for a particular department. The university's new financial system changed business practices, terminology, and a number of policies and procedures. At the same time, a new set of concepts (e.g. Cost Centers and WBS Elements replaced E-accounts and R-accounts, Funds Centers replaced Department Codes, etc.) and associated

coding schemes were introduced. Some departments understood the new terminology and accounting structure better than others and some departments are inherently more complex than others. The project team could have spent more time educating people as to how to make the new system work best for their area. However, more staff would have been needed to prepare and conduct this additional training. As with most projects, resources and deadlines dictate much of what can be accomplished and the sequence in which things are done. As it turned out, most people learned “on the job” and quickly became familiar with the new concepts and adapted their approval routes accordingly.