

# Issues of ERP Upgrade in Public Sectors: A Case Study

Tanja Scheckenbach<sup>1</sup>, Fan Zhao<sup>2</sup>, Erik Allard<sup>2</sup>, Jermaine Burke<sup>2</sup>, Kevin Chiwaki<sup>2</sup>,  
and Sean Marlow<sup>2</sup>

<sup>1</sup> College of Business, Wuerzburg University  
tscheckenbach@wiinf.uni-wuerzburg.de  
<sup>2</sup> College of Business, Florida Gulf Coast University  
fzhao@fgcu.edu

**Abstract.** As more organizations seek to upgrade their ERP systems to take advantage of continuing technological innovations, effective technology implementations are increasingly important. This study tried to provide a deeper understanding of ERP upgrade in public sectors industry. Three issues were found in the study: problems left from ERP implementation, choice between customization and fully adoption, and organizational culture related issues. Lessons and implications were discussed.

**Keywords:** ERP Upgrade, Public Sectors, Case Study.

## 1 Introduction

ERP systems are commercial software packages that attempt to integrate all departments, functions, and business processes in an organization into a single computer system/application. The reasons that companies implement an ERP system vary, but overall, most companies state that they implement an ERP system for seamless flow of company information, to improve and streamline business processes, and to increase cost savings.

ERP upgrades are mainly intended to take advantages of new technologies and business strategies to ensure that the organization keeps up with the latest business development trends. Therefore, the decision to upgrade ERP is usually not driven by code deterioration or anticipated reduction in maintenance costs alone, but by different purposes. According to an AMR research [1], 55% of upgrades were voluntary business improvements triggered by the need for new functionality, expansion or consolidation of systems; 24% of upgrades were triggered by technology stack changes; 15% of upgrades were forced by de-support of the running version of software to avoid vendor support termination [2]; and 6% of upgrades were triggered by bug fixes or statutory changes. The cost of ERP upgrades is high [3]. Swanton [1] mentioned that the costs of each upgrade include: 50% of the original software license fee and 20% of the original implementation cost per user, which means over 6 million dollars for a 5,000-user system. Typically, each ERP upgrade requires eight to nine months of effort with a team the equivalent of one full-time employee per 35 business users. The ERP-adopting organization does not have to develop and re-write the ERP system itself but rather it replaces (or upgrades) the old version with a readily

available new version from the ERP vendor. However, a lack of experience may cause the costs and length of the upgrade project to approach or even exceed those of the original ERP implementation effort. Collins [4] listed some general benefits for organizations from ERP upgrades:

- **Eligibility for Help Desk Support:** Most of ERP software vendors stop providing technical support 12 to 18 months after the next version becomes available. Therefore, keeping upgrade with the pace of ERP vendors will guarantee the support for the system from the vendors.
- **Solutions for Outstanding “Bugs” or Design Weaknesses:** It is impossible to guarantee spotless and error-free ERP systems after the implementations even though vendors will conduct many different testing processes to eliminate the happenings of errors in the system before the leasing time. “The majority of software bugs are resolved and delivered either fix-by-fix, or all-at-once as part of the next release version of the ERP package”. In this case, upgrades will be beneficial to the organizations in problem solving.
- **New, Expanded, or Improved Features:** ERP software provides organizations the knowledge and strength (i.e. best practices) from the vendors. ERP upgrades provide organizations future enhancement from the vendors to give the organizations better opportunities to catch up the current business development, improve their processes and build more efficient business models with new functions, new features and new processing styles provided in the upgraded ERP versions.

Regarding the research of ERP, more lessons were learned on optimizing ERP implementations after more and more companies completed their initial ERP implementation. For years, ERP acceptance models, such as TAM [5], DoI [6], attract many researchers. Recently, researchers began to notice the importance of post-implementation studies [7]. ERP maintenance and upgrade are two major activities in ERP post-implementation. However, only a few studies were found in ERP upgrade and there is no empirical or case study focused on ERP upgrade in public sectors. Therefore, this paper focus on a public sector case to study the issues of ERP upgrade in a certain industry.

## 2 Literature Review

System upgrades occur in the post-implementation stage after the initial ERP implementations. Similar to ERP implementations, an ERP upgrade is deceptively complicated and could be a disaster to those organizations ignoring the massive efforts required by the project [8]. Ng et al. [9] demonstrated a software upgrade stage model for ERP upgrade (see Table 1 for details). By following this upgrade stage model, some benefits are obtained by the organization. Stage 1 minimizes upgrade risk by identifying risks at an early stage. Stage 3 allows the organization to justify all the benefits and costs of an upgrade to ensure a successful activity. Stages 6 to 11 are recommended by consultants and practitioners for best practices in ERP upgrade process. Visibility and facilitating management and control are also provided by this upgrade stage model.

**Table 1.** Upgrade stage model by Ng et al. [9]

Stage Number	Upgrade Stages	Description
1	Design an upgrade project methodology	Identify the best method to apply ERP upgrade and tailor it for internal use and gather the information about tools and services available from the vendor to the customer
2	Research for upgrade options available	Analyze different upgrade options available; analyze pros and cons, and the stability of each option; and identify the support window for the versions to ensure the chosen upgrade version is the optimal solution based on the organization's business objectives
3	Develop a business case	Identify the factors influencing the upgrade decision by developing a business case, such as planning for the upgrade data, evaluating costs for the upgrade, developing a plan for budget allocations, evaluating the benefits of the upgrade, and evaluating the personal requirements
4	Make full assessment of modifications in the current version and technical environment	Analyze current system from both management and technical perspectives to investigate the number of modifications on the existing system and identify which modifications are still required and which are not
5	Make full assessment of the new functionality, and technical requirements in each (potential) upgrade option	Analyze each upgrade option from both management and technical perspectives to assess the new features/functionality in each option for each ERP module of interest and the technical requirement in each option to evaluate benefits of the functionality to the organization
6	Conduct impact analysis between the new upgrade version and the existing version	Gap analysis of current system and new upgrade version to examine the impacts of the new version on the organization and minimize future maintenance cost and ensure that requirements for the project are identified so that budget, time, and staff allocations can be made accordingly
7	Install the new version onto the development system	Apply all the previous patches onto the new ERP system to ensure that the new version is up-to-date by incorporating all the earlier bug fixes and enhancements
8	Construct the new system	All previous development (reporting capability, interfaces, and modification) overwritten during the new version upgrade will be re-developed or re-applied on the new system to ensure that all competitive business processes remain in the new

**Table 1.** (Continued.)

9	Conduct a thorough testing of the upgrade system	Verify accuracy of the system functionality and data conversion to ensure that the new system still meets the user requirements and is aligned to the business objectives
10	Carry out the trial upgrades	Conduct the trial upgrades to exercise the upgrade process and identify errors or potential problems that would happen during the actual upgrade
11	Conversion (or go live)	Deliver the well-tested system into the production system

The decision to upgrade an ERP system is usually influenced by both internal and external factors [8-10]. Upgrades should be coincided with business needs and expansion, such as greater ROI, expanded system capabilities, integration of new modules, and so on. However, sometimes, companies are “forced” into upgrading their system by their vendors. ERP vendors encourage their clients to upgrade their systems to newer versions or business suites. They do this by setting “de-support dates” – this means that at a certain date, the ERP vendor will stop support on old versions of their systems. This forces organizations to make the decision to either risk the responsibility for maintenance of their ERP system or to upgrade the system [8-10].

Wenrich [10] suggests that treating system upgrades as a new system implementation is a critical factor for post-implementation success. The same processes that were used for the system implementation must be used for the system upgrade, although importance will be varied [8]. Companies may underestimate the importance of some critical success factors during a system upgrade. This could easily cause a failure upgrade project. Therefore, a successful ERP implementation does not mean a successful upgrade later. To further understand the issues of ERP upgrade, in this study, we focus on an ERP upgrade of a local school district.

Many school districts have moved from standalone system applications to fully integrated ERP systems with one central database. School districts face a unique challenge of being in a niche market due to the fact that most legacy systems need to have enough customization in place in order to carry out the various tasks they face on a daily basis. Most notably school districts with a well-defined project plan, a well-informed project team, and a culture that understands the benefits and risks associated with the implementation of a new ERP system, have achieved success within their school district at getting an ERP system up and running in a timely matter and close to their projected budget. Though many small and medium-sized school districts have reported price savings and an improvement to their budget, other school districts have experienced difficulties in failing to implement a new ERP system due to budget constraints and organizational and corporate culture issues experienced in their school district. This paper describes a case study for a school district who are facing too many challenges in order to upgrade a working ERP system. Lessons such as having a well-defined project plan, a qualified project team, proper data testing, and an organization and corporate culture who understands the risks and benefits associated with

ERP projects are discussed in order for other school districts to discover the benefits of upgrading their ERP systems all while helping them to avoid issues that may be experienced during their implementations.

### 3 Case Description

Collier County Public Schools (CCPS) is a preK-12 educational institution serving Collier County Florida. CCPS administrates 48 schools with an enrollment of approximately 45,000 students. CCPS administration depends on ERP software to manage their rather large organization and a relatively small IT department in proportion to the size served to get the job done. This division is known as the Division of Administrator Technology, and the head is the coordinator of software selection.

CCPS is a government entity that falls under the local county government category. It is a sub entity of the state government and the Florida Department of Education. Any ERP system the district would want to implement or has implemented not only must follow the strict standards and needs of CCPS but also the laws of Collier County, Florida. These laws include record keeping, privacy laws, protecting students, budget constraints, and the disposal of discharged hardware. The ERP system has to follow several laws pertaining to how data is handled, and must also do it at a level where the rules/laws are well integrated into the system at a near unnoticeable status. Though these laws are implemented for the protection the students and staff, they have added an extra hurdle in selecting and customizing software. For example, it adds difficulty in the selection process of new software, as well as maintaining the system and adding additional code. The supervisors of CCPS are the superintendent and five board members, who were elected into office. Board members serve five-year terms that are staggered so that there is some continuity in the board's voice but also a sense of progressiveness due to constant change of each seat. The district is home to 29 elementary schools, 10 middle schools, 8 high schools, and one PreK-thru-12 school. CCPS spans a large and diverse population necessitating a strong and effective ERP system to efficiently govern the student-body and other enterprise administrative tasks commonly found in ERP systems.

Currently, the district is using an older version of EDR platform on IBM AS400 mainframe system where the system is housed. The system was upgraded to its current form during the Y2K upgrade phase to become Y2K compliant. EDR software was specifically developed for education industry and further specialized in Florida law pertaining to education and record keeping.

The Division of Administrator Technology acts as a development team when lack of resources call for it. Since the 2007 economic recession, most government entities have had to scale back their budgets due to overall budget cuts, and the CCPS district is no exception. The budget cuts have deterred the district from truly upgrading their software and instead the team is faced with the task of developing their own "bolt-on" software, which has been described to have the "look-and-feel" of the overall ERP system. The ERP and mainframe server run on a COBOL based language, making the daunting task of in-house development even more impressive. One prime example is the food-service section of the ERP system. The current version of SR4 did not support foodservice in their software. The Division of Administrator Technology

developed their own code for handling this side of the ERP. It was then “attached” to the ERP so that it was accessible from EDR ERP.

CCPS does have a decent recovery plan to back up data in the event of an emergency. In this aspect, the biggest threat to Collier County is hurricanes, and so out-of-area backup is necessary to make recovery realistically possible. Currently, all data is backed up at a site in Miami, FL. The data is replicated using the hot-backup method. The data can then be recovered and accessed in neighboring Lee County, which uses the same mainframe system but a different ERP. Alternatively, the data can also be recovered at a site in Jacksonville, FL. The Jacksonville site is useful if a region-wide emergency occurs, which would affect neighboring Lee County too.

ERP systems used in education industry differ slightly from a traditional ERP. The overall system is familiar including components such as HR, food service revenue, payroll, and accounting. There is also, however, the education side, which contains student’s records, scheduling forms, and discipline issues. The student section is the main focus of an education based ERP, and helps integrate data across the many schools of Collier County. The student records section particularly is of interest because it is accessed by many end-users. This section is not accessed directly through ERP but a web-based application that acts as a user interface and bridges the two together. For all intents and purposes, it can be described as middleware.

The Division of Administrator Technology appears to be in the midst of a wind of change, at least from an outsider’s perspective. They currently do not have successor plans for any of their key positions, and so positions are not filled when personnel move-on. Instead, positions are consolidated and the duties are simply passed around to the staff left behind. Another indication of a change is that all personnel are older and very close to retirement, about a decade or less. As technology has matured, specifically ERP, the need for a full IT staff such as the one CCPS house may no longer be necessary and this is a division being phased out or at least moving in a very different direction. Additionally, with the emergence of cloud computing and its many variations, the outsourcing of an ERP system (at least to the extent of having a full-blown division/department dedicated to it) may be a thing of the past. Of course, this is speculation from the point of the researchers and might merely be the effects of government budget cut especially in a state that is not famous for its Department of Education.

## 4 Case Analysis

In this case study, the manager and staffs in The Division of Administrator Technology were interviewed with a semi-structure interview format to explore key issues of ERP upgrade. Some documents related to ERP upgrade were also reviewed to complement the findings from the interviews to finalize the discussion and conclusions.

For our case study, we focused on key issues in three main areas: the need for short of special IT staff and proper planning, the customization aspect of software, and organizational and corporate culture. The first key issue referred to the implementation phase. While the initial implementation was ten years, the team members working on upgrading their legacy system were only part-time members. The second issue was customization of the current ERP. It is likely that problems will arise during the

implementation phase of upgrading the current legacy ERP systems to newer ERP systems. The final issues we focused on are organizational and corporate culture. This includes the level of comfort users feel with the system, and how news including new ERP systems, upgrades, and other important announcements are made aware to the employees of the organization.

## 5 Case Discussion

When the Collier County School District faces to the ERP upgrade request, there were several issues seen throughout the case. The first problem that was made aware to us was that the staff members working on the project were part-time. Bingi et al. [11] argues that "companies intending to implement an ERP system must be willing to dedicate some of their best employees to the project for a successful implementation." Schiff [12] agrees with this assessment and states "many organizations focus on getting executive approval, instead of gathering key participants from across the organization, from finance, operations, manufacturing, purchasing, and the warehouse, in addition to IT."

The problem with the Collier County School District's implementation team was the fact that they were only part-time members. Since the project members were part-time, no one was dedicated to the project. Ultimately choosing the right team will help the ERP project by having key team members involved throughout the implementation process and avoiding any unnecessary delays since everyone involved will have a common interest, and help to curtail any additional implementation costs. Another issue that occurs under poor planning is not having a solid project plan in place to help throughout the ERP implementation. The Collier County School District failed to have a strong project plan in place which leads to them not having any hard deadlines. This resulted in them taking ten years to complete the implementation of the ERP system, which became a legacy system right after the implementation was completed.

Second key issue that Collier County School District faced relates to the customization aspect of the ERP system. According to Kimberling [13], the two main disadvantages of ERP customization are "upgrades become more complex, costly, and risky, and customization may be a symptom of organizational change management issues." As the organization continues to perform more customization on ERP system, the costs associated with the customization will continue to increase. Aldrich [14] argues that although customization can be costly and time-consuming, it can bring a great deal of benefit to a company. One thing that the Collier County School District did was cater to the users in the individual departments. The manager of the Division of Administrator Technology introduced that users in the Collier County School District would want little features added here and there to make their jobs easier. Eventually more people called the IT department up to request features. During the ten-year's implementation, Collier County School District developed many customized functions and features in EDR ERP systems. Overall, this is a disadvantage for a school district during the upgrade. The disadvantages of the influx of requested changes may have outweighed the potential benefits of customization. Aldrich [14] argues that "if an organization customizes software in order to cater to the comfort of

employees, the organization may end up ignoring inefficient business processes that need reengineering." In order to correct this mentality at the school district, the school district should have evaluated their business processes in order to see which processes actually required additional customization. This reevaluation could potentially save the organization time and money during the ERP upgrade.

The last key issues that we found through the interviews are organizational and corporate culture mentalities in the Collier County School District. According to Kappos [15], an organizations culture "can be defined by a number of constructs, such as symbols, language, ideology, beliefs, rituals, and myths that affect an individual's behavior." Organizational culture refers to patterns of behavior in organizations. It is a wider and deeper concept than corporate culture. Corporate culture, on the other hand, refers to beliefs and behaviors that determine how a company's employees and management interact and handle outside business transactions. Generally a corporate culture is implied and develops organically over time from the cumulative traits of the people the company hires.

In the case of the Collier County School District, this may be due to the fact that staff and management are set in their ways regarding how they perform their daily tasks. Kappos [15] argues that the organization's culture change is influenced by the organization's ability to assimilate to the ERP by allowing a sufficient amount of time to pass in order for members to get used to the changes. In other words, while users get set in their ways for the daily tasks they perform at work, they will need to adapt to the changing conditions in the workplace. This includes their daily routine, training on new software they will have to use to perform their tasks, and any new employees or superiors that will join the organization.

According to Cook [16], changing organizational culture isn't as simple as issuing a memo or calling a meeting. Corporate culture takes steady effort directing and making people realize that things are changing. Change management in the ERP context can be thought of as involving all human, social-related and cultural change techniques needed by management to ease the transition to and minimize organizational resistance of the new ERP environment [17]. ERP projects bring a massive change in an organization's structure and affect the way people work and interact. Therefore the introduction of ERP systems can cause resistance, confusion, redundancies, and errors. It is estimated that half of ERP projects fail to achieve expected benefits because organizations significantly underestimate the efforts involved in change management [18]. To overcome the corporate culture change, organizations need to make sure the employees are aware of the new ERP system by making them feel welcome in the new ERP system. This is vital to the newly released ERP system so the adoption rate in the company is high. Since most of the IT staffs are close to retirement and most of the users in EDR ERP systems used the current system for years, it will be hard for them to accept a new ERP system. This could be a vital issue even the upgrade project is successful. In this case, integrating proper management support, information, communication and training should be a good way to smooth the change derived from an ERP upgrade project. In addition, Norris et al. [19] argued that leadership, communication, training, planning and incentive systems can be tools to help organizations manage the change.



## 6 Conclusions

As more organizations seek to upgrade their ERP systems to take advantage of continuing technological innovations, effective technology implementations are increasingly important. This study tried to provide a deeper understanding of ERP upgrade in public sectors industry.

We have examined the school district CCPS, and found several issues in their current ERP system and concerns for their upcoming ERP upgrade. District administration's view of IT, like many companies, is as an expense and not as the key asset in ensuring the functionality of the organization as a whole. CCPS must take their next ERP upgrade project more seriously and tackle it head on. They must use a dedicated staff for implementation and not treat it as mini side projects. If they don't they are guaranteed to end up with another out of date system by the time they finish implementation.

Additionally, CCPS needs to decide what their IT department's role will be in the future. Will they still house and maintain their own mini-development team, or will they downsize to a simple IT department that maintains workstations? If this is the case, outsourcing is the best option but has consequences. If not, they need to dedicate more resources. ERP technology has matured enough to be treated with more importance. Only when they figure this out CCPS will be able to move ahead completely and successfully.

After carefully analyzing the data and all of the problems experienced in the Collier County School District, we have come to the conclusion that the school district failed to have a strong project plan in place throughout their implementation. Not having a well-defined project plan in place caused them to experience the issues that we have discussed. For public sectors, they need to clearly outline all of the goals and objectives they need from an ERP upgrade. This includes having team members that are dedicated to the project. In the past they had part-time members working on the team. This will no longer be the case. They need to think of the project as a vital part of their organization instead of the traditional view of an extensive and time consuming endeavor. They should also make sure the project plan has objectives for assessing their current ERP system. This will enable the school district to see what areas meet their requirements and what areas need improvement.

Another important view that the school district needs to understand is the time aspect of the project. This should be made aware to all members of the team, upper management, and finally to the end users. They need to work on their mentality of being able to perform changes to the software at will in the future. Their new ERP application may not be as conducive to this way of thinking and they must adapt to this going forward. This may be able to be accomplished by spending additional time to carefully select the correct ERP application. This can be accomplished by considering multiple vendors and even have the vendor demo the product to the school district. If the district needs to hire outside consultants in order to help them improve their change management mindset, then they must outline these objectives in their project plan in order to accomplish the goals. Once they have a well-defined project plan in place, and an overall different perspective in the school district, they should be able to achieve great success in upcoming ERP upgrade.

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