# Communications of the Association for Information Systems

4-12-2002

# The Perils of Ignoring "Systems 101": Recovering from Mishaps at Two Small Companies

Miguel Garcia
*Worldcom*

Joseph Gelbard
*Westwood One Radio*

Brooke Huston
*Great Place to Work Institute*

Rochelle Jackson
*SBC Communications*

Wendy Kuefer
*American Arbitration Association*

**See next page for additional authors**

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**Authors**

Miguel Garcia, Joseph Gelbard, Brooke Huston, Rochelle Jackson, Wendy Kuefer, Gwyn Lauber, Holming Lee, Margaret Miller, Bill Xie, and Steven Alter

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**Miguel Garcia**
**Joseph Gelbard**
**Brooke Huston**
**Rochelle Jackson**
**Wendy Kuefer**
**Gwyn Lauber**
**Holming Lee**
**Margaret Miller**
**Bill Xie**
**Steven Alter**
*School of Business and Management*
*University of San Francisco*
alter@usfca.edu

## ABSTRACT

This article combines two real world cases involving expensive, but highly unsuccessful IT initiatives in small companies. One initiative used commercial software package; the other used custom-built software. Both cases illustrate common mishaps that occur in smaller companies whose employees and management have not paid much attention to the challenges of building systems in organizations. Both cases leave the reader with questions about what should be done next. Students using these cases benefit in the following ways:

Each of these brief cases provides enough details to see how project and life cycle principles really do matter, and how lack of attention to these principles frequently leads to disaster. Students comparing the two cases can identify for themselves a set of project principles that might have led to better outcomes.

Each case provides a possibility of asking students to deal with a series of questions that any business professional must deal with in defining an IT initiative and deciding whether it has a high probability of success.  These questions include:

- What problem does the IT initiative address?
- What work system has this problem?
- Exactly what information will the information system create or use?
- What is the relationship between the information system and the work system it supports?
- How would success be measured?

Each case also provides an opportunity to look at prior student recommendations and question whether they are justified by the facts or whether other recommendations might be better.

**KEYWORDS:** system life cycle, system development case study, IT investment, system failure, system implementation, system development in small firms

## I. FOREWORD

This article combines and revises two brief real world cases produced by students in the Professional MBA program at the University of San Francisco. Both cases involve expensive, but highly unsuccessful IT initiatives in small companies. One initiative used a commercial software package; the other used custom-built software. Both cases illustrate common mishaps that occur in smaller companies whose employees and management have not paid much attention to the challenges of building systems in organizations. Both cases leave the reader with questions about what should be done next. A four-phase life cycle model summarized in the Appendix can be used to help understand some of the problems that occurred.

These relatively brief cases can be used individually or in combination in conjunction with introductory course material related to building and implementing information systems in organizations. The cases were originally written in December, 2001 based on interviews, software demonstrations, and documentation related to IT initiatives in two unrelated small companies. The real companies encountered the system-related problems presented here, but they are not named UpNow and Websters4, and contrary to the descriptions in the cases, their lines of business are not directly related to the use of the Internet.

## II. UPNOW SOFTWARE, INC.: ACQUIRING AND IMPLEMENTING CUSTOMER RELATIONSHIP MANAGEMENT SOFTWARE

UpNow Software, Inc. is a privately held company founded in 1996 to sell an innovative type of integrated software for building, operating, and monitoring e-commerce Web sites. Instead of focusing on the software UpNow sells, this case focuses on activities in its sales department. When UpNow started selling its products in 1997 the sales force consisted of the CEO and two Vice Presidents. As its potential sales opportunities began to grow UpNow began to hire a professional sales force. By the summer of 2000 UpNow had a direct sales force that consisted of three Regional Vice Presidents, 20 sales representatives and three account development representatives.

### GETTING STARTED

Despite employing 20 sales representatives, in the summer of 2000, UpNow used surprisingly informal methods to track sales opportunities, forecast sales, document relevant information about clients, and monitor the progress of sales cycles. The account development team's primary responsibilities were prospecting for new sales opportunities and qualifying new leads. When they qualified a lead, they would pass the information via e-mail to the designated sales representative, who would continue to work with the prospect. The sales representatives kept track of their own sales cycles. Once a quarter they entered data manually into spreadsheets used to submit forecasted sales revenue and estimate dates for closing sales. Their sales managers used this information plus conversations and email messages to monitor the status and recent progress of potential sales and to produce estimates of total quarterly sales for all sales people they managed.

This manual method seemed adequate when UpNow was small. Because there were relatively few clients, most potential sales were discussed frequently by sales people and their managers. As the company grew, it became clear that this process no longer worked. Sales management needed visibility into the sales pipeline to forecast company revenues more accurately and to determine which prospects had the highest priority and deserved an extra push or additional resources. Furthermore, because details on leads and prospects were documented only in a salesperson's personal files, the departure of a sales or account development

representative meant that knowledge and sales opportunities were simply lost.  The sales force as a whole needed to be able to share knowledge and information on accounts to minimize repetitive effort and enable them quickly to identify customer needs and respond to opportunities.

UpNow's management concluded that addressing these problems required a system that would enable the sales representatives to consolidate prospective customer information in a database and make it available to everyone who needed access to the information. In addition, management wanted a system that formalized the tracking of leads throughout the sales cycle and provided the ability to create accurate forecasts of future business.

Instead of creating the required software, UpNow's management decided to purchase a software package. It selected SellingWeb Software, which sold a web-based software product named SellingWeb.

## IMPLEMENTING THE SYSTEM

Although some customization of SellingWeb was required before it could be implemented in the organization, no user input was gathered to guide the initial customization of the product.

SellingWeb was rolled out to the sales force in August 2000 shortly after it was selected. Although the sales force received only a brief introduction and a short training session on how to use SellingWeb, they were instructed to begin using the tool immediately.

Joseph Harkins, a member of the IS support staff at UpNow was assigned to be the SellingWeb administrator after the initial roll out of the software, but was not involved from the beginning of the project. Harkins did not know the SellingWeb product very well and was unfamiliar with the business processes within the sales department.

After the software was rolled out, the sales team found the tool to be cumbersome and believed it did not perform as well as management promised it would or as well as they wanted it to perform. As a result, they did not use SellingWeb and went back to the old system of tracking information manually on spreadsheets. The management at UpNow was unhappy with the initial results, obtained feedback from the sales team, and went back to the vendor to request additional changes and customization.

Unfortunately many of the changes in the software that attempted to fix a bug or improve the software's fit to UpNow's sales processes resulted in problems elsewhere. Because no one at UpNow or SellingWeb was responsible for mapping out the changes, a number of the changes seem to have been made without thinking through the consequences in other parts of the system.

Even though UpNow's CEO signed off and supported SellingWeb, the sales management team showed little buy-in or commitment. The Senior VP of sales and his managers did not see the value in using SellingWeb, believed it was extremely difficult to use, and argued that it created extra work for sales people and took them away from creating new business. The sales managers and representatives continued to employ the old system of using spreadsheets to track sales information. Even when executive management threatened to eliminate commissions if the sales organization did not begin to use SellingWeb, the sales managers refused to use SellingWeb and continued to work as they had in the past.

UpNow already spent over $200,000 dollars on a software product that the entire sales team refused to use because it was viewed as a negative change rather than a positive improvement.

In January 2001 executive management at UpNow decided to make a second attempt to fix the problems and roll out SellingWeb to the sales force. At this time, UpNow was in the process of moving all of its computing to Windows 2000 and SellingWeb Software was coming out with a new release. SellingWeb Software agreed to give UpNow a break on the price of additional customization of SellingWeb if UpNow would agree to be a beta site for the new release on Windows 2000.

SellingWeb consultants were brought in to redesign the user interface and to fix the existing problems that made the software difficult to use. This time, user input from the sales team was gathered in an attempt to make SellingWeb fit better with the existing business processes and to make it easier to use. A new administrator from within UpNow replaced Joseph Harkins, the previous internal administrator for SellingWeb. Executive management at UpNow pushed their direct reports from sales management to agree to use the software. SellingWeb was rolled out to the sales force a second time in April 2001.

As the sales team and managers began using SellingWeb, it became apparent that no policies or procedures were in place describing how the software should be used and how information should be entered into the database. As a result, sales people entered information inconsistently and used the same data fields for different purposes. In some instances, the same account was entered up to five times in five different ways in several different places because no formal procedures dictated how accounts should be defined and entered.

As a rotating group of SellingWeb consultants continued fixing bugs and improving the interface, it also became apparent that no one was really in charge of what the consultants were doing. Different consultants worked on the project from week to week, and a change created by one consultant sometimes reversed a previous change by another consultant or caused a bug somewhere else in the software. Soon problems emerged involving lost or missing data whose disappearance no one could explain.

To complicate the situation further, changes and patches in the software went into effect only when they were installed on the PCs the sales force used. Many of the remote sales representatives did not get around to installing the patches on a timely basis. As a result, three or four different versions of the software were soon being used simultaneously and circulating among the sales representatives. This software inconsistency created confusion and further resistance to using the SellingWeb.

These problems continued to undermine the sales team's confidence in SellingWeb. In light of these problems, the Senior VP of Sales continued to use his spreadsheet to track sales volume and to do forecasting. To create the appearance of following the top management mandate, he instructed his assistant to enter the information from his spreadsheet into SellingWeb and run a report so it appeared as though the data was in SellingWeb all along.

By August 2001, UpNow spent another $50,000 and did not have software that was working properly or business processes that actually used the software that was available. UpNow had made some progress but still had a long way to go.

At this time, the CEO of UpNow demanded that the use of spreadsheets to track and forecast sales be eliminated. The sales representatives, managers and VPs started using SellingWeb to track sales and to run reports, but they did so reluctantly. However, some sales managers still tried to work around the use of SellingWeb by not entering an account into SellingWeb until they had worked with it for several months or more. The ability of upper management to see how the sales people were progressing with their accounts was limited.

## RECOMMENDATIONS BY THE STUDENT TEAM

Executive management at UpNow decided that UpNow needed to be more effective in producing reliable sales forecasts and tracking sales throughout the sales cycle. Inadequacies in these areas made it extremely difficult for the company to make plans for the future and to meet its long-term goals. In an attempt to solve these problems, they decided to invest a lot of time and money in a software product that they believed would solve the problem. In some ways they seemed to view SellingWeb as the magic bullet that would automatically resolve all of their problems with sales automation.

Despite spending over $250,000, UpNow is not yet able to accomplish this project's goals because it lacks a formal design and executed the implementation process poorly. To accomplish the project's goals UpNow needs to restart this project a third time. To succeed, it will have to invest much more heavily in implementing the software in the organization and training the entire sales staff about how to use the package and what is expected of them. A substantial implementation effort will be required in order to attain the level of buy-in necessary for a success project.

UpNow should implement the following recommendations:

1. Designate a manager for this project. This person would have two main roles.
   - Project manager and primary point of contact with SellingWeb Software.
   - A change agent who would be the advocate for SellingWeb throughout the organization.

This person would have to be well versed in the business processes affected by SellingWeb and capable of interacting effectively with personnel from SellingWeb Software.

2. UpNow should insist that SellingWeb Software also designate a project manager who would oversee the UpNow project and manage all changes. Many different consultants may do some of the work, but this individual within the software company should be responsible as the vendor's project manager and should track all changes to ensure that no change interferes accidentally with a previous change. We recognize that finding all interferences is a difficult task, but it must be done.

3. UpNow needs to conduct the formal, detailed requirements analysis that should have been performed early in the project. This analysis will help define the problems that UpNow is attempting to solve using SellingWeb. Conducting a formal analysis will help ensure that the next roll out will address UpNow's real requirements. This analysis should include input from users, sales management, and IT. This analysis was not done prior to the first rollout of SellingWeb because users were not involved. It was not done effectively prior to the second rollout. Doing this analysis should lead to agreement among the participants as to how work is done currently and how it should be done in the future.

4. Business processes within the sales group and other processes that are relevant to sales should be documented in detail from start to finish. This documentation should include the way sales work is done now and the way it should be done using SellingWeb. This analysis should define the process by which sales cycle data is entered and what fields are used for what purpose. This documentation will help eliminate inconsistency in data entry and problems with the same field being used for multiple purposes. The only enhancements or changes to SellingWeb should be those that support sales business processes. Care in this area should eliminate ad-hoc changes to the software that solve one problem but cause another.

5. UpNow should conduct a third roll out with a small subset of users. That is, it should do a pilot test with this subset. The firm should test the system thoroughly before a final version is rolled out to the entire sales force. Once SellingWeb is thoroughly tested, it should be presented to sales management to obtain buy-in and to prove that the software is finally working. Once sales management makes a clear commitment, it should be easier to encourage sales representatives to use it.

6. Once the software is operating properly and the pilot project is complete, the entire sales team should be trained formally on SellingWeb, and on the business processes that will use the software.

*Note: Questions follow the Websters4 case.*

## III. WEBSTERS4, INC.: DEVELOPING A DATABASE AND ANALYTIC SOFTWARE FOR ANALYZING WEB SITE USAGE

Websters4, Inc. is a company that provides data collection and analysis services related to the use of e-commerce Web sites by potential and actual e-commerce customers. The company was founded in 1996 by four entrepreneurs, but grew rapidly over the past few years, hiring most of its 25 employees since 1998. In addition to providing software that monitors e-commerce Web sites and collects data needed to discern usage patterns and problems encountered in using e-commerce Web sites, Websters4 also performs 50 to 60 analysis projects per year supporting a variety of multi-national organizations and small clients from many industries. In late 2001 Websters4 was still a young company with limited infrastructure and very few formal processes and procedures in place.

When defining an engagement with a client, a Websters4 sales team works with clients to identify important issues related to Web site usage and to determine what aspects of Web site usage will be monitored by the Websters4 software. After a formal agreement is signed, the Websters4 software is configured and often customized so that it can be used to monitor the Web site for an agreed time span. At this point, clients may simply analyze the resulting data

themselves, or they may engage a Websters4 consulting team to create a series of reports based on statistics collected by monitoring the Web site.  These report include extensive spreadsheets and graphs showing the numerical results segmented by various breakouts of customers and other variables. For example, the breakouts by customer might include:

- established customer vs. new customer,
- big spender vs. little spender,
- Web-savvy vs. apparently novice customer.

The consultants conduct a comprehensive analysis of the data, identify the Web site's strengths and opportunities for improvement, and develop recommendations to be presented to the client. Client reports are typically produced for the entire Web site as well as subsets of the site, such as the customer search process or the payment process.  Larger projects may include over 50 reports.
       Creating the graphs and spreadsheets in these reports became a challenging project because it took too long to produce the graphs and spreadsheets and the potential for errors was high.  Webster4's CEO and the VP of Analysis Services felt that the company's core strength was usage analysis and development of recommendations.  However, most of the staff's time was being spent on manipulating the data, manual auditing, and quality control.  In some instances it took up to two days to produce a single spreadsheet from the data collected by the monitoring software.  Many steps of the report production process were completed manually or through custom programming for individual clients, leading to potential errors in the data and the need for extensive quality checking. Particularly problematic was the extraction, filtering, and aggregation of usage data collected by customized applications designed around the peculiarities of client Web sites. The time and effort required for creating reports became an obstacle that limited the company's ability to work with large clients who want more complex analysis and expect a large number of reports that look at the statistical results from many different viewpoints.  The excessive effort required to produce the reports also had a significant impact on staff morale and job satisfaction because staff members had to spend much of their time on tedious data consolidation and spreadsheet manipulation instead of analysis and formulation of recommendations.

## GETTING STARTED

       Recognizing these issues and their impact on the company's productivity and its prospects for long term growth, Websters4's top management decided to make a significant investment in an information system that would store the Web usage data and would support the production of graphs and spreadsheets for the reports. To do the information system project they hired RJA Systems, a company with which they had an  existing relationship.  The original bid from RJA estimated the highest project fees to be $93,500.  Barry Felton of the Websters4 consulting team was assigned to lead the project and began working with the vendor to document the company's requirements.  Webster4's senior leadership team and members of the consulting team were only minimally involved.  A draft outline of the requirements was created and the vendor began programming.
       From the outset the project was approached with little focus or structure. No feasibility study was carried out. A lot of people within Websters4 were unhappy about the status quo, and there was a general consensus of a need for a better way to convert Web usage data into graphs and spreadsheets, but there was no careful discussion or clear documentation of the specific changes that were necessary. The technical and organizational costs and impacts were not discussed in depth.

## BUILDING THE INFORMATION SYSTEM

       After a number of months the vendor delivered the first version of the information system.  Around the time the first version appeared, Barry Felton, the only Websters4 employee assigned to the project, left the company for another opportunity.  The company's IT manager took over the process of testing the information system and communicating problems to the

vendor.  The users received approximately half a day of training and began using the information system.  The training was ineffective because several bugs were found which the vendor needed to fix before the staff could use the information system at all.  As the staff began using the information system, it became apparent that the software contained numerous bugs and that some of the required functionality was not yet programmed.

A new team consisting of the company's IT manager, manager of analysis services, and VP of Operations was created to lead the effort to test the information system, further refine the requirements and documentation, and communicate the needed changes to RJA Systems.  An ineffective cycle began in which the vendor would fix a few of the bugs and deliver a new version; Websters4 employees would then find more bugs and inform the vendor.  Neither the vendor nor Websters4 used formal processes for documenting and communicating problems or testing new versions.  Halfway through this process, Websters4 management realized that the development process was out of control. To create at least a minimal level of control, the IT manager extended the Websters4 internal intranet to provide a location where users could record bugs and rate the severity of the problems.

Shortly thereafter, RJA Systems found itself in dire financial straits and laid off the majority of its staff, including the project manager for this project.  At this point, customer service and project management became even worse.  Websters4 lost confidence in RJA due to the lack of staff, poor customer service, and inability to understand their needs.

Websters4 terminated the relationship.  The information system was incomplete and unusable because the core functionality was not finished and because whatever functionality had been produced was not completely debugged.  The source code for the programs was available, but training manuals and roll out presentations were extremely limited. The database and the programs were undocumented. The total bill from RJA Systems was approximately $150,000, which was $57,000 more than the highest estimate on the original proposal.  The project was 18 months old, three times the original estimate of 6 months.

## IN RETROSPECT

In retrospect, every phase of this project had serious flaws. During the project initiation, a proper feasibility study should have been carried out to identify the problems with the existing system. This feasibility study should also have stated the proposed scope and goals of the new system, and should have summarized the economic, technical, and organizational feasibility and impacts of a new system. Furthermore, no project plan was established to guide the development of the new system. The vendor selection process was also questionable since Websters4 simply used a vendor with whom it had an established relationship and assumed this company could do the job. In addition, instead of establishing a core team, only one person was assigned to work with the vendor, and senior management was uninvolved after the project began. A detailed project plan should have been established before starting any of the development work. That plan would have set start and completion times for various stages in the project, identified staffing requirements, and charted a transition process from the existing system to the new system.

In retrospect, the following problems were encountered during the development phase,

1. Neither external specifications nor internal specifications for the information system were produced.
2. As a result of relying on limited and informal documentation, the vendor and Websters4 staff did not have a shared understanding as to what was needed.  A direct consequence was that the information system lacked core functionality needed by Websters4 to meet the system's goal of producing reports more efficiently.
3. A formal test plan was not created. Such a test plan should have existed and should have identified how the new system would be tested, the data that would be used in the testing, and the process involved in identifying and correcting errors. The lack of awareness of the need for formal testing is one of the reasons why the company began using the information system before testing was finished.

4.  Most bugs were found in the process of using the information system instead of in a testing environment, leading to delays and quality problems in work done for client projects as well as frustration and loss of confidence in the new information system.

Just as there were no external or internal specifications to guide the programming effort, there were no real plans to guide the implementation in the organization. Instead, implementation began in a haphazard, unsystematic manner while the information system was still being developed and before it had been debugged. Another problem was that there was only very limited training and user documentation.  The half-day of training and short user document was not substantial enough to allow users to begin using the information system effectively. After 18 months and major expense and frustration, the system was not yet operational and could not become operational until its functionality was complete.

## RECOMMENDATIONS BY THE STUDENT TEAM

Based upon our analysis, we believe there are four primary options to resolve the issue currently facing Websters4.  Not fixing the information system is not really an option because of the serious business implications of the status quo, such as loss of new business, limited growth in the number of projects, size of clientele, and flexibility to meet current customer needs.  The realistic options are:

1.  hiring a new staff member to complete the current information system,
2.  hiring a new vendor to complete the current information system,
3.  hiring a new vendor to outsource report production,
4.  hiring a new vendor and starting over in creating a new information system.

Each of the four options has particular strengths and weaknesses.  We used a weighted score approach to evaluate the options systematically and to ensure we considered the most important components of each. Through interviews with Websters4 senior leadership team we determined that the most important criteria for evaluating alternatives include (listed in order of importance):

- cost to completion,
- time to completion,
- quality of work,
- flexibility and ability to make changes to meet new demand,
- annual maintenance cost, and
- ease of training.

Using a weighting and ranking approach, we assigned a weighting between 0 and 3 to each of the six criteria. For each of the four options we assigned a value between 0 and 10 to describe the extent to which the option fulfilled the criterion. The numerical results are summarized in Tables 1 and 2.

Based on the data in the Tables, we recommend completing the information system in-house by hiring a staff person to complete the current information system. "Cost to completion" and "time to completion" were the most important factors to Websters4 and scored highest and second highest respectively in this option.  The in-house option is estimated to cost $50,000 and take 6 months to get the information system operating effectively in the company.

We do not anticipate significant difficulty finding someone with experience and the required skills.  All Websters4 employees have already been through some form of training on the information system so additional training will not have to be as extensive as with a new information system. In going forward with the in-house option, we recommend that Websters4 take the following specific steps during the project.  Above all, the company should focus on putting more structure and formal processes in place.

Table 1: Applying Six Criteria to the Options for Websters4

| Criterion | Option I<br>In-house with current database (hire a staff person to fix the database and programs) | Option II<br>New vendor, current system (find new vendor to fix the database and programs) | Option III<br>New vendor who will produce reports on an outsourcing basis | Option IV<br>New vendor, new system (start over from scratch) |
|---|---|---|---|---|
| Cost to completion | $50,000. Assumes the new hire would cost $10,400 per month (including benefits) and would work on the project for 3 months. (Also includes hiring expense) | Estimated at $115,000 | Total cost would be $173,000 based on initial bid from a newly identified vendor. | $150,000 (this was the total fee of the vendor who programmed the system) |
| Time to completion | 6 months<br>(2 months to hire, 1 month to review code and work completed, 3 months to complete) | 6 months<br>(3 months to find vendor, 1 month to review code and work completed, 2 months to complete, assuming vendor can assign several programmers to the project) | 5 months<br>(3 months to find vendor, 2 months to program our reporting requirements, time could be reduced by moving forward with vendor a recently identified vendor) | 12+ months<br>(3 months to find vendor, 9+ months to review requirements, design, document and program, database) |
| Quality of work | Moderate:  Significant concerns with the work completed by old vendor (due to high volume of bugs) | Moderate:  Should be confident that new vendor can fix bugs and will do good job, but the structure of the database would be based on the first vendor's work | High:  Vendor would have proven capability of producing reports, having already done some initial work on the database. | High: Websters4 has a good idea of what it wants and is better able to outline requirements for the vendor. |
| Flexibility and ability to make changes to meet new needs | High:  By having a staff member do the work, the only limitations would be the staff person's capabilities and time available for this project. | Moderate: Websters4 would have to hire the vendor each time it needed to change something. | Moderate:  New vendor is able to make changes at any point, but Websters4 would have to pay flat rate every time it wants another report created or a significant modification. | Moderate:  Websters4 would have to hire the vendor every time it needs something changed after the new system was installed. |
| Annual maintenance cost | $41,000<br>(estimated) | $23,000<br>(estimated) | $34,600<br>(estimated) | $30,000<br>(estimated) |
| Ease of Training | Moderate:  Would be using current database that the Websters4 staff understands based on partial training to date. Onsite person could lead training and be available to support staff ongoing. | Moderate:  Would be using current database that the Websters4 staff understands based on partial training to date. Vendor would complete training. | High:  Minimal training needed because vendor would be producing reports. | Low:  New system, so training would start all over.  Vendor could provide training as part of the project. |

Table 2: Comparing the Four Options Using Rankings and Weightings

| | Weight | Score | | | | Weighted Score | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | Opt 1 | Opt 2 | Opt 3 | Opt 4 | Opt 1 | Opt 2 | Opt 3 | Opt 4 |
| Cost to completion | 3 | 8 | 5 | 2 | 3 | 24 | 15 | 6 | 9 |
| Time to completion | 2.5 | 5 | 5 | 6 | 1 | 12.5 | 12.5 | 15 | 2.5 |
| Quality of work | 2 | 6 | 6 | 8 | 8 | 12 | 12 | 16 | 16 |
| Flexibility to changes | 2 | 8 | 6 | 6 | 6 | 16 | 12 | 12 | 12 |
| Annual Maintenance Cost | 2 | 4 | 7 | 5 | 6 | 8 | 14 | 10 | 12 |
| Ease of Training | 1 | 8 | 6 | 10 | 4 | 8 | 6 | 10 | 4 |
| Total | | | | | | 80.5 | 71.5 | 69 | 55.5 |

In restarting the project, it is essential that Websters4 create a core project team. Even though they will be bringing someone in-house to make the changes, there must be a team to support these efforts.  The purpose of the core team is to specify the scope and goal of the project, make decisions during the development of the information system, and oversee implementation in the company.  The core team would also identify the specific skills lacking in-house (e.g., programming skills) and conduct a thorough search for a person meeting the requirements, potentially using a recruitment firm to ensure the person hired had the required skills.

The core team should consist of one person from senior management, the IT manger, the consulting manager, a project manager (an active user), and the new hire. Once the scope, goals, costs, and time-to-completion are identified, the core team will complete a project plan. An acceptance test plan and transition plan should also be started at this point.

The core team should create a clear project plan whose timeline specifies key deliverables and milestones. The project plan should break the project into stages, each with start and completion times. Additional software and hardware needs should also be identified.  Most important, the requirements documentation should be formal and reviewed thoroughly to ensure clear understanding of the company's needs.  A communication plan should be developed to keep the company informed of progress, problems and issues. A test plan should be created to identify errors and ensure that the system complies with the specifications.

A process should also be developed whereby changes, upgrades or corrections to the system can be specified, prioritized, approved and implemented. The core team should also periodically re-evaluate the system to determine if the system will continue to meet the needs of the company in the next six months, or whether a redesign/replacement of the system is required. Websters4 cannot afford to waste any more valuable time and resources on a project that does not lead to a fully functioning information system.   It is essential that the next attempt to fix the reporting problem be successful.  If Websters4 follows the specific steps recommended, we are confident they will end up with an information system that meets their needs and that can be implemented and maintained effectively.

## IV. QUESTIONS

1. Clarify the situation in each of the two cases by deciding:
   a. What problem does the IT initiative address?
   b. What work system has this problem?
   c. Exactly what information will the information system create or use?

        d. What is the relationship between the information system and the work system it supports?

        e. How would success be measured?

2. What are the main lessons from the Websters4 case?  From the UpNow case?

3. Assume that each company could start its project from the beginning and could follow a well-defined process for acquiring and implementing its new information system. For each case summarize what you think that process would be. Identify significant similarities and differences between the desired processes for the two cases.

4.  Take a very skeptical view and ask yourself whether there is enough evidence in either case that the projects should be completed and not simply abandoned before more time and money is spent.  Identify plausible arguments (if there are any) in favor of abandoning the projects.

5. Review the student recommendations for each of the two cases and decide whether these recommendations were based on enough information. If so, explain why. If not, explain what additional information would be required before coming to a well-justified recommendation.

6. Assume that you have to make a recommendation without gathering any additional information. Which student recommendations do you agree or disagree with, and why?

Editor's Note: This article was received on March 7, 2002 and was published on April 12, 2002.

## APPENDIX: PHASES IN A WORK SYSTEM'S LIFE CYCLE

From a business viewpoint, any system, regardless of whether or how it uses IT goes through one or more iterations of four phases:[1]

- Initiation is the process of stating the problem and how a new IT-based system or major upgrade of a previous system should help.
- Development involves acquiring, building, and/or modifying the systems (IT and non-IT) and other resources required to perform the required functions.
- Implementation involves making the new system operational in the firm.
- Operation and maintenance is the ongoing operation of the IT-based system and the entire work system, plus activities related to solving problems solving as they arise.

Each of these phases will be discussed in a bit more detail

**Initiation**. The initiation phase is the process of clarifying the reasons for changing the work system, identifying the people and processes that will be affected, describing in general terms what the changes will entail, and allocating the time and other resources necessary to accomplish the change.  This phase may occur in response to obvious problems, such as unavailable or incorrect data. It may be part of a planning process searching for innovations even if current systems pose no overt problems.  When the work system involves software, errors and omissions in this phase may result in software that seems to work on the computer but needs expensive retrofitting after initial attempts at implementation in the organization.  Unless the initial investigation shows the project should be dropped, this phase concludes with a verbal or written agreement about the proposed system's general function and scope, plus a shared understanding that it is economically justified and technically and organizationally feasible. Depending on the situation this agreement might be general and informal, or might be quite specific in identifying budgets, timelines, and measurable objectives. Key issues in this  phase

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[1] Source: Alter, S *Information Systems: Foundation of E-Business*, 4th ed., Upper Saddle River, NJ; Prentice-Hall, 2002. These phases are the basis of a revised life cycle model presented in Alter, S (2001) "Which Life Cycle - Work System, Information System, or Project?" *Communications of AIS*, 7(17).

include attaining agreement on the purpose and goals of the proposed change and making sure that the likely benefits far exceed the likely costs in terms of time and resources.  The larger the project the more desirable it is to document specific expectations along with a plan for accomplishing genuine results (as opposed to just performing specific activities at specific times). Regardless of how formal the agreement is, the details of the desired changes will be worked out in the development phase.

**Development**. The development phase is the process of defining, creating, or obtaining the tools, documentation, procedures, facilities, and any other physical and informational resources needed before the change can be implemented successfully in the organization. This phase includes deciding how the work system will operate and specifying which parts of the work will be computerized and which parts will be manual. In projects that involve new hardware, the hardware must be acquired and installed. In projects that involve creating software, development includes producing detailed specifications of what the users will see and how the software and data operate on the computer. After the software programs and documentation are created and debugged, the entire system of hardware and software is tested.

Completion of development does not mean "the system works." Rather, it only means that the tools, documentation, and procedures have been produced and that computerized parts of the work system operate correctly on computers. Whether or not the computerized parts of the work system actually work adequately will be determined later by how the entire work system operates in the organization. Key issues in this phase revolve around creating or obtaining all required resources in a cost-effective manner and, if necessary, demonstrating that tools and procedures actually meet the requirements. Completion of this phase means that the tools seem to function properly.  Whether the work system will absorb or reject the desired changes is determined by the next phase.

**Implementation**. The implementation phase is the process of making the desired changes operational in the organization, which in the case of e-business might be a virtual organization involving a number of different companies.  Implementation activities include planning, training of work system participants, conversion to the new work methods, and follow-up to ensure the entire work system operates as it should.  Ideally, the bulk of the work in this phase should occur after development is complete, meaning that all tools and procedures are ready and that all software has been tested and operates correctly on the computer. This phase ends when the updated work system operates effectively in the organization.

An initial step in this phase is detailed planning for the conversion from the old way of doing things to the new. After work system participants are trained, the actual conversion to the new work system occurs. This step usually raises issues about how to convert to a new process with minimum pain and how to deal with political questions and changes in power relationships. In all of this, success of the computerized parts of the work system is determined partially by features and partially by the development and implementation process itself. The likelihood of success drops if this process cannot overcome the inertia of current business processes or if the implementation itself causes resistance.

 If a work system's development phase created or modified an information system, some parts of the conversion involve the changeover to the new or modified information system and other parts of the conversion may be changes in practices that are unrelated to the information system. When the conversion affects data and methods used for transaction processing, it is often necessary to perform the transaction work twice, once using the old work system and once using the new work system in order to minimize the risk that the new work system will have unforeseen problems that jeopardize or prevent its successful operation.

**Operation and maintenance**. This final phase involves keeping the work system operating effectively by monitoring its performance and making minor changes that do not require a major project. When an information system plays a major role in a work system, someone must make sure that it continues to operate, that it provides benefits, and that desired changes are at least considered.  This phase continues until the system is terminated or until major changes are required.  At that time a new iteration of the four phases starts; management allocates resources to initiate a project; the new initiation phase ends with specific ideas about what should change; the new development phase begins, and so on. Operation and maintenance may not seem as

intellectually intriguing as development, but by typical estimates it absorbs the majority of a firm's information system expenses.

## ABOUT THE AUTHORS

These two cases were written by students in the Professional MBA program at the University of San Francisco and later revised and combined by Professor Steven Alter.

**Miguel Garcia** is a Senior Finance Analyst at WorldCom West Region Operations Group. He has a BS in Business Administration from San Jose State University.

**Joseph Gelbard** is a Regional Sales Manager with Westwood One Radio. He has a BS in Communications from the University of Pennsylvania

**Brooke Huston** is the Director of Consulting at Great Place to Work Institute in San Francisco, California. She received her BA in English from Occidental College in Los Angeles.

**Rochelle Jackson** is a manager of Sales Planning at SBC Communications. She has a BA in Communications from California State University, Fresno.

**Wendy Kuefer** is vice president for the San Francisco regional office of the American Arbitration Association. She has a BS in Political Science from Arizona State University.

**Gwyn Lauber** is the manager of investor relations at Network Associates, Inc. She received a BA in History from San Francisco State University.

**Holming Lee** is Manager of Network Engineering at Vodafone Global Platform in California. He has a Bachelor of Engineering (E&E) from the University of Auckland, New Zealand.

**Margaret Miller** is a Sales Consultant with Silicon Energy, Inc. She has a B.A. in Sociology from the University of California, Santa Barbara

**Bill Xie** is a Risk Management Consultant at Wells Fargo Bank, NA. He has a B.A. in International Business from the College of Wooster.

**Steven Alter** is Professor of Information Systems at the University of San Francisco. He holds a B.S. in mathematics and Ph.D. in management science from MIT. He extended his 1975 Ph.D. thesis into one of the first books on decision support systems. After teaching at the University of Southern California he served for eight years as co-founder and Vice President of Consilium, a manufacturing software firm that went public in 1989 and was acquired by Applied Materials in 1998. His many roles at Consilium included starting departments for customer service, training, documentation, technical support, and product management. Upon returning to academia, he wrote an information systems textbook whose fourth edition was published in August 2001 with a new title, *Information Systems: Foundation of E-business*. His articles have appeared in *Harvard Business Review, Sloan Management Review, MIS Quarterly, Interfaces, Communications of the ACM, Communications of the AIS, CIO Insight, Futures, The Futurist,* and many conference transactions.

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