

# **System Implementation Success Factors; It's not just the Technology**

**Paula J. Vaughan  
Project Manager  
Information Technology Services  
Campus Box 455  
University of Colorado at Boulder  
Boulder, Colorado 80309-0455  
Paula.Vaughan@Colorado.EDU**

The University of Colorado at Boulder, founded in 1876  
when Boulder and the State of Colorado chose to build a university rather than a prison

System implementation efforts offer extraordinary challenges to information technology professionals and the organizations impacted by the implementations. A successful implementation can reap vast rewards in organizational strengths and efficiencies. A failure can drain an organization of people, funds and vitality. Consequently, many people have puzzled over the reasons for the successes and failures experienced with these implementations. This paper examines these puzzlings as offered through scholarly research and first-hand reports of system implementations within institutions of higher education and discovers that many answers lie outside the bounds of technology.

Scholarly works offered the following important considerations for system implementations:

- The interaction of technology and the organization – a broad concept that lays the groundwork for many of the other factors for consideration.
- User involvement and participation – influenced by a number of variables that must be carefully balanced in order to ensure success of the involvement.
- Resistance – can work for or against a project depending upon how it is managed.
- Commitment – an essential ingredient for success but, because it involves a plethora of forces including the human psyche, is a challenge to achieve and maintain.
- Planning – more able to be controlled by project managers than other success factors, and involving many critical components.
- Risks – exist with every project but must be anticipated and managed in order to achieve success.

First hand accounts of implementations prove that scholarly theories regarding these success factors hold up well in the test bed of Higher Ed system implementations where theories, practice, pragmatism and common sense all influence the outcome of a system implementation. This paper should provide food for thought for anyone who has accepted the challenge of guiding a systems implementation to a successful conclusion.

# System Implementation Success Factors; It's not just the Technology

## SCHOLARLY WORKS

### Interaction of technology and the organization

Technology affects “the ways in which organizational members must interact with one another to accomplish routine tasks.”<sup>1</sup> System implementers must be cognizant of the cultural implications of the systems effort. Institutional and cultural separation between users and designers can easily result in a large gap between those who design the technology and those who actually use it. To address this cross-cultural gap, “enterprises should look for functional representatives with a broader understanding of the overall business beyond the daily transaction level, and technical representatives with an understanding of the potential business uses of technology.”<sup>2</sup> The *technologist* should be aware that imposing a technological solution may exacerbate rather than resolve a problem. It is essential that the contextual interrelation of processes be examined, understood and documented before deciding that a new system might resolve any problems that lie within the processes. The *organization* must be aware that processes that have worked in the past may no longer be adequate. If both parties come to the table with their individual areas of expertise, without disabling biases, and with their minds open to a broad view of the situation at hand, an effective solution that complements the organization’s culture may be achieved. The cross-cultural gap extends to the highest echelons of the organization as well. In order for the CIO to be accepted as a member of the executive team, and to gain their trust and sponsorship for proposed IT initiatives, the CIO must extend beyond a technology focus and become a “full-spectrum contributor to the development and management of the organization’s business strategies.”<sup>3</sup> “Full-spectrum” includes understanding and appreciating organizational politics, basic financial issues, strategic planning, and other challenges faced by the CEO and executive team members. At all levels of the organization, nurturing a cross-cultural understanding of information technology and business practices will better position both the IT unit and the organization for the successful implementation of technology-based initiatives.

If a systems solution is decided upon, the impact of the solution on the organization must be planned for. An enterprise system will undoubtedly affect all aspects of the organization and, with today’s increasing reliance on cross-institutional partnerships, involve external organizations as well. The impact and how it is perceived and reacted to will differ from subculture to subculture because of differing uses and understanding of technologies. Adequately addressing the needs of these subcultures requires an in depth understanding of the language, processes and functions unique to the subculture and an appreciation for the values and beliefs embedded in the subculture. This understanding is best achieved by openly involving members of each subculture impacted by the systems process and/or by working intimately with the subcultures in their own environments.

The introduction of information technologies has a tremendous impact on power relations, work practices and value.<sup>4</sup> Every system is biased by its creator(s). Like a work of art, the personalities, values and beliefs of the design team are imbedded in their creation (the system). An organization that opens itself up to a system implementation effort leaves itself vulnerable to power realignments imposed by the design of the system. Involving only management in the design could disempower downstream workers whereas involving end users offers the opportunity to empower these users with enhanced processes, job duties and organizational alignments. It is also important to recognize that technology is introducing a change in the relationship between the employee and the task accomplished through the use of this new technology tool. This impacts the knowledge required by the employee, knowledge that is a valued commodity in the community and treasured by the employee. The combined changes of tool, task, knowledge and value disrupt employees’ perceptions of their roles within the organization. Not only might they lose sight of which cog they are in their community’s wheel, they may no longer even recognize the wheel. Until employees become reconnected with their roles within the organization and are able to reform their assumptions about their workplace, acceptance of the new system will be difficult.

### User Involvement and Participation

“No single quality of management practice is more highly correlated with success [than employee participation].”<sup>5</sup> The question then becomes how to structure this participation to best ensure its success for the employee, the project and the organization.

Baronas and Louis examine the effect of change (anticipated differences in features) and surprise (unanticipated differences): “More important than the actual changes implementers might make are their skills at communicating

them to users and linking them into users' experiences. ... Implementation activities that assist users in making sense of and coping with changes, contrasts and surprises should contribute to system success."<sup>6</sup> Baronas and Louis propose that user acceptance of a new system would be facilitated when

- changes are realistically anticipated through input from knowledgeable sources;
- contrasts are given free expression through discussion among coworkers and between implementers and users;
- surprises are minimized through preview and realistic testing;
- assistance is provided in coping through the availability and coaching of experienced implementers.

System implementations often impose a threat of reduced control over a user's work. Baronas and Louis suggest that when employees are given the opportunity to enhance perceived control during a system implementation, they will adapt to the resultant changes and more readily accept the system.<sup>7</sup> Enhancement of control through involvement can be accomplished by

- offering choices to the employee, involving them with meaningful decisions during the systems process;
- laying the groundwork for predictability by painting a complete and accurate picture in advance of the users' exposure to the system during *and* after implementation;
- allowing the employee to assume some measure of responsibility during the system design and implementation process making them accountable for the results of specific tasks integral to the implementation process and encouraging shared ownership of the project;
- offering opportunities to reduce or escape from the stress that is inherent in a system implementation project.

System implementers often request "user participation." Barki and Hartwick define user participation as a set of behaviors, activities and assignments that engage users throughout the systems development process.<sup>8</sup> This participation has multiple dimensions: overall responsibility that the user may have with the project, the relationship between the user and the system, and hands-on project-related tasks. Increasing user participation in one or more of these dimensions enhances post-development user involvement and attitude. The effectiveness of involvement as a success factor is also enhanced if implementers recognize that: "A user is involved when he or she considers a system to be *both important and personally relevant*."<sup>9</sup>

In addition, if an individual believes that the system is personally relevant, he will be more likely to form a positive attitude toward the system since attitudes are generally formed on the basis of beliefs.<sup>10</sup> The strength of an individual's involvement is directly related to the extremity of his or her attitude toward the system. A high level of involvement could drive an extremely positive or extremely negative attitude. A low level of involvement, however, leaves a person susceptible to other influencers (e.g., persuasive forces, factual arguments). With increased user involvement and a positive attitude, users will have an increased desire to participate in development.<sup>11</sup>

Implementers might be able to enhance the probability of effective user involvement by examining several antecedents of and strategies for involvement including:<sup>12 13</sup>

- Involvement roles (primary users, secondary users such as input specialists or recipients of outputs, top management)
- User predisposition toward the system (often based upon involvement with and attitude toward the present information system).
- Development conditions including the type of system (appropriateness of the system for the organization, the knowledge needed to work with the system and the impact of the system).
- User beliefs regarding perceived ability to effectively contribute during the development process. Low self-efficacy perceptions may inhibit a user's desire to participate regardless of other factors. It is important to provide opportunities to participate where users will judge their experiences to be successful.
- *Post*-development cognitive, affective and motivational factors can be optimized by providing meaningful participation opportunities to users who deem the system to be personally relevant and important.
- Most importantly, user participation in systems development may revolve around the issue of user control. Maximizing the user's instrumental control over the proposed system is a successful participation strategy.

Upon becoming a project participant, many factors influence the strength of the individual's participation-to-involvement relationship:<sup>14</sup>

- Reasons for participating (i.e., voluntary or coerced). Hunton and Beeler's field study indicated that coerced/mandated participation would be an ineffective means of gaining participation, particularly if the users do not gain a sense of responsibility or control during the course of their participation.<sup>15</sup>

- The kind of participation: direct involvement of affected users; indirect involvement (e.g., committee representation); consultative involvement (system design is influenced by the user but implemented by IT); representative involvement (users are represented on the design team); consensus involvement (involving all users throughout the organization).
- The degree of participation including the amount of influence the participation has on the project. As noted by Deetz, et al. “To be listened to and to have a stake in the outcomes are powerful forces.”<sup>16</sup> Degree of participation is also affected by the timing of the participation. The participant’s impact is strongest with an Instrumental Voice expressed throughout the decision process with evidence allowing users to believe that they have participated effectively in the development process.
- Hunton and Beeler conclude that the key information system success factor is to provide users with a sense of overall responsibility and system ownership.<sup>17</sup>

*Who* should participate is a critical decision point. While essential to involve key decision makers for their insights, authority and sponsorship, one should also consider involving anyone who would be touched by the system. Staff members involved with daily operations offer important insights into critical operational success factors. As representatives of a variety of subcultures, they also bring a broad representative diversity to the project. The diversity of participation is especially critical when the system impacts wide reaching areas of the organization – as is the case with enterprise system implementations. Project success is dependent upon the insights and knowledge of invested members from each of the subcultures expected to embrace the system.

*Cautionary side note:* Involvement (the importance that the user attaches to a system) is dependent upon the user’s focus. Rather than becoming involved with the *system*, the user could become focused on (and, therefore, involved with) the *process*. This could lead to task-specific involvement to the detriment of more global system involvement.

### **Resistance and Skeptics**

Markus offers three theories of why resistance may occur<sup>18</sup>:

- A person or subunit may resist because of factors unique to the individual or common to the entire group. Eliminating this resistance may require a change in personnel involved with the system implementation, educating the individual, coercing the resistor with edicts or policies, persuading the resistor, and/or by increasing user participation in order to earn their commitment to the project. Education and participation are far more preferable than coercion.
- Resistance may be a response to factors inherent in the system being implemented. People resist technically inadequate systems, systems of poor ergonomic design and “user-unfriendly” systems. If resistance is system-related, correcting the problems associated with the system should reduce or eliminate the resistance. To proactively address system-based resistance, use skilled designers, pay attention to ergonomic features, modify the system to better conform to organizational procedures, and involve users during the design phase.

The first theory involves internal factors while the second theory focuses on external factors. *Both* can be held simultaneously. An individual may have a tendency to resist a system – but, with all other factors being equal, this individual would be less likely to resist a well-designed system.

Markus’ third theory addresses the combination of system and person: resistance can be the result of the interaction between characteristics of the people being asked to adopt the system and characteristics of the system itself. Within the bounds of this third theory, the source of resistance lies with the *interaction* of the organization and system. This accounts for the acceptance of a system in one organizational setting while the same system might be rejected in a different organizational setting (or why one organization may accept one system while rejecting another). The third theory also introduces a political variant: resistance is the product of the interaction of the system’s design features with the intraorganizational distribution of power. The greater the impact of the system on existing power structures, the greater the resistance from those who lose power (or perceive that they will lose/have lost power). Those who believe they have gained power, however, are more likely to accept the system.

If resistance falls within the realm of this third theory, neither changing the individuals involved with the system nor changing the technical features of the system itself will reduce the resistance. To protect against interaction resistance, address organizational problems *prior* to introducing a system change. The organization must analyze its current situation, identify factors that will facilitate or hinder change, proceed with necessary changes, *then* introduce a system that supports the revised organizational situation. Consider restructuring the relationship between users and system designers. Design and implementation of the system will be enhanced by a positive, effective relationship between these two groups. Conversely, design will suffer and resulting structures will be negatively impacted if one group dominates over another during design.

One key to the successful use of the interaction theory is for the implementer to consider himself as one of the affected parties. By conducting a self-examination of one's own interests, motives, payoffs and power bases, the implementer will enhance his understanding of other members' reactions to the system design as well as the potential impact of the system implementation on the culture as a whole. This task also requires an empathetic examination of the interests, values and anxieties of the diverse organizational population. This should lead to advance recognition of the potential for resistance, providing two options: the ability to avoid resistance or pockets of resistance, and the opportunity to proactively and constructively confront the resistance.<sup>19</sup>

Markus notes that resistance can be destructive if it results in ill will, conflict or consumes inordinate amounts of time and attention. However, resistance can be functional if it prevents the installation of a system that might have led to persistent negative consequences such as chronic stress, high turnover and significant reductions in productivity. Resistance is not a problem to be solved so that a system can be installed exactly as originally intended. Rather, it is a useful clue to what went wrong and how the situation can be corrected.<sup>20</sup>

Publicly expressed opinions of skeptics is one source of organizational resistance to IT initiatives. "Skeptics are highly opinionated about our performance and won't hesitate to inform coworkers about what they consider to be our questionable management ability. Skeptics can divert attention from the positive aspects of our work."<sup>21</sup> The most effective (but most difficult) way to neutralize skeptics is to convert them.<sup>22</sup> Methodologies recommended for this conversion address many of the components of Markus' interaction resistance theory. During a system implementation, bring skeptics into the process early and in a significant way. They should become system experts, mitigating their fears of loss of control or power. By developing a working relationship with skeptics, the project will benefit from their insights. If skeptics are involved with the design of success metrics, they can carry the results of these measurements back to their peers, building further support and winning over other skeptics. A project that does not welcome or foster genuine involvement of employees will breed cynicism.<sup>23</sup> Alternatively, a project that embraces the involvement of employees (supporters *and* critics) will breed project champions.

### **Commitment**

Successful development of an information system is dependent upon commitment to the project.<sup>24</sup> Commitment is a complex state involving the human psyche, external forces imposed upon the individual or organization, and the element of time that may or may not correspond to the timeline of the systems project. Commitment can be defined as the state of mind that holds people and organizations in a line of behavior.<sup>25</sup> It encompasses psychological forces that bind an individual to an action as well as structural conditions that make a behavior irrevocable or difficult to change.<sup>26</sup> Commitment also affects the persistence of behavior.<sup>27</sup> Commitment to a systems project involves "doing what is necessary throughout the stages of system development, installation and use to assure that the problem is understood and that the system development solves that problem."<sup>28</sup> Commitment also involves a commitment to change. The organization must demonstrate a willingness to make changes to behavior, procedures, structure and any other factors that are necessary for the system to work.<sup>29</sup> This commitment must exist throughout the organization starting with top management. Commitment from the executive level is arguably the most important factor in information systems planning and implementation. When employees are able to participate in a systems project, they have the opportunity to follow management's lead which, if positive, encourages commitment to the project goals. However, a lack of commitment will result in an organization permeated with indifference and resistance. Many of the leadership qualities described by Edgar Schein as necessary for building an organizational culture also apply to leading commitment for project initiatives: systematically paying attention to the project effort, responding to project-related crises in a manner reflecting the importance of the project as an integral part of the organization, ensuring adequate resource availability, coaching the organization in preparation for implementation, rewarding efforts made on behalf of the project, and recruiting individuals who will contribute to the project and/or the project-impacted organization.<sup>30</sup> For a project to succeed, commitment must come from all levels of the organization and be persistent through the project life cycle.

Determinants of commitment according to Newman and Sabherwal include:

- Project determinants (objective attributes associated with a project such as cost and return on investment).
- Psychological determinants (the relationship that key individuals and decision makers have with the project).
- Social determinants (the groups involved with project, the public or organization-wide identification with the project, politics, and prior resistance that may have existed).
- Structural determinants (attributes such as political and managerial support for the project, the strategic positioning of the project).

Newman and Sabherwal describe a dynamic model of commitment that recognizes the volatility of systems projects. This model includes the stages of: making the initial commitment, withdrawing the commitment, committing to a

new approach and the ensuing events including systems development activities. The initial commitment phase is influenced by the project determinants of budget, cost and anticipated benefits. As the project evolves, social and structural determinants (key project relationships, public identification with the project) may decline leading to the withdrawal of commitment. After this withdrawal, the organization will again become aware of the problematic factors that were the original impetus for the project and the psychological determinants (i.e., key decision makers) will reassert themselves and renew the project determinants resulting in an escalation of commitment.<sup>31</sup>

System projects, particularly those involving enterprise systems, are very long term. According to Newman and Sabherwal, it is easier to maintain commitment if problems experienced during a project can be attributed to temporary causes or specific, avoidable project features.<sup>32</sup> If an organization perceives a problem to be chronic and without resolution, commitment will fade. The long-term nature of information system projects can also impact the continuity of the project team, which is often the project's core commitment source. To address this, system development projects should be supported by a wide group of stakeholders to ensure continuity even if the project champion or key team members leave.

*Cautionary side note:* Decision makers must also be wary of the *escalation* of commitment where project sponsors continue to invest resources in a failing project leading to a spiral of failure rather than success.

### **Planning**

A project plan begins with a vision. This vision should be clearly defined and publicly stated. Strong leadership with a clearly stated vision that is embraced by the organization will provide a powerful source of internal motivation enabling members of the organization to support each other's efforts toward reaching a common goal; in this case, the successful system implementation. The vision should feed into the project plan. Extent of project definition and planning is a critical determinant of successful system implementations.<sup>33 34</sup> To be successful, the project plan must be clear, concrete, focused on meaningful details and banish hidden agendas. It should include careful specifications of project team member roles, an analysis of the organization's needs (addressing why the software is being implemented), a communication plan, specification of which people, units, functions and processes will be affected by the project, success factors for the project and strategies for meeting them, risk analysis, evaluation criteria for potential systems, training requirements, and the project schedule. Such a detailed plan will set accurate expectations and define user involvement, reducing individual anxiety of the unknown.

Detailed project plans can also contribute to shorter implementation timeframes. The plan provides a focus and well-defined scope reducing "feature creep." A compacted timeframe reduces the risk of implementing a system into an organization that has experienced significant evolution since the project's inception. A phased or modular implementation might also be considered for the project timeframe. This approach can make the process more manageable and less daunting for developers and impacted users. Incremental implementations can provide incremental success stories that might help build project commitment and secure funding and support for the remainder of the project. However, phased projects introduce the complexity of multiple implementations and multiple disruptions complicated by multiple integration points between the modules and cultures involved.

An essential component of the project plan involves the mapping of business processes to determine where intervention is actually needed and whether a technical solution is appropriate. "Information systems cannot be designed independently of empirical knowledge of workplaces...in order to accurately represent the open systems' properties of workplaces we should study them and incorporate tacit knowledge and articulation."<sup>35</sup> The analysis should determine the size and complexity of the problem and the corresponding size and complexity of the solution required to address the problem. Process mapping must involve strong, hands-on collaboration of the impacted users and system designers. The resulting understanding of the cultural context of the processes and their integration points will enable a more effective analysis of the types of change needed to address identified problems.<sup>36</sup>

*Cautionary side note:* Research has shown that, while a well-defined project definition and plan contribute to success, they cannot make up for a lack of commitment.<sup>37</sup>

### **Risks**

"Through 2004, under managing project risk will result in implementation cost overruns of as much as 50 percent for half of the enterprises embarking on collaborative projects."<sup>38</sup> Every systems project involves some risks because of the organizational impact of the system. To help manage these risks, project leaders should be aware of the linkage between system success dimensions and project risks factors.<sup>39 40</sup> Often cited risk factors include:

project size, number of subcultures impacted, technological change, novelty of the application, personnel changes, lack of team expertise, unwilling users, lack of top management support, conflicting preferences

between users and systems developers, high numbers and cultures involved in decision making, number of project partners, unrealistic schedules, unrealistic budget, lack of risk management, inappropriate user interfaces, flawed software functionality, continual requests for changes, and personnel shortfalls.

Success factors offer a contrast based on clarity, strength and inclusion:

Clearly defined goals, top management support, representative steering committee, sufficient and appropriate resources, competent team members, adequate communication, collaborative planning and management, formal risk management, clear project scope, rapid results, defined and effective decision-making structure, focus on organizational change issues, system quality, expectation management, user information satisfaction, IS usage, and cost/benefit productivity.

The Jiang and Klein survey of IS project managers found that individual project risk variables are not equally important in influencing success. The results evaluated risks against various dimensions of success<sup>41</sup>:

- Critical risks for the systems development process include application complexity, lack of user experience, and general lack of team experience.
- Risks related to user satisfaction with system use are most affected by users' experiences with the system. Clarity of role definition on the team was another significant risk factor within this success dimension.
- Technological newness is the most critical risk factor within the system quality satisfaction dimension (where "quality" is measured by performance, flexibility of changes, response time and ease of use).
- Within the organization impact success dimension, the key risk factor is the ability to earn user support for the system. Support is measured by the extent to which users believe the information made available to them meets their information requirement; it is a user view rather than a technical view of the system.<sup>42</sup> Based on this finding, it appears that achieving maximum organizational effectiveness from a system depends upon users having a positive attitude toward the new system and valuing the outcomes of the system-induced changes. The user support factor manifested itself most frequently during the productive life of the system implying that visible sponsorship and meaningful system involvement must extend beyond the early days of implementation in order to foster continued user support and ensure long-term organization-wide system success.

## **PRACTICE – THE SCHOLAR'S CHALLENGE**

Most of the accounts of system implementations reviewed for this study describe success and risk factors that fall within the areas of consideration highlighted by the scholarly works and add important dimensions to these considerations. The accounts also address a number of details not emphasized by the scholarly works. These include building a business case, budgetary concerns, technological issues, consultant/vendor roles, and methodology choices. Every project should include these more concrete factors yet continue to maintain a focus on the organizational, human and system integration factors described by scholars. Two areas of consideration, communication and training, played such significant roles in the reported implementations, they have been added as critical success factors in and of themselves within this discussion of practitioners' experiences.

### **Interaction of technology and the organization – in practice**

Practitioners acknowledge that a major system implementation is not just a question of technology nor is it simply an exercise in overhauling a business process; rather, business processes and information technologies must be examined together – and both within the context of the organization as a whole. George Washington University sums it up nicely with "we must seek synergy of technology and organizational process. But merely pursuing technological change is not enough – we must *implement a culture of change* if we are to be successful in that transformation."<sup>43</sup> Valparaiso University reinforces this with: "There is one principle that undergirds our successes: this is about **people**, not technology."<sup>44</sup> Practitioners build upon this with the following experiential insights.

The University of Pennsylvania, in a multi-year effort linking business processes with information systems architecture, recognized that technology plays only a supporting role in any organization and that, while providing a critical infrastructure for the organization, it "cannot substitute for organizational and cultural change."<sup>45</sup> Every aspect of an organization is involved in enterprise process and system re-engineering efforts, organizational boundaries are crossed, "jobs, skills, rewards, tools, organizational structures, and to some extent, their values and beliefs" are changed. The Pennsylvania project team writings reflected interdependencies of individuals, the organization and the values and belief structures that could either bind them together or keep them apart. Comments such as "as we changed organizationally, we saw ourselves changing personally," "pushing...past our own assumptions," "you have to be inclusive," and "[business and IT] must understand each other," peppered the report.

Bryant College recommends bringing underlying assumptions to the surface by documenting success factors, working side by side with users within the user arena and “checking, checking, checking with those users.”<sup>46</sup> Indiana University/Bloomington’s guiding principles emphasize the importance of integrating IT culture with organizational culture: “Success would be measured from a user-centric point of view. The goal we set for this migration project was that at least 95 percent of the users affected by it would agree that the improvements in the quality of their computing environment more than outweighed the difficulties they experienced as a result of the conversion.”<sup>47</sup> These universities reaffirm the scholars’ insistence that, if an organization is impacted by something as monumental as an enterprise system implementation, implementers must look below the surface and drill down to the core of basic assumptions, values and beliefs of the organization, examining each layer along the way.

Pennsylvania’s IT organization documented and publicized Information Technology Principles with the purpose of explicitly stating the University’s beliefs regarding the interaction of IT with business functions. They give the organization a starting point for identifying and resolving conflicts and provide “the foundation on which the architectures, policies, standards, plans, and systems are built.”<sup>48</sup> George Washington University followed a similar path by creating an “infostructure” designed to support the mission and goals of the University. This included developing a computing master plan to provide a foundation and set direction for the future of administrative computing and support. The plan was developed through a participatory process including as many creators as possible. The outcome of this process was an integrated approach to information systems that is owned by all members of the institution and links technology with processes and the university’s human resources.<sup>49</sup> These principles and plans build a cohesive environment formally blending the basic assumptions of the IT subculture with the parent organization’s culture.

Purdue University operates with a formal project team structure that demands involvement from multiple organizational cultures. The Purdue project teams are cross-functional and single-focused, responsible for all phases of the development effort. They include a project manager, business analyst, architect, database administrator and developer. Units affected by the project are required to provide staffing for both the project manager and business analyst roles. This structure, particularly the role of the business analyst, has addressed IT and organization-wide integration issues in a number of ways: business analyst involvement enhances credibility; communication between subcultures and client knowledge levels; project involvement enhances client acceptance of the final result; the quality of the final product is greater with the greater involvement; technology being implemented into the culture is demystified; changes being introduced to the organization are managed cross-functionally; and the nature of projects has evolved from an IS orientation to a strategic orientation.<sup>50</sup>

### **User Involvement and Participation – in practice**

As noted by scholars, “involvement” has many dimensions. The general consensus among practitioners seems to be that each affected unit must at least be considered. Whether to actively involve these units in the process, who to involve and when, and how to involve them are the questions that implementers struggle to answer. Many of the methodologies described by practitioners demonstrate the validity of the scholars’ proposals for gaining user acceptance through free discussion, minimizing surprises, ready access to implementers, meaningful involvement, control choices, participation across multiple dimensions and evidence of results.

Bradley University addressed the participation issue by using Rapid Application Development methodology during their conversion from mainframe administrative software to a client/server environment. Bradley included multiple levels of the organization noting that an appropriate balance of people is critical for ensuring that the design is not biased toward a particular function to the exclusion of other functions. Weekly meetings with stakeholders were key to binding the users to the project by offering first hand demonstrations of progress, a forum for issue-specific discussions, and for setting milestones. By involving key players at frequent intervals, the project team was able to “make major and minor adjustments to the system early and continuously in the development cycle” and designed a system that was adaptable to the volatile environment into which it would be implemented.<sup>51</sup>

Arizona State University chose the Joint Application Design methodology for their client/server application development effort. ASU reported that “the value of JAD sessions is getting the developers and users together to set common expectations and getting the users actively involved so that they feel ownership of the system.” This was accomplished at ASU through a dedicated project room, a comfortable and casual approach to meetings, a focus on results, and by delving deeply into issues. Results from the JAD sessions were analyzed by technical *and* functional staff to build requirements models that were then reviewed by a larger group of team members.<sup>52</sup>

The Incremental Prototyping Methodology was the vehicle of choice for involving users with the PeopleSoft systems implementation project at the School of the Art Institute of Chicago for two reasons: to decrease the

development cycle in order to respond quickly to fluid and changing requirements and to overcome a tradition of IT's inadequate ability to predict the "feelings and reactions of ordinary people." This process uses fit/gap analysis, modeling, hands-on simulation using real processes and data and an iterative building block approach of testing, conversion, enhancements and interface development prior to implementation. AIC learned that team members' project involvement was compromised by competing priorities and job duties. Their recommendation: that assignments to the core team be 100%; 50% assignments did not work. AIC also learned that, to foster ongoing communication between members of the organization involved with the project, there needs to be a dedicated project space where members can work on an ad hoc basis whenever the need for gathering might arise.<sup>53</sup>

Choosing who to be involved requires building a team that can accomplish the tasks required of them. It also requires building a team that will effectively represent the organizational issues that are being addressed by the project and will *continue* to support and integrate the new programs and processes into the post-implementation culture. Positive results with team selection were experienced at the University of Colorado where functional users were involved throughout the Acquisition Card Project as representatives on a "Core Team" and/or "Project Team." "Involving a wide representation of the campus community ensured that policy and procedural issues would be evaluated and decided upon by those whose day-to-day operations would be most affected and by those who would be responsible for enforcing the policies and procedures."<sup>54</sup> The smaller, more nimble Core Team was responsible for the project details and included representatives from pilot departments, the administrative departments most impacted by the project, the systems project leader, and the primary decision-making authority. The Core Team provided a communication avenue to the wider representation of the larger Project Team. The Core Team/function-specific team model was also used by Western Iowa Tech Community College with the goals of achieving high commitment from the entire college staff and of producing a better-rounded result.<sup>55</sup>

Recognizing and responding quickly to the contributions of individuals working with the project moves these representatives from the realm of bystander to that of involved participant – a critical component of success according to scholars and practitioners alike. Cleveland State stresses that "a sense of efficacy in the process has to be developed."<sup>56</sup> The University of Colorado developed this sense of efficacy and built additional organizational project support by implementing significant enhancement requests recommended by the pilot team in time for the full implementation.<sup>57</sup> University of Wisconsin-Madison let their project representatives "know how much we valued their input by showing them quickly how what they wanted would work" by bringing refinements right to the user's desks for their immediate response which was then folded into further refinements. "An iterative, user-centered approach is essential for [the project's] success."<sup>58</sup> In each of these cases, user involvement was solidified by project team responsiveness, validating the meaningfulness of the involvement. Designers of a personal information system remark on the effect iterative user involvement has on *designers*: "Since there was no separation between fieldwork and design, there was no battle to fight to convince an unwilling engineer to relinquish a precious, hard-wrought prototype."<sup>59</sup>

*Pragmatic side note:* As users become more involved with a project, they generate increasing numbers of ideas and requests. However, Bradley University warns: "At some point, we need to stop developing and implement the system."<sup>60</sup> The University of Pennsylvania also mentions this aspect of team involvement: "At some point the sponsor has to step in and say, 'Thank you, that's enough.'"<sup>61</sup>

In a cautionary tale of success (per designers) and failure (per users) of an information system, York University draws upon Markus' theories regarding user involvement. York's experiences clearly illustrate the potential for designers to use systems as sources of power. The system was designed with no input from members outside the project team (composed of technicians and managers); the system design then dictated the process design. Designers fostered the perception that the system was complex and maintained tight access controls over the system. With limited system knowledge among secondary users and access controlled by primary users, a power base was created around the primary users. York states that Markus' discussion of IS professionals' power over users "is precisely what occurred in this case. Markus and Bjorn-Andersen could be describing the design team in noting: 'IS professionals exercise power over user behavior by creating organizational structures and routine operating procedures that give them formal authority over users or foster dependence on them for important resources.'"<sup>62</sup>

Other implementations have addressed control issues by experimenting with many of the parameters described by Baronas and Louis. Bryant College's administrative system implementation offered two control lessons. First, there is a difference between user participation and user control. Formerly, users at Bryant would control IT by asking for changes but did not participate in making those changes. With Bryant's current initiative, the project management required extensive user project participation. Second, Bryant learned that, with IT controlling the project, IT was

being held accountable for everything when, in fact, scope changes and missed schedules were, to some degree, due to user demands and inflated expectations. Bryant decided that, in their next project phase, the Steering Team will return control to the users and match it with accountability by including representatives from completed modules (to offer insights from their recent implementation experience) and representatives from modules to be implemented (to ensure early and continual user involvement).<sup>63</sup> Western Iowa Tech Community College encountered a similar problem with accountability and ownership noting that IT ownership resulted in IT being blamed for all flaws. It is WITCC's opinion that "This lack of ownership by the college as a whole could be viewed as the biggest problem resulting from the original implementation."<sup>64</sup> Indiana University/Bloomington, on the other hand, experienced the benefits of sharing control with members outside IT by involving their faculty advisory committee in project discussions, acting upon the faculty's advice and receiving their endorsement. According to IU/Bloomington: "These endorsements helped to mitigate any perceptions that the computing center was issuing edicts to the faculty." (IU notes that their focus on customer satisfaction also contributed to the faculty endorsement.)<sup>65</sup>

Bringing participants into a project is challenging, particularly in institutions with firmly entrenched reporting structures and organizational boundaries. Cleveland State University addressed this challenge by formalizing the recruitment process. After first soliciting opinions from supervisors, department heads and Vice Presidents, personal invitations were sent to staff members inviting them to participate in the project. A copy of the invitation and a request to release the employee from regular duties was sent to the supervisor.<sup>66</sup> This process demonstrates high level sanctioning of the project and it formally recognizes the time commitment to be imposed by the project.

Personalities must be considered when deciding who to bring into the project culture. CIOs from the University of California, Berkeley and Yale University stress the importance of identifying, recruiting and encouraging early involvement of individuals who have the following characteristics: detailed knowledge of institutional operations, clearheaded analytic capabilities, creativeness, vision, ability to bridge between software and business requirements, and willingness to work for months or years under intense scrutiny and pressure.<sup>67</sup> University of Pennsylvania's experience demonstrates the validity of these recommendations. Pennsylvania purposefully sought out people who enjoy challenges, are comfortable with uncertainty and have a thick skin to be part of the team dealing first hand with the uncertainties and politics of the project. The resulting team dynamic was one of energy, excitement and new alliances while building a cultural foundation of trust, respect and commitment.<sup>68</sup> Additional considerations mentioned by the CIOs include balancing marketing with technical types and being wary of highly knowledgeable functional and technical staff with a potential bias toward the status quo.<sup>69</sup> Bryant College recommends "pairing up visionaries with detailed pragmatists ensuring that planned changes are realistic."<sup>70</sup> Similarly, University of Wisconsin-Madison mentions the value of including new employees who bring a fresh viewpoint to the process along with users who are familiar with the older systems and processes.<sup>71</sup> Western Iowa Tech Community College recommends selecting people with adaptive personalities (i.e., innovators vs. laggards) for reengineering efforts, and limiting involvement of laggard personalities with functional expertise to operational or policy issues.<sup>72</sup>

Project involvement of vendors and consultants is discussed often by practitioners. In order to ensure a successful project, vendors must be fully cognizant of the project mission, organizational culture, processes, and implications of change and should assume some responsibility for the success of the project. Consultant and vendor relations must also be carefully managed. CIOs from UC Berkeley and Yale are adamant in their recommendation that universities "not relinquish project leadership to outsiders!"<sup>73</sup> If consultants are brought in to the project, take measures to ensure that knowledge transfer occurs between the consultants and the project team and organization. Those left behind will be responsible for sustaining the achievements of the external resources.

### **Resistance and Skeptics – in practice**

Scholars provide academic insights into resistance. Academia provides unique resistance challenges. As described by those who have attempted to implement systems within institutions of higher education, resistance can arise from a variety of environmental factors unique to these organizations. Tenure earned within well-entrenched practices, diffusion of authority, politically-rooted organizational structures, silos of closely controlled information, lack of incentives, unwieldy infrastructures and unbending academic cycles are factors within higher education that can create roadblocks to managing change.<sup>74 75</sup> How strong are these roadblocks? Western Iowa Tech Community College goes so far as to say "resistance to change is a powerful force. Expecting change from those who are resistant is futile, even with supportive top-down leadership."<sup>76</sup> This does not mean, however, that steps cannot be taken to mitigate this resistance. WITCC claims that, if they had it to do over, they would emphasize a person's orientation to change rather than their functional expertise when selecting their project team in order to counteract some of the resistance within their project effort.

Cleveland State tackles the resistance born of the higher education culture by working with resisting subcultures until they understand the new initiatives and processes and how they relate to the larger picture. Cleveland State also observed that policy changes meet even greater resistance than process changes and require support from faculty governance bodies, senior administration and, in some cases, the highest governing body of the institution (Trustees or Regents). They noted that “many colleagues report that the inability to get even the simplest policy change has wrecked havoc with their implementation.”<sup>77</sup>

The University of Colorado addressed pockets of resistance inherent in the subcultures of the university by explicitly including traditional resisters in their Acquisition Card project team. Representatives from uniquely challenging departments were purposefully chosen for the project to ensure that their concerns, fears and needs would be addressed throughout the project life cycle. This approach reflects Markus’ interaction theory by recognizing that the project would have a unique impact on each type of subculture represented at the University. Confirming Miller’s strategies regarding the conversion of skeptics, the Acquisition Card project team members and early resisters who were involved in the initial pilot later became champions of the project, speaking at town meetings and advising departments who adopted the system later in the implementation cycle.<sup>78</sup>

Virginia Commonwealth University met initial resistance from sub committee leaders and committee members. The project leader gained the trust of these committees by using a very fundamental technique: listening – meeting with the leaders individually, in their offices and at their convenience. During these meetings the project leader was able to demonstrate both his knowledge and his commitment to doing the right thing.<sup>79</sup>

### **Commitment – in practice**

The readings of system implementations indicate that most institutions address the Psychological determinants of commitment through project involvement and resistor conversion. Implementers found that individuals who became involved with a project in a meaningful way developed a sense of ownership in the project and became committed to the project. By involving impacted subcultures and key political stakeholders, the institutions also addressed Social determinants of commitment.

Institutions seem to universally address the Structural determinants of commitment by recognizing the importance of appropriate project sponsorship. Senior executive sponsorship is critical to establishing cross-boundary commitment; consistent commitment across managers and departments is critical to fostering institution-wide commitment. Many institutions specified that, to ensure organization-wide commitment, the Executive Sponsor should *not* belong to the Information Technology arm of the institution. However, simply having a sponsor is not enough. The sponsor must take on the crusade of selling the project to the institution, i.e., per Schein, of embedding the project effort into the culture of the organization. “Executive level staff need to be visibly supporting the process to ensure acceptance of the development projects... Clearly articulated benefits to the business area help develop this strong commitment.”<sup>80</sup> The sponsor must convince the community that the benefits to be reaped by embracing this change far outweigh the angst that the culture will experience while undergoing the change. To do this, the sponsor must already have forged strong alliances throughout the institution, built credibility and trust, and be respected as a leader. Without this, executive sponsorship will not be an asset to the project. As noted by a discouraged project manager for a troubled PeopleSoft implementation at a major research institution: “Oh, we had a sponsor – but nobody liked him.” [anon]

Practitioners must also deal with situations where involvement, commitment and ownership do not work as planned. Cleveland State’s efforts for shared ownership of their enterprise implementation projects led to the following conclusion: “Ownership by the functional area is to be preferred greatly to ownership residing in Information Services but it doesn’t always work that way. Launching a technical project is to be preferred to inaction as it lends itself to the efficacy of the process redesign. Although the total cost of ownership increases so does the benefit to the end users.”<sup>81</sup> Here we see an example of pragmatic leadership guiding the institution towards their stated goals.

### **Planning – in practice**

Every systems project reviewed for this research included some form of planning. Few included 100 percent of the components gleaned from the review of scholarly works; many included additional aspects. What can be learned from this is that: a) planning is important as a project management tool *and* as a vehicle for weaving the project’s culture into the parent culture; b) planning is made up of many detailed components, some more pertinent than others depending upon the organization; c) the final plan should reflect and fit your institution; and, d) you’re probably going to forget something so it is a good thing that a Plan is a living document which should (must!) reflect the changing nature of the organization. Practitioners’ planning suggestions and observations include:

- Begin with a foundation phase during which time the project forms, the end goal is defined and the means for achieving the goal are laid out providing a grounding for the project team and the organization for the remainder of the project life cycle. This phase culminates with the approval of the project.<sup>82</sup>
- Formalize the “process of discovering assumptions, articulating expectations and building shared vision – instead of assuming that everyone is moving in the same direction toward the same goals.”<sup>83</sup>
- Strategic objectives are necessary regardless of the scope of the project. Whether the implementation involves one department or impacts the entire institution, objectives must be clearly defined and publicized.<sup>84</sup>
- The project vision must be shared by all decision makers. Lack of shared vision will cause delays in implementation tasks due to resistance from those who have not embraced the vision.<sup>85</sup>  
To help insure a shared vision, goals should be realistic for both the people and the institution.<sup>86</sup>
- Clearly define goals *and* the means to achieve those goals. Staff is unlikely to perform according to expectations if they do not know the expectations; staff may assume they ‘may not’ if they are not told that they ‘may.’<sup>87</sup>
- The project mission statement should be long-term and encompass design, development and implementation of the new program and system as well as the design or redesign of processes.<sup>88</sup>
- Practitioners offered a personal view of project initiatives. For example, project goals should answer the question of “what’s in it for me” for each area impacted by the project.<sup>89</sup>
- Because administrative initiatives are closely scrutinized by all constituencies of the university, it is important that success factors and the metrics for evaluating success are developed and sanctioned by these constituencies.
- CIOs from George Washington University and West Virginia University state that “the ability to efficiently and effectively run a large project [is] the single most important attribute of [the project manager], far outweighing any other factor.”<sup>90</sup>
- The project schedule should be realistic, flexible, include all tasks and allow for delays. Frequently overlooked scheduling components include the time to honor pre-project commitments, project initiation (foundation phase), team selection and formation, vendor scheduling, institution-wide review activities, and time for redoing things that don’t work right the first time.<sup>91</sup>
- Develop a “critical issues” list built from the organization’s project expectations, converted to specific tasks and task assignments with measurements for success and completeness.<sup>92</sup>
- Design a Communication Plan addressing formal and informal communications, private and public communication, frequency, methods (email, focus groups, brown bags, town meetings, university newspaper, computing newsletters, university radio and TV, posters, buttons, etc.) and the appropriate audiences for each type of communication. *Each communication should have a purpose.*
- Overlooked in many project plans, but deemed important by many institutions: team building, skills training, risk assessment, documentation resources and contingency planning.
- The “go live” point of the project plan “is a crisis and it calls for crisis management.”<sup>93</sup> It requires quick response capabilities with tools already in place, communication paths determined, problem reporting mechanisms defined and a tracking system ready to track. The ability to provide a quick, competent and effective response to a crisis at a time of significant cultural disruption plays a major role in maintaining (or earning) credibility, trust and continued commitment to the project.
- The project plan must extend beyond the go live date. The organization will continue to move on, the process must move with it.

### **Risks – in practice**

Practitioners build upon the risk factors emphasized by scholars:

- Many enterprise system implementations are attempted after long periods of stabilization. Consequently there is “little organizational experience” with initiatives of this nature or magnitude.<sup>94</sup>
- Institutions often underestimate the magnitude of changes imposed by an enterprise implementation effort and overestimate the ability of the organization to absorb these changes. CIOs from the University of California, Berkeley and Yale University draw upon physics to describe the situation: “...there is built in inertia that makes change difficult. ...an external force is needed to overcome this inertia, and for each action there will be an equal and opposite organizational reaction.”<sup>95</sup> Implementers must predict these reactions and ensure that they move in the direction necessary to achieve the organization’s goals and meld with the organization’s culture.
- The complexity of a system is directly related to the amount of risk involved with the system implementation. To mitigate complexity-related risks, implementers should build specific strategies for working with the application during development, documenting the software, and for testing. System customizations increase

complexity throughout the life of the project including the development, testing and maintenance phases. Failure to understand the risks of customizations “is the most serious mistake administrators can make.”<sup>96</sup>

- An imbalance between near term focus of initiating a project *and* long term planning can cause a “schizophrenia of startup.”<sup>97</sup> Too much emphasis on project startup, planning and preparation can lead to paralysis; too much emphasis on near-term implementation tasks can lead to near-term progress but long-term confusion.
- As noted by scholars, an inadequate decision-making structure is a critical risk factor. The Art Institute of Chicago built their decision-making structure with the goal of enabling steady forward motion of their project. Their structure empowered each level of the project with decision-making authority appropriate to their project responsibilities. The Core Project Team was responsible for software implementation, met weekly and made decisions related directly to the implementation. Another committee (meeting biweekly) was responsible for addressing cross-boundary organizational and integration issues. An Executive Committee included project leads and managers and supplied progress monitoring as well as resolution decision-making authority for the Core Team. The Steering Team included the executive management of the Art Institute; decisions that could not be resolved by the other decision-making teams landed here. This extremely effective decision-making structure builds upon scholars’ recommendations for involving the right people at the right time, granting appropriate levels of responsibility to members throughout the organization, ensuring responsiveness in a timeliness reflective of the issues being addressed and building a structure that is clearly defined and well established within the project and community.<sup>98</sup> CIOs from University of California, Berkeley, Yale University, George Washington University and West Virginia University claim that “consensus decision making does not work for ERP projects.”<sup>99</sup> Their opinion is based upon cultural characteristics found in higher education: the tendency to repeatedly revisit decisions, to perceive a decision as a ‘temporary indication of direction.’ ERP project decisions cross many organizational boundaries and *must* be made quickly. The CIOs conclude that “senior management has to be part of the process.”<sup>100</sup>
- Do not underestimate the amount of effort and stress involved with learning a new system and reengineering business processes while continuing to respond to existing operational demands.
- Everyone involved in the project must remember that the system by itself is not the solution. “The complete solution covers the entire business process, and the system should not be allowed to eclipse that.”<sup>101</sup>
- Assuming that the system will work properly and according to expectation on the first try is dangerous. Implementers should provide hands on experience with the system in conditions that closely mimic the idiosyncrasies of the institution. “Not adhering to this in the early stage of the Banner project was the single largest mistake” admits Rensselaer Polytechnic Institute.<sup>102</sup> Western Iowa Tech Community College included a testing phase simulating an academic term from start to finish in a compressed time frame. Though deemed the most challenging phase, it reaped significant rewards by bringing all of the project teams together to test the system as an integrated solution and by creating “a common deadline for the teams to learn the software, make decisions, build codes and identify processes in a systematic and integrated fashion.”<sup>103</sup>
- Coopers and Lybrand’s Higher Education Consulting Practice states that “the number one hindrance to moving to Client/Server core applications was a lack of appropriate skills in the organization.”<sup>104</sup> “Skills” in this context refers to the ability to work with an organization that is dealing with a drastic shift in attitudes and politics as well as technologies and systems. They recommend that, if an experienced implementer is not already on board, someone should be brought in to help guide the institution through this process.

### **Communication and Training**

Communication and training were mentioned repeatedly by scholars within the context of other concepts. Practitioners focused on communication and training as key success factors in and of themselves.

### **Communication**

Nuggets of wisdom from universities:

*Valparaiso University*: “take your cue from Madison Avenue: to get people’s attention, communication needs to be frequent, repetitive, and perhaps even annoying.”<sup>105</sup>

*Cleveland State*: “Constant communication is mandatory. No matter how often or in what medium you choose to communicate, it is never enough. Use every appropriate means at your disposal to let the campus community know what you are doing but make sure that the communications plan is appropriate to your campus culture.”<sup>106</sup>

*Rice University*: “the most important lesson that we learned... was the need to keep open the channels of communication with all constituencies...”<sup>107</sup>

*Indiana University/Bloomington* guiding principles: “Extensive communication with and support for computer users would be critical to success.”<sup>108</sup>

*Western Iowa Tech Community College*: built a communication plan and a common foundation for the organization to work from. The plan included an Approach Document that provided a history of information systems implementation, the strategic importance of the initiative, the project's organizational structure, goals, roles, responsibilities of the organizational layers, obstacles and the project budget.<sup>109</sup>

*Rensselaer Polytechnic Institute*: The challenge in communication is "to communicate what other people in the community should be aware of *before* 'go live'." Prior projects at Rensselaer caught people off guard because of tardy communications that focused on specific details rather than on overall project process. With Rensselaer's Banner implementation, the project Steering Team assumed the responsibility for communicating with the campus community. A plan was built, information to be communicated was outlined, means of communication were defined and timing was specified.<sup>110</sup> Resting the responsibility of communication with the project's highest project team emphasizes the importance of this project component.

General success factors related to internal (project team) and external (project to organization) communication as reported by practitioners include: setting appropriate expectations; communicating with all affected parties; using multiple means of communication to reach multiple audiences (e.g., email is fast, efficient, self documenting and relatively nonintrusive; face-to-face communication is vital for teamwork and collegiality<sup>111</sup>); providing advance accurate notification of changes allowing time for users to move past an emotional reaction prior to initiation of the change; providing project members with immediate and full-time access to project managers; frequent, regular progress report meetings with directly impacted users; frequent, regular meetings with project managers to discuss developments and tactical concerns; offering opportunities for private communication as appropriate; project-wide meetings at important milestones; and regular unbiased reporting of project progress.

### **Training**

Without training, the implementation will take longer, adaptation will be more problematic and frustration will be higher. A training plan should be developed that includes everyone who will either support or use the new system. Components of a successful training program, as reported by practitioners, include:

- Business process reengineering training and team training prior to project work.<sup>112</sup>
- Extensive documentation
- Appropriate timing, coordinating between project schedule, trainer availability and trainee availability.
- Appropriate training forum (classroom, computer-based, one-on-one).
- Building upon and coordinating with existing training expertise within the institution (staff development offices, professional development centers, IT training programs).<sup>113</sup>
- Function-specific *and* broad-view training.
- Cross-functional training to ensure user understanding of institution-wide processes, new workflows and interdependencies between units in addition to basic system functions.
- Testing the training as part of a pilot implementation and making adjustments prior to full implementation.
- An in-house training curriculum to continue the training cycle beyond implementation. The curriculum should be dynamic, mirroring the dynamic nature of the organization, its processes and systems.

Project planners should be aware that, when training commences, and as the system is deployed, the final training requirements will often exceed initial expectations.

### **CONCLUSIONS**

Based upon the readings, it appears that scholars and practitioners recognize and appreciate many of the same issues integral to the success of system implementations. Practitioners, through the school of hard knocks and years of experiential analysis, have learned "what" seems to work and what doesn't. Scholars, through years of academic study and research, can tell us "why." By blending the whats and the whys, and tossing in a bit of common sense, we strengthen the guidelines for successful implementations.

### **Interaction of technology and the organization**

*"It don't take much to see that something is wrong, but it does take some eyesight to see what will put it right again."* [Will Rogers]

Scholars describe the hazards of implementing systems in an unsuspecting culture. Fortunately, practitioners have recognized the havoc that system implementations can wreak on departments, subcultures and organizations if the efforts are undertaken with a technocentric focus and without consideration for the existing culture. In fact,

forward-thinking institutions are already working from proactive strategic principles that integrate information technology initiatives, culture (values, beliefs and goals) and the organization as a whole. These principles familiarize the organization with the challenges and opportunities offered by information technologies, foster collaboration for the development of information technology initiatives and build a foundation from which IT and the organization can partner in the pursuit of new initiatives.

Bottom line: Cross-cultural understanding that permeates all levels of the organization is an essential element in system implementation efforts; do not attempt a project without it.

### **Involvement**

*“People’s minds are changed through observation and not through argument.” [Will Rogers]*

All concur that a wide swath of representatives must be involved in the project, and that involvement should begin early and last throughout the project. Scholars highlight multiple dimensions, the implications of the desire to be involved and the effect of involvement: predisposition toward IT, perceived ability to contribute, meaningful participation, shared control, heightened awareness and minimized surprises – to name a few.

Practitioner reports reflect full awareness of the value of significant involvement from the user community. They also introduce pragmatic observations: dedicated project space is required; participants must balance involvement with their “regular” employment; project work requires a unique combination of personality traits; and, at some point, the stream of ideas from involved participants needs to be stopped so the system can actually be implemented.

### **Resistance**

*“If you get to thinkin’ you’re a person of some influence, try ordering somebody else’s dog around.” [Will Rogers]*

Scholars present many useful insights and theories regarding resistance. In particular, the interaction theory of resistance, which carries significant credibility based upon higher education’s experiences, points out that resistance may arise from the interaction of a particular person (or group) with a particular system. To counteract this, both sides of the resistance coin must be polished. The scholar’s recommendation is to analyze the current situation first, then make the necessary changes to the organization, then add the system appropriate to the revised organization. In reality, often times an organization cannot be fundamentally changed without the system in place to support the change. *However*, organizations would benefit from adhering to the recommendation to analyze first; they could then set direction and choose a system based upon the organizational vision chosen by the (formal, inclusive) analysis process. Scholars also discuss resistance spawned from the influence a system design can have on organizational power structures. This is seldom mentioned as a pre-implementation variable in the experiential readings although power restructuring outcomes are noted. Awareness of this aspect of a system implementation must be moved up to the inception stages of the project.

Practitioners found that the idiosyncrasies and traditions of universities can make a fertile breeding ground for resisters and are tackling the issue of resistance head on corroborating many of the scholar-recommended techniques.. Bringing resisters into the project early and in a significant way has proven to be an effective technique at more than one institution. (Scholars highly recommend this technique but caution that it is the most difficult.)

### **Commitment**

*“Actual knowledge of the future was never lower, but hope was never higher. Confidence will beat predictions any time.” [Will Rogers]*

Both scholars and practitioners emphasize the importance of commitment to a project. As practitioners struggle to earn this commitment, it is helpful to realize that commitment is mitigated by several influencers as described by scholars: objective, psychological, social, and structural. By recognizing each of these influencing variables, project sponsors can take a more comprehensive approach to building the commitment necessary for the success of the project. Scholars also emphasize the time dimension associated with commitment. Practitioners should not be caught by surprise if commitment takes on an ebb and flow. Instead, be prepared for this aspect of this success factor and include proactive strategies for both renewing and sustaining commitment. Meanwhile, practitioners describe problems of achieving cohesive commitment among disparate university subcultures. Many institutions reported success while others failed to achieve commitment ingredients of single-focused teams or shared ownership. Pragmatists among the latter forged ahead preferring to continue working toward the identified goals of the university rather than wait on the principle of shared ownership.

Yes, commitment is a critical success factor; yes, scholars offer insights; yes, institutions are gaining commitment through many proven techniques; and yes, institutions must work with or without this commitment in a manner most appropriate for their specific organizational cultures.

### **Plan**

*“If you’re ridin’ ahead of the herd, take a look back every now and then to make sure it’s still there.” [Will Rogers]*

Scholars and practitioners alike recognize that neither the organization nor the project is going to know where to go or how to get there without a plan. A plethora of components can go into a plan but it typically begins with a vision and builds from there. The decision of what to put in a plan should be based upon what is needed to initiate, manage, direct, guide, construct, nurture, validate and complete the project within *your* institution. If a component falls into any of these categories, it should be in the plan.

Four C’s describe an effective plan: Clear, Concrete, Comprehensive, Communicated.

### **Risk**

*“Good judgment comes from experience, and a lot of that comes from bad judgment.” [Will Rogers]*

Risk is associated with almost everything we do; it is definitely associated with enterprise-wide systems projects. But just as we can reduce risk in our every day lives, we can proactively reduce project-associated risks. Practitioners have identified key areas of risk that confirm what scholars have outlined. Some of these areas have received a great deal of attention from practitioners; their insights should be required reading for new implementers. Scholars have also given attention to linking individual risk factors to particular dimensions of success (systems development, user satisfaction, quality satisfaction and organizational impact). By analyzing the risk factors present in an institution and weighing them against the success factors most vulnerable to these risks, project managers can proactively turn the tide in favor of success.

### **Communication and Training**

*“The greatest publicity and interest in the world is to be told about something, not to have read about it.”*

*“If you send somebody to teach somebody, be sure that the system you are teaching is better than the system they are practicing.” [Will Rogers]*

Communication and Training were emphasized more heavily by practitioners than by scholars in the readings collected for this study.

Regarding communication:

Identify your audience, select your method, do it! get creative, and do it some more.

Regarding training:

Identify your audience, select your method, do it! get creative, and do it some more.

In other words, both are essential, neither can be overdone and both should be audience-specific. Communication is the glue that holds a culture together; training strengthens the threads of knowledge woven through the culture.

### Endnotes

<sup>1</sup> Deetz, Stanley A., Sarah J. Tracy, and Jennifer Lyn Simpson. *Leading Organizations Through Transition*. Thousand Oaks, London, New Delhi, Sage Publications, Inc., 2000.

<sup>2</sup> P. Phelan, “Implementing Business Applications in a Collaborative Environment.” *Gartner Advisory*, October 3, 2000.

<sup>3</sup> Michael R. Zastrocky and Frank Schlier, “The Higher Education CIO in the 21st Century.” *Educause Quarterly*, 2000, (1), pp. 53-59.

<sup>4</sup> Deetz, et.al, *Leading Organizations Through Transition*

<sup>5</sup> ibid

<sup>6</sup> Ann-Marie Baronas and Meryl Reis Louis, “Restoring A Sense of Control During Implementation: How User Involvement Leads to System Acceptance.” *MIS Quarterly*, March, 1988, (12:1), pp. 111-123.

<sup>7</sup> ibid

<sup>8</sup> Henri Barki and Jon Hartwick, “Measuring User Participation, User Involvement, and User Attitude.” *MIS Quarterly*, March, 1994, (18:1), pp. 59-82.

- 
- <sup>9</sup> Barki, Henri, and Jon Hartwick. "Rethinking the Concept of User Involvement." *MIS Quarterly*, March, 1989, (13:1), pp. 53-63.
- <sup>10</sup> M. Fishbein and I. Ajzen, *Belief, Attitude, Intentions and behavior: An Introduction to Theory and Research*, Addison-Wesley, Boston, MA, 1975.
- <sup>11</sup> Barki and Hartwick, 1989
- <sup>12</sup> Blake Ives and Margrethe H.Olson, "User Involvement and MIS Success: A Review of Research" *Management Science*, May, 1984 (30:5), pp 586-603.
- <sup>13</sup> James E. Huntun and Jesse D. Beeler, "Effects of User Participation in Systems Development: A longitudinal Field Experiment." *MIS Quarterly*, December, 1997 (21:4), pp. 359-388.
- <sup>14</sup> Barki and Hartwick, 1989; Ives and Olson, 1984
- <sup>15</sup> Hunton and Beeler, 1997
- <sup>16</sup> Deetz, et.al, *Leading Organizations Through Transition*
- <sup>17</sup> Hunton and Beeler, 1997
- <sup>18</sup> M. Lynne Markus, "Power, Politics and MIS Implementation." *Communications of the ACD*, June 1983, (26:6), pp. 430-444.
- <sup>19</sup> ibid
- <sup>20</sup> ibid
- <sup>21</sup> Glen M. Miller "Beyond a Reasonable Doubt." *CIO Magazine*, December 1, 1999.
- <sup>22</sup> ibid
- <sup>23</sup> Deetz, et.al, *Leading Organizations Through Transition*
- <sup>24</sup> Michael Newman and Rajiv Sabherwal, "Determinants of Commitment to Information Systems Development: A Longitudinal Investigation." *MIS Quarterly*, March 1996, (20:1), pp. 23-54.
- <sup>25</sup> B.M. Staw, "Counterforces to Change." *Change in Organizations: New Perspectives on Theory, Research and Practice*, P.S. Goodman (ed.), Jossey-Bass Inc., San Francisco, CA, 1982. pp. 87-121.
- <sup>26</sup> H.S. Becker, "Notes on the Concept of Commitment." *American Journal of Sociology*, July, 1960, (66:1), pp. 32-40.
- <sup>27</sup> G.R. Salancik, "Commitment and the Control of Organizational Behavior and Belief." *New Directions in Organizational Behavior*, B. Staw and G.R. Salancik (eds.), St. Clair Press, Chicago, IL, 1977, pp. 1-54.
- <sup>28</sup> Michael J. Ginzberg, "Key Recurrent Issues in the MIS Implementation Process." *MIS Quarterly*, June, 1981, (5:2), pp. 47-59.
- <sup>29</sup> ibid
- <sup>30</sup> Edgar H. Schein, *Organizational Culture and Leadership*, San Francisco, CA, Jossey-Bass, Inc., 1992.
- <sup>31</sup> Newman and Sabherwal, 1996
- <sup>32</sup> ibid
- <sup>33</sup> Ginzberg, 1981
- <sup>34</sup> Jeff Sweat, "Learning Curve." *Informationweek.com*, August 2, 1999.
- <sup>35</sup> E. Gerson and S.L. Star, "Analyzing due process in the workplace." *ACM Transactions on Office Information Systems*, 1986, (4), pp. 403-417.
- <sup>36</sup> Deetz, et.al, *Leading Organizations Through Transition*
- <sup>37</sup> Ginzberg, 1981
- <sup>38</sup> Phelan, 2000
- <sup>39</sup> ibid
- <sup>40</sup> James J. Jiang and Gary Klein, "Risks to different aspects of system success." *Information & Management*, November, 1999 (36:5), pp. 263-272.
- <sup>41</sup> ibid
- <sup>42</sup> Blake Ives, Margrethe H. Olson, and Jack J. Baroudi, "The Measurement of User Information Satisfaction" *Communications of the ACM*, October, 1983 (26:10), pp. 785-793.
- <sup>43</sup> Walter M. Bortz, "Implementing a culture of Change. A Five Year Transformation of The George Washington University." *CAUSE Proceedings*, 1994.
- <sup>44</sup> Ann F. Trost and J. Michael Yohe, "Chasms and Bridges on the Path to a New Administrative System." <http://www.valpo.edu/home/staff/myohe/papers/99chasm/99chasmd.htm>.
- <sup>45</sup> Linda May, Janet Gordon, Robin Beck, and Noam Arzt, "Architecture and re-engineering: Partnership for change at the University of Pennsylvania." *CAUSE Proceedings*, 1994.
- <sup>46</sup> Lynn A. DeNoia, "The Art and Politics of Re-engineering Under Crisis Conditions." *CAUSE Proceedings*, 1994.
- <sup>47</sup> Craig A. Stewart, Douglas Grover and Vernon, R. David, "Changing (Almost) Everything and Keeping (Almost) Everyone Happy." *CAUSE/EFFECT*, 1998, (21:3).
- <sup>48</sup> May, et al., 1994
- <sup>49</sup> Bortz, 1994.

- 
- <sup>50</sup> Diana C. Allen and Harry D. Smith, "Captive Clients: The High Road To Customer Involvement." *CUMREC Proceedings*, 1996.
- <sup>51</sup> Stephen Patrick and Ellen Watson, "From Mainframe to client/Server – a Success Story." *CUMREC Proceedings*, 1997.
- <sup>52</sup> Roger A. Lurie, "A Recipe for Success: Departmental Client/Server Application Development." *CUMREC Proceedings*, 1997.
- <sup>53</sup> Jonathan Lindsay and Michael Dillon, "Managing the Critical Path: Implementing PeopleSoft's Enterprise-Wide System." *CUMREC Proceedings*. 1998.
- <sup>54</sup> Kathe Graham and Paula J. Vaughan, "University of Colorado Acquisition Card Project A Successful Partnership of Program, Process and Systems." *CAUSE/EFFECT*, Winter 1997-98, (20:4), pp. 52-57.
- <sup>55</sup> Gayle E. Jaacks and Michael Kurtz, "Lessons Learned in Process Reengineering at a Community College." *CAUSE/EFFECT*, (22:4).
- <sup>56</sup> J. Fred Gage, "Making PeopleSoft Administrative Systems Work: the Case for Business Process Redesign." *CAUSE Proceedings*, 1998.
- <sup>57</sup> Graham and Vaughan, 1997
- <sup>58</sup> Calvin Chan and Osmond Chen, "A User-Centered Approach to Student Information Systems Design." *EDUCAUSE Proceedings*, 2000.
- <sup>59</sup> Victoria Bellotte and Ian Smith, "Informing the Design of an Information Management System with Iterative Fieldwork." *Symposium on Designing Interactive Systems: processes, practices, methods and techniques Proceedings*, August, 2000.
- <sup>60</sup> Patrick and Watson, 1997
- <sup>61</sup> May, et al., 1994
- <sup>62</sup> Catherine Middleton, "A Tale of Two Systems? Success and Failure in a Single Information System Implementation." <http://hsb.baylor.edu/ramsower/acis/papers/cmiddlet.htm>.
- <sup>63</sup> DeNoia, 1994
- <sup>64</sup> Jaacks and Kurtz, 1999
- <sup>65</sup> Stewart, et al., 1998
- <sup>66</sup> Gage, 1998.
- <sup>67</sup> Jack McCredie and Dan Updegrove. "Enterprise System Implementations: Lessons from the Trenches." *CAUSE/EFFECT*, 1999, (22:4).
- <sup>68</sup> May, et al., 1994
- <sup>69</sup> McCredie and Updegrove, 1999
- <sup>70</sup> DeNoia, 1994
- <sup>71</sup> Chan and Chen, 2000
- <sup>72</sup> Jaacks and Kurtz, 1999
- <sup>73</sup> McCredie and Updegrove, 1999
- <sup>74</sup> Bortz, 1994; Gage, 1998
- <sup>75</sup> Frank Tait, "Education Process Engineering: A Template Tailored for Higher Education." *CAUSE/EFFECT*, 1999, (22:1).
- <sup>76</sup> Jaacks and Kurtz, 1999
- <sup>77</sup> Gage, 1998
- <sup>78</sup> Graham and Vaughan, 1997
- <sup>79</sup> Jim Bostick, "Of Teams and White Papers: Do Working Groups Work?" *SIGUCCS Proceedings*, 1999. pp 21-25.
- <sup>80</sup> Allen and Smith, 1996.
- <sup>81</sup> Gage, 1998
- <sup>82</sup> John D. Wilder, "Implementation Projects: Land Mines and Other Lessons." *EDUCAUSE Proceedings*, 1999
- <sup>83</sup> DeNoia, 1994.
- <sup>84</sup> Tait, 1999
- <sup>85</sup> Lindsay, 1998.
- <sup>86</sup> DeNoia, 1994
- <sup>87</sup> Lindsay and Dillon, 1998
- <sup>88</sup> Graham and Vaughan, 1997
- <sup>89</sup> Tait, 1999
- <sup>90</sup> Dave Swartz and Ken Orgill, "Higher Education ERP: Lessons Learned." *EDUCAUSE Proceedings*, 2000.
- <sup>91</sup> DeNoia, 1994; Trost and Yohe; Wilder, 1999
- <sup>92</sup> Jaacks and Kurtz, 1999
- <sup>93</sup> Wilder, 1999
- <sup>94</sup> ibid
- <sup>95</sup> McCredie and Updegrove, 1999
- <sup>96</sup> Joel M. Smith "Avoiding Problems in Implementing Administrative Systems." *Educause Quarterly*, 2000, (1), pp. 50-52.
- <sup>97</sup> Wilder, 1999
- <sup>98</sup> Lindsay and Dillon, 1998
- <sup>99</sup> Swartz and Orgill, 2000; McCredie and Updegrove, 1999
- <sup>100</sup> McCredie and Updegrove, 1999

- 
- <sup>101</sup> Wilder, 1999  
<sup>102</sup> *ibid*  
<sup>103</sup> Jaacks and Kurtz, 1999  
<sup>104</sup> Peter Segall, Dale Johnson, Michael O’Leary, and Elizabeth Connelly, “Key Issues and Best Practices in Administrative Computing.” *CUMREC Proceedings*, 1997.  
<sup>105</sup> Trost and Yohe  
<sup>106</sup> Gage, 1998  
<sup>107</sup> Thomas J. Hochstettler, Barry P. McFarland, Andrea Martin, and Joseph Watters Jr. “We Built the House Around Us: Simultaneous Process Reengineering and System Replacement at Rice University.” *CAUSE Proceedings*, 1998  
<sup>108</sup> Stewart et al., 1998  
<sup>109</sup> Jaacks and Kurtz, 1999  
<sup>110</sup> Wilder, 1999  
<sup>111</sup> Trost and Yohe  
<sup>112</sup> Jaacks and Kurtz, 1999  
<sup>113</sup> Kristin Bruno, Barbara Vrana and Linda Welz, “Practical Process Engineering for Higher Education.” *CAUSE Proceedings*. 1998.  
And  
Ayres, Alex (ed). *The Wit and Wisdom of Will Rogers*. NY, NY, Penguin Books, 1993.