

# Preface

## **Significance of the ERP Phenomenon**

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Enterprise resource planning (ERP) was a major success story of the 1990s. By 1998, 40 percent of multinational organizations with a turnover of \$1 billion had replaced their outdated “legacy systems” with an ERP system, hoping to achieve integration across functions and departments. The trend of ERP adoption has continued into higher education around the world, with a substantial number of implementations. Although famous failures have been reported in the press (Gilbert, 2004), very few studies of ERP implementations in a university environment have been presented in the literature.

Universities are medium to large organizations with significant export capabilities. For example, Griffith University in Australia, which is the research site for six of the case studies in this book, has twice won the state’s export award in recognition of its contribution to the nation’s export industry. We expect the findings reported in this book to be relevant to other industries of similar standing in the country’s economy.

There is a relatively small number of scholarly publications within the information systems (IS) community on ERP systems compared to the size of the business they generate (Esteves & Pastor, 2001). Esteves and Pastor even claimed in their annotated bibliography of ERP literature that research on ERP systems has been treated as a “secondary” and neglected by the IS community (p. 3). Other researchers also argued the need for more investigations into ERP (Allen & Kern, 2001; Gable, 1998).

The lack of publications discussing the ERP implementation and use of an ERP system within a university environment is clear. One of the few papers was based in the United Kingdom and was written by Allen and Kern (2001). This book addresses this gap in the IS literature, with discussion of ERP implementation cases on three continents.

## **The ERP Implementation**

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ERPs evolved from materials requirements planning (MRP) systems, initiated in the 1970s to reduce inventories, lead times, and costs; improve market responsiveness; improve control; and improve organizational communication (Light, Holland, Kelly, & Wills, 2000). MRP later evolved to materials resource planning (MRP II) and then to enterprise resource planning (ERP), which attempts to integrate systems holistically across an organization with the aims of improving productivity, reducing costs, and aiding in planning (Ascompt Technologies, 2001). The evolution of ERP systems continues into new markets with the extension of interorganizational processes, such as supply chain management and customer relationship management (Hillegersberg & Kumar, 2000). Siau and Messersmith (2003) suggested that the next generation of ERP will need to evolve further, with support for multiple linked organizations across multiple sites incorporating technologies for mobile commerce, with advances in 24–7 availability, security, maintainability, and data sharing and integration.

A “silver bullet” ERPs are not. The implementation of ERP is problematic because of the packaged nature of the software. Packaged software should, if successfully implemented, satisfy the different information needs of different organizations and users in different industries and release the burden of maintaining the companies’ “legacy systems” (Swanson, 2003). However, the cross-industry definition of “best practice” of an ERP system does not guarantee a problem-free implementation, because an organization has to adjust its business processes to fit the package or build extra functionality around the package, often requiring a consulting company’s help and guidance through the implementation.

Packaged business software has long been in use. Its popularity escalated along with the advent of personal computers. Research that was carried out among small companies prior to the rise of the use of ERP packages in large organizations indicated that although by acquiring a “shrink-wrapped” software package a small company may avoid costly development of a general-purpose business package, the users required a lot of help in order to be fully satisfied with the package (von Hellens, 1991).

The life cycle of ERP implementation first focuses on mapping the organization’s information requirements to the processes and terminology employed by the software vendor and setting the software system parameters to suit the organization. Tailoring the package and adjusting existing organizational processes to fit the software then follows. Adjusting software to the organization is a major undertaking and is beyond what many information technology (IT) departments can offer; therefore, the implementation is often outsourced. This means that the organizations that purchase an ERP system enter into long term relationships with both the software vendor and the implementation company. It is not

surprising that major consulting companies found ERP to be a significant source of business (Swanson, 2003).

When successfully implemented, ERPs can offer operational, managerial, and strategic benefits. They are often promoted as being the solution for organizational IT integration problems (Siau & Messersmith, 2003) and a way to centralize data for improved decision making. Organizations reaping these benefits were reported; however, cases reporting failures are more prevalent. Criticisms of ERP systems include their significant up front investments, lengthy and error prone customizations, and mediocre results. Other identified critical success factors include top management support, project champions, teamwork and composition, project management, and change management and culture (Fui-Hoon Nah, Zuckweller, & Lee-Shang Lau, 2003). Whether the result is a success or a failure, and inconsequential of whether or not this specific projected amount is accurate, the monetary costs are clear. According to Al-Mashari (2003), it was projected in 1998 that in 2002, “organizations’ total spending on ERP applications would reach \$72.63 billion.” Al Mashari also suggested that it is now more urgent than ever to establish a research agenda to help us to understand the issues surrounding an unsuccessful (and successful) implementation.

The expected adherence to the best practices encouraged by ERPs can cause confusion in organizations (Siau & Messersmith, 2003), as best practice is a subjective term and, as with success, is often measured by various people according to different criteria. Adding to this confusion are the attempts at adjusting ERP for organizational fit, a factor that is particularly relevant to the adoption by higher education institutes. ERPs have been developed for private-sector corporate organizations, with little effort made to fit them to universities, except for making available a student administration system.

## **Entry of ERP into Higher Education**

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A recent special issue of the *International Journal of Human-Computer Interaction* focused on ERP management and social and organizational issues. Of particular interest is the article by Siau and Messersmith (2003) that examines the end-user perspective of an ERP implementation in a public university. The user focus and particular context (public university) explored in Siau and Messersmith’s (2003) article provide a detailed discussion, one of the few presented in the literature. A number of the discussions presented in this book provide a similar perspective. The primary context for discussion is the public higher education sector, particularly the university sector. Qualitative studies of

this nature have been clearly missing from the literature on IS, in comparison to the very large costs and revenues that ERP systems generate (Esteves & Pastor, 2001). Organizations are only now realizing the need to constantly update and maintain their implemented ERP systems and the significant costs of keeping up with the rate of business change. The criticality of these factors is evident across the cases presented in this book.

It is suggested that an influential factor essential for success is the integration of end-users into the implementation process (Siau & Messersmith, 2003). End users are commonly viewed as passive participants in ERP implementations. The impact of not involving them in this type of complex, difficult, and often lengthy implementation could result in user resistance far more severe than can be predicted. Universities such as Royal Melbourne Institute of Technology in Melbourne, Australia, have almost reached breaking point, while other universities are engaging in legal actions against vendors and consulting companies (Gilbert, 2004).

Following the example of large corporations, universities are increasingly replacing their management and administration computer systems. Universities' problems are similar to those of a wide range of organizations, and the standard tools of contemporary organizational analysis and institutional management can be similarly applied. These tools include computer systems such as ERP software (Pollock & Cornford, 2004).

ERP vendors and implementation consultants tailored their products for new markets, with the higher education sector being one of the emerging adopting industries. PeopleSoft® is the leading ERP vendor for the university sector (Wieder, 1999). PeopleSoft ERP has a strong position in the market of human resource management, and within the university environment, often complements this module with a financial and student administration module. Many universities worldwide (McCredie & Updegrove, 1999) and in Australia (Beekhuyzen, Goodwin, & Nielsen, 2002) adopted an ERP solution in order to cope with the changing environment of the higher education sector (Noble, 1998; Crase, Freund, Liu, Mahoney, & Pasternack, 2000; Brown, 2002). Little research has been conducted regarding ERP implementations in the university environment, compared to the actual number of ERP implementations in the higher education sector worldwide (Orgill & Swartz, 2000), and specifically in Australia (CAUDIT, 2001).

Reported factors that limited the implementation success of these projects include budget overruns and lack of functionality (Lawnham, 2001; Brown, 2002; Madden, 2002). Oliver and Romm (2000) investigated why universities wanted to adopt ERP systems, but the shortcoming of this research was that it consisted of secondary research data, collected through Web sites of the ERP projects at universities in Australia and the United States. Mahrer's (1999) research investigated the impact an ERP system can have on a university. The

researcher reported on a successful ERP implementation in a Swiss university and thought strong communication and coherence between the departments in the university comprised the primary factor for success.

Universities face the typical ERP obstacle of how much customization should be done to the ERP package to fit the organization, or conversely, how can the university initiate changes in order to fit the organization to the ERP package (Cornford & Pollock, 2001). ERP systems are based on “best business practices,” which are “defined structures of doing business operations” that the implementing organization can choose to exploit (Davenport, 1998; O’Leary, 2000). Lozinsky and Wahl (1998) made the same claim as the ERP vendors selling these packages — that they have “universal applicability.” However, critiques of this stance exist, suggesting that the assumptions made of how an organization is operating do not always fit with the university operations (Cunningham, Tapsall, Ryan, Stedman, Bagdon, & Flew, 1998). Heiskanen, Newman, and Similä (2000) found industry best practice standards in ERP packages to be inappropriate for universities due to their unique and impossible-to-model structures and decision-making processes. Their argument draws on the first authors’ significant experience in managing IT in Finland’s largest university. Several organizations are, nevertheless, still adopting ERP packages and deciding to match their organizations to the systems rather than the other way around (Davenport, 1998; Markus, Axline, Petrie, & Tanis, 2000; Koch, 2001).

The Allen and Kern (2001) study of four ERP implementations in UK universities found that the ERP projects placed the universities in complex relationships with the ERP vendors and implementation consultants. Furthermore, the academic culture in universities made it particularly hard to implement such large systems. McConachie (2001) found that university staff wanted “a” system but were afraid of the complexity of an ERP system. Chang, Gable, Smythe, and Timbrell (2000) looked at the importance of knowledge management in ERP implementations in the public sector in Australia. They concluded that knowledge management had to be taken into account to successfully implement an ERP system. Many universities are implementing ERP systems, as a solution to their information systems needs, with varying results in terms of success.

The significance of the cases presented in this book are underlined by the recent production of another book that provides a collection of 18 research papers from academics around the world, examining the use of ERP to improve existing business processes (Shanks, Seddon, & Willocks, 2003). Cases highlighted in this book include a much-publicized disaster-ridden implementation at the Royal Melbourne Institute of Technology (RMIT). The problematic PeopleSoft Academic Management system implementation was reported (Turner, 2004) to have had significant issues “with virtually every aspect of the implementation of the \$47 million software system that went live in October 2001.” It was suggested that the university “did not manage the project appropriately, had a poor implementation plan, little senior management involvement,

poor corporate governance and a lack of accurate documentation.” This case is by no means unique, with further evidence of ERP failures within universities brought about by recent media interest.

The attorney general of Ohio laid charges on behalf of Cleveland State University against the ERP vendor PeopleSoft and its consulting partner Kaludis Consulting Group for “failing to fulfill its contractual duties.” More than US\$130 million is sought for compensatory and punitive damages (Gilbert, 2004). With the student administration system being a source of many problems, administering student financial aid and keeping student records in sync caused irreparable damage.

Due to the pervasiveness of ERP adoptions within the higher education sector (including 36 out of a possible 42 adoptions by universities in Australia in 2002), and more traditionally within the corporate environment, ERP systems are of interest to a wide range of professional and scholarly communities, in addition to the academic fields of information systems (Esteves & Pastor, 2001), where many cases have been reported.

## **Organization of the Book**

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Although the editors’ original objective was to focus on ERP implementation in the higher education sector, our call for papers attracted a number of interesting contributions discussing other sectors. The chapters are characterized by their references to a number of seminal studies in information systems research.

Section 1 consists of a variety of ERP implementation approaches, including two contrasting grounded theory investigations, a study of communication during the implementation, a health-sector case using relational governance, and a description of ERP implementation in a complex environment of a consolidated college system.

The chapters in Section 2 all refer to Lynne Marcus’s paper on information systems implementation (1983) and provide further illustration of the significance of the interaction between organizational and technical factors in information systems implementation.

The chapters in Section 3 are concerned with critical success factors and the perceptions of information systems success. The content relies heavily on the DeLone and McLeod model of information systems success (1992 and 2003).

## **Section 1: ERP Implementation Approaches**

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In Part 1, five different ERP implementations are discussed, including those of universities on both sides of the Atlantic (the United States, Spain, and Israel), a community and technical college system in the United States, and a Western rural hospital. Apart from Chapter 4, they all report substantial research studies critiquing the respective implementation approach. Chapter 4 illustrates PeopleSoft implementation into a complex administration of a recently consolidated college system and the benefits the college achieved through ERP.

In Chapter 1, “Sociotechnical Aspects of ERP Implementation: The Central Role of Communication,” Dov Te’eni investigates development and appropriation of ERP (Oracle®) as a collaborative effort that relies on communication for its success. The consequences of communication problems of the implementation of human resource and student information systems modules are illustrated, including the escalating costs due to the delays and unacceptable level of service to the university personnel who did not receive their appointments in time. An analysis of the communication problems demonstrates how communication is affected by the organizational context and how communication affects ERP success. The chapter looks at content and form of communication by utilizing a framework for researching communication (Urquhart, 2001) and extends this framework for investigation of the gap between the sender and receiver prior to the communication, recognizing the different interests of the developers and the users.

Actual incidents of communication breakdowns are used to clarify the impact of communication gaps and communication complexity on mutual understanding and relationships between communicators. The chapter also discusses how these factors affect critical success factors of ERP, such as commitment and involvement, user acceptance, and monitoring and feedback. Examples are given of effective communication forms, and advice on how to develop these “effective” forms of communication is provided.

An important implication is that communication in ERP has to be structured and managed. The qualitative methodology employed relies on records of the communication between the actors, so that for the researcher, communication also tells the story of the collaboration between the ERP actors. It is suggested that communication complexity and breakdowns can serve as diagnostic tools that should alert management to take corrective action to improve involvement and user acceptance and to stop the growing resistance.

Chapter 2, “Postimplementation Use of a Complex Technology: The Case of a Southeastern U.S. University” by Marie-Claude Boudreau reports on a substantial qualitative research study conducted within a Southeastern U.S. university. The study investigated how organizational members appropriated an ERP package (PeopleSoft) over time.

In this chapter, the implementation of an ERP (PeopleSoft) is observed during a 15-month period, starting one month before the ERP going live. Particular emphasis is on users' learning to cope with the new system and how the work practices evolved as the users became more experienced with the system. The findings suggest that the practice of informal learning was key in understanding how organizational members transited from one state of use to another. The users learned from each other in a variety of ways, including "watercooler" conversations, casual questioning of more knowledgeable users, and spontaneous demonstrations of some of the systems' functioning.

A framework suggested by Lassila and Brancheau (1999), which distinguishes different states of software usage, was found to be particularly appropriate in understanding ERP usage and how it evolved over time. The method of research was the version of grounded theory methodology that allowed the use of an existing theory. The data analysis was supported by the software Atlas.ti®. The chapter also gives helpful details of how this software is used.

The chapter is a very good illustration of different transition patterns of use exhibited by organizational members. The different types of users found different ways to overcome the problems of ERP use and to progress to higher levels of use. Existing research indicates assimilation of new work processes constituting a major knowledge barrier for ERP implementation and suggests formal training and phased implementation to remove the barrier. This chapter highlights a third method — informal learning and structures that encourage such learning — to facilitate the assimilation of new work processes associated with ERP.

Chapter 3, "Understanding an ERP System Implementation in a Higher Education Institution: A Grounded Theory Approach" by Jose Esteves and Joan Pastor, addresses the problem of ERP implementation in the higher education sector. The chapter contributes to the understanding of ERP implementations in the higher education sector by identifying and analyzing the major factors that affect these types of projects. In particular, the chapter explores contextual influence and organizational factors. Esteves and Pastor suggest that most of the problems of ERP implementation projects are not technological; instead, they can be attributed to organizational factors. The chapter describes an in-depth case study of the implementation of a well-known European software system in 2001.

The case study is based on a substantial research study of a "big bang" implementation, i.e., going live with all ERP modules at the same time using a grounded theory approach. The chapter also describes the conceptual model that was developed and discusses in detail the strategic and organizational factors that contributed to the success of the implementation.

In Chapter 4, "ERP and New Organizational Capabilities: The Example of the Kentucky Community and Technical College System" Roy Tapp, Jon Hesselden,

Linda Morefield, and George Kelley discuss the organizational impact of a newly implemented ERP system on the daily and strategic functioning of the Kentucky Community and Technical College System. This chapter is an interesting report of a successful ERP (PeopleSoft) implementation, pointing out some of the benefits achieved through the ERP. The college's newly implemented ERP system enabled new organizational capabilities in the areas of recruitment, retention, and credential transparency, and also became the official basis for institutional funding. In addition, in the face of a surge in enrollments and a related shift in the number and type of academic credentials awarded by the college, the new ERP system also helped the institution enhance its ability to adapt to change, create new knowledge and performance measures, and even identify a new strategic horizon. Given the recent news about PeopleSoft's troubled run in the education IT market, it is fascinating to learn about relatively successful implementations.

The case study described in Chapter 5, "Technology Innovation in a Small Rural Hospital" by Sheila K. McGinnis, Carla Wiggins, Kenneth Trimmer, and Lela "Kitty" Pumphrey is not in higher education, but it is an interesting example of a successful ERP implementation in a health-sector organization. The chapter describes an ERP adoption in a rural Western hospital and how management actions contributed to the success of its implementation. The case explores the leaders' role in strategic adaptation, innovation, and governance to support their pursuit of superior quality. Their approach to ERP implementation may be effective in other organizations that are not driven by profits, such as government-funded education.

The case study illustrates how the leaders of a small, rural hospital were able to successfully introduce and institutionalize a strategic change in information technologies. The ERP provides the connectivity between departments and helps to overcome some of the problems of rural health care. The chapter reviews strategic change leadership and common theories of innovation and governance, and proposes that governance may be better understood as a form of social control. A manager can use collaboration and social ties to align goals and improve intraorganizational integration. The relational form of governance as opposed to bureaucratic, control-based governance seems especially appropriate for understanding IT governance in the hospital setting.

The case study investigates how a hospital's top management team used managerial discretion to create and institutionalize a strategic information technology innovation, which in this case is MEDITECH, an enterprise-wide information system. The system was initially acquired in 1991. Since its initial implementation, for financial function the hospital has invested heavily in IT for more than a decade, expanding the system and aiming to convert physicians and nurses to a paperless system and to provide a wireless network throughout the hospital.

The case suggests that relational governance is important in successful implementation of IT change, due to its positive effect on professional integration. In

this case, the key IT staff who “internalized leading from a visionary place” spearheaded IT and quality improvement horizontally throughout the organization.

## **Section 2: Culture and Politics in ERP Adoption and Implementation**

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All of the chapters in this book give weight to the social and organizational processes involved in ERP implementation, but the chapters in this section explicitly use cultural and political theories and concepts to interpret what is going on in each case. In Chapter 6, the author’s use of four dimensions of Hofstede’s model of national culture (Hofstede, 1980) identifies some factors that do not support the model. In Chapter 7, metaphor analysis is used to examine the symbolic significance of the ERP implementation. Chapter 8 provides a bridge between the cultural and political perspectives, using the analogy of a battleground to present the results of an intensive case of ERP implementation. In Chapters 9 and 10, the political perspectives vary from Bradshaw’s (1998) notions of surface-personal power, surface-structural power, and deep-cultural power, to the metaphor of Turner’s (1974) social drama, in Chapter 10, which helps show the shifts in power in the arena of ERP implementation. The final chapter in this section uses the widely cited French and Raven (1959) framework to analyze user resistance. The cases, therefore, contribute not only to our understanding of the problems and benefits of ERP implementation but also to our appreciation of a number of theories, frameworks, and methods for analyzing information systems implementation and use.

In Chapter 6, “What Went Wrong? Lessons Learned from Studying ERP Implementation Across Cultures,” Celia Romm Livermore addresses the lack of research into the context and nature of managerial decision making. She discusses her investigation of the implementation of a SAP system in two manufacturing companies in Israel and the United States, which displayed two different decision-making styles — centralized and decentralized. She utilizes four dimensions of Hofstede’s model of national culture — power distance, uncertainty avoidance, individualism/collectivism, and masculinity/femininity — to explore decision-making patterns underlying the implementation of the ERP systems. The two cases show how culture can influence patterns of decision making during the implementation process as well as the outcomes of ERP implementations. The lessons learned are applied to the university sector, and the two cases provide a useful perspective from a different industry.

In Chapter 7, “Metaphorically Speaking, Does Culture Matter?,” the view narrows to users’ perceptions of an ERP subsystem designed to manage the large and ever-changing number of part-time and “sessional” academic staff in an IT department. Jenine Beekhuyzen, taking a symbolic view of organizational cul-

ture, uses metaphor analysis to elicit users' views of the sessional staff system during its trial in an Australian university. This case is particularly interesting because of its focus on IT academics as users and the use of metaphors to frame the interview questions. The cost of the subsystem led to its abandonment despite the effort invested in its trial, but this case still provides useful lessons about the influence of academic culture on user acceptance of information systems.

In Chapter 8, "Looking Back, Looking In and Looking On: Treading Over the ERP Battleground," Dave Oliver and Marilyn Van Dyke use a battlefield metaphor to explore the way that ERP adoption is justified to staff, and the subsequent staff reaction. Their case studies used ethnographic methods to create a rich description of the events leading to ERP adoption in a central Queensland university, as well as to the context for the decision making. Management's representation of the ERP to the university staff created a dissonance between expectations and the reality of the implementation. The authors emphasize the difficulties of understanding the complexity of ERP implementation and the need to present these difficulties in a realistic light to all the staff involved. They stress that because of this complexity, the adoption of ERP systems needs to be understood as a learning process. The difficulty of planning for ERP implementation underlines the importance of publishing case studies such as this so that more can be learned about the problems likely to be encountered.

Cherilyn Randolph and Rebecca Main point out in Chapter 9, "Exploring the Power and Politics of a PeopleSoft® Implementation," that lessons learned from ERP implementation changed the way an Australian university approaches new information systems. They investigate resistance to the implementation of the financial management systems of a widely used ERP and explain how this resistance decreased once the motivations of the financial management group became clearer. This chapter also emphasizes the importance of the organizational context — in this case, a highly devolved management structure — and the way that unconstructive political behavior can be avoided. The authors found that, in this case, the implementation team modified the best practices embedded in the ERP in order to cope with the political behavior associated with the implementation. Randolph and Main emphasize the political nature of systems implementation and the need to pay as much attention to change management as to the hardware and software aspects of the implementation.

In Chapter 10, "Managing Complexity and Institutionalization: Power and Politics in ERP Implementation in an Australian University," Brian Corbitt, Konrad Peszynski, and Olaf Boon emphasize the political nature of information systems implementation and the need to look beyond technology and cost considerations. They draw on Foucault's (1977) critique of the power-knowledge relationship and use Turner's (1974) notion of social drama to explain the history of staff resistance to ERP. In this case, ERP implementation was compli-

cated by the complexity of the university structure, with several diverse faculties operating independently on six campuses. The authors identified the key role of the project champion who was able to use position power to resolve the political problems and realize the benefits of the ERP.

The final chapter of this section (Chapter 11), “Tales of Resistance in an Australian University,” provides a detailed view of one group of users and the reasons for their resistance to the student administration subsystem of the ERP. The dedication of the faculty administrative staff to their student clientele and their frustration with the new system led to them work around the system in order to effectively carry out their work. Matt Goodwin’s argument is similar to that presented in Chapter 8. Rather than promote the benefits of the ERP, management would be better advised to acknowledge the difficulties and certainly not attempt to reduce staff numbers as a means of achieving efficiency. The author also argues that although resistance is viewed as undesirable and something to be overcome, it is not necessarily destructive or unproductive. In this case, the resistance derived from staff’s perception of the implementation team’s efforts to involve users as “tokenistic” and the system as unworkable and punitive to staff and other stakeholders.

The cultural and political perspectives in this section inevitably focus on the difficulties of ERP implementation. Many of these cases describe implementations that were not successfully completed at the time of publication. However, they also provide lessons for future implementations and, in some cases, instances where cultural understanding and the positive use of power enabled benefits to be gained from ERP adoption. All of the chapters acknowledge the seminal work in this area, particularly that of Lynne Markus (1983) and her coauthors.

### **Section 3: Information Systems Success**

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The papers in this section discuss ERP system success. Four of the five cases presented here explore the same research site, providing different views of success and quality, or at least perceived success of the ERP implementation. This provides a good overview of one particular implementation. The other chapter presented here discusses the implementation of a campus management system and is interesting as it is conducted in one of four university global pilot sites for SAP. There has been much discussion about the critical success factors in ERP implementations in the literature (see table in Nielsen, Chapter 13); however, the university environment has been largely neglected in these discussions. Underlying these discussions of success is that quality, whether system or information, plays an important role in achieving any level of success.

In Chapter 12, “Evaluating the North American Pilot for SAP’s Campus Management System,” Kathryn F. Gates investigates the implementation of a cam-

pus management system, which is one of four pilot implementations globally for SAP. This pilot complemented those being undertaken at the University of Basel in Switzerland, the University of Newcastle in Great Britain, and the Katholieke Universiteit in Belgium. Gates provides a case rich with examples, with the institution playing an important role in the development of product functionality and enabling some functionality of the system to be “tested in the field.” Particularly, Gates explores the critical success factors for a successful implementation within a university environment, with a focus on the transition from main-frame to ERP, exploring the organizational issues and project management. She proposes critical success factors and suggests strategies for making the transition to ERP in an educational setting.

One specific benefit of the new campus management system presented includes the availability of Web registrations. The new system now allows access to this functionality 24 hours a day. Previously, access was not available after 9 p.m. each night due to nightly production jobs necessary for data integrity.

Particular transition strategies for the universities include having a policy on how software modifications will take place; configuring the ERP to meet institutional need; having adequate technical support of the system; and having a clear bottom line and using powerful configuration capabilities in the software for a more flexible integration.

The major organizational issues deemed necessary for success include having support from high-level management, having a transparent and clear decision-making process, and having sound change management practices in place. Critical project management issues also need to be addressed.

In Chapter 13, “Critical Success Factors for Implementing an ERP System,” Jens Laurits Nielsen presents his framework of critical success factors, based on existing frameworks and theories of DeLone and McLean (1992, 2003), Brown and Vessey (1999), and Holland and Light (1999), in particular. He identified 29 unique critical success factors presented in the literature, none of which focus on higher education.

Nielsen’s interviewees discussed 22 of these 29 factors, with four new factors being presented that were not identified in the literature. The new factors include competitive edge, service for students, knowledge management, and system ownership. Nielsen’s model broadly defines an approach to critical success factors with a focus on strategic factors, organizational context, system quality, information quality, project scope, and user satisfaction and use. He then uses this model to make sense of the data.

Chapter 14, “Implementation Factors that Affect ERP System Success,” by Craig Chatfield, explores system success in terms of system quality. Based on his study of an early part of an ERP implementation, he suggests that many incorrect assumptions were made about the implementing environment and the

users of the system. Ineffective change management and support strategies were identified, and it is said that this, in turn, reduced the overall system quality and thus the benefits to the organization.

Chatfield uses DeLone and McLean's Information System Success Model for analysis. However, this study does not seek to measure each of the success criteria, but rather examines the influence of the implementation phases and decisions on these measures of success. One clear negative impact was the reduced timeframe of the implementation, resulting in increased stress on all users due to the deployment of users to the project team, and not replacing people in their regular positions. Also, due to the reduced timeframe, the user analysis was excluded. The training was said to be very useful; however, it was very task-oriented and lacked a holistic view, leaving users unsure of the implications of the impact of errors in the system.

In terms of system quality, there was generally low user satisfaction and problems with initial use of the system in terms of ease of use. Chatfield's suggestions for the future focus on the importance of tailoring user training, change management, and support strategies to the specific organization's culture and users.

In Chapter 15, "Academic and Business Users: A Model of ERP User Acceptance," Nicole Mayer also draws on DeLone and McLean's model of IS success to analyze two user groups involved in an implementation in an academic environment. The academic and business users are assessed to determine which success factors have the greatest impact on system uptake and, ultimately, success. She proposes her own model of user acceptance that incorporates factors of success from DeLone and McLean (1992, 2003) and Lucas (1975). Factors explored are system and information quality, attitudes and perceptions, training quality, user ability, and user's situational and personal factors.

Mayer's analysis suggests that training had the greatest impact on the business user group, with the techniques used creating favorable impressions of the system. The reputation of the vendor PeopleSoft also contributed to this positive view. The academic users, however, had much more difficulty accepting the system.

Both groups portrayed strong personal and cultural background influences as well as workplace influences. Overall, the business users seemed to better accept the system than the academic users. The positive outlook could be attributed to the particularly strong culture and history of the business group. It is believed that these positive perceptions had a large impact on the business users' acceptance of the system.

Chapter 16, "Achieving Strategic Goals: The Role of ERP and the Influence of Use Quality," presents a project by Michelle Morley to investigate strategic information systems planning (Earl, 1989, 1990) within the international center of a large Australian University. Recent changes in higher education in Australia

lia have made universities strive for competitiveness to survive. This necessity forces universities to place great importance on attracting and recruiting overseas, full-fee-paying students. “Internationalization” is one of the university’s five commitments expressed in their mission statements, and there is a goal of increasing international student numbers. Therefore, the ERP implementation had significant impact and implications for the strategic formulation of the international center.

A framework for IS use quality is presented, which is a synthesis of the use quality models put forth by Eriksson and Törn (1990), Salmela (1997), and Lindroos (1997). The model helps us to understand the strategic role of ERP, without judging the overall success or failure of the system. The study is useful in that it highlights the significant effect of what may seem to be a small problem, and how this can cause difficulties in the execution of key business strategies.

Morley concludes that the newly implemented ERP did not adequately support the execution of organizational strategy and the achievement of goals set by the university. The use quality issues resulted from a mismatch between the intended and actual roles of the system. The system also lacked support for the formulation of organizational strategy within the international center. Commonly shared perceptions of users were that the system was slow, complex, and uncontrollable (or at least uncontrolled). This system (or possibly even just the perception of it) resulted in constraints on users’ work. This suggested that culture was also an important consideration in gaining value from a large-scale information systems investment such as this.

## **Main Themes**

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Each case presents a discussion of the implementation of an ERP module or of the entire system. Each case is an in-depth study of the problems and issues in the organization. The qualitative research highlights contextual issues, mapping them against existing research and theoretical frameworks. Given the approach to research generalization beyond the case under investigation is not easy. In this section, we try to summarize some of the common themes highlighted in the collection of cases.

### **Lack of User Involvement**

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In most of the case studies, the authors report that users perceived their lack of involvement in decision making as a key issue. In some cases, an important

group of employees felt their information needs were neglected. A typical example in the university is to involve administration staff in the implementation, whereas academics whose work practices are heavily affected by the new business system were not involved until they were advised about the immediate changes. Intuitively, it would make sense to not bother the academics too much, because ERP is basically about streamlining and integrating administrative functions. However, the origins of ERP software are in integrating manufacturing processes, which are distinctively different from the processes in an information industry such as higher education.

Although there are similarities between “best business practice” in the manufacturing sector and other industries, the differences warrant attention as long as they are associated with the core business and competition. The technical core in the higher education sector is teaching and research, including content and curriculum development, as well as administration processes for overseeing the progress of students. The core business of universities is teaching and research, the quality of which is very dependent on the individuals involved. A cultural analysis also indicates different subcultures among the employees, for example, the academic staff versus administration staff (Mayer, Chapter 15). In such an environment, all users should be involved in decision making in the early stages of analysis.

Celia Romm Livermore (Chapter 6) warns that the decision-making style should be aligned with national cultural characteristics. Centralization of decision making in an egalitarian culture is bound to lead to user resistance. In other cases (Goodwin, Chapter 11; Oliver and Van Dyke, Chapter 8), the users reported that although they were consulted during the implementation process, they believed that the consultation was motivated by the need to appease users rather than to really involve them in the implementation.

## **Communication Gap between Users and Implementation Staff**

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Problems in systems development and implementation are often attributed to the communication gap between users and IT experts. Many of the cases in this book report on the communication problems between personnel and the implementation or project team. Goodwin (Chapter 11) points to personnel's perceptions of lack of sincerity and openness among the project team in their dealings with the student administration staff.

Communication problems were reported in every stage of the implementation. Early on during the implementation, users were especially uncomfortable about the new system's “semantic jargon.” Boudreau (Chapter 2) observed a heavy burden on the people originating the information, and the minimal amount of

training the users received was not helping either. In another case, the changes in terminology were annoying and confusing; “courses” needed to be called “programs,” and “subjects” needed to be called “courses.” Because this basic university and course information is distributed around the world to potential and current students, it is not surprising that staff became preoccupied with correcting the misunderstandings that the changes in terminology caused.

An extreme case of poor communication was reported by Te’eni (Chapter 1). In the design stage of the human resource module, communication between the main users and the IT professionals broke down, and the users did not have meaningful communication with the university’s own IT staff or the ERP supplier (Oracle). Users wanted to talk about the impact on processes, whereas IT people concentrated on the implications for technology resulting from lack of user acceptance, poor user involvement, and growing resistance to change.

The communication breakdown was not corrected until later, when an organizational consultant was appointed to initiate reassessment of the system, and the implementation returned to the analysis stage. The impact of poor communication caused an unacceptable level of human resource service in a large university, including significant delays in staff salary payments.

Other cases are more concerned with the way that university or company management communicated the benefits and the need for the ERP system to the other stakeholders. For example, Oliver and Van Dyke (Chapter 8) report dissatisfaction with the management communication style and the participant’s need for clear and comprehensive information to be provided about the project, especially about matters of serious concern, such as potential job losses.

## **Resistance Toward the New System**

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Many users realized that the complexity of the ERP system and the high cost of customization meant that their suggestions were unlikely to be taken. However, as Oliver and Van Dyke (Chapter 8) point out, it might be more ethical and effective for management to be honest about the likely problems rather than promote the ERP as a panacea for the existing systems problems.

Lack of effective user involvement is likely to decrease user engagement and, in some cases, may lead to user resistance. Goodwin (Chapter 11) reports that staff developed ways of working around the new student administration subsystem, both to maintain their previous level of service and to avoid an increase in their workload. Boudreau (Chapter 2) also reported on systems being used in slightly different ways from their original purposes and observed “work-arounds” and “tweaking.” As users develop counterproductive habits, it is unlikely that an organization will reap the full benefits of the new system integration, if staff put their energies into developing other ways of working. Assimilation of new

work processes is a major knowledge barrier in ERP implementation. Boudreau suggests that encouraging “informal learning” among all users might be the way to overcome the knowledge barrier, especially if the informal learning supports the formal training that is offered.

## **Perceived Lack of Power**

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The four chapters in this book that explicitly use a political perspective emphasize the impact of ERP systems on organizational structure and the distribution of power.

Oliver and van Dyke (Chapter 8) report the widespread view that the ERP implementation partner had a greater degree of control than the senior management. The staff members in Goodwin’s (Chapter 11) study were also skeptical of the project team’s power to instigate real changes to the ERP.

On a positive note, Randolph and Main (Chapter 9) report that in a university characterized by a highly devolved management structure, resistance to the ERP system was alleviated by effective communication and reconciliation between the different stakeholders. Another positive note was a case organization’s shift to relational governance, reported by McGinnis, Wiggins, Trimmer, and Pumphrey (Chapter 5). The key IT staff served to institutionalize the strategic and operational innovations enabled by the ERP within the organizational culture. Relational governance and social norms for quality improvement reinforced motivation and brought culture change in the form of organizational learning, an increased capacity to improve, and professional integration.

Overall, the significance of culture and the need to assess existing power structures are emphasized in most of these cases. Failure to align the implementation process with the prevailing organizational climate and lack of openness by management about the likely problems and outcomes exacerbated the already difficult and complex implementation task.

In contrast, Corbitt, Peszynski, and Boon (Chapter 10) also report on a positive outcome that accrued from the presence of a project champion who was influential in moving a decentralized university operating on several campuses toward the centralized decision making that was required to gain the full benefit of the ERP implementation.

## **Importance of Organizational Context and History**

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Overall, the authors view the ERP implementation process as a complex and intricate problem reflecting the complexity, intricacy, and scope of the ERP

system. The need to take into account all aspects of an organization's culture, structure, politics, and history are emphasized in all the cases. User perceptions of the ERP system and the implementation process are affected not only by the functionality of the system and the expertise and behavior of the implementation team, but also by their organizational contexts and histories. Many of the staff members in the organizations described in these cases appear to be "change weary." In the case reported by Goodwin (Chapter 11), the staff were still affected by an organizational restructure that centralized most of the student administration personnel and that left the administrative officers in the various academic departments feeling understaffed and overworked.

The rapid rate of change in the wider industry context is also very important, and it influences staff perceptions as well as management goals. The modern context includes the increasingly competitive nature of the international higher education industry and the need for universities to respond to a diverse range of pressures from the government as well as from other stakeholders, such as international students and industry associations.

## **Future Directions**

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The cases in this book are examples of an increasing number of user studies, all of which could inform and direct the software houses involved in ERP development and the consulting companies offering implementation services.

ERP implementation in universities is costly, but so are the alternatives, as mentioned earlier. Even though ERP systems provide platforms from which to improve business by integrating the underlying administration processes, they suffer from their packaged software attributes. Purchasing a software system and not needing to build one may achieve immediate "savings," but there are hidden implementation costs that become apparent at a later stage.

The ERP implementation studies rely on existing theories of IT implementation, all of which have limitations and fail to fully explain implementation problems and to advise on how to successfully implement an ERP. We hope the case studies presented in this book will encourage researchers to develop a more comprehensive theory of ERP implementation.

## **References**

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- Al-Mashari, M. (2003). Enterprise resource planning (ERP) systems: A research agenda. *Industrial Management and Data Systems*, 103(1), 22–27.

- Allen, D., & Kern, T. (2001). Enterprise resource planning implementation: Stories of power, politics and resistance. *IFIP Working Group 8.2 Conference on Realigning Research and Practice in Information Systems Development: The Social and Organizational Perspective*. Boise, ID.
- Ascompt Technologies. (2001). FAQ. Retrieved March 18, 2001, from the World Wide Web: <http://www.ascomp.com/support/faqs/index.htm>
- Beekhuyzen, J., Goodwin, M., & Nielsen, J. L. (2002). ERP in universities: The Australian explosion. *Proceedings of the 13th Australasian Conference on Information Systems (ACIS)*. Melbourne, Australia.
- Bradshaw, P. (1998). Power as dynamic tension and its implications for radical organizational change. *European Journal of Work and Organizational Psychology*, 7(2), 121–143.
- Brown, C., & Vessey, I. (1999). ERP implementation approaches: Toward a contingency framework. *Proceedings of the 20th International Conference on Information Systems (ICIS)*. Charlotte, NC.
- Brown, P. (2002). Rocky road to hi-tech admin. *The Australian*. Sydney, p. 20.
- CAUDIT. (2001). Updated information on administrative systems — October 2001, Council of Australian University Directors of Information Technology, CAUDIT. Retrieved July 2, 2001, from the World Wide Web: <http://www.caudit.edu.au>
- Chang, S.-I., Gable, G. G., Smythe, E., & Timbrell, G. (2000). A Delphi examination of public sector ERP implementation issues. *Proceedings of the 21st International Conference on Information Systems*. Brisbane, Australia.
- Cornford, J., & Pollock, N. (2001). Customising industry standard computer systems for universities: ERP systems and the university as an “unique” organisation. *Critical Management Studies Conference*, July 11–13. UMIST, England.
- Cruse, M., Freund, S. A., Liu, Mahoney, & Pasternack. (2000). Managing IT initiatives at the largest university system in North America. *Sixth Americas Conference on Information Systems*. Long Beach, CA.
- Cunningham, S., Tapsall, S., Ryan, Y., Stedman, L., Bagdon, K., & Flew, T. (1998). *New media and borderless education: A review of the convergence between global media networks and higher education provision*. Evaluations and Investigations Program, Higher Education Division, Canberra: Department of Employment, Education, Training and Youth Affairs, AGPS.
- Davenport, T. H. (1998). Putting the enterprise into the enterprise system. *Harvard Business Review*, 76, 121–131.

- DeLone, W. H., & McLean, E. R. (1992). Information systems success: The quest for the dependent variable. *Information Systems Research*, 3(1), 60–95.
- DeLone, W. H., & McLean, E. R. (2003). The DeLone and McLean model of information systems success: A ten-year update. *Journal of Management Information Systems*, 19(4), 9–30.
- Earl, M. (1989). *Management strategies for information technology*. Harlow, England: Prentice Hall.
- Earl, M. (1990). Approaches to strategic information systems planning experience in twenty-one United Kingdom companies. *Proceedings of the 11th International Conference on Information Systems*. Copenhagen Denmark.
- Eriksson, I., & Törn, A. (1990). SOLE — Research on information systems quality. *Proceedings of the Software Quality Workshop*, Dundee Institute of Technology, June 26–27. Dundee, Scotland.
- Esteves, J., & Pastor, J. (2001). Enterprise resource planning systems research: An annotated bibliography. *Communications of the Association for Information Systems*, 7(8), 1–52.
- Foucault, M. (1977). *The archaeology of knowledge*. London: Tavistock.
- French, J. R. P., & Raven, B. H. (1959). The bases of social power. In D. Cartwright (Ed.), *Studies in social power*. Ann Arbor, MI: University of Michigan Press.
- Fui-Hoon Nah, F., Zuckweller, K. M., & Lee-Shang Lau, J. (2003). ERP implementation: Chief information officers' perceptions of critical success factors. *International Journal of Human–Computer Interaction*, 16(1), 5–22.
- Gable, G. G. (1998). Large package software: A neglected technology? *Journal of Global Information Management*, 6(3), 3–4.
- Gilbert, A. (2004). PeopleSoft sued over U.S. Uni project, ZDNews. Retrieved April 1, 2004, from the World Wide Web: <http://www.zdnet.com.au/news/software/0,2000061733,39143607,00.htm>
- Heiskanen, A., Newman, M., & Similä, J. (2000). The social dynamics of software development. *Accounting, Management & Information Technology*, 10(1), 1–32.
- Hillegersberg, J. v., & Kumar, K. (2000). ERP experience and evolution. *Communications of the ACM*, 43(4), 23–26.
- Hofstede, G. (1980). *Culture consequences: International difference in work related values*. Thousand Oaks, CA: Sage Publications.
- Holland, C. P., & Light, B. (1999). A critical success factors model for ERP implementation. *IEEE Software*, 16(3), 30–36.

- Koch, C. (2001). BPR and ERP: Realising a vision of process with IT. *Business Process Management Journal*, 7(3), 258–265.
- Lassila, K. S., & Brancheau, J. C. (1999). Adoption and utilization of commercial software packages: Exploring utilization equilibria, transitions, triggers, and tracks. *Journal of Management Information Systems*, 16(2), 63–90.
- Lawnham, P. (2001). Software costs soar. *The Australian*. Sydney, p. 37.
- Light, B., Holland, C. P., Kelly, S., & Wills, K. (2000). Best of breed IT strategy: An alternative to enterprise resource planning systems. *Proceedings of the Eighth European Conference on Information Systems (ECIS)*. Vienna, Austria, Vienna University of Economics and Business Administration.
- Lindroos, K. (1997). Use quality and the World Wide Web. *Information and Software Technology*, 39(12), 827–836.
- Lozinsky, S., & Wahl, P. (1998). *Enterprise-wide software solutions*. Reading, MA: Addison Wesley.
- Lucas, H. C., Jr. (1975). Performance and the use of an information system. *Management Science*, 21(8), 908–919.
- Madden, J. (2002). Software system a flop, but RMIT has ways of covering costs. *The Australian*. Sydney, p. 31.
- Mahrer, H. (1999). SAP R/3 implementation at the ETH Zurich: A higher education management success story. *Fifth Americas Conference on Information Systems*. Milwaukee, WI.
- Markus, L. (1983). Power, politics and MIS implementation. *Communications of the ACM*, 26(8).
- Markus, M. L., Axline, S., Petrie, D., & Tanis, C. (2000). Learning from adopters' experiences with ERP: Problems encountered and success achieved. *Journal of Information Technology*, 15(4), 245–266.
- McConachie, J. (2001). The effect of sub-cultures on the implementation of an enterprise system: An Australian regional university perspective. *Learning Technologies 2001*. South Pacific Resort, Noosa, Queensland, Australia.
- McCredie, J., & Updegrove, D. (1999). Enterprise system implementations: Lessons from the trenches. *CAUSE/EFFECT*, 22(4), 1–10.
- Noble, D. F. (1998). Digital diploma mills: The automation of higher education. *First Monday* (3). Retrieved April 2, 2004, from the World Wide Web: <http://members.aol.com/rebryn/disslink.htm>
- O'Leary, D. E. (2000). *Enterprise resource planning systems: Systems, life cycles, electronic commerce, and risk*. New York: Cambridge University Press.
- Oliver, D., & Romm, C. (2000). Issues in university administration systems: A regional Australian case. *Proceedings of the 15th Annual Conference of*

- the International Academy for Information Management (IAIM)*. Brisbane, Australia.
- Orgill, K., & Swartz, D. (2000). Higher education ERP: Lessons learned. Retrieved September 6, 2001, from the World Wide Web: <http://www.gwu.edu/~cio/presentations/erp.html>
- Pollock, N., & Cornford, J. (2004). ERP systems and the university as a “unique” organization. *Information Technology and People*, 17(1), 31–52.
- Salmela, H. (1997). From information systems quality to sustainable business quality. *Information and Software Technology*, 39(12), 819–826.
- Shanks, G., Seddon, P. B., & Willcocks, L. P. (Eds.). (2003). *Second-wave enterprise resource planning systems*. New York: Cambridge University Press.
- Siau, K., & Messersmith, J. (2003). Analyzing ERP implementation at a public university using the innovative strategy model. *International Journal of Human–Computer Interaction*, 16(1), 57–80.
- Swanson, E. B. (2003). Innovating with packaged business software: Toward an assessment. In G. Shanks, P. B. Seddon, & L. P. Willcocks (Eds.), *Second-wave enterprise resource planning systems* (pp. 56–73). New York: Cambridge University Press.
- Turner, A. (2004). ERP rides the second wave. *The Age Newspaper*. Sydney.
- Turner, V. W. (1974). *Dramas, fields, and metaphors: Symbolic action in human society*. London: Cornell University Press.
- Urquhart C. (2001). Analysts and clients in organisations: A conversational view. *Journal of Strategic Information Systems*, 10(3), 243–262.
- von Hellens, L. A. (1991). Application software packages for small companies: Implementation success and supplier strategy. *Proceedings of the 24th Hawaii International Conference on System Sciences* (pp. 446–457), January 8–11. Kailua-Kona, HI.
- Wieder, B. (1999). ERP-software integration at Australian universities — recent developments in integrated business education. *CTI Accounting Finance & Management Conference 1999*. Brighton, UK.