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THE ROLE OF COMMUNITY COLLEGE REGISTRARS
IN RELATION TO STUDENT INFORMATION SYSTEMS IMPLEMENTATION

by

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A dissertation submitted in partial fulfillment of the requirements
for the degree of Doctor of Education
in the Department of Educational Research, Technology and Leadership
in the College of Education
at the University of Central Florida
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ABSTRACT

This study examined the effects of implementing Web-enabled technology systems on the functional role of the community college registrar. The focus on systems implementation included in-house, outsourced, consortia, or combination of implementation strategies. A quantitative and qualitative approach included several interviews and a mailed survey questionnaire. The researcher developed the instrument from human resources position description forms, an adapted administrative Q-sort technique, and a role conflict and ambiguity perception questionnaire. The study targeted the members of the American Association of Collegiate Registrars and Admissions Officers.

The research findings indicated that some aspects of perceived role, role conflict (harmony), and ambiguity (clarity) were different for registrars whose colleges used in-house, outsourced, consortium, or a combination of implementation strategies, and for certain background characteristics. For example, the study identified different levels of involvement for some duties and some differences in collaboration among divisions and departments within institutions and with other organizations. Suggested uses of the research results include professional development programming for more efficient technology implementation. The research instrument could be adapted to study functional role of other job positions, implementation projects, and administrative strategies.

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CHAPTER 1 – OVERVIEW OF THE STUDY

Introduction

After more than two decades of widespread computer mainframe technology use, an increasing number of community colleges in the United States have converted or are in the process of converting student information systems to Web-enabled technology (Green, 2002). A variety of homegrown, consortium-purchased (Spiwak, 2000; Widmayer, 1999), and proprietary systems (Halttunen, 2002) have been used. These implementations have followed a variety of information technology administration organization strategies, including in-house and outsourced (Braz et al. 2003). The implementation phase, once complete, is followed by scheduled upgrades, while looking ahead to future technological enhancements, as the cycle continues (Cunningham, 2003).

The role of the registrar within the community college organization is referred to herein as the functional role. This role includes a bundle of job duties and responsibilities, which has over time varied somewhat from college to college. This variation was on the list of most important topics of the American Association of Collegiate Registrars and Admissions Officers at the organization's first meeting in 1910 (AACRAO, 2003a). The community college registrar is typically a key stakeholder with regard to student information systems. As stewards of student information, registrars must protect the privacy of the data while allowing access by others through technology (Siblock, 1997).

Lanier's 1995 article in *College and University*, the journal of the American Association of Collegiate Registrars and Admissions Officers (AACRAO), suggested that the role of the college registrar was changing. According to Lanier, since the year 1200 the registrar existed as a top level official, controlling enrollment, course records, student records, transcript evaluations and dissemination, degree notation, graduation ceremonies, and system development. These officers were often responsible for admissions, enrollment management, and institutional reporting until external forces, such as competition for students and regional accreditation bodies, influenced the creation of other departments for these duties in many cases. Lanier emphasized that the college registrar must stay current and involved as technology develops or risk relegation to a clerical position, or even extinction.

Student information systems are the centerpieces of higher education administrative systems, interfacing with all other administrative information technology systems and many peripherals. The systems promote sound enrollment management by providing for automated conveniences (Dauphinais, 1998) and continuous registration (DeCristoforo, 1996) to facilitate students' individual circumstances. Students can, from a place convenient to them, at any time, tour an institution, meet the faculty, process their admission application, view course catalogs, self-advise, self-register, monitor openings in classes, access the degree audit at the time of registration, and pay for their classes. Student reports are defined and provided, and security is enforced. Marketing is enhanced with timely and valuable information. Accountability is improved with ready access to data analysis. With varied responsibilities registrars' offices can play key roles in planning and implementing sound enrollment management activities (DeCristoforo).

The process of implementing a new Web-enabled student information system at a community college may have an impact on the registrar's job duties, as well as cause role conflict and role ambiguity. This impact may vary with implementation strategies or background characteristics of the college and the registrar.

This study focused on the changes, if any, to the functional role of community college registrars as a social aspect of the implementation of information systems. With the assumption that individuals' realities are developed socially, the study will help identify registrars' roles within variable political and social contexts related to systems implementation projects and information technology implementation strategies. This study should contribute to the understanding of information systems implementation.

Purpose of Study

The purpose of this study was to describe the effect, if any, of the process of implementing Web-enabled technology systems on the functional role of the community college registrar. More specifically, the study sought to determine how the registrars' job duties might differ based upon implementation strategy and also key background characteristics. Information technology implementation strategies were classified as in-house, outsourced, consortium, or combination strategies. Perceptions of role conflict and role ambiguity associated with systems implementation and key background characteristics were also studied.

Research Questions and Sub-Questions

A research question and three sub-questions were proposed for this study. The following research question was proposed: What are the perceived differences, if any, in the functional role of community college registrars involved in Web-enabled student information systems implementation projects compared to those who are not involved in such projects? The following sub-questions were proposed:

1. What are the self-perceived job duties and responsibilities, role conflict, and role ambiguity for registrars involved in the process of Web-enabled student systems implementation and for registrars who are not involved in systems implementation?

2. What is the relationship between the type of information technology implementation strategy: (a) in-house; (b) outsourced; (c) consortium; or (d) combination strategies, and the registrars' self-perceived job duties and responsibilities, role conflict, and role ambiguity?

3. To what extent do registrars who are involved in Web-enabled student systems implementation differ in self-perceived job duties and responsibilities, role conflict, and role ambiguity by background characteristics?

Definitions

1. Community colleges – These are public or private institutions of higher education that typically grant Associate Degrees and Certificates, and also offer non-college credit and community enrichment programs.

2. Functional role – Refers to a combination of self-perceived job duties and responsibilities of community college registrars.

3. Student Information Systems – Refers to computer hardware and software that provide processes for recruitment, admissions, advising, registration, enrollment

certification, grades processing, graduation, and alumni data management, and are integrated with other systems and peripheral equipment.

4. Information systems administration strategy – This refers to a college’s administrative decision to: (a) retain equipment and employees necessary to operate the institution’s administrative systems; (b) hire outside companies or consultants to administer, develop or provide equipment, software, and employees for the administrative systems; or (c) join a consortium of colleges.
other systems and peripheral equipment.

5. Registrars – Refers to community college professionals, typically charged with academic calendars, course catalogs, class and facility scheduling, enrolling students, record keeping, grade processing, enrollment certification, and graduation processing. Registrars are often involved with telecommunications, networks, Internet portals, desktop data importing and report publishing, and security systems, among other technologies (Huddleston, 2000).

6. Student Information Systems – Refers to computer hardware and software that provide processes for recruitment, admissions, advising, registration, enrollment certification, grades processing, graduation, and alumni data management, and are integrated with other systems and peripheral equipment.

7. Systems implementation – Involves the processes of installing and setting up new information systems, including all that must occur so that a new technology can be managed and used by all who need access.

8. Web-enabled – Includes networks, security systems, hardware, and integrated software that allow information systems to interface with telecommunications and the World Wide Web for on-line searching and transactions by end users.

Significance of the Study

A major objective of Web-enabled student information systems implementation projects at community colleges is improved student success (Kyne, Miller, & Norton, 2002). However, the progress of technology in higher education is relatively slow compared to business and industry (Green, 2001). For example, Kiernan (2003) reported that a longer than expected time frame was required to implement a campus-wide technology security enhancement which seemed relatively simple. The change, considered essential to administrators, was resisted, and even criticized by some. Systems implementation can take years, requiring continued commitment and work efforts (Olsen, 2003a). Brown and Hagel (2003) wrote that many businesses failed to use the advantages of new technology because they did not change practices. The American Association of Collegiate Registrars and Admissions Officers (AACRAO, 2003b) recognized that members need to better understand and implement integrated systems and services necessary to higher education. Their first annual conference directed at implementing technology took place in October 2003. This was nearly a decade after large-scale projects began at many higher education institutions.

Community college registrars are functionally responsible for student information (Huddleston, 2000; Scarlett, 1984a). As mentioned above, concern for college registrars' functional role, or job duties and responsibilities, has been the focus of their national

professional association since it began in 1910 (AACRAO, 2003a). One academic researcher who targeted community college registrars focused on their opinions and uses of computers (Brewer, 1987). Another focused on perceptions regarding enrollment management (Simpson, 1997). The research conducted by Butler (1985) was more aligned with this study. Butler studied all third level community college administrators' perceptions of their roles, current issues, and frustrations. Butler made recommendations for reform so that colleges may be more effective with regard to the role of these administrators. Registrars are typically among this third level of administrators. They report to the executive administrators at the second level. The executive administrators report to the president at the first level (Butler).

This researcher did not find empirical research focused on technology implementation and how it affects the functional role of the community college registrar. However, as Web-enabled student information systems create an increasingly global environment for access (Green, 2002), registrars are at risk of sacrificing data integrity and security (Siblock, 1997). Increased access to information is necessary to respond to market and legislative imperatives (Carnevale, 2001; Florida Statutes, 2002) and to expand the concept of community (Jonassen, 1995; Jonassen, Peck, & Wilson, 1999). The implementation projects are costly, challenging, and sometimes confusing, involving extensive integration and collaboration (Green, 2001; Halttunen, 2002; Hossler, 2000; McCredie & Updegrave, 1999; Watts, 2003).

Studies of technology outsourcing reported that as many as 20 percent of the higher education institutions currently outsource at least portions of their information technology (AACRAO, 2003c; Braz, et al. 2001;). Some institutions aligned more or less with

vendor consultants for implementation (Doucette, 2001; Smith, 1999). Controversy regarding changes and controls abounded as colleges and universities worked to stay current in technology applications for administration, enrollment, and instruction (Olsen, 2003a). College registrars are often central to systems implementation efforts because enrollment systems are the largest and interface with all others in the institution. Their functional role may be affected by the changes implicit in technology integration and also changes associated with various implementation strategies. Web-enabled student information systems implementations provide an opportunity for study of the effects of technology implementation on functional role. The results of the study may apply to implementation of periodic system upgrades and future technologies.

Pollard's (2001) research concerned changes in mental well-being, blood pressure and cholesterol levels during workplace reorganization and especially the impact of uncertainty. He found that role conflict and role ambiguity associated with workplace reorganization could contribute to significant health problems. This study is an attempt to identify role conflict and role ambiguity associated with workplace changes experienced by community college registrars as a result of technology implementation.

Conceptual Framework

Practical guidelines and research for higher education systems implementation emerged in recent years (Carnevale, 2001a; Doucette, 2001; Gilbert & Ehrmann, 2002; Halttunen, 2002; Hirt, Murray, & McBee, 2000; McCredie & Updegrove, 1999; Miles & Healy, 1998). Some researchers studied the objective aspects of systems implementation, and some studied the subjective or social aspects (Sarker, 2000). Focus shifted somewhat

from concern for things to concern for people, with regard to determinants of success. For example, Sarker described a long trend of systems implementation research that focused on object-oriented aspects. These are the things involved in technology, such as facilities, equipment, software, and even technical skills. Sarker presented the reasons for the change in emphasis to subjective, or social aspects, as an evolution of systems implementation understanding from a static phenomenon to a process mediated by people, to a school of thought that combines social and technical understanding. Sarker (2000) argued that subjective realities, such as an individual person's thinking and understanding, must be addressed. These subjective realities also include political and symbolic issues. Political scientists and policy analysts addressed implications associated with technology, expanded communities, and education (Hirt, Murray, & McBee, 2000; Kahne, 1994; Kezar, 2000). Other theorists, such as Willower (1991) and Lassner (2000), recognized the political processes involved in school improvement.

According to Getzels, Lipham, and Campbell (1968), studies of conflicting roles can help initiate positive change. These theorists and researchers maintained that visible conflicts may be catalysts for adjustments in a system and that awareness of the causes of role conflict gives researchers problems for study. Katz and Kahn (1978) described organizations as systems of roles involving behavior that was extrinsically motivated by the rewards of membership, and was a process of learning what others expect, accepting the learned expectations, and fulfilling those expectations. Stewart (1982) studied options for managers who held the same functional role. She maintained that demands, constraints, and perceptions of choice influenced how managers carried out their roles

within their units and outside their units. Results indicated that these choices changed from time to time in a job, should be recognized, and the possibilities evaluated.

Getzels, Lipham, and Campbell (1968) taught students of educational administration that behaviors of individuals in organizations varied with roles and personalities. Administrators' formal relationships in bureaucracies were based mostly on "function rather than emotion; however perceptions, needs, and preferences existed with regard to what and who was involved, and were difficult to determine" (p. 88). The functional aspect of the registrar's role was studied because this usage of the concept of role involves what occurs in the social system of the organization. Role was considered by Getzels, Lipham, and Campbell to be the most important unit for study within an institution (p. 59).

The subjective roles of influencer and relationship builder, often informal in nature, were identified as important in Becker's research (1999). She used the leadership frames inventory (Bolman & Deal, 1997) to study subjective aspects of systems implementation from the point of view of the official college-wide technology administrator, the chief information officer. The person in the registrar's position is a key user of information systems. The community college registrar, as a department head, may also be an influencer and relationship builder as a representative of the user community. He or she may also be a technologically skilled individual with current knowledge of systems implementation based on training and experience.

Sarker (2000) adapted Leavitt's (1965) objective organizational model for systems implementation which included: (a) formally structured objects; (b) programming and other specific tasks; (c) job titles and descriptions; and (d) technology objects such as

mainframe, local access networks, etc. According to social systems theory, however, these objects were actually processes. They comprised, for example, the educational process portion of schooling. These objects, or processes, were preceded by inputs emanating from society and succeeded by outputs directed toward society (Owens, 2001). Sarker (2000) conducted a more subjective empirical study of systems implementation to add subjective realities to Leavitt's model. This study recognized issues such as informality in structure, more satisfying tasks, trained and qualified personnel, and technology that helps the organization, or its constituents.

Wang (2002) found that communication, support, and encouragement from administrators were key to successful implementation of systems, as it was often difficult for people to understand what was happening and how to gain access to a system. Sociologists, psychologists, and philosophers looked at role changes in relation to reaching agreement in groups (Klein, Conn, Smith, & Sorra, 2001), and concepts of seeing oneself in the future (McInerney, 2000) as issues for management awareness. Although many researchers have long recognized that successful school leadership required understanding people, technology implementation researchers have more recently recognized this.

A major challenge with respect to implementing new Web-enabled student information systems was the traditional nature of colleges and universities. The historical organization of colleges and universities was unsuited to new forms of technology delivery and few of them have significantly reorganized or altered roles to ensure optimal use of educational technologies (Bates, 2000; Murphy, 2002; Palloff & Pratt, 1999; Poley, 2001; Shields, 2000). Linear alignments of organizational structure did not allow

colleges to seize some advantages of new technology and other opportunities (Dauphinais, 1998). Those who were most aligned with tradition may have felt a loss as change occurred (Dauphinais; Olsen, 2003). Those who had a need for structure and identity may have become more stressed as systems were implemented if role conflict and role ambiguity were felt. This would make it important for systems implementation planners to recognize this problem and plan for changes in functional roles to complement the new system (Elovainio & Kivimaki, 2001). Community college registrars ideally operated in a structured environment for continued accountability to students, auditors, and others who demand consistency and compliance. Thus, these professionals may have experienced stress associated with technology systems implementation.

The continual evolution of the information age with a heightened pace of uncertainty with respect to innovations and creativity affected managers of colleges, universities, and businesses (Rowley, Lujan & Dolence, 1998). When charged with implementing a strategic plan, managers were often involved with teams of various institutional constituencies, and were expected to become ambassadors involved with team building (Rowley, Lujan & Dolence, 1997). In 2002 Seyfarth emphasized that for optimal performance, roles must be clearly stated in job descriptions and job models. This may be difficult during times of organizational change such as a technology implementation. Research findings of Bray and Brawley (2002) endorsed the importance of role clarity for performance of formal roles in interdependent team environments. Other research found that role conflict and role ambiguity, resulting from a multitude of issues and challenges, led some community college administrators to be dissatisfied, feel

added stress, and leave their jobs (Murray, Murray, & Summar, 2001). Although role ambiguity has long been recognized as characteristic of higher education administration (Bess & Goldman, 2001; Ecker, 1979), an increased focus on accountability had these institutions performing more like businesses. This may have resulted in less tolerance for ambiguity.

In addition to Elovainio and Kivimaki's (2001) finding that role ambiguity was moderated by one's personal need for structure, they found that job dissatisfaction and strain was more prevalent among people who have a "chronic desire for clarity" (p. 367). According to Milstein, Galaszewski, and Duquette (1984), implementation of new technology required attention in several areas. These included reengineering of activities and outcomes for which employees were responsible, a balance of authority with responsibility for assignments, a reasonable workload, ability to access necessary information, and job security for those involved.

Challenges of systems implementations have included social and psychological factors of behavior (Klein, Conn, Smith, & Sorra, 2001; Miles & Healy, 1998; Sarker, 2000). The quest for school improvement has been ever present in many institutions (Willower, 1991). Technology has been seen as an enabler with respect to services to students (Lonabocker, 1996) and student access (Harris & Herring, 1999). From this perspective, a registrar's role may have changed "from defined tasks to on-going technical development, data analysis, staff development, student service, and decision-making" (Lonabocker, 1997, p. 24). According to Goffman (1971) fully activated or alarmed states personify implementation phases. Goffman claimed that a return to normal after a period of heightened activity was important for several reasons. These reasons

include the need for time to check on stability of the environment that had undergone the implementation. Goffman also noted that after a period of heightened activity, a return to normal was important for coping behavior and also for public relations.

The fully activated state mentioned by Goffman (1971) may imply that registrars' roles were affected by implementation phases. Edgerton (1996) found that technology episodes could be intelligently followed. Fortunately, technology innovation has usually been evolutionary in that one advance has set the stage for the next. However, sometimes new innovations arrived independently and provided new challenges. Edgerton referenced Richard Nelson, who examined the role of the firm and technological episodes, and concluded that we cannot characterize what we want to understand about players until we characterize the game. Indeed, the registrar's role during implementation may be better understood by understanding the implementation strategy.

Based on information obtained through e-mail interviews, there were changes in the roles of some key personnel in a community college registrar's office as a result of a Web-enabled systems implementation project with an outsourced implementation strategy. The assistant registrar (personal communication, April 2003) reported spending more time traveling to branch campuses, training, and problem solving. She also reported more than usual production problems, more than usual time delays, and mentioned that student complaints reached an all time high. The student records technician (personal communication, April 2003) reported that his new role included on-line maintenance of system modules with respect to rules for transaction processing. A student services specialist (personal communication, April 2003) reported that the college registrar saw students less and spent more time involved with the systems implementation. The

assistant registrar (personal communication, April 2003) praised the system, but she reported spending a great deal of time defending the system to some personnel who had been at the college the longest. Also, personal experience as a community college director of admissions and records provided limited evidence that, for example, authority was shared through collaboration when technology implementation was outsourced or where consortia existed. These scenarios involved cooperating with people who were working on systems implementation as members of external organizations, while at the same time, increasing collaboration with members of the college. Personal experience as an information technology administrator in both in-house and outsourced environments led to an observation that relationships with programmers and analysts were more formal in the outsourced environment. This sometimes led to longer wait times for problem resolutions or development issues to be resolved. At times the college registrar requested technical services that the external organization felt was not within their scope of duties. However, this may sometimes occur with in-house information technology operations.

Delimitations and Limitations

This study focuses only on community college registrars and those in closely related positions. An example would be a college where the title is Director of Admissions and Records. This research did not look at the roles of registrar professionals in other businesses or industries, such as health care or hospitality. However, the results of this research may apply to industries other than higher education. The focus of this study was on community colleges in the United States of America.

This study sought only to identify community college registrars' self-perceptions of their own functional role with respect to technology implementation and information technology implementation strategy at their institution. The study was limited in reliance only on community college registrars as sources of primary data.

Methodology

Population and sample

The population for this study included all of the 1,166 (AACC, 2002) community colleges in the United States. The American Association of Collegiate Registrars and Admissions Officers Member Guide, 2003–2004 was used to identify the names and addresses of the community college registrars. A table of random numbers was used to select 250 of the institutions to receive the survey questionnaires. The district registrar or the campus registrar from the main, or largest, campus of each college was targeted for the study. The researcher projected a 50% return of surveys based on responses to previous studies of college registrars. One response rate of just 14% was reported for a recent e-mailed technology outsourcing survey of registrars conducted by a special task force of the American Association of Collegiate Registrars and Admissions Officers directed at its own members (Braz et al. 2001). An earlier nationwide mailed survey sent to collegiate registrars on the topic of computer usage received a response rate of 57% (Brewer, 1987). However, Simpson (1997) reported a 62.8% response to a mailed survey of registrars, using advance notices and follow-up letters and notes. Potential for improved response was expected as a result of using a modified version of Dillman's five-step approach (1998) and timing the first questionnaire mailing so that it reached

potential respondents from late January through February, 2004, to avoid any inconvenience due to conflict with peak enrollment activities, grades processing, or graduation.

The researcher projected that sample size of 250 with a 50% return would yield 125 completed surveys. A two-tailed test where level of significance was set at .05, with power = .90, and effect size of .30, required a return of 117 completed usable questionnaires (Shavelson, 1996, p. 640). The sample size was not adjusted after the results of the 50 pre-test questionnaires were received.

Instrumentation and Data Collection Procedures

The researcher proposed a mailed self-administered pre-test survey questionnaire, followed by a mailed self-administered final survey questionnaire. A total of 50 registrars received the pre-test and 200 registrars received the final questionnaire. The quantitative and qualitative methods were somewhat characteristic of “an interpretive/constructivist paradigm” (Mertens, 1998, p. 11). Although this paradigm usually involves personal interviews, a mailed survey was used due to time and financial constraints.

The instrument included adapted items from the official Position Description Questionnaire used in the Human Resources Department at Edison Community College in Southwest Florida (2000a). The researcher adapted the following questions from that instrument: (1) position title; (2) list of job duties and responsibilities; and (3) personal contacts outside the office; i.e., position and department, frequency, and purpose. The list of job duties and responsibilities was based on the job descriptions for the District Registrar at Edison Community College (2000b) and the College Registrar at Palm Beach

Community College (2003) in Florida. Respondents were asked to identify the duties with which they were recently involved on a Likert type scale.

The Administrative Q-Sort (Miller, Schroeder, & Hotes, 1982) was also used for defining roles and functions. Miller et al. adapted French's Q-sort for management and administration. It helped to identify what people see as the role at various mid-management levels. This method was previously used in health care and education to clarify issues and conflicts. Miller et al. also provided a list of administrative duties from one community college and asked respondents to prioritize them. The present study asked respondents to identify and rate their job duties. The proposed study differed from the study conducted by Miller et al. in that fewer activities were listed in an effort to reduce completion time and increase response rate.

A role perception questionnaire used by Murray, Murray, and Summar (2001) in a study of chief academic officers was adapted for this study. That instrument was adapted from Rizzo, House, and Litzman who developed it in 1970. It was used and referenced by others and was believed to be statistically reliable and valid (Allen, Freeman, Russell, Reinzenstein, & Rentz, 2001; Bray & Brawley, 2002; Murray, Murray, & Summar, 2001; Pollard, 2001). Three questions regarding role clarity/ambiguity and three regarding role harmony/conflict were included (House & Rizzo, 1972, p. 480). The specific questions that were selected had the highest factor analysis loadings from earlier research (Rizzo, House, & Litzman, 1970). King and King (1990) noted that role conflict and role ambiguity, as defined and measured in their subjective forms, appear to bring about negative outcomes within the person under focus. This was found during their critical assessment of construct validity. In cases where the original question was worded in a

negative context, this researcher changed the wording to a positive context. Respondents to this research study entered their answers on a six point Likert type scale, from strongly agree to strongly disagree.

The researcher included questions regarding background characteristics to identify the following: (1) college enrollment, (2) number of years respondents had served as college registrar, (3) educational background, (4) gender, (5) whether they were involved in a Web-enabled student information system implementation project at the time of the study, and (6) how many such projects they had administered. A key question on the survey, for those who were involved in Web-enabled student information system implementation projects at the time of the study, identified the information technology strategy at the institution and also the information technology strategy chosen for the implementation projects: (1) in-house; (2) collaboration or consortium; (3) outsourced; or (4) combination. The questionnaire totaled no more than 15 questions to expedite data analysis without compromising the internal validity of the questionnaire. Cronbach's alpha was used to test internal reliabilities for each question.

Survey questionnaires were sent by mail. Advance notice was not provided. The survey questionnaire was sent with a cover letter. Non-respondents were contacted with a post card. Those still not responding were sent a second letter and survey questionnaire. Most of this method was recommended by Dillman (1998). The mail survey allowed all registrars who were members of AACRAO to be included, so that those who were and were not involved with current technology implementation projects, and those who did not regularly use electronic communications, would have opportunity to respond.

Analytic and Statistical Methods

Statistical analysis software, Statistical Package for the Social Sciences Version 11.0 for Windows (SPSS, 2001), was used to analyze the data that resulted from the research question and sub-questions. Table 1 indicates the research questions and sub-questions, survey questionnaire data collection methods, and the analysis. This research asked the following question: What are the perceived differences, if any, in the functional role of community college registrars involved in Web-enabled student information systems implementation projects compared to those who are not involved in such projects? Three sub questions include the following:

What are the self-perceived job duties and responsibilities, role conflict, and role ambiguity for community college registrars involved in systems implementation, and for those who are not involved?

What is the relationship between the type of information technology implementation strategy: (a) in-house, (b) outsourced, (c) consortium, or (d) combination, and the registrar's self-perceived job duties, role conflict, and role ambiguity?

To what extent do registrars who are involved in Web-enabled student information system implementation differ in job duties, role conflict, and role ambiguity, by background characteristics?

Descriptive statistics using counts (such as frequencies or percentages) along with a Chi-Square test for independence adequately analyzed the nominal categorical data from the survey responses and provided answers to this research question (Shavelson, 1996). The registrars' functional role, role conflict, and role ambiguity were considered as the dependent variables for each analysis. Functional role was indicated by the highly

rated duties and responsibilities. Contacts outside the respondents' departments, and the frequency and purpose of those contacts were also identified. Two independent variables were the existence or non-existence of a current Web-enabled student information system implementation project. Additional independent (intervening) contextual variables for respondents who were involved with systems implementation were the three alternative information technology implementation strategies, and also background characteristics.

The results also included narrative data. The researcher analyzed the narrative data by identifying like responses and grouping them wherever possible.

Table 1. Research Sub-Questions by Data Collection Methods and Analysis

Research Sub-Questions	Survey Questionnaire Data Collection Methods	Analysis
1. What are the self-perceived job duties and responsibilities, role conflict, and role ambiguity for community college registrars involved in systems implementation, and for those who are not involved?	Administrative Q-sort list of job duties using Likert type scale and list of contacts were used to identify self-perceived functional role. Instances of current implementation projects were assessed with a forced Yes or No response question.	Frequencies and percentages of each combination of job duties and responsibilities were compared for those who were and were not currently involved with systems implementation projects. Responses of very high involvement and high involvement were used to categorize each combination of job duties and responsibilities.
2. What is the relationship between the type of information technology implementation strategy: (a) in-house, (b) outsourced, (c) consortium, or (d) combination, and the registrar's self-perceived job duties, role conflict, and role ambiguity?	Two multiple-choice questions identified technology implementation strategies in use, both in general and for current implementation. Six Likert type scale questions were included to assess perceptions of role conflict and role ambiguity.	Chi Square Test of Independence with contingency tables identified differences in job duties and perceptions of high/moderate role conflict and role ambiguity for those who were involved in implementation projects, for each technology implementation strategy.
3. To what extent do registrars who are involved in Web-enabled student information system implementation differ in job duties, role conflict, and role ambiguity, by background characteristics?	Background characteristics were compared with job duties, role conflict, and role ambiguity, for each systems implementation strategy.	Chi Square Test of Independence contingency tables was used.

Assumptions

1. It was assumed that there were many community college registrars who were participating in student systems implementation projects that involved the World Wide Web.
2. It was assumed that there were a variety of contexts within which the new systems implementation projects occurred.
3. It was assumed that registrars who responded to the questionnaire and interviews had appropriate knowledge of systems implementation efforts at their institution.
4. It was assumed that individuals would respond honestly and accurately to the questionnaire and interviews.

Organization of the Study

This dissertation is divided into five chapters. Chapter 1 includes the introduction to the problem, significance and limitations of the study, conceptual framework, and definitions. Chapter 2 comprises a literature review pertaining to community colleges, technology implementation, role theory and research, and community college registrars' functional duties in relation to systems implementation and other responsibilities. Chapter 3 describes the methodology and instruments used for the research. Chapter 4 provides evidence of data collected and the analysis. Chapter 5 includes findings, conclusions and recommendations for practice and further study.

CHAPTER 2 – LITERATURE REVIEW

Introduction

This chapter provides a selected literature review organized into several major sections, and chronologically within each section. The review focuses on the functional role of community college registrars in relation to Web-enabled student information systems implementation. The review begins with a brief look at the purpose, growth, and globalization of community colleges. Placing the focus directly on the target population for this research, the second area of this review includes literature on the functional role of the community college registrar, who is typically a mid-level administrator. The third area of inquiry is the literature concerning the process of implementing Web-enabled technology systems, including a look at specific implementation administration strategies and possible effects on functional roles within organizations, with a focus on higher education. Implementation strategies include in-house, outsourced, consortia, or combination of strategies. The employment of project consultants is included within the study of implementation strategies. Additionally, the concepts of role conflict and ambiguity are studied with respect to social aspects of higher education administration and the possible effects of Web-enabled technology implementation. Finally, a review of the influence of background characteristics upon the role of community college registrars and other managers and leaders during technology implementation is included.

The Purpose, Growth, and Globalization of Community Colleges

Purpose

A definition of a community college usually includes reference to post-secondary comprehensive education, most often publicly funded (Gleazer, 1968). Also called *two-year colleges*, most students attended these schools part time, and not all programs fit that time frame (Gleazer). According to Diener (1986) the community college provided basic general liberal lower division college academic education, guidance and counseling for selection of major courses of study and transfer purposes, and training for technical fields, including business. These colleges focused on promoting learners, reaching to them and helping them achieve academic success (Diener). Early policymakers made decisions to widely distribute community colleges and offer inexpensive tuition, creating widespread interest in education (Dougherty, 1994).

O'Banion (1997) called for abandoning time-bound and place-bound restrictions with Web-enabled technology to better serve learners' individual needs. Technology was seen as allowing students to learn at different rates, and allowing open access to the college for students, faculty and administrators (O'Banion). This research asks whether the roles of college administrators, specifically community college registrars, were affected during the process of implementing Web-enabled student information systems in efforts to better respond to the opportunities they offer.

In 2001, Levin called for community colleges to reassess their identity and their role with regard to globalization, economic and political scenes. According to the American Association of Community Colleges (2002), each community college had an

individual mission. In addition, community college students' goals were varied, from personal improvement to degree attainment (AACC, 2002). Quigley and Bailey (2003) called for more research focused on these institutions, since they educated more than one half of the lower division college students in the United States. Also, technology's demands for skills presented an increased role for community colleges (Quigley & Bailey).

Growth

Originating very early in the 20th century, community colleges grew rapidly in number and student enrollment during the 1960s (Gleazer, 1968). During the last forty years of the 20th century, community colleges competed with other forms of education, including four year colleges, vocational-technical schools, and private training providers (Diener, 1986). In spite of this competition, as of 2002, there were 1,166 public and independent community colleges in the United States (AACC, 2002). Many had multiple branches, totaling approximately 1,600 campuses, and were expected to continue to grow amid funding and diversity challenges (Quigley & Bailey, 2003).

Globalization

In 1968 Gleazer wrote that community college leaders should reach beyond the institution so that the community college experience may address unmet needs in other cultures. Rowley, Lujan and Dolence (1998) noted the role of higher education as providing learning that was globally accessible. The effort was to reach students at work, home, and school, with a variety of learning style formats, with a focus on educating

those who had been excluded in the past to improve overall productivity in the future (Rowley et al. 1998). According to a case study conducted by Roy and Roy (1998), globalization and competition in business led to organizational transformations including technology innovations and job changes. Reflecting a focus on globalization and life long learning, the theme of the 2002 Annual Convention of the American Association of Community Colleges was *Building a World of Learners*.

Levin (2001, 2002) studied changes in community college missions during the 1990s. Global economic concerns were identified. According to Levin, by the mid-1990s community colleges had evolved into cultures resembling businesses and corporations. A more vocational focus may have been partially a response to Dale Parnell's (1986) criticism of the emphasis on community colleges' academic transfer programs, citing that future jobs would require a work force more prepared for technology.

Levin's (2001) research revealed specific changes in community college missions focusing on accessing and administering resources. College administrators such as registrars may be absorbed in accessing and administering resources to accommodate the fast pace of technology development and implementation.

A development resulting from Web-based functionality was the increase in Internet based relationships, eliminating the need for face-to-face contacts (Dede, 2005). Physical presence at a location was not necessary to be considered present. Students could be enrolled and participate virtually and concurrently in a variety of educational settings. Seamless collaboration and shared decision-making and authorship provided challenges for colleges and universities for academic services and also for support services (Dede).

Viewing students as consumers, higher education officials worked to serve their emerging characteristics (Wagner, 2005). *Net generation* students worked with technology as a delivery mechanism to achieve their needs (Wagner). Personal contact through e-mail replaced walk-in traffic. Students expected quick electronic responses to questions and problems and rapid access to enrollment and other related transactions that enabled them to pursue their goals. Customized and personalized services were expected, requiring well-established links between service providers and technologists (Wagner). At The Penn State University, the *eLion System* offered a secure Web-based delivery of student services at any place or time (Wagner, 2005). There, the university registrar participated on multiple teams that operated concurrently to develop and implement all functions as quickly as possible (Wagner). The experiences of Penn State provide just one indication that the role of the registrar was apparently changed during Web-enabled system implementation.

Functional Role of College Registrars as Middle Managers

Several writers who focused on higher education administrators recognized variations in roles and functions (Graff, 1986; Kerr, 1991; Quann, et al. 1979; Rashdall, 1936). The registrar's duties originally appeared in the Middle Ages and were carried out by highly respected and privileged rectors, or chief administrative officials of universities, and later some of the duties were handled by scribes or secretaries (Rashdall). In 1289, an official list or *Matricula* of enrolled students was developed to put an end to ongoing disputes as to whether a person was in fact enrolled, a scholar, and thus

entitled to certain privileges; however, the official title of registrar appeared much later, in the 15th century (Rashdall).

Originally published in 1940, Alma Preinkert's *The Work of the Registrar* was re-published by AACRAO in 2004. Preinkert, a respected university registrar of lengthy tenure, focused on the registrar's role as one of attending to students' problems, and articulating with other administrative offices. According to Preinkert, powers and responsibilities accompanied function to establish a registrar's role. Preinkert observed that registrars' duties were better understood at larger institutions. Functions broadly involved admissions, student records, and interpretation of student records.

Quann, et al. (1979) studied and categorized college and university registrars' functions, responsibilities, and titles, and recognized variations by size and scope of the institution, by internal organizational structure, financial resources, and by the education and experience of the individual official. Quann, et al. provided a list of duties and responsibilities that were often found to be within the purview of the registrar. Significant duties included "registration and scheduling, grade reporting and record keeping, transcript preparation and certification, catalog and brochure preparation, veterans' affairs, data processing, and research and reporting" (Quann, et al., p. 19). As one of the chief administrative offices, the registrar's office handled all aspects of student enrollment and records, and the registrar maintained the official college seal (Quann, et al.). He or she sometimes served on the curriculum committee, and most often reported to the highest-ranking academic official, but sometimes reported to the highest-ranking student affairs official (Quann, et al.).

Burr (1980) used a survey questionnaire and interviews to study job satisfaction among community college and university registrars in Florida and also identified the job functions of the registrars who were included in the study. These job functions were identified as

- Selection, supervision, coordination, and evaluation of staff
- Responsibility for student enrollment and records
- Undergraduate and/or graduate registration; scheduling of classes, examinations, and classroom facilities; and maintenance of student records
- Professional and civic activities
- Counseling and advising students, parents of students, and other interested groups or individuals
- Participation in program planning and budgeting (Burr).

Certain aspects of the registrar's functional role as found by Rashdall (1936), Preinkert (1940), Quann, et al. (1979), and Burr (1980) may have been considered unique to that office. Responsibilities for student enrollment and records may have been unique functions of the registrar, as well as scheduling classes and classroom facilities. However, in 2005 Web-enabled student information systems allowed these functions to be carried out by students, academic deans, and others who had a legitimate reason for access. The registrar's role may have changed to include: monitoring rules that allowed transactions to occur, maintenance of established system variables, and keeping abreast of emerging technologies, among other duties.

In 1984, Scarlett predicted that opportunities for the role of institutional leadership of admissions officers and registrars would increase. Scarlett predicted this

due to the scope of college and university registrars' work, the urgency of recruiting and retaining students, and an extension of responsibilities in relationships with other administrators. Halfond (1984) and also Graff (1986) proposed that the registrar's role had yet to be totally understood or truly established. These administrators had different backgrounds and a variety of institutional reporting scenarios (Halfond). Halfond proposed that registrars become information specialists, since they often knew what data were available and how it may have been useful to institutions. Graff proposed that the registrar was an important potential contributor to an enrollment management team in light of the effects of the registrar's office activities on student retention and the registrar's role as guardian of data that supported enrollment research.

Brewer (1987) referred to the college registrar as responsible for maintaining student and academic records, the registration process, and a variety of other student services. Brewer studied college and university registrars' opinions of computers and recommended further research on the effects of implementing computer technology. Importantly, Brewer found that registrars' opinions toward computer technology implementation were factors in the implementation outcome.

In 1992, Gunn and Backes, both experienced university registrars, were convinced that registrars' new technology combined with simplicity of procedures and a positive supportive student orientation by staff contributed to an institution's success. Gunn and Backes maintained that registrars' ideal mission would be to support academics and introduce services that did not induce dissatisfaction that might cause students to leave an institution.

Lanier (1995) proposed that the role of the college registrar was in a time of change. He urged these professionals to recognize opportunities provided by their places within the college administration. Highly visible within the administrative community, Lanier suggested that effective registrars must be talented managers, leaders with vision, developers of interest groups for change, and able to combine new technology with best practices of service management concepts. As stewards of the student and academic data, as well as multiple codes such as those referring to student status, and other data, registrars were obliged to protect the data while working with others and with technology (Siblock, 1997).

Little has been published about the registrars' role in enrollment management, yet responsiveness to student needs affects students' continued enrollment, according to DeCristoforo (1996). Riesman (1998) observed that community colleges adjusted their offerings and schedules to meet students' and communities' needs. These adjustments may have directly affected the registrar's role due to the challenges of enabling continuous adaptation and correct documentation as programs changed.

Quann (1996) conducted a field study to compare the functional role of registrars in two countries, the United States and China. Quann used a template he had developed earlier, based on his major work that was published in 1979, and divided the registrars' duties into several functional tiers. These tiers principally involved class enrollment and reporting, computing services and other data reporting, producing and administering academic publications, system analysis and technical services, including staff training, and services for veterans. The fourth tier involved developing and implementing technology. In 1996, Quann summarized the function of the registrar as a principal

academic officer usually reporting to the academic dean, yet found that most registrars did not routinely teach academic courses. He found that some registrars acted as admissions officers, and yet rarely administered admissions tests. Quann had a secondary interest in computer automation, and in 1996 focused on the ability to pre-register students for improved enrollment planning, finding that pre-registration was a common duty of the registrars in the United States.

Whether reporting directly to the president or to the chief academic officer, many colleges and universities developed an enrollment management structure beginning in the 1980s as a form of marketing management to increase enrollments (Huddleston & Rumbough, 1997). A national study of enrollment management organizations at four-year colleges and universities revealed that the registrars were part of the enrollment management team in many, but not all, institutions (Huddleston & Rumbough). A recommendation of that study included moving the registration function into enrollment management, agreeing with Graff's earlier recommendation.

Several researchers and authorities have addressed issues concerning data security and accuracy. Guzman (1997) conducted a small Internet survey and found that registrars sometimes shifted part of their responsibility for correct data input to the students. He maintained that this was a problem due to increased fraudulent claims by students regarding enrollment and graduation. In 2000, Huddleston mentioned that college registrars were often involved with multiple technologies as they handled student and academic information and processes. This created a complex environment. Katz (2001) noted that certification of certain student information, such as athletic compliance, was a highly visible and important responsibility of registrars. This protected the institution

from noncompliance penalties. Registrars were required to verify initial and continuing student athlete eligibility and transfer eligibility. Institutional penalties for noncompliance sometimes involved financial consequences, negative image, and ban from airing sports events in the public media. The efforts to enable students to control their enrollment, combined with the complexity of multiple technologies and pressures for accurate reporting, made the registrar's function very challenging.

According to Huddleston (2000), the college or university registrar typically oversaw student enrollment, managed student records, class schedules and classroom facilities scheduling, and often produced the college catalog and academic calendar. According to Huddleston, the registrar managed the centralized information systems and the office of the registrar professional staff were typically in the midst of technological innovations that served the institution, referred to as a *campus community*. The registrar's office was seen as a unit that significantly impacted students' initial and continued enrollment, graduation, and thus the institutions' growth (Huddleston). Huddleston's view of the registrar also included a requirement "to supervise and utilized management information systems for reports and programs of the *academic infrastructure*" (p. 68). Collaboration with academic affairs was viewed as critical (Huddleston). Seeing the level of registrars' institutional involvement with enrollment management, AACRAO leaders extended that association's umbrella of seminars and publication topics to include enrollment management.

As a manager, typically somewhere in the middle of a college's organizational structure, a registrar reports to those above and supervises those below this level. Blumentritt and Hardie (2000) proposed a new role for middle managers in service

organizations, differentiated from the traditional authority role. This new role was one of knowledge management by facilitation, coordination, and communication (Blumentritt & Hardie). While many of the traditional information gathering and disseminating duties of middle managers have been eliminated by computers, it has become apparent that complex integrated knowledge needs many of the same efforts, but on a broader scale (Blumentritt & Hardie). The middle manager in the year 2000 was at the intersection of the hierarchy, and integrated systems operated at the intersection of the horizontal organizational structure (Blumentritt & Hardie). A model for a middle manager's handling of knowledge transfer in this scenario included: identification, acquisition, creation, validation, capture, transfer, and utilization (Blumentritt & Hardie).

Pugh (2001), a veteran university registrar and national leader in the profession, focused on the registrar's job as a unique role in academia. His published mission statement at Indiana University focused on support of instruction. This involved accurate representation of the teaching faculty by maintaining correct course records, student records, and teaching assignments. Pugh's office housed information technology personnel to enable control of development to faculty specifications. EDUCAUSE, an information technology consulting firm that serves higher education, recognized Pugh and his institution in 1995 with a *best practices* award. Pugh gained academic status through the use of information technology to help form and evaluate academic policies.

Based on the premise that the role of middle managers was often misunderstood after a period of organizational downsizing and reengineering, Balogun (2003) conducted a case study of a United Kingdom utility implementing a preplanned strategic change including systems, structure, and work practices. This led to a broad conclusion that

middle managers focus included making sense of their surroundings and overseeing implementation activities. Balogun concluded that middle managers have four roles during change implementation: (1) personal change, 2) continuous business during change, 3) implementing change, and 4) helping others implement change. Direct observation of middle managers led Van der Weide and Wilderom (2004) to understand that middle managers' most effective behaviors during change included: steering, supporting, self-defending, and sounding. The most successful middle managers were found to be directive and spent a great deal of time steering, or dramatically sharing the vision of their organizations as jobs were dynamic due to the fast pace of change resulting from the shorter life cycle of innovations (Van der Weide & Wilderom).

Rosser (2004) conducted a nationwide study in the United States that focused on midlevel leaders in higher education. Rosser described the role of midlevel leaders as important in supporting academic goals and mission. This survey of literature regarding registrars' roles in higher education, including both colleges and universities, indicates a focus on academic support with awareness of the importance of facilitating student success. Levels of information technology responsibilities vary, but may be the catalyst for increased professionalism of the registrar's functional role, considering the importance of accurate and secure student records.

Delmestri and Walgenbach's (2005) qualitative research in Europe, applied Stewart's (1982) work regarding managers' choices. Middle managers in three different countries in industries including education, where technical knowledge was considered to be important, shared a common theme of maintaining a positive social environment, handling exceptions, and solving unexpected problems (Delmestri & Walgenbach).

Registrars may choose to embrace Web-enabled system implementation efforts at their institutions due to the problems presented regarding access to student records.

Student Records Custodians

College and university registrars' responsibility for access to computer records, has led to a major focus of their nationwide professional organization. The American Association of Collegiate Registrars and Admissions Officers (AACRAO) has provided professional education for college and university registrars and monitored federal laws, rules and regulations pertaining to student records. Computer access to records was among the top issues. The Family Educational Rights and Privacy Act (FERPA) of 1974, as amended, was enacted as Section 438 of the General Education Provisions Act (20 U.S.C. 1232g). This applied to persons who were currently or had previously attended postsecondary institutions. It included electronic data storage requirements (AACRAO, 1995). Most states had a privacy act as well.

Each institution was required to publish policies that advised students of their rights to privacy and also to gain access to their own records. Each college was mandated to prevent unauthorized release of educational records that allowed a person to be individually identified. Documentation of requests and disclosures were required to be made and kept on file (AACRAO, 1995).

Technology changes and trends led to electronic transmission of records. AACRAO sponsored a standing committee, Standardization of Postsecondary Educational Electronic Data Exchange (SPEEDE). This committee joined with the

technical advisory group for exchange of permanent records electronics for students and schools (ExPRESS) to develop electronic data interchange (EDI) standards for student records. The American National Standards Institute Accredited Standards Committee X12 approved standards developed by these groups. There were strict requirements for transfer of student records electronically, including written authorization from the student, unless the records were sent to another educational institution to which a student had applied. Other issues pertaining to FERPA involved allowing others with legitimate educational interests to access student records (AACRAO, 1995).

Registrars must be knowledgeable of FERPA, the amendments, regulations, its relationship to the Crime Awareness and Campus Security Act of 1990, the Higher Education Amendments of 1992, and other federal and state laws such as those pertaining to international students and athletes. The registrar was typically responsible for the admission records, and these often included cumulative academic records, health records, financial records, placement records, progress records, and disciplinary records (AACRAO, 1995).

Penalties for violating FERPA regulations could include block of federal funds such as financial aid and educational grants to institutions. This occurred when compliance could not be secured. Web-enabled systems were another threat to institutions' student records access and also to their funding should the systems fail.

In 2000, Johnsrud and Rosser proposed that registrars were administrative and professional employees whose work demanded advanced knowledge of management, technology, and the current laws and requirements of higher education and, specifically, community colleges. Registrars often participated in developing policies and plans at the

institutional, state, regional, and national levels. They usually managed the finances of their office, recruited and employed support staff, provided direction within their unit, and coordinated with other administrators, faculty, and advisors. Registrars often interacted with students and the general public. Due to the requirement for lifelong maintenance and security of student records, the registrar was the student records custodian, implying a high level of stewardship and responsibility. The registrar's office worked closely with the computer center at their institution. They were often leaders of technology operations related to student information system and other systems that integrated with the student system (Johnsrud & Rosser, 2000).

When Internet hackers invaded college and university computers in February 2000 the security was said to be weak, leaving them vulnerable (Sern, 2000). Higher education institutions began instructing employees and students regarding individual responsibilities of network use (Sern). Garret Sern, a policy analyst for EDUCAUSE, claimed that as technical and policy challenges continued, administrators would be required to manage widely integrated and distributed systems with appropriate network user requirements.

Long time Miami Dade Community College registrar, Tom Stewart, was known for his intense involvement with leading edge technology (Stones, 2004a). Stewart summarized the primary roles of the community college registrar. Stewart mentioned that registrars' duties should include modeling ethics, acting as the *conscience* for the college with regard to student record keeping, and promoting student data use for planning while protecting the data from use that is not authorized (Stones, 2004a).

Information Technology Systems Implementation

Implementation implies new experiences for all who interact with a new system. The community college registrars may be considered as stakeholders with regard to student information systems due to their job duties and responsibilities. Registrars and their staffs interact with systems, while monitoring input, output, transactions, and inquiries of the other people who also interact with the systems, implying a social aspect of systems operations. This study of the functional role of community college registrars is a sociological study that considers registrars' self-perceptions of the effects of Web-enabled system implementation on that role. The purpose of the study is to improve understanding of information technology systems implementation.

The social aspect of technology implementation has been the focus of recent research efforts. Ibsen (1990), in a doctoral dissertation, presented a model for implementing information systems in higher education that emphasized social and cultural factors. Ibsen's study embraced a naturalistic and participant-oriented approach and involved a case study, interviews, and site visits.

The social context of accepting and using new technology use may be an issue for leadership role studies, according to Bromley (1998). Bromley urged that studies direct attention to accepting and using new technology and accompanying work and workplace changes through active research and feedback. Sarker (2000) studied the socio-technical school of thought as an interactionist approach and reported that this approach dominated the study of information systems implementation in organizations. Clarification regarding how a new technology fits into an employee's daily job may be better understood if those

who supervise provide information to them and encourage them to ask questions. This study includes an assessment of how involved community college registrars are in employee training.

Hochstettler, McFarland, Martin and Watters, Jr. (1999) reported a case study involving Rice University with very positive results from simultaneous student information system implementation and restructuring of business practices. Student registration and overall records management were included with undergraduate admissions, financial aid, and student accounts in a system implementation in advance of the year 2000 millennium crisis caused by the need to accommodate the switch to a four digit date field (Hochstettler et al.) Rice University was using 1980s hardware that was no longer supported by the manufacturer. The registrar participated on a process re-design steering committee. The information technology director and the student information system project director were on the committee along with department heads from all of the above-mentioned offices. The present state (what is), and then goals (what should be) were identified regarding workflow in each area with regard to simplifying. This was done before selecting the new system. Duplication was identified, and processes were simplified by identifying a single point of contact for students, having bought into a *one stop shopping* idea already in place at the other leading universities. Hochstettler et al. concluded that technology change drives process changes; and all of the student services offices have become offices of information management. Management of functional areas has become “intertwined with management of pieces of information through data collection, presentation, dissemination, and general management” (Hochstettler et al., p. 13).

E-business skills of business management have not evolved with large-scale systems implementations, according to Hawking and Stein (2002), researchers at the School of Information Systems of the Victoria University of Technology in Melbourne, Australia. This has led to incomplete implementations that do not use the functionality of large systems (Hawking & Stein). In addition to technical skills, specific personal skills (systems thinking) and interpersonal skills (collaboration) are important, as well as problem solving and effective conflict resolution skills (Hawking & Stein). A study of 27 information systems professionals in Australia and New Zealand led Hawking and Stein to conclude that teamwork, delivery of solutions to needs, and meeting business deadlines were viewed as the most important business skills of information services professionals, while knowledge of security firewalls, software engineering, and Web design models were the most important technical skills. To the extent that college registrars are in charge of managing information systems, they may want to acquire key business and technical knowledge.

Yakovlev (2002) provided a case analysis of the People Soft Student Administration (SA) implementation at the University of Wisconsin-Superior (UWS). With an enrollment of approximately 2,700 students this case provided a report from a small institution. The administrative role during system implementation was a very active one. During system implementation reports were redesigned with a goal of simplifying and reducing the required number. The registrar's office and other administrative areas had to change the way they operated with one another. The greatest changes were business practices associated with the twenty-year old legacy system. With a small information technology staff, UWS was forced to accept the software as delivered, thus

had to change many day-to-day activities involving the student information system. The registrar was likely on the steering committee, as the report indicated that the leaders from the student service offices were involved. The student records implementation team included two representatives from the registrar's office, two from administrative information services, and one from the advising office, among others. Observations from the case study included the focus on increased data and information, resolving issues such as data sharing and data entries (Yakovlev).

K-12 school districts have been implementing Web-enabled student information systems as well. This was due partly to the data requirements of the *No Child Left Behind Act* which became fully enforced in 2002 (Trefny, 2002). Vice president of achievement for Edison Schools, Todd McIntire (2004) provided descriptive information in his article about student information systems. According to McIntire, a new student information system needs intense support. A full year of focused effort was required for installation and conversion. Also, follow-up on specific and recurring events was needed. Grading, semester schedule changes, and year-end processes were sometimes challenges (McIntire), most likely requiring more time and attention.

A case study of technology implementation and air traffic controllers, mid-level and senior managers, drew on older industrial sociology theories to understand findings (Hallier, 2004). Job security and position power overrode employee input during system implementation. With a new cultural environment caused by changes in management structure, competition among units to meet objectives grew as evaluations became based on implementation successes. Choices were made based on job security during system implementation as conflicts abounded. This was due to senior management's

destabilizing of mid-management's power, status, authority, and functional roles as mid-level identities were re-categorized. Middle managers perceived less freedom to select their own unit's priorities, leading to a struggle for position advantage based on in-group favoritism. Also, over reliance on informality led to lack of procedures for solving unexpected problems as workers' concerns were neglected (Hallier).

Stivers and Garrity (2004) reported the results of a Web-enabled student system implementation case study at a mid-sized public comprehensive college. The information technology department had developed all of the college software in-house, yet the president decided to purchase a software package. Executive responsibility for the software implementation was given to the vice president of finance who was described as a visionary leader. He promoted the project and appointed a steering committee that was chaired by the associate vice president for enrollment management and included the college registrar.

The administrators in Stivers and Garrity's (2004) case study used Bolman and Deal's (1997) multi-frame approach to management by attending to all four frames as they planned their system implementation. These frames include: structural, political, human resources, and symbolic (Bolman & Deal). Due to the changing nature of tasks over the course of a major implementation, the performance programs and job descriptions had to be substantially modified each of the first three years of the project (Stivers & Garrity). Transitions to the project and back to the original work were aided with individual counseling. Policies and practices were changed while focusing on them through Bolman and Deal's four frames. Jobs and functional roles changed as implementations progressed.

Stivers and Garrity (2004) found that individuals asked how the project changes would affect their daily responsibilities. The registrar and provost educated students and advisors about the need to observe specific policies and procedures, providing answers for individual employees. Support strategies for live production operations involved identifying when new ways of doing business were needed. Adapting old practices to new systems became recognized as part of the evolving nature of large-scale software implementation projects. The Transition Leadership Network was established and was key to networking concerns, offering support and organized answers (Stivers & Garrity). The findings of the study by Stivers and Garrity indicated the potential for transformation presented by a wide scale system implementation. Project team members took on new roles during the course of the project. Due to the reengineering and reorganization of jobs that sometimes occurred during a systems implementation, they sometimes needed new roles after the project was complete (Stivers & Garrity).

In 2005, the chief information officer at The University of North Carolina at Chapel Hill, also the vice chancellor for information technology, holding an executive position, stated that mid-level administrators sometimes resisted change while top-level administrators and support staff members promoted it (Foster, 2005). Fears of diluted authority sometimes prevented mid-level administrators' support, according to the vice chancellor (Foster). Mid-level administrators' functional roles may include new opportunities if they demonstrate openness to change, willingness to learn, and assertiveness in communicating across boundaries.

Case studies, personal interviews, and a national on-line survey were highlights of Cramer's (2005) work, pursued with participation by AACRAO and focused on a student

system implementation project team at Buffalo State College. In Spring 2005, 492 AACRAO members responded to an inquiry about implementing student information systems. At that time, 51% indicated that their college campus had implemented such a large-scale student system during the previous five (5) years. Twenty-one percent (21%) had a major student system implementation in progress at the time of the survey. Changes in management and business practices evolved with the system implementation (Cramer).

Collaboration and communication with all *stakeholders* was a major role of project team members during implementation, and the key to success according to this research (Cramer, 2005). According to Cramer, collaboration sometimes involved making concessions in order to achieve a goal. The integrated Web-based technology required collaboration of diverse functional areas, and Cramer found that implementations affected cultural changes more than the way things were done. Cramer (2005) used Howard Gardner's (2004) work regarding the place of values on the job to examine how work values relate to personal values. It was helpful when practitioners thought about their work and implications for other areas. Many people gained new insights during system implementation by learning how their work affected other areas of the college or university, the students, and outside entities that interfaced with their own functional areas' work processes (Cramer). Team members sometimes participated in focus groups or project team meetings' structured activities to highlight and address diverse viewpoints or practices that would in any way affect a successful implementation.

The AACRAO survey (2005) results, reported in frequencies and percentages, indicated that nearly one half of the functional staff bore simultaneous duties and responsibilities for implementation and day-to-day work. Comments from respondents

reported 7-day work-weeks with 12-hour days. A minority of campuses used full-time implementation teams.

Cramer (2005) concluded that project team members' levels of commitment to working through challenging collaboration issues had an important bearing on projects' success. According to Cramer, whether a new Web-based integrated student system was built or purchased, registrars and others asked questions of themselves during implementation, including the identification of the work that they did, how they did the work, and how their work involved others on campus. Cramer called for further research concerning project structure, and details about individual backgrounds and effects on student system implementation, including functional roles.

According to college and university chief information officers in 2005, security and identity management and administrative/ERP Information systems replaced online student services as the top information technology issues (Maltz, DeBlois, & EDUCAUSE Current Issues Committee, 2005). On-line student services, admittedly, were still a major issue at many higher education institutions, and Web systems and services were also among the top ten of issues with indicated potential to become even more significant and necessary to resolve for strategic success (Maltz et al.).

Voloudakis (2005), a leader in higher education consulting practice and research, was convinced that survival was related to ability to adapt to a changing environment. According to Voloudakis, business roles in higher education have shifted due to automation of many office processes. Information technology has led to uncertainty as a normal aspect of business while admissions, registration, and academic advising become self-services, providing more information to students (Voloudakis). Observed by

Voloudakis, roles of business and information technology administrators varied with strategy.

Information Technology Implementation Strategies

Implementation strategies are referenced here as the approaches used to adapt new Web-enabled information technology. This study examined community college implementation strategies including in-house, outsourced, consortia, or combination of strategies to find out whether they affected the functional role of the registrars.

In contrast to Gulick's (1937) unity of command principle, the latter decades of the 20th century saw the use of matrix and network structures, as well as quality group initiatives (Dessler, 1995). Matrix and network structures involved more than one person in charge of a unit or process. Quality group initiatives involved line and staff employees working together to monitor operations and provided a limited scope of recommendations to management. Integrated strategic management was new in the operations development field. This was a program involving several steps. First, managers and employees analyzed current strategy and organizational design. Then senior management chose a desired strategy and organizational design, designed a strategic change plan, and, finally, implemented and evaluated the strategic change plan (Dessler). The challenge to authority was felt by many organizational managers and leaders as units and processes became more complex and specialized.

Part of the transition during system implementation may involve increased work with people in other divisions of the college and with private for profit corporations outside the college. Dubrin (1996) acknowledged the challenging trend of corporate

strategies that sometimes required alliances with many firms. Information technology allowed the virtual world to exist. Other examples of outside alliances involving technology were information clearinghouses, made possible as computer networking was developed. At community colleges, on-line computer access to electronic clearinghouses enabled student financial aid and admissions eligibility decisions to be made rapidly. Here employees improved workflow speed by operating concurrently with computer-linked outside entities. Community college liaison duties may be affected by the increased interfaces with outside entities. Collaboration both internally and externally can be enhanced by Web-based technology.

Yesterday's vertical integration of functions evolved to new horizontal integration of processes through Web-enabled information technology capabilities (Venkatraman, 1998). According to the findings of Venkatraman's case studies and proposed model for harnessing information technology, an organizations' processes, especially those that involve external entities, rather than functions, and also horizontal integration, are the appropriate foci for both leadership and management for ideal leveraging of opportunities, distinction among competitors, enabling strategy, and maintaining operations in the 21st century. As community college registrars switch alternately from production phases to implementation phases involving new Web-enabled systems and linkages, their role may change from focus on independent functions to focus on collaborative processes. Their functional role may, at least temporarily, become more of a process role.

Discussing the concept of roles and collaboration, Katzenbach (1998) said that most leaders address viewpoints of each person from their functional role and from their

own perspective. As one interacts with new people and technology, values may influence outcome. Bush and Coleman (2000) suggested that strategy is driven by values and is attached to a college's leadership vision and mission. Strategy is an approach to organizational management with several limitations. According to Bush and Coleman, a stable situation is important for success of an organizational management strategy. Community college registrars whose colleges are involved with Web-enabled technology implementation may need to lead and manage processes with internal entities with which they have previously had limited interaction as well as with new external entities, all in a state of change during systems implementation. Attitudes and behaviors that promote the organization's new technology, the implementation strategy, and foster stability may be needed. Registrars may be called upon to increase communications and outflow of information as new processes are implemented across organizational boundaries.

Rapert, Villiquette, and Garretson (2002) studied strategy implementation and found that success was based on the premise that functional areas within an organization share a basic understanding of the strategy. Termed *strategic consensus*, this concept referred to the extent to which intra-organizational perceptions indicated the same understanding of priorities (Rapert, Villiquette, & Garretson). This occurred through frequent vertical communications and shared understanding of the implementation process. A community college registrar's level of involvement with key stakeholders outside his or her department may change during system implementation. His or her level of role harmony, role clarity, and effectiveness may be related to understanding system implementation strategy.

Two information services executives at Northeastern University in Boston both agreed that Web-enabled enterprise software, including student information systems, when integrated or assembled, offered the only real way to adapt to rapid changes in technology (Weir & Mickool, 2003). Some vendors have trouble dedicating sufficient support resources to software buyers. A reason that college administrators must be comfortable with fast technology implementation is that a short implementation period will lessen the likelihood that functional requirements will change before an implementation is complete (Weir & Mickool). Some technology will likely be purchased because an individual college cannot usually make everything they need. This has led to group software development. Just as software purchased from a vendor, in-house software also needs integrating, just as if it were purchased. Weir and Mickool promoted a combination, or assembly of system development and implementation strategies. With assembly of strategies the prime motivation is integration, not creation, being constantly flexible and willing to embrace change (Weir & Mickool). This may help a college maintain a competitive presence.

Community colleges exist in a competitive environment, as universities and career training provide options for students. According to Yukl and Lepsinger (2004), competition for a product or service leads organizations to adapt. They also reported that fast technology changes were associated with uncertainty, yet were important so the organization could respond to competition and new market opportunities. Yukl and Lepsinger reported research indicating that only 30 percent of firms were successful in implementing reengineering projects. Because of this, competitive strategy made adaptation very important. Competitive strategy was focused on changes in the market

(Yukl & Lepsinger). Community colleges' technology administration strategies may be considered to be competitive in that they position these colleges in the marketplace. Colleges may choose implementation strategies, such as in-house, outsourced, consortium or a combination of strategies. The community college registrars' role, if well understood within the parameters of an implementation strategy, may enable the college to integrate technology more efficiently.

Appropriate behavior of a community college registrar during implementation of an administrative strategy may be a feature of his or her role. As understood by Yukl and Lepsinger (2004), leaders at different levels should be compatible with one another and with the administrative strategy for success. An aspect of the registrar's role may be to become involved with and provide support for an administrative strategy.

In-house Information Technology Administration

Higher education's in-house strategies may reflect those of more technically oriented business and industry. Bontrager (2004) prescribed strategies and practices for enrollment management, applicable to in-house technology implementation. He stressed that enrollment management, which usually included or was led by the office of the college registrar, was dependent on institutional research and information technology. He suggested that Web-enabled student systems usually required substantial investments in the beginning and a reallocation of human resources to technical support and content management. He mentioned that virtually all of the effective technology implementations involved review and revision of core business practices. Bontrager suggested that enrollment managers hire information specialists, establish expectations and rewards, and

communicate regularly with staff so they know what is taking place. Bontrager highlighted the case of California Polytechnic State University–San Luis Obispo, where technology was used to build campus relationships. According to Bontrager, enrollment managers were increasingly technology experts as implementation cycles followed one another.

Outsourced Information Technology Administration

The concept of outsourcing refers to purchase of some services from outside an organization, rather than using in-house employees for those services. Outsourcing is a form of administration that involves written contractual agreements with people who are not college employees. The efforts toward reorganized work places, often part of technology implementation, ideally result in eliminating low value endeavors. This may be politically charged. One solution is outsourcing for increased objectivity in decision-making. Experts who work for an outside organization may offer solutions that an employee may hesitate to propose. However, the areas identified as candidates for outsourcing as suggested by Dubrin (1996) did not include information technology. There were issues that prevented many institutions from outsourcing information technology implementation. A level of trust for outside entities would be needed (Dubrin). Skills in collaborating without formal authority would also be important as administrators worked with outside entities to implement an inside technology (Dubrin).

Hesselbein (1998a, 1998b) recognized that partnerships of non-profit organizations with corporations were a challenge for leaders. She maintained that these partnerships could serve as models and that such partnerships offered additional possibilities for better

schools and communities. Venkatraman (1998) studied the growing trend in business process outsourcing and concluded that the emerging global Internet information technology capabilities would support an increase in outsourcing, yet found confusion about responsibility for the outsourced processes. Kezar (2000) found that higher education has been successful with outsourcing as a management technique.

According to the American Association of Collegiate Registrars and Admissions Officers' (AACRAO) Outsourcing Task Force, outsourcing must be evaluated based on stakeholders' needs, institutional internal or financial resources, and commitment to core expertise (Braz, Dallam, Krogh, Oxford, Poehls, & Servis, et al, 2001). The fast changing environments of the 1990s found companies looking for ways to adapt services with reduced production time (Ragatz, Handfield, & Peterson, 2002). Outsourcing was the answer for some. Ragatz, Handfield, and Peterson found that supplier integration with an organization was more likely to be employed under conditions of technology uncertainty leading to significant improvements in cost, quality, and time objectives. Community colleges may tend to outsource information technology implementation if they are uncertain about the possibility of success of in-house, consortium, or a combination of implementation strategies.

The report by the AACRAO task force also included reference to outsourcing surveys conducted by the National Association of College and University Business Officers and the National Association for Collegiate Auxiliary Services. The business officers focused on cost savings. The survey of outsourcing led AACRAO's Task Force to suggest that response time was a key motivator for an institution to outsource information technology. AACRAO's Task Force recognized that there was a need to plan

for reassuming any outsourced functions at the end of contracts. Other concerns of the task force involved vendors' responsiveness to registrars' responsibility for student records and privacy of data. Administrators' communications with vendors and students must be ongoing during outsourcing. Increased communications with certain areas of the college may be a major aspect of the change in community college registrars' functional role during Web-enabled system implementation.

As discussed above, outsourcing involves negotiating and collaborating with one or more outside entities for work affecting internal organizational processes. Malhotra and Murnighan (2002) explored the relationship between explicit, binding contracts and informal agreements in organizations. These researchers found that trust improved in organizations that existed without binding contracts. Coordination of non-formal agreements presents problems, however, and offers research opportunities. When collaboration among multiple units was needed, self-imposed agreements and sanctions prevailed. Non-binding contracts included communications, norms, and trust. When a binding contract was enacted with little advance notice to those impacted, trust was lowered dramatically (Malhotra & Murnighan, 2002). Community college registrars may or may not be included in the administrative decision-making regarding technology strategy.

Some of college registrars' responsibilities may be similar to other industries' middle and back office transactions processing functions that have been outsourced. Hughes (2002) conducted interviews of representatives from The Bank of New York and BNP Paribas Securities Services, as both investment companies were leading a move to outsource some transaction processing, including middle and back office functions.

Middle office functions include record keeping and reconciliation, and include outsourced functions in the investment management field. A need for real time trade processing as opposed to batch processing involved a quick technological upgrade. Manual intervention of processes was reduced for efficiency and reduced costs. Some functions were being outsourced to other companies. According to Hughes, some of the largest investment banks have outsourced large information technology projects. Technology implementations require intense activity and skills in the early stages until in full production. Outsourcing is a convenient way to add the needed resources temporarily (Hughes).

An international manufacturing company's information technology system development outsourcing provided a case study for Lander, Purvis, McCray, and Leigh (2003). Project team members, differentiated from upper level management in this study, noted the importance of transferring knowledge between appropriate in-house personnel and the outsourced service provider(s). Important to the transfer of such mission-critical knowledge to the outsourced service provider(s) was the perception of the in-house personnel that control was shared (Lander et al.).

Problems sometimes occurred with outsourced technology administration. Kiernan (2004) reported a power struggle between the University of Wisconsin System and other state agencies over the design of a new statewide network. Kiernan said that users were disappointed in the performance of an outsourced company. The company was contracted to provide computer connections to public schools. The state did not have enough power over the company, and, also the University of Wisconsin did not wish to run their systems on a network that was operated by a vendor.

At Cornell University, officials attempted to minimize modifications of a newly delivered student records system (Olsen, 2004). Vendor modifications were expensive and in-house modifications were difficult to manage. David S. Yeh, the university registrar, was involved in the decision-making and was behind the effort to accept the large vendor systems without significant modifications (Olsen). Yeh's actions indicated that he was a stakeholder in the decision-making during implementation. Administrative decision-making may be an aspect of the registrar's job that changes during system implementation.

A single qualitative case study, involving the Oakland, California school district, sought to begin to develop theory regarding best use of intermediary organizations, including technical assistance providers, for policy implementation (Honig, 2004). According to Honig, intermediary organizations included contractors who supplement a school district's functions to enable large-scale policy implementations. The researcher concluded that the intermediary organizations depended on central office and site-based administrators to identify their functions (Honig). The external organization added system knowledge and administrative tools not available from within the district office or school sites. The researcher found that the intermediary managed the changes being implemented yet depended on central office and sites to perform their respective duties or functions. This case study revealed that long term financial constraints on the part of the school district and several of the intermediaries eventually led to their demise.

As administrators become better negotiators and collaborators, outsourcing arrangements, those that maintain funding, may be optimized. Olsen (2004) predicted that

two of the greatest challenges through the next ten years would be collaboration and development of tools that better facilitated collaboration efforts.

Consortia

By 1995 the State of Florida offered financial incentives for consortia development, and many of Florida's community colleges became involved. Led by Pensacola Community College in 1998, Florida community colleges cooperated to purchase personal computers (Spiwak, 2001). By 2000, the Florida Community College Software Consortium and the IBM Mid Range Consortium involved approximately half of the 28 colleges in software development.

Widmayer (1999) described the North Suburban (Chicago) Higher Education Consortium, one of ten in Illinois. This example was included among best practices (Dotolo & Strandness, 1999). Purposes of this consortium included satisfying unmet needs and achieving shared costs. Over time, some institutions withdrew and others emerged. Advantages were seen in the shared technology, applications, and support. Disadvantages included the slow pace forced by disagreements. The prevalence of advantages and disadvantages depended on the organizational structure of the consortia entity and members' commitment.

The regional consortia were seen as important for communicating ideas among people. In 1999, California State University at Fullerton viewed the Internet as a new tool to distribute information systems' functionality to new and existing clients (Harris & Herring, 1999). Administrators and employees of community colleges may use the

Internet more during a system implementation project to disseminate information college-wide, especially in larger, multi-campus colleges.

A longitudinal study of consortia found many advantages to this form of technology administration strategy, yet some inter-institutional arrangements have ended, possibly due to differences in basic missions and lack of commitment to funding (Keim, 1999). Community colleges can learn from other higher education institutions that have invested their resources in Web-enabled technology by way of consortia. In-house experts such as registrars may be very involved with systems implementation, even though a consortium exists for this reason. Inter-institutional systems implementation requires collaboration with other institutions, involving time and focus. This may affect the registrar's functional role.

The Boston Consortium for Higher Education was formed in 1998 (Cannata, Cavanaugh, Nicastro, On, & Wheeler, 2002). Administrators from 13 colleges and universities of various sizes successfully formed a consortium to include information technology training needs for students, faculty, and staff (Cannata et al.). Beginning with small projects, the consortium built on successes and ultimately offered a variety of IT training to meet needs as they materialized. Professional development efforts included training in facilitation skills to help administrators collaborate with peers and also understand training needs of employees. This consortium contracted with vendors to provide just-in-time Web-based training. The collaboration was seen as a cost-saving enabler for professional development and organizational growth among other benefits (Cannata et al.). This was an example of a technical consortium in the field of higher

education. A Web-enabled student information system implementation may benefit from such collaboration for Web based training.

Project Consultants

This review includes project consultants within the study of outsourcing. Project consultants were often employed temporarily for an objective view of systems implementation. They sometimes provided formats, steps, and tools for administering change. Registrars may need to work effectively with outsourced entities such as project consultants during systems implementation. Katzenbach (1998) noted that consultants were often employed for process redesign or reengineering in large corporations.

According to Lauriano (2000) a project manager from outside a group may be viewed as more objective, and may be a skilled facilitator of differences, creating productive teams that would otherwise be less effective. This may be very valuable during a fast paced system implementation.

A case study indicating the use of consultants involved 10 academic and general higher education staff members who identified a role of effective professional development in higher education during transformational change (Roche, 2001). The continued offering of support for individual and organizational changes was deemed very effective (Roche). Some administrators conduct professional development within their own departments, or participated in professional development with outside consultants and with other managers on campus or with their own department staff during system implementation. According to Roche, when staff members transform themselves, the organization adapts to change. As needed, professional developers can be employed to

help managers change and handle role conflict and ambiguity issues during change (Roche).

Systems implementation, a form of organizational development, may benefit from process-oriented direction from consultants. Fast paced diffusion of new technology involves psychological factors, according to Macy (2002). Gurus in the field who were hired to help executives deal with confounding uncertainties personified the charismatic approach to management of change. According to Macy, these consultants sometimes inflated the insecurities of prospective customers, causing undue reliance on outside expertise. Commitment and loyalty to the organization may be overlooked if in-house expertise is not used or if in-house leaders are not provided an opportunity to receive the training necessary to lead systems implementation projects. However, there are many talented technical consultants and administrative consultants, and their reputations usually keep them in demand (Macy).

Carlson (2004) interviewed Mr. Warren Arbogast, a college consultant for information technology. Arbogast saw a need to translate technology and offered a type of therapy to college administrators. Consultants such as Mr. Arbogast, and also Geoffrey Tritch, President of Compass Consulting, negotiated decisions among numerous higher education professionals and staff who contributed to technology projects. According to Mr. Arbogast, in education, as opposed to business, there were more gatherings of decision makers where a technology consultant could help people understand and accept project tasks involved in systems implementation, among other issues. One challenge was that departments were independent, but many information technology demands led to centralized management (Carlson). This is consistent with the traditional role of registrars

as central campus or centralized college administrators. The need for standards and the tendency toward centralization may result in registrars retaining traditional controls over student information systems and their data during system implementation and beyond.

Community colleges, as widely distributed higher education institutions, have grown and many have become global in their missions to educate students. Administrators such as registrars have functional roles within their institutions that many times involve implementing new technology such as Web-enabled student information systems. A variety of administrative strategies are employed during systems implementation, each involving changing technology.

Extended Focus on Role Conflict and Ambiguity

Dolence and Norris (1995) called for “redefining the roles and responsibilities within realigned, redesigned higher education” (p. 20). According to Dolence and Norris, defining educational roles could identify the new world of work and learning in a college or university. The provider role of higher education has given way to the role of facilitator, knowledge navigator, and learner/service intermediary. These are the new roles that support learners. According to Dolence and Norris, administrator roles in accommodating *network learning* are now those of general contractor, sharing the plan and vision, developer, systems operator, and auditor.

The role of staff development may be added to a community college registrar’s role during systems implementation, and this role may evolve, depending on the type of implementation strategy. Also, during implementation, regular duties may include

increased collaboration with other departments or outside organizations. Ford et al. (1996) suggested that one person can carry out more than one role and that several people can carry out one role. Katzenbach (1998) proposed the concept of *role multiplicity*. This is a concept that a person may use to capitalize on their own attributes and traits, playing different roles within a formal position to encourage top performance from teams and from individuals.

Role Harmony or Conflict

A person may be directed by his superior, and requested by subordinates and colleagues, to assume power and exercise a responsibility to achieve goals that are different from officially allocated roles and facilities. This creates a role conflict. According to Coladarci and Getzels (1955), this can lead to problems in the overall administrative process. Role conflict tends to appear when administrative relationships have been mishandled and functional roles have been unclear, yet have developed at a college or other institution (Coladarci & Getzels). Coladarci and Getzels did not suggest that administrative relationships were usually limited to a single, narrowly defined role. Administrators, such as community college registrars, may serve multiple roles.

The research of Kahn et al. (1964) concerning role conflict and ambiguity explored: (1) the extent to which this phenomenon existed in industrial jobs, (2) the kinds of situations which fostered such problems, (3) the different effects of role conflict and ambiguity based on personal adjustment and effectiveness, and (4) the extent to which background characteristics and interpersonal relations came into play. Their proposition was that contemporary environmental factors related to social psychology significantly

affected personal health and well-being. Their research involved individuals in organizations and also a probability sample of the national population.

Colleges may offer arenas for situations that may breed role conflict and ambiguity for administrators. Kahn et al. (1964) found that crossing organizational boundaries, producing creative answers to problems, and supervision were role situations that comprised role conflict and ambiguity. Technology implementation may affect perceived role conflict and ambiguity if roles change in response to the situation.

Conflict related to functions was induced by various subsystems in an organization (Kahn et al. 1964). Some employees, due to the nature of their various functions within the organization, were oriented inward, outward, or toward adaptation objectives. This in itself may have created potential role conflict as those who were oriented inward may have maintained customs and loyalties that were questioned by those working with outward orientation, or adaptation objectives. An individual work area's tendency toward the norm greatly determined the potential for conflict during an innovation phase (Kahn et al.). A community college registrar may have increased opportunities to see potential conflict during systems implementation projects. He or she may have opportunities to prevent or help solve any conflicts and may even take on a role as mediator.

Multiple roles and certain situations may influence role conflict. The effect of role conflict is prevalent in organizations, according to Kahn et al. (1964). These researchers found that 88 percent of the conflicts in organizations were between persons of different rank. When combined, direct and indirect supervision resulted in role tensions and conflicts. Less than half of the respondents reported conflict with a person outside the organization. Kahn et al. also found that role overload was a major type of role conflict.

This was a conflict among legitimate tasks or a problem in priority setting. The upper middle management levels indicated the most occurrences of conflict. This is the level at which many community college registrars operate.

According to Hoy and Miskel (1987), role conflicts in social systems refer to formal roles with respect to expectations of those in a bureaucracy. A social system is a single social entity with a group of elements or subsystems and activities that are bound and interact (Hoy & Miskel). These writers presented theory and research regarding conflicts related to: (1) authority, (2) bureaucracy, (3) choice of administrators, (4) decision making theory, (5) group decisions, (6) organizations, and (7) professionals in bureaucracies, schools, and social systems. In formal organizations, role conflict is sometimes limited by the existence of rules and regulations as well as procedures. In spite of intense efforts to specify how work is to be carried out, stress does exist as people work to define formal roles and their expectations within organizations, and the resulting tensions emanate from organizations, affecting tensions and pressures outside the formal organizations (Hoy & Miskel). These writers described several types of role conflicts. The role-goal conflict exists when organizational goals do not match bureaucratic expectancies (Hoy & Miskel). Conflicts related to roles and norms arise when the formal and informal organization does not coexist easily (Hoy & Miskel). Role-personality conflicts exist when tension arises in an organization because bureaucracy gets in the way of personal needs (Hoy & Miskel). The aforementioned role conflicts have in common an appearance of incongruence between expectations of people in bureaucratic organizations.

A possible result of role conflict is occupational stress and dysfunction (Bandura, 1997). Those involved in direct services to students may experience exhaustion and lack of sense of personal accomplishment if services are routine and depersonalized to the point where people are treated as faceless objects. Those who work in providing human services may tend to treat individuals more personally (Bandura). Dysfunction may be avoided if the human services focus remains strong through a major Web-enabled technology implementation project.

Bandura (1997) proposed that one's personal social influence might be more or less enhanced if one uses personal influence on the conditions around them. Bandura went on to say that social systems involve continuous vying for power and lobbying as coalitions shift. Progress is limited when there is no shared vision. According to Bandura, a clear vision communicated from the executive administration may support the efforts of mid-level administrators. Open discussion of any conflicts may be helpful for community college registrars preparing to lead a Web-enabled system implementation project.

Business processes were redesigned or reengineered but job functions were not always clarified as implementations often focused on technology (Roy & Roy, 1998). Four case studies and 38 completed survey questionnaires of Canadian businesses led these researchers to conclude that business process reengineering projects did not usually take a socio-technical approach due to cost of participative processes, uses of top-down approaches, and dominance of technical focus among consultants (Roy & Roy).

Another upper mid level college or university administrator, the academic dean, is often caught between individual colleges and central leadership with respect to role expectations (Wolverton & Wolverton, 1999). An academic on one hand, and

administrator on the other, the conflicts come in the shapes of priorities and issues. Although a dean holds a position of authority, he or she may judge best not to engage in direct use of power. Negotiating and coordinating among educators and taking their priorities and issues to top executives lead to greater influence. Previously seen as a quiet scholar, today's academic dean is more politically skilled with a strong sense of economics (Wolverton & Wolverton). A community college registrar, though seldom holding the title of Dean, is a mid level college administrator who may share some of the same role requirements as other mid level administrators at an institution.

Mohr and Dichter (2001) wrote that conflict is a normal developmental aspect of group behavior, and indicated that every member's negotiation and mediation skills are important so that conflicts are resolved without too much compromise. Unacknowledged conflicts can arise repeatedly, according to Mohr and Dichter. As conflicts develop during system implementation, administrators such as college registrars may find that they play a role in negotiations and mediations.

Montez, Wolverton, and Gmelch (2002) described college and university administrators, specifically deans, as thriving in a turbulent environment in which one challenging strategy was technology development and use. These administrators juggled their own values and work related situations. Montez et al. felt it necessary to understand what deans actually did, as well as role conflict, and ambiguity, and future challenging tasks. According to Rizzo et al. (1970), change in technology was one issue that could cause confusion on the part of a college or university dean. Earlier, Kahn et al. (1964) concluded that common reactions to role ambiguity included heightened levels of tension and anxiety, negative attitude toward a superior, and lessened productivity. Montez et al.

used data from a national study of academic deans that included a task inventory with a conflict and ambiguity section, and an open-ended inquiry concerning future challenges. They analyzed principal components with varimax rotation using an SPSS statistical package, and reported the factor analysis of the task inventory list, and confirmed the previous results of Rizzo et al. (1970). They computed Pearson's product moment correlation coefficients across constructs of perceived roles and role conflict and ambiguity. Internal productivity, academic personnel management, as well as external and political relations were found to be key duties. Sources of role conflict included: 1) working with two or more different operating groups, 2) doing things accepted by one person and not by others, and 3) receiving assignments without proper resources. No causality was assumed and relationships between role and conflict sources were not confirmed.

Sotirakou (2004) recognized that technology and globalization, among other pressures, led to a new managerial philosophy in providing public services. A shift toward market principles conflicted with ideals of academic autonomy in United Kingdom higher education, the focus of this study (Sotirakou). According to Sotirakou, role conflict without understanding could severely threaten an institution. Heads of departments were expected to take on new tasks, especially leadership and entrepreneurial activities, involving, as examples, development of new partnerships and liaisons with academics, government, business, and industry (Sotirakou). Sotirakou found many lists of universities' department head duties, calling for a dual role as academic and manager, but found little attention to stresses and conflicts. Her research included identifying degree and type of departmental role conflict, and identifying and analyzing

sources of role conflict. A mailed questionnaire was sent to 200 or 10% of the United Kingdom university department heads, and gained a 71% response rate. Satirakou used measurement scales from previous studies, selecting a 10-item scale to measure the independent variable, role conflict. Job structuring was measured on a 5-point scale, asking people to identify how their work was designed. Satirakou also measured rewards and participation in policy level and financial decision-making on a 5-point scale. Role requirements were assessed by measures of time in 11 categories of responsibilities. Factor analysis found Janusian conflict, that is, lack of time for academics, and values conflict, or difficulty mediating incompatible demands (Sotarikou).

Role Clarity or Ambiguity

Functional role clarity is likely to be important to individuals in organizations. Coladarci and Getzels (1955) theorized that when expectations were congruent the administration could progress as planned. Alternatively, if expectations were incongruent, processes could be stopped. According to the administrative theory proposed by Coladarci and Getzels, three dimensions of the administrative relationship were most important: authority, scope, and affectivity. Scope referred to the range of roles included in a relationship (Coladarci & Getzels). These theorists believed that role clarity between managers and staffs, or leaders and followers, lead to educational administration effectiveness.

Kahn, Wolfe, Quinn, Snoek, and Rosenthal (1964) noted that role ambiguity often leads to stress because people become frustrated when they do not have access to adequate information needed to complete important duties. This was believed to reduce

and retard performance and job satisfaction. Kahn et al. found that technology and task complexity were major sources of role ambiguity. Additionally, a fast pace of change, internal connections among an organization's functional roles, and a management philosophy in favor of restricting information are also sources of role ambiguity. Kahn et al. also found that role ambiguity decreased self-confidence, negatively affected individuals' attitudes toward one another, ultimately increasing tensions. Role ambiguity can lead to many problems and may be more prevalent during times of significant changes in the workplace.

According to the findings of Roueche, Baker, and Rose (1989), leader and follower cohesion may occur when both understand campus expectations. Technology implementation may be a time when there is more confusion about such expectations. Modern leadership style is an interactive process, and is tolerant of considerable ambiguity (Roueche et al.). This tolerance may need to be understood to overcome any fear or confusion caused by technology changes. A registrar's functional role in times of technology implementation may include allowing more time for listening to staff expectations.

In 1991 Singh and Rhoads developed role conflict and ambiguity scales to measure ambiguity in boundary-spanning roles. They found that role ambiguity is important because it is thought to have a negative effect on an employee's job satisfaction, performance, and turnover. Role ambiguity causes problems because there is a lack of information concerning how to proceed with critical tasks. This leads to frustration, and in turn, to tension (Singh & Rhoads). The study of role ambiguity appears to have merit when addressing functional roles of college administrators during organizational change.

Community college registrars may be viewed as boundary spanners when they collaborate with those in other areas of a college, or with those outside the college organization. Role ambiguity existed in varying degrees among people who regularly collaborated with others outside their immediate department or office when role performance instruction was missing or inadequate (Singh & Rhoads, 1991). Four types of role ambiguity were identified: the scope of a person's responsibilities, the behaviors needed to handle responsibilities, expectations of those who assign roles, and being unclear about how one's actions would affect the overall goals.

Singh and Rhoads (1991) developed a definition of role ambiguity based on focus groups, discussions, and literature in the field: These researchers perceived role ambiguity as a complex evaluation about the need for additional information for effective role performance. The task environment was thought to be one of several aspects of the evaluation of ambiguity. Singh and Rhoads also examined the extent to which different facets of role ambiguity were related to employee demographics and personality. The combination of ambiguous task environment, demographics, and personality issues comprise several variables for the study of functional role ambiguity.

Hirshhorn & Gilmore (1992) discussed negative results of an absence of authority, and maintained that it may be appropriate to have a strong authority to resolve tensions created by the shared authority of increased participation. Hersey and Blanchard (1993) recognized that conflict occurred when people did not know what was expected or did not know the definition or appearance of good performance. Mohr and Dichter (2001) promoted communication as a cure for ambiguity, including many forms of communication by everyone in a work group, rather than maintaining one channel of

authoritative communication. According to Cramer (2005) during Web-enabled student information system implementations, conflicts may be resolved by maintaining a strong authority while venturing into collaborative learning and decision-making. Registrars' skills may determine the extent of role conflict that is caused by ambiguity that occurs during a system implementation involving cross-functional teams and committees.

Bandura (1997) also reported on role ambiguity. Evidence showed that role ambiguity impeded use of personal capabilities. Bandura found that managers of both high and low self-efficacy perform similarly when in ambiguously structured roles. Bandura defined perceived self-efficacy as a person's ability to accomplish goals. Self-efficacy may influence role ambiguity, but Bandura found that when role expectations were clear, managers with high self-efficacy showed measurable performance improvements. Those of low perceived efficacy improved only slightly. These findings suggested different remedial measures for low organizational productivity. Those managers who had high degrees of self-efficacy needed role clarification while those who were less efficacious need guided mastery experiences and also role clarification (Bandura). Bandura's work may provide insights for management development programming.

According to Yukl and Lepsinger (2004), poor role clarification can cause team member or inter-departmental conflicts when no one accepts responsibility for something that needs to be done. Yukl and Lepsinger found that role clarifying was especially useful when the work was complex as in when technology changes include large complex tasks performed by multiple people or groups, and that clarifying was one of the leadership behaviors that enhanced efficiency in an operation.

Tom Stewart, a registrar with a lengthy and exemplary career (1966 to 2003) at Miami Dade Community College, did not like ambiguity (Stones, 2004b). Tom enjoyed the analytical aspects of systems development and implementation for many years. Previously a math professor with an engineering background, Tom never espoused to become a dean because he did not see himself as a leader or as inspirational, and did not enjoy the prospect of having to make exceptions to rules, as deans often are called to do (Stones, 2004b). Tom Stewart liked things to be black or white, yes or no. His background characteristics may have influenced his style of work, which he characterized as manager rather than leader (Stones, 2004b). The ambiguity of a large-scale implementation can cause confusion that will alienate project team members if not addressed (Cramer, 2005). A registrar may often endure role ambiguity as they participate in a large-scale Web-enabled system implementation

Background Characteristics

Is it possible that certain community college and registrar background characteristics have a bearing on the registrar's functional role during Web-enabled system implementation projects? According to Lewin (1935), success breeds success while failure breeds failure. It is possible, for example, that the number of successful projects previously implemented have an impact on the role of community college registrars during system implementation.

Brewer's (1987) research included background characteristics of registrars. Brewer recognized a trend of an increasing number of women taking on the role of college or university registrar, and recommended further opinion research regarding computer

technology and type of institution where women were more represented. In 1983 Moore's national study of higher education administrators found that although just 20% were women, most of them were registrars, librarians and directors of financial aid. The three positions most held by men were president, chief business officer and registrar (Moore). Brewer also recognized the extensive differences in educational backgrounds of registrars. She recommended assessing computer competences of registrars, and recognized a need for technical training on the part of registrars. In addition, age may be a characteristic that affects technology implementation. Brewer recognized resistance to computer technology among older registrars and recommended educational programs for them. Job performance of registrars and their departmental staff and success of their departments as entities may be enhanced, according to Brewer, by identifying registrars' technological expertise.

As late as 1986, a sizeable proportion of registrars had negative opinions concerning computers or felt that they were not essential to their jobs. Brewer (1987) found, as had others before her, that older individuals were less willing to adapt to changes driven by technology. Brewer found that the more highly educated registrars had more positive opinions toward technology usage, and those who owned computers also had more favorable opinions toward them. This research focused on community college registrars included certain background characteristics, including number of system implementations completed, college enrollment, gender, level of education, and years of service.

Brewer (1987) also found that enrollment, rather than the type of institution, was related to the registrars' opinions toward and use of computers. She also found that

gender of the registrars was related to use of computers but was not related to their opinions toward them. Brewer concluded that women at smaller colleges may have affected her data because there were more women than men serving at small institutions and they may not have been exposed to computers as much as their colleagues at larger institutions. Brewer may have had different results if she conducted her research again at the beginning of the 21st century. By 1995 Rosin and Korabik's study of men and women managers' organizational experiences and propensity to leave revealed that differences were largely based on situations rather than gender, which were consistent with Brewer's conclusions.

According to Brewer's (1987) findings, community college enrollment was related to opinion and usage of computers. Though some registrars did not concur, in general, mainframe and microcomputers were popular among registrars in 1986 (Brewer). Microcomputers were being used in some registrars' offices in lieu of mainframe computers for some tasks (Brewer).

Fowler and Gilfillan (2003) found that background and expertise contributed to the functional role of systems implementation project personnel. Interviews regarding project management during information systems implementation focused on ERP (enterprise resource planning for integrated information systems) in the United Kingdom higher education sector (Fowler & Gilfillan). Topics included current role, responsibilities, and type of involvement with system implementation. Researchers found that roles varied based on cultural factors, such as participants' own background and experience as well as on the technology (Fowler & Gilfillan). Ambiguity resulted from lack of awareness of the work needed. Duties included negotiation of an increased amount of standardization and

centralized control. Roles shifted with project early, middle, and closure periods (Fowler & Gilfillan). This research indicated potential conflict of roles between stakeholders and consultants. Implementation project manager roles included those of administrator, leader, and politician. A participative management approach was overall viewed as positive for standardizing information across the enterprise or institution, and allowing access to a multitude of functional areas, involving re-design of work procedures, in efforts to implement a vendor's integrated package. The registrar's office was depicted as one of the providers of support processes and the temporary structure during implementation was matrix management (Fowler & Gilfillan). Matrix management implies that more than one functional area is involved in a process and may result in an administrator, such as community college registrar, working under the direction of more than one division head.

In 2003, Cohen and Brawer published the fourth edition of *The American Community College*. Their research indicated that administrative patterns of community colleges showed evidence of emphasis on college functions depending on the size of the institution. For example, larger colleges may have deans of admissions, and smaller colleges may have deans of student services and academic services. Two major challenges, according to Cohen and Brawer, were the size of many community colleges and the diversity of the students, staff, and communities they served. This research included size among other background characteristics of community colleges and registrars that may apply to the functional role during Web-enabled system implementation. Importantly, the study relied upon the perceptions of registrars.

Summary of the Literature Review

The literature review for this study of the functional role of community college registrars is related to Web-enabled system implementation. The researcher focused on selections from a number of topics that were identified in the statement of purpose and research questions. The study began with research on the history, growth and globalization of community colleges. Next, the review of the functional role of community college registrars included their duties and responsibilities, with a focus on registrars' responsibility as custodian of student records. Systems implementation topics followed, with a survey of in-house, outsourced, consortium strategies, the use of project consultants, and the need for technical expertise on the part of the college registrar. An extended focus on role conflict and ambiguity followed with a study of role conflict and role ambiguity. The literature review also covered theory and research on the possible effects of college and registrar background characteristics on functional role during system implementation. Background characteristics included college enrollment, educational background, gender, length of time in administrative service, and experience with major Web-enabled student system implementation projects. The purpose of the study was to discover whether there is a difference in the role of the community college registrar when a college is involved in a Web-enabled student system implementation project.

Research and improved understanding has occurred in areas of organizational roles and technology implementation. Social and behavioral sciences provide guidance for organizations and their leaders and managers as they identify functional roles and roles within processes. This study is deemed to be valuable since human resources are

key to systems implementation, change, and understanding as people share in technology and its rewards. The next chapter describes the research methodology for this study, and applies a social science approach. This is in terms of subjective perceptions of functional role of mid level college administrators, specifically community college registrars, with regard to Web-enabled systems implementation.

CHAPTER 3 – RESEARCH METHODOLOGY

Introduction

What are the perceived differences, if any, in the functional role of community college registrars who are involved in Web-enabled student information systems implementation projects compared to those who are not involved in such projects? This question leads the research for the study presented herein. The table that follows, Table 1, presents the research sub-questions, data collection methods, and analysis; it is repeated here for the reader's convenience.

The research sub-questions are:

- What are the self-perceived job duties and responsibilities, role conflict, and role ambiguity for community college registrars who are involved in the process of Web-enabled student systems implementation, and for those registrars who are not involved in systems implementation?
- What is the relationship between the type of information technology implementation strategy: (a) in-house; (b) outsourced; (c) consortium; or (d) combination, and the registrars' self-perceived job duties and responsibilities, role conflict, and role ambiguity?
- To what extent do registrars who are involved in Web-enabled student systems implementation differ in self-perceived job duties and responsibilities, role conflict, and role ambiguity by background characteristics?

Table 2. Research Sub-questions, Data Collection Methods and Analysis

Research Sub-Questions	Survey Questionnaire Data Collection Methods	Analysis
1. What are the self-perceived job duties and responsibilities, role conflict, and role ambiguity for community college registrars involved in systems implementation, and for those who are not involved?	Administrative Q-sort list of job duties using Likert type scale and list of contacts were used to identify self-perceived functional role. Instances of current implementation projects were assessed with a forced Yes or No response question.	Frequencies and percentages of each combination of job duties and responsibilities were compared for those who were and were not involved with systems implementation projects. Responses of very high involvement and high involvement were used to categorize each job duty and responsibility.
2. What is the relationship between the type of information technology implementation strategy: (a) in-house, (b) outsourced, (c) consortium, or (d) combination, and the registrar's self-perceived job duties, role conflict, and role ambiguity?	Two multiple-choice questions identified technology implementation strategies in use, both in general and for current implementation. Six Likert type scale questions were included to assess perceptions of role conflict and role ambiguity.	Chi Square Test of Independence with contingency tables identified differences in job duties and perceptions of very high or high role conflict and role ambiguity for those who were involved in implementation projects, for each technology implementation strategy.
3. To what extent do registrars who are involved in Web-enabled student information system implementation differ in job duties, role conflict, and role ambiguity, by selected background characteristics?	Selected background characteristics were compared with job duties, role conflict, and role ambiguity, for each systems implementation strategy.	Chi Square Test of Independence contingency tables was used.

Methodology

The researcher looked to Max Weber's (1920/1964) work regarding methods of research in social science. Weber's basic thesis in promoting social science was accepting the subjective point of view. His critical attack on the "historical" position concerned the idea that "generalized theoretical categories are as essential to the proof of causal relationships in the human and cultural field as they are in the natural sciences" (p. 9). Weber made a number of references to the bearing of a phenomenon on the "survival of the system, organism or society, under consideration" (p. 18). Weber identified the functional approach, indicating that this could be used in terms of a frame of reference that included a person acting out a situation, rather than an organism existing in an environment. The present study offered a functional approach that was based in the social sciences and focused on organizational behavior.

Research methods in organizational behavior sometimes include questionnaires. The present study incorporated the preliminary use of interviews, yet mainly relied on survey questionnaires for data collection.

A preliminary inquiry regarding the proposed research for this dissertation was conducted during April of 2003. E-mail interviews were conducted with four student services employees at one community college. Results indicated that the role of the respondent from the recruitment, admissions and registrar offices did change as a result of a student system implementation project. The role of a respondent from the counseling and advising department did not change, based on the perception of the respondent. The researcher concluded that some jobs may have been directly affected by the changed

work demands resulting from Web-enabled system implementation. The remainder of the research methodology for this study relied on survey questionnaires for a random sample of the target population.

Population and Sample

The membership of the American Association of Collegiate Registrars and Admissions Officers (AACRAO) served as the source for identifying respondents for this research study. AACRAO is the official professional organization representing collegiate registrars, and the AACRAO membership guide contains the contact names and addresses needed to reach registrars directly. The researcher found that all of the 1,166 (AACC, 2002) community colleges were not AACRAO members. The two-year community and technical colleges, both public and private, in the AACRAO Member Guide 2003-2004, totaled 435 institutions. The researcher tallied and numbered the 435 AACRAO institutions and then randomly selected 250 registrars from that group.

All colleges were selected by following Shavelson's (1996) random sampling procedure and by using Shavelson's Table A: Random Numbers (pgs. 614 – 615). There was no control for geographic location. The researcher selected the district registrar or the campus registrar from the main or largest campus of each college to receive the survey instrument.

The researcher projected a 50% return of survey questionnaires based on responses to previous studies of college registrars. One response rate of just 14% was reported for an e-mailed technology outsourcing survey of registrars conducted by a special task force of AACRAO directed to its own members (Braz et al. 2001). An earlier

nationwide mailed survey sent to collegiate registrars on the topic of computer usage received a response rate of 57% (Brewer, 1987). However, Simpson (1997) reported a 63% response to a mailed survey of registrars, using advance notices and follow-up letters and notes. Potential for improved response was expected as a result of using an approach similar to the one recommended by Dillman (1998). The advance notice recommended by Dillman was not used, and the time between follow-up mailings differed somewhat. The questionnaire mailings were timed so that they reached potential respondents to avoid any inconvenience due to conflict with peak enrollment activities, grades processing, or graduation.

The sample size of 250 was expected to yield at least a 50% return, resulting in 125 completed surveys. A two-tailed test where level of significance was set at .05, with power = .90, and effect size of .30, required a return of 117 completed usable questionnaires (Shavelson, 1996, p. 640).

The target population and sampling methods described herein provided the basis for reaching the audience for this research project. Instrumentation and data collection procedures follow.

Instrumentation and Data Collection Procedures

The researcher conducted a mailed self-administered pre-test survey questionnaire, followed by a mailed self-administered final survey questionnaire. A total of 50 registrars received the pre-test and 200 registrars received the final questionnaire. The quantitative and qualitative methods were somewhat characteristic of “an interpretive/constructivist

paradigm” (Mertens, 1998, p. 11). Although this paradigm usually involves personal interviews, a mailed survey was used due to time and financial constraints.

The instrument included adapted items from the official Position Description Questionnaire used in the Human Resources Department at Edison Community College in Southwest Florida (2000a). The researcher adapted the following questions from that instrument: (1) position title; (2) list of job duties and responsibilities; and (3) personal contacts outside the office; i.e., position and department, frequency, and purpose. The list of job duties and responsibilities was based on the job descriptions for the District Registrar at Edison Community College (2000b) and the College Registrar at Palm Beach Community College (2003) in Florida. Respondents to the mailed survey questionnaire were asked to identify their duties and extent of involvement on a Likert type scale. Categories ranged from very high involvement to very low involvement. Responses of very high or high involvement were tallied as indicating a definitive perceived job duty or responsibility.

The Administrative Q-Sort (Miller, Schroeder, & Hotes, 1982) was also used for defining roles and functions. Miller et al. adapted French’s Q-sort for management and administration. It helped to identify what people saw as the role at various mid-management levels. This method was previously used in health care and education to clarify issues and conflicts. Miller et al. also provided a list of administrative duties from one community college and asked officials in continuing education departments to prioritize them, thereby identifying and rating their own job duties and responsibilities. However, the present study of community college administrators differed from the study conducted by Miller et al. in that fewer activities were listed in an effort to reduce

completion time and increase the response rate for the overall study. However, the current instrument expanded on job duties as respondents were subsequently asked to identify the personnel outside of their departments with whom they had collaborated in the last month, including the frequency of contacts, and reasons for those contacts.

Immediately following the question regarding outside contacts, respondents were asked whether their college was involved with implementation of a Web-enabled student system implementation project at the time of the survey. The registrars were also asked to specify the systems involved.

A role perception questionnaire used by Murray, Murray, and Summar (2001) in a study of chief academic officers was also adapted for a section of this study's survey questionnaire. That instrument was adapted from Rizzo, House, and Litzman who developed it in 1970. This earlier instrument was previously used and referenced by others, and was believed to be statistically reliable and valid (Allen, Freeman, Russell, Reinzenstein, & Rentz, 2001; Bray & Brawley, 2002; Murray, Murray, & Summar, 2001; Pollard, 2001). Kahn, Wolfe, Quinn, Snoek, and Rosenthal (1964) also developed and tested measures of role conflict and ambiguity. More recently Singh and Rhoads (1991) tested prior-developed scales for measuring organizational functional role conflict and ambiguity. Three questions regarding role clarity and ambiguity and three regarding role harmony and conflict were included in this present study of community college registrars, having been adapted from House and Rizzo, 1972 (p. 480). The specific questions that were selected had the highest factor analysis loadings from earlier research mentioned above (Rizzo, House, & Litzman, 1970). In cases where the original question was worded in a negative context, the wording was changed to a positive context for the present

research project. Respondents to this current research project entered their answers on a six point Likert-type scale, from 'Strongly Agree' to 'Strongly Disagree'. The researcher combined answers of 'Strongly Agree' and 'Agree' from the positively worded questions to indicate perceived role clarity or role harmony. This is further described in the analysis to follow.

A key question on the survey, for those who were involved in Web-enabled student information system implementation projects at the time of the study, identified the information technology strategy at the institution and also the information technology strategy chosen for the implementation projects: (1) in-house; (2) collaboration or consortium; (3) outsourced; or (4) combination of strategies.

The researcher included questions regarding selected background characteristics to identify the following: (1) college enrollment, (2) number of years respondents had served as college registrar, (3) educational background, (4) gender, (5) whether they were involved in a Web-enabled student information system implementation project at the time of the study, and (6) how many such projects they had administered. The questionnaire was limited to 15 questions to expedite data analysis without compromising the internal validity of the questionnaire. Cronbach's alpha was used to test internal reliabilities for each question.

Data were collected via a mailed questionnaire (detailed below). Each participant first received a packet containing a cover letter, questionnaire, and stamped return envelope. A pre-test of 50 questionnaires was sent in January 2004. Only 10 were returned and all of these 10 were completed. Following this response, the only significant change was the color of the questionnaire, from light orange to light blue. The researcher

felt that the light blue color would be viewed as a more legitimate form. The first complete mailing of 250 packets was sent out in mid-February 2004. This first mailing resulted in 105 responses. The researcher then sent out a follow-up postcard to each non-respondent in late March 2004, over one month after the first mailing. After the follow-up postcard, the number of returned questionnaires equaled 136. A second complete packet was mailed to the non-respondents in June 2004. The researcher delayed the second mailing because typically college registrars are extremely busy with final grades, graduation, and summer enrollment during the months of April and May. The June mailing resulted in a total of 173 completed questionnaires. A final follow-up letter was mailed in July 2004. This resulted in a total of 181 returned questionnaires (72.4%), with 179 (71.6%) of the returned questionnaires answered by the respondents. Just two registrars returned their questionnaires with notes that they preferred not to participate. These two questionnaires were returned blank, with no answers to any of the questions. Some individual questions were left blank by the registrars who did respond to the study. Each question that was left blank, including each question on the two instruments that were returned totally blank, was reported as *No Answer* and calculated with other responses using frequencies and percents. The final number of completed usable questionnaires, 179, was acceptable based on the required number for the study to be statistically significant, 117, and also compared to other surveys of college administrators.

To summarize, this study employed a data collection method similar to that recommended by Dillman (1998). Survey questionnaires were sent by mail, each with a cover letter and stamped return envelope. Advance notice was not provided. Non-

respondents were contacted with a postcard. Those still not responding were sent a second letter and survey questionnaire. Those still remaining as non-respondents were sent a final letter requesting that they take a moment to complete the questionnaire and return it for inclusion in the study. The mailed survey allowed all community and technical college registrars who were members of AACRAO to be included. Those who were, and were not, involved with technology implementation projects at the time of the survey, and those who did, and did not, regularly use electronic communications, had opportunity to respond.

Analytic and Statistical Methods

Statistical analysis software, Statistical Package for the Social Sciences Version 11.0 for Windows (SPSS, 2001), was used to analyze the data that resulted from the research question. The question is repeated below for the reader's convenience.

Research Question: What are the perceived differences, if any, in the functional role of community college registrars involved in Web-enabled student information systems implementation projects compared to those who are not involved in such projects?

Descriptive statistics using counts (such as frequencies or percentages) along with a Chi-Square test for independence adequately analyzed the nominal categorical data from the survey responses and provided answers to this research question (Shavelson, 1996). The registrars' functional role, role conflict, and role ambiguity were considered as the dependent variables for each analysis. Each highly rated duty or responsibility was identified as a functional role. Two independent variables were the existence or non-existence of a current Web-enabled student information system implementation project.

Additional independent (intervening) variables for respondents who were involved with systems implementation were the four alternative information technology implementation strategies, and also selected background characteristics.

The results also included narrative data. The researcher analyzed the narrative data by identifying like responses and grouping them wherever possible.

CHAPTER 4 – ANALYSIS AND CONCLUSIONS

Analysis

This chapter presents the complete analysis of survey research data received during the time frame of the study. All three parts, or sub-questions, of the research question are included in this analysis. Briefly, this study involved a nationwide survey of community college registrars. These professionals are typically mid-level administrators. The focus was an inquiry about the functional role of registrars who were involved in implementing Web-enabled student information systems, compared to those who were not involved in such implementations. The study included an assessment of community college registrars' involvement in a list of job duties and responsibilities. Implementation strategies, specifically in-house, outsourced, consortia, and combinations of strategies, were included. The study also included role conflict (harmony) and role ambiguity (clarity) related questions.

The final section of the research data included specific background characteristics and level of community college registrars' involvement with Web-enabled student systems implementation, type of implementation strategy, and perceptions of role conflict (harmony) and role ambiguity (clarity). This question inquired as to whether there was a difference in duties and responsibilities within various implementation strategy scenarios and within different categories of the background characteristics. The following background characteristics were included: college credit enrollment headcount, community college registrars' level of education, gender, number of years in office, and number of Web-enabled implementation projects completed.

Table 3 describes community college registrars' job duty and responsibility for implementing Web-enabled technology systems. It compares two levels of involvement to the implementation strategy used for the new systems. These registrars' highest involvement in implementing Web-enabled technology systems occurred with the in-house implementation strategy (71.6%). Lowest involvement was with the consortium strategy (53.3%).

Table 3: Implementation Strategy by Involvement Level for Implementing Web-enabled Technology Systems

Job Duty		Implementation Strategy						Total
Duty	Involvement Level	In House	Out-Sourced	Consortium	Combination	No Current Project	No Answer	
Implement Web-enabled technology systems.	Very High or High	48 71.6%	14 66.6%	7 46.6%	29 67.4%	11 47.8%	4 33.3%	113 62.4%
	Moderate or None	18 26.9%	5 23.8%	8 53.3%	13 30.2%	12 52.2%	5 41.7%	61 33.7%
	No Answer	1 1.5%	2 9.5%	0	1 23.3%	0	3 25%	7 3.9%
	Total	67 100%	21 100%	15 100%	43 100%	23 100%	12 100%	181 100%

Pearson Chi-Square Value = 28.422, df = 10, two-tailed, $p = .002$
Cramer's Value = .280, $p = .002$

The study assessed community college registrars' job duty and responsibility for administering registrar office policies and procedures. Results indicated that 172 of 181 or 95% (Pearson Chi-Square Value = 36.452, df = 10, two-tailed, $p = .000$) (Cramer's Value = .317, $p = .000$) of the registrars were very highly or highly involved with

administering registrar office policies and procedures. The results were consistent regardless of implementation strategy or whether the colleges were involved in a Web-enabled technology implementation project. Providing overall leadership for the office of the registrar was also reported as a fundamental activity of these administrators regardless of implementation strategy or whether a Web-enabled implementation project was in progress. Overall, 171 of 181 or 94.5% (Pearson Chi-Square Value = 28.422, $df = 10$, two-tailed, $p = .002$) (Cramer's Value = .280, $p = .002$) of all community college registrars were very highly or highly involved with office leadership.

Table 4 indicates the extent to which community college registrars were involved in supervising office staff. In all, 16.0% of the respondents had moderate to no involvement with this duty or responsibility. It appears that registrars whose colleges were involved with a consortium (93.3%) or combination (93.0%) of Web-enabled technology implementation strategies may have been most involved with supervising office staff.

Table 4: Implementation Strategy by Level of Involvement for Supervising Office Staff

Job Duty		Implementation Strategy						Total
Duty	Level of Involvement	In-House	Out-sourced	Consortium	Combination	No Current Project	No Answer	
Supervise office staff.	Very High or High	56 83.6%	18 85.7%	14 93.3%	34 93.0%	19 82.6%	8 66.7%	149 82.3%
	Moderate or None	11 16.4%	3 14.3%	1 6.7%	9 2.1%	4 17.4%	1 3.3%	29 16.0%
	No Answer	0	0	0	0	0	3 25.0%	3 1.7%
	Total	67 100%	21 100%	15 100%	43 100%	23 100%	12 100%	181 100%

Pearson Chi-Square Value = 44.908, df =10, two-tailed, $p = .000$
 Cramer's Value = .352, $p = .000$

Table 5 examines community college registrars' level of involvement in establishing registrar office goals and objectives compared with Web-enabled system implementation strategy. Those at colleges with in-house implementation were relatively more involved (94.0%) with establishing their offices' goals and objectives. Registrars at colleges that had outsourced their systems implementation efforts were most likely of all to be moderately or not involved in this duty or responsibility (28.6%).

Table 5: Implementation Strategy by Level of Involvement for Establishing Registrar Office Goals and Objectives

Job Duty	Level of Involvement	Implementation Strategy						Total
		In-House	Out-sourced	Consortium	Combination	No Current Project	No Answer	
Establish registrar office goals and objectives.	Very High or High	63 94.0%	14 66.7%	13 86.7%	34 79.1%	18 78.3%	9 .8%	151 83.4%
	Moderate to None	4 6.0%	6 28.6%	2 13.3%	8 18.6%	5 21.7%	0	25 13.8%
	No Answer	0	1 4.8%	0	1 2.3%	0	3 25%	5 2.8%
	Total	67 100%	21 100%	15 100%	43 100%	23 100%	12 100%	181 100%

Pearson Chi-Square Value = 36.335, df =10, two-tailed, $p = .000$
 Cramer's Value = .317, $p = .000$

The greatest difference in the community college registrars' involvement in providing overall guidance and direction to on-line processes is shown in Table 5. The difference was noted between in-house (76.1%) and outsourced implementation strategy (57.1%) with regard to very high or high involvement in this activity. Another interesting finding is that overall a majority of community college registrars (67.4%) reported that they are very highly or highly involved in guiding and directing on-line processes.

Table 6: Implementation Strategy by Level of Involvement Providing Overall Guidance and Direction to On-line Processes

Job Duty		IMPLEMENTATION STRATEGY						Total
Duty	Level of Involvement	In-House	Out-sourced	Consortium	Combination	No Current Project	No Answer	
Provide overall guidance and direction to on-line processes.	Very High or High	51 76.1%	12 57.1%	11 73.3%	28 65.1%	14 60.9%	6 50%	122 67.4%
	Moderate or None	16 23.9%	9 42.9%	4 26.7%	15 34.9%	9 39.1%	3 25.0%	56 30.9%
	No Answer	0	0	0	0	0	3 25.0%	3 1.7%
Total		67 100%	21 100%	15 100%	43 100%	23 100%	12 100%	181 100%

Pearson Chi-Square Value = 47.113, df =10, two-tailed, $p = .000$
 Cramer's Value = .361, $p = .000$

Table 7 presents responses concerning one of the traditionally fundamental aspects of a community college registrar's job: maintaining student records. Those registrars at colleges involved in a combination of Web-enabled system implementation strategies (79.1%) were less likely than others to be very highly or highly involved with maintaining student records. Just 86.2% of all respondents in this research study indicated that they were very highly or highly involved with maintaining student records. Where there was no Web-enabled technology implementation project, 91.3% of the registrars maintained student records with very high or high involvement. Multiple positions held by one person sometimes included the position of registrar; however, when there was no project, the registrar focused on the fundamental duty of maintaining student records.

Table 7: Implementation Strategy by Level of Involvement Maintaining Student Records

Job Duty		Implementation Strategy						Total
Duties	Level of Involvement	In-House	Out-sourced	Consortium	Combination	No Current Project	No Answer	
Maintain student records.	Very High or High	61 91.0%	18 85.7%	13 86.7%	34 79.1%	21 91.3%	9 .8%	156 86.2%
	Moderate or None	6 9.0%	3 14.3%	2 13.3%	9 20.9%	2 8.7%	0	22 12.2%
	No Answer	0	0	0	0	0	3 25.0%	3 1.7%
	Total	67 100%	21 100%	15 100%	43 100%	23 100%	12 100%	181 100%

Pearson Chi-Square Value = 48.000, df =10, two-tailed, $p = .000$
 Cramer's Value = .364, $p = .000$

Table 8 indicates community college registrars' level of duty and responsible involvement as the custodian of academic records on the computer data base. This was the responsibility of some registrars according to the job descriptions used to base this study. The consortium implementation strategy appeared to elicit the highest involvement in this responsibility (93.3%). A combination of implementation strategies indicates the lowest of registrars' involvement as custodian of the academic records computer database, with 20.9% of registrars at these colleges reporting moderate to no responsibility for this activity. However, overall, 87.8% of registrars across the board were very highly or highly involved as responsible custodian of all academic records on the computer database.

Table 8: Implementation Strategy by Level of Involvement Acting as Responsible Custodian of All Academic Records on the Computer Database

Job Duty	Level of Involvement	Implementation Strategy						Total
		In-House	Out-sourced	Consortium	Combination	No Current Project	No Answer	
Act as responsible custodian of all academic records on the computer database.	Very High or High	60 89.6%	19 90.5%	14 93.3%	37 86.0%	20 87.0%	9 75.0%	159 87.8%
	Moderate or None	7 10.4%	2 9.5%	1 6.7%	6 14.0%	3 13.0%	0	19 10.5%
	No Answer	0	0	0	0	0	3 25.0%	3 1.7%
	Total	67 100%	21 100%	15 100%	43 100%	23 100%	12 100%	181 100%

Pearson Chi-Square Value = 44.703, df =10, two-tailed, $p = .000$
 Cramer's Value = .351, $p = .000$

The research assessed the extent of registrars' responsibility for maintaining and securing the use of the official college seal. 135 of 181 or 74.6% of all community college registrars reported that they are very highly or highly responsible for this. The outsourced strategy for Web-enabled systems implementation appeared to coincide with a greater incidence of responsibility for the college seal, with 17 of the 21 (81%) registrars in outsourced environments reporting to have this duty (Pearson Chi-Square Value = 47.760, df =10, two-tailed, $p = .000$) (Cramer's Value = .363, $p = .000$).

The activities of conducting staff meetings to discuss information, policies, and procedures are examined in Table 9. In-house Web-enabled system implementation strategy represented the greatest percentage (85.1%) of very high or high involvement on

the part of the registrar, with regard to conducting such staff meetings. Alternately, the outsourced strategy appeared to highly or very highly involve fewer registrars (61.9%) in conducting staff meetings to discuss information, policies, and procedures.

Table 9: Implementation Strategy by Level of Involvement for Conducting Staff Meetings to Discuss Information, Policies, and Procedures

Job Duty	Level of Involvement	Implementation Strategy						Total
		In-House	Out-sourced	Consortium	Combination	No Current Project	No Answer	
Conduct staff meetings to discuss information, policies, and procedures.	Very High or High	57 85.1%	13 61.9%	10 66.7%	28 65.1%	18 78.2%	8 66.6%	134 74.0%
	Moderate or None	10 14.9%	8 38.1%	5 33.3%	15 34.9%	5 21.7%	0	43 23.8%
	No Answer	0	0	0	0	0	4 33.3%	4 2.2%
	Total	67 100%	21 100%	15 100%	43 100%	23 100%	12 100%	181 100%

Pearson Chi-Square Value = 68.296, df =10, two-tailed, $p = .000$
Cramer's Value = .434, $p = .000$

Table 10 indicates the extent of very high or high involvement by community college registrars in collaborating and acting as liaison with other departments, functions, or groups. Registrars at colleges that were involved with a consortium (93.3%) or a combination of implementation strategies (93.0%) were very highly or highly involved with collaborating and acting as a liaison. The existence of a Web-enabled technology implementation project appears to make a difference in the involvement in these

activities. The highest percentage of moderate or no involvement in liaison activities was reported by those working at colleges with no such project in progress at the time of this study, 21.7%.

Table 10: Implementation Strategy by Level of Involvement with Collaborating and Acting as Liaison With Other Departments, Functions, or Groups

Job Duty	Level of Involvement	Implementation Strategy						Total
		In-House	Out-sourced	Consortium	Combination	No Current Project	No Answer	
Collaborate and act as liaison with other departments, functions, or groups.	Very High or High	62 92.5%	18 85.7%	14 93.3%	40 93.0%	18 78.3%	8 66.7%	160 88.4%
	Moderate or None	5 7.5%	3 14.3%	1 6.7%	3 6.8%	5 21.7%	1 8.3%	18 9.9%
	No Answer	0	0	0	0	0	3 25.0%	3 1.7%
	Total	67 100%	21 100%	15 100%	43 100%	23 100%	12 100%	181 100%

Pearson Chi-Square Value = 48.055, df =10, two-tailed, $p = .000$
 Cramer's Value = .364, $p = .000$

The study assessed community college registrars' level of involvement in resolving system errors or failures. Overall, a small majority of registrars (63.3%) were very highly or highly involved with this job duty. This was the case for all system implementation strategies studied, and also for those whose colleges were not involved in a Web-enabled student system implementation project at the time of this study (Pearson Chi-Square Value = 44.226, df =10, two-tailed, $p = .000$) (Cramer's Value = .351, $p = .000$).

Table 11 indicates community college registrars' level of involvement in developing, delivering, and assessing internal employee training compared by current Web-enabled system implementation strategy. Overall, 47.5% of community college registrars are very highly or highly involved in internal employee training, while 50.8% have moderate to no involvement in this duty. The least involved with this activity were registrars whose colleges employed consortium strategy for implementation. Meanwhile, moderate to no involvement was reported by 80.0% of the community college registrars who worked in a consortium system implementation environment. Those most involved with internal employee training were registrars at colleges that were not at the time involved in such implementation projects (61.9%).

Table 11: Implementation Strategy and Level of Involvement to Develop, Deliver, and Assess Internal Employee Training

Job Duty	Level of Involvement	Implementation Strategy						Total
		In-House	Out-sourced	Consortium	Combination	No Current Project	No Answer	
Develop, deliver, and assess internal employee training.	Very High or High	38 56.7%	8 38.1%	3 20.0%	18 41.9%	14 61.9%	5 41.7%	86 47.5%
	Moderate or None	29 43.3%	13 61.9%	12 80.0%	25 58.1%	9 39.1%	4 33.3%	92 50.8%
	No Answer	0	0	0	0	0	3 25.0%	3 1.7%
	Total	67 100%	21 100%	15 100%	43 100%	23 100%	12 100%	181 100%

Pearson Chi-Square Value = 53.028, df =10, two-tailed, $p = .000$
 Cramer's Value = .383, $p = .000$

Level of involvement with general management for information services activities is indicated in Table 12. Overall, 37.0% of all community college registrars reported a very high or high level of involvement with general management for information services activities. Community college registrars with in-house implementation strategies were more likely to report that they were highly or very highly involved in general management for information services activities (43.3%). Of those who had no implementation project, 69.6% reported having moderate to no involvement in providing general management for information services activities (69.6%).

Table 12: Implementation Strategy and Level of Involvement for Providing General Management for Information Services Activities

Job Duty Duty	Level of Involvement	Implementation Strategy						Total
		In- House	Out- sourced	Consortium	Combination	No Current Project	No Answer	
Provide general management for information services activities.	Very High or High	29 43.3%	7 33.3%	4 26.7%	17 39.5%	6 26.1%	4 33.3%	67 37.0%
	Moderate or None	38 56.7%	14 66.7%	11 73.3%	26 60.5%	16 69.6%	5 41.7%	110 60.8%
	No Answer	0	0	0	0	1 4.3%	3 25.0%	4 2.2%
	Total	67 100%	21 100%	15 100%	43 100%	23 100%	12 100%	181 100%

Pearson Chi-Square Value = 35.692, df =10, two-tailed, $p = .000$
 Cramer's Value = .314, $p = .000$

Results of Table 13 indicate that just 33.3% of registrars in outsourced implementation environments were very highly or highly involved in attending workshops and training to enhance their own technical skills. More registrars working with an in-house implementation (46.3%) were very highly or highly involved with attending technical workshops and training.

Table 13: Implementation Strategy and Level of Involvement for Attending Workshops and Training to Enhance Technical Skills

Job Duty	Level of Involvement	Implementation Strategy						Total
		In-House	Out-sourced	Consortium	Combination	No Current Project	No Answer	
Attend workshops and training to enhance technical skills.	Very High or High	31 46.3%	7 33.3%	6 40.0%	18 41.9%	8 34.8%	4 33.3%	74 40.9%
	Moderate or None	36 53.7%	14 66.7%	9 60.0%	25 58.1%	15 65.2%	5 41.7%	104 57.5%
	No Answer	0	0	0	0	0	0	3 1.7%
	Total	67 100%	21 100%	15 100%	43 100%	23 100%	12 100%	181 100%

Pearson Chi-Square Value = 44.662, df =10, two-tailed, $p = .000$
 Cramer's Value = .351, $p = .000$

Table 14 reveals the registrars' level of involvement with monitoring projects to ensure effectiveness and compliance with regard to Web-enabled systems implementation strategies. Registrars who worked at community colleges with a consortium implementation strategy indicated the highest percentage of involvement in this activity (86.7%). Overall, 72.4% of community college registrars were very highly or highly involved in monitoring projects for effectiveness and compliance. Those who worked in colleges with no Web-enabled student system implementation project in progress were less involved in this activity. Just 47.8% of registrars with no implementation projects reported very high or high levels of involvement with monitoring projects for effectiveness and compliance.

Table 14: Implementation Strategy and Level of Involvement for Monitoring Projects to Ensure Effectiveness and Compliance

Job Duty	Level of Involvement	Implementation Strategy						Total
		In-House	Out-sourced	Consortium	Combination	No Current Project	No Answer	
Monitor projects to ensure effectiveness and compliance.	Very High or High	52 77.6%	17 81.0%	13 86.7%	29 67.4%	11 47.8%	9 .8%	131 72.4%
	Moderate or None	15 22.4%	4 19.0%	2 13.3%	14 32.6%	12 52.2%	0	47 26.0%
	No Answer	0	0	0	0	0	3 25.0%	3 1.7%
	Total	67 100%	21 100%	15 100%	43 100%	23 100%	12 100%	181 100%

Pearson Chi-Square Value = 56.770, df =10, two- tailed, $p = .000$
 Cramer's Value = .396, $p = .000$

According to the survey results indicated in Table 15, community college registrars were most involved (73.9%) in developing and producing reports on student enrollment for college administration when there was no Web-enabled student system implementation project in progress. Registrars were least involved with student enrollment reports (53.5%) when there was an implementation project and their colleges employed a combination of implementation strategies. Overall, 65.2% of community college registrars were very highly or highly involved in developing and producing reports on student enrollment for their college administration at the time of the study.

Table 15: Implementation Strategy and Level of Involvement for Developing and Producing Reports on Student Enrollment

Job Duty	Level of Involvement	Implementation Strategy						Total
		In-House	Out-sourced	Consortium	Combination	No Current Project	No Answer	
Develop and produce reports on student enrollment for college administration.	Very High or High	47 70.1%	15 71.4%	11 73.3%	23 53.5%	17 73.9%	5 41.7%	118 65.2%
	Moderate or None	20 29.9%	6 28.6%	4 26.7%	20 46.5%	6 26.1%	4 33.3%	60 33.1%
	No Answer	0	0	0	0	0	3 25.0%	3 1.7%
	Total	67 100%	21 100%	15 100%	43 100%	23 100%	12 100%	181 100%

Pearson Chi-Square Value = 48.176, df =10, two-tailed, $p = .000$
 Cramer's Value = .365, $p = .000$

Overall, the research indicated that 130 of 181 or 71.8% of the community colleges were involved in a Web-enabled student system implementation project at the time of the survey. Of the 130 colleges that were involved in such a project, 60 (46.2%) employed an in-house implementation strategy, while 33 (25.4%) used a combination of strategies. A much lower frequency, 15 (11.5%) of the 130 colleges involved with a Web-enabled implementation project used an outsourced strategy while another 15 (11.5%) implemented by way of a consortium (Pearson Chi-Square Value = 90.675, df = 10, two-tailed, $p = .000$) (Cramer's Value = .500, $p = .000$).

Table 16 is the first of six tables that present a cross tabulation of community college registrars' perceptions of their own job duties and responsibilities compared by Web-enabled student system implementation strategies. In response to the survey questionnaire statement, "I know what my responsibilities are," 95.6% of all community college registrars who responded to the research study indicated that they strongly agreed or agreed with this statement. Regardless of implementation strategy, community college registrars knew their responsibilities. The consortium implementation strategy appeared to enhance the clearest view of responsibilities, with 100% of those with the consortium implementation strategy in place reporting having full knowledge of their responsibilities.

Table 16: Implementation Strategy by Knowledge of Responsibilities

Perception of Current Job Duties		Implementation Strategy						Total
Perception	Level of Agreement	In-House	Out-sourced	Consortium	Combination	No Current Project	No Answer	
I know what my responsibilities are.	Strongly Agree or Agree	66 98.5%	20 95.2%	15 100%	42 97.7%	21 91.3%	9 75.0%	173 95.6%
	Somewhat Agree or Do Not Agree	1 1.5%	1 4.7%	0	1 2.3%	2 8.7%	0	5 2.8%
	No Answer	0	0	0	0	0	3 25.0%	3 16.6%
	Total	67 100%	21 100%	15 100%	43 100%	23 100%	12 100%	181 100%

Pearson Chi-Square Value = 47.338, df = 10, two-tailed, $p = .000$
Cramer's Value = .362, $p = .000$

Table 17 presents responses indicating that 75.1% of community college registrars strongly agreed or agreed that they knew they divided their time wisely. The highest percentage of registrars who were confident of the way they divided their time were those who had no Web-enabled system implementation project in place (82.6%). Those who were in an environment with a combination of implementation strategies reported the lowest percentage of confidence in the way they divided their time (69.8%).

Table 17: Implementation Strategy by Knowledge of Properly Dividing Time

Perception of Current Job Duties	Level of Agreement	Implementation Strategy						Total
		In-House	Out-sourced	Consortium	Combination	No Current Project	No Answer	
I know I have divided my time properly.	Strongly Agree or Agree	51 76.1%	16 76.2%	12 80.0%	30 69.8%	19 82.6%	8 66.7%	136 75.1%
	Somewhat Agree or Do Not Agree	16 23.9%	5 23.8%	3 20.0%	13 30.2%	4 17.4%	1 8.3%	42 23.2%
	No Answer	0	0	0	0	0	3 25.0%	3 1.7%
	Total	67 100%	21 100%	15 100%	43 100%	23 100%	12 100%	181 100%

Pearson Chi-Square Value = 45.236, df = 10, two-tailed, $p = .000$

Cramer's Value = .353, $p = .000$

Table 18 indicates that a slight majority (58.6%) of the registrars perceived that they worked under conditions of clear directives or orders. Those who worked at colleges that were not involved with Web-enabled student system implementation projects reported the greatest clarity of working conditions (69.5%). The least clear scenario appeared to be among registrars whose colleges were implementing such systems by way of a combination of implementation strategies. Just 48.8% of those registrars reported that they strongly agreed or agreed that they worked under clear directives or orders, whereas a slight majority (51.2%) somewhat agreed or did not agree.

Table 18: Implementation Strategy by Perception of Working Under Clear Directives or Orders

Perception of Current Job Duties		Implementation Strategy						Total
Perception	Level of Agreement	In-House	Out-sourced	Consortium	Combination	No Current Project	No Answer	Total
I work under clear directives or orders.	Strongly Agree or Agree	38 56.7%	14 66.7%	9 60.0%	21 48.8%	16 69.5%	8 6.7%	106 58.6%
	Somewhat Agree or Do Not Agree	29 43.3%	7 33.3%	5 33.3%	22 51.2%	7 30.4%	1 8.3%	71 39.2%
	No Answer	0	0	1 6.7%	0	0	3 25.0%	4 2.2%
	Total	67 100%	21 100%	15 100%	43 100%	23 100%	12 100%	181 100%

Pearson Chi-Square Value = 40.073, df = 10, two-tailed, $p = .000$
 Cramer's Value = .333, $p = .000$

Table 19 shows that a slight majority of community college registrars (54.7%) reported that they strongly agreed or agreed with the way things were done. Those with no implementation project were more likely to strongly agree or agree with this statement (65.2%). Of those whose colleges employed an implementation strategy, the greatest agreement with the way things were done was among those in a consortium environment (60.0%).

Table 19: Implementation Strategy by Agreement With the Way Things are Done

Perception of Current Job Duties		Implementation Strategy						Total
Perception	Level of Agreement	In-House	Out-sourced	Consortium	Combination	No Current Project	No Answer	
I agree with the way things are done.	Strongly Agree or Agree	36 53.7%	11 52.4%	9 60.0%	22 51.2%	15 65.2%	6 50.0%	99 54.7%
	Somewhat Agree or Do Not Agree	31 46.3%	10 47.6%	6 40.0%	21 48.8%	8 34.8%	3 25.0%	79 43.6%
	No Answer	0	0	0	0	0	3 25.0%	3 1.7%
	Total	67 100%	21 100%	15 100%	43 100%	23 100%	12 100%	181 100%

Pearson Chi-Square Value = 44.834, df = 10, two-tailed, $p = .000$
 Cramer's Value = .352, $p = .000$

Table 20 reports a perception of registrars' job duties described as knowing exactly what is expected of them. A majority (71.8%) of community college registrars strongly agreed or agreed that they know what others expect of them. A greater majority of those who had no Web-enabled student system implementation project (87.0%) agreed that they know what others expect of them. Registrars who work at a college with a combination of system implementation strategies were somewhat less in agreement with this statement, as just 58.1% of registrars at those community colleges reported that they strongly agreed or agreed. The highest level of agreement among those whose colleges employed an implementation strategy, regarding knowing what others expect, came from

registrars working in an outsourced environment. Overall, 81.0% of those registrars reported that they strongly agreed or agreed that they know exactly what is expected of them.

Table 20: Implementation Strategy by Knowing Exactly What is Expected

Perception of Current Job Duties	Implementation Strategy							Total
	Level of Agreement	In-House	Out-sourced	Consortium	Combination	No Current Project	No Answer	
I know exactly what is expected of me.	Strongly Agree or Agree	50 74.6%	17 81.0%	11 73.3%	25 58.1%	20 87.0%	7 58.3%	130 71.8%
	Somewhat Agree or Do Not Agree	17 25.4%	4 19.0%	4 26.7%	18 41.9%	3 13.0%	2 16.7%	48 26.5%
	No Answer	0	0	0	0	0	3 25.0%	3 1.7%
	Total	67 100%	21 100%	15 100%	43 100%	23 100%	12 100%	181 100%

Pearson Chi-Square Value = 51.036, df = 10, two-tailed, $p = .000$
 Cramer's Value = .375, $p = .000$

Table 21 indicates community college registrars' responses to the statement, "I work under compatible policies and guidelines". Responses were compared for those in various Web-enabled systems implementation strategy environments and for those whose colleges were not involved in such student system implementation projects. The majority of respondents, (67.4%) reported that they strongly agreed or agreed that they worked

under compatible policies and guidelines. However, of registrars whose colleges were not involved with such an implementation project at the time of this study, 87.0% agreed that they worked under compatible policies and guidelines. Just 55.8% of registrars working with a combination of implementation strategies reported agreement with this statement. Registrars who were working with a consortium implementation strategy, and whose colleges were implementing a Web-enabled student information system, were the group with the highest level of agreement that they worked under compatible policies and guidelines (80%).

Table 21: Implementation Strategy by Perception of Working Under Compatible Policies and Guidelines

Perception of Current Job Duties		Implementation Strategy						Total
Perception	Level of Agreement	In-House	Out-sourced	Consortium	Combination	No Current Project	No Answer	
I Work Under Compatible Policies and Guidelines.	Strongly Agree or Agree	46 68.7%	14 66.7%	12 80.0%	24 55.8%	20 87.0%	6 50.0%	122 67.4%
	Somewhat Agree or Do Not Agree	21 31.3%	6 28.6%	3 20.0%	19 44.2%	3 13.0%	3 25.0%	55 30.4%
	No Answer	0	1 4.8%	0	0	0	3 25.0%	4 2.2%
	Total	67 100%	21 100%	15 100%	43 100%	23 100%	12 100%	181 100%

Pearson Chi-Square Value = 40.825, df = 10, two-tailed, $p = .000$
 Cramer's Value = .336, $p = .000$

Table 22 is the first of four tables that compare background characteristics with technology implementation strategy. The first background characteristic presented in this table is college enrollment. The greatest percentage of survey respondents (46.4%), were employed at smaller colleges, those with less than 5,000 students. Another 28.2% were employed at mid sized colleges with enrollments of 5,000 to less than 10,000 students. 22.7% of registrars reported that they were employed at institutions with enrollments of 10,000 or more students. A majority of the colleges that were not involved in a Web-

enabled system implementation project at the time of this study were these smaller institutions (73.9%). Of those who were involved with system implementation, in-house implementation was reportedly the most frequently reported strategy across the board. Combination of strategies was the least frequently reported for the smaller colleges. Consortia was the least frequently implemented strategy for the larger colleges. Also noteworthy, of colleges with a combination of implementation strategies, 34.9% were among the largest institutions.

Table 22: Implementation Strategy by College Credit Headcount

Background Characteristic		Implementation Strategy					No Current Project	No Answer	Total
		In-House	Out-sourced	Consortium	Combination				
Fall 2003 Headcount	<5,000	26 38.8%	12 57.1%	8 53.3%	16 37.2%	17 73.9%	5 41.7%	84 46.4%	
	5,000 to <10,000	23 34.3%	5 28.6%	6 40.0%	12 27.9%	4 17.4%	1 83.3%	51 28.2%	
	10,000+	18 26.9%	4 19.0%	1 6.7%	15 34.9%	1 4.3%	2 16.7%	41 22.7%	
	Total	67 100%	21 100%	15 100%	43 100%	23 100%	12 100%	181 100%	

Pearson Chi-Square Value = 64.126, df = 15, $p = .000$
Cramer's Value = .344, $p = .000$

Table 23 reports community college registrars' highest level of education and compares this with the college's implementation strategy. Overall, the largest group (55.8%) of community college registrars had an earned master's degree or specialist

degree. Another 23.8% reported holding a bachelor's degree, and 9.9% reported a doctorate degree. Another 8.3% reported having a high school diploma or some college education. In all, 61.9% of registrars who worked in an outsourced environment held earned masters or specialist degrees, and of those who worked with in-house implementation strategies, 56.7 % held an earned masters or specialist degree. Of the 18 reporting community college registrars who held doctorates, 7 were involved with in-house implementation environments, and 5 were in a combination of strategies environment. Of the 15 registrars with high school or some college, 7 were also working at a college with an in-house Web-enabled student information system implementation in progress, while 4 were at colleges with no project in process at the time of this study.

Table 23: Implementation Strategy By Registrars' Educational Level

Background Characteristic		Implementation Strategy					No Current Project	No Answer	Total
		In-House	Out-sourced	Consortium	Combination				
Highest Level of Education	High School or Some College	7 10.4%	0	1 6.7%	2 4.6%	4 17.4%	1 8.3%	15 8.3%	
	Bachelor Degree	15 22.4%	7 33.3%	4 26.7%	12 27.9%	5 41.7%	0	43 23.8%	
	Masters or Specialist Degree	38 56.7%	13 61.9%	8 53.3%	24 55.8%	13 56.5%	5 41.7%	101 55.8%	
	Doctorate Degree	7 10.4%	1 4.7%	2 13.3%	5 11.6%	1 4.3%	2 16.7%	18 9.9%	
	No Answer	0	0	0	0	0	4 33.3%	4 2.2%	
Total		67 100%	21 100%	15 100%	43 100%	23 100%	12 100%	181 100%	

Pearson Chi-Square Value = 68.352, df = 20, two-sided, $p = .000$
 Cramer's Value = .307, $p = .000$

The study assessed the gender differences among community college registrars. Overall, 57 (31.5%) were male and 119 (65.7%) were female. However the greatest percentage of men worked in an outsourced environment (47.6%) and the greatest percentage of women worked in the consortium environment (73.3%) (Pearson Chi-Square Value = 47.881, df = 10, two-tailed, $p = .000$) (Cramer's Value = .364, $p = .000$).

Table 24 indicates the number of years in office and implementation strategy. The 1 to 5 year tenure category represented the greatest number of registrars (30.4%) who responded to the survey. Of this and every other tenure group, the greatest number worked with in-house implementation environments. Of those who had no project, the greatest percentage (34.8%) also had 1 to 5 years seniority. Of outsourced colleges, 33.3% employed registrars with 1 to 5 years of experience. Also, of the in-house institutions, 31.3% of the registrars had just 1 – 5 years of experience. In contrast, 27.7% of all community college registrars had more than 15 years in office. Of outsourced colleges, only 14.3% had a registrar with more than 15 years experience. Rather, the colleges with a combination of implementation strategies had the greatest percentage of top seniority registrars (34.9%).

The greatest percentage of registrars working in consortium implementation environments had 6 to 10 years of experience (33.3%), and the greatest percentage of registrars working a combination of consortium strategies had more than 15 years of experience (34.9%).

Table 24: Implementation Strategy by Registrars' Number of Years in Office

Background Characteristic		Implementation Strategy					No Current Project	No Answer	Total
		In-House	Out-sourced	Consortium	Combination				
Years in office	<1 yr.	3 4.5%	1 4.8%	1 6.7%	0	2 8.7%	0	7 3.9%	
	1 – 5 yrs.	21 31.3%	7 33.3%	3 20.0%	13 30.2%	8 34.8%	3 25.0%	55 30.4%	
	6 – 10 yrs.	17 25.4%	5 23.8%	5 33.3%	9 20.9%	6 26.1%	1 8.3%	43 23.8%	
	11 – 15 yrs.	8 11.9%	5 23.8%	2 13.3%	6 14.0%	1 4.3%	1 3.33%	23 12.7%	
	>15 yrs.	18 26.9%	3 14.3%	4 26.7%	15 34.9%	6 26.1%	3 25.0%	49 27.7%	
	No Answer	0	0	0	0	0	4 33.3%	4 2.2%	
Total		67 100%	21 100%	15 100%	43 100%	23 100%	12 100%	181 100%	

Pearson Chi-Square Value = 69.022, df = 25, two-tailed, $p = .000$

Cramer's Value = .276, $p = .000$

Table 25 indicates the total number of Web-enabled student information system implementation projects that the community college registrars worked with compared with implementation strategies in place at the time of the study. Registrars with no experience with these projects (10.5%) were most represented among the colleges with no implementation project in progress at the time of the study. Overall, the greatest percentage of respondents (42.5%) reported having been through one such project. The

second largest group of respondents (36.5%) reported involvement with two Web-enabled technology implementation projects.

Of those working on in-house implementation projects, 38.8% of the registrars had experience with one implementation, and another 29.9% had experience with two implementations. Registrars at colleges with outsourced environments were more likely to be those who had experience with one implementation project (66.7%). Among the colleges with a combination of strategies approach, 41.9% of the registrars had experience with two systems implementation projects. A total of 14 of 181 (7.7%) respondents reported experience with four or more such projects. Of these, the greatest number of registrars ($n = 5$) were involved with an in-house project at the time of the study.

Table 25: Implementation Strategies by Registrars' Number of Web-enabled Student System Implementation Projects

Background Characteristic	Number of Projects	Implementation Strategy						Total
		In-House	Out-sourced	Consortium	Combination	No Current Project	No Answer	
Registrars' Involvement with Web-Enabled Student Information Systems Projects	0	2 3.0%	1 4.8%	2 13.3%	2 4.7%	8 34.8%	4 33.3%	19 10.5%
	1	26 38.8%	14 66.7%	6 40.0%	21 48.8%	9 39.1%	1 8.3%	77 42.5%
	2	32 29.9%	5 23.8%	6 40.0%	18 41.9%	2 8.7%	3 25.0%	66 36.5%
	3	2 3.0%	0	0	1 2.3%	2 8.7%	0	5 2.8%
	4+	5 7.5%	1 4.8%	1 6.7%	1 2.3%	2 8.7%	4 33.3%	14 7.7%
	No Answer	0	0	0	0	0	0	0
Total		67 100%	21 100%	15 100%	43 100%	23 100%	12 100%	181 100%

Pearson Chi-Square Value = 70.030, df = 25, two-tailed, $p = .000$

Cramer's Value = .278, $p = .000$

Regarding community college registrars' job titles, the title of *registrar* was reported most frequently in an open-ended question, whether or not respondents were involved in Web-enabled student information system projects. Director or Dean of Enrollment Services was the next most frequently reported title, occurring much less often, however. A total of 40 different titles were reported by registrars at colleges that were involved with Web-enabled technology implementation at the time of this study.

Respondents from colleges that were not involved with a Web-enabled technology implementation project reported a total of 12 different job titles.

Another open-ended question on the survey instrument assessed the registrars' most frequent contacts outside their own offices for colleges that were involved with a Web-enabled technology implementation with an in-house implementation strategy. The most frequent contact was with academic administrators, followed by information technology or data processing personnel. The purposes for the contacts with academic administrators most frequently included general information discussions, database and policy/procedure coordination, resolving academic, curriculum, student, and class scheduling or other class related issues, questions, program furlough proposals, governance and management, supervision, and instructor problems. Purposes for contacts with information technology or data processing personnel mostly included specific technical specifications, operations management, student system problems, collaborative work, computer issues, problems or enhancements, problems resolution, admission and registration troubleshooting, follow up, security, projects, and database issues.

Community college registrars who worked in outsourced Web-enabled student system implementation environments reported the information technology administrator or staff as their top daily contact outside of their own department. Topics of such contacts predominantly included implementation updates, problems, student data, technical reports, system questions, technical issues, updates, and other computer related issues.

The registrars who worked in a consortium strategy environment reported that their most frequent daily contacts were with information technology administrators and also with vice presidents and deans of academics or instruction. The nature or purposes for

registrars' contacts with the information technology administrators included discussions or work which involved the technology, system, degree audit, computer problems, or varied issues. The issues covered with vice presidents and deans of academics or instruction included graduation evaluation, conferences on overall systems, student academic concerns, and a variety of student issues.

Registrars working in a combination of implementation strategies also named computer information systems administrators as their most frequent daily contacts outside of their own department. This was followed closely by daily contacts with the vice president or dean of student services. The collaborative work with information technology administrators and staff involved identifying needs for support, enhancements, various system questions, registration reports, system implementation, work reports, and resolving software problems. The contacts with vice presidents or deans of student services focused on coordination of activities, attending meetings, resolving problems, meeting with a supervisor, policy discussions, and carrying out requests.

Finally, the registrars not involved in a Web-enabled technology implementation project reported that the most frequent contacts outside the department were with the instructional or academic vice president or dean. Contacts with the business office and the vice president or dean of student services followed. For the registrars who were not involved with Web-enabled system implementation projects, information technology administrators and staff ranked fourth among daily outside contacts made by the registrar. Topics covered in contacts with instructional or academic dean for registrars whose colleges were not involved with Web-enabled system implementation included: schedule

and scheduling, student affairs, courses on system, coordinating offices, grades, enrollment, general information, reports to supervisor, policies, academic administration, many academic related purposes, curriculum issues, and graduation. Registrars' topics of collaboration with business office administrators and staff when not involved with a system implementation project included: correcting problems, student issues, student billing, enrollment, attendance, student fee issues, and exchanging information.

The results presented below demonstrate the data collected in answer to the last part of the research question. This portion of the question assessed whether community college registrars' level of involvement with system implementation was associated with college enrollment. The results indicated that 78.0% of community college registrars who were employed at colleges that served more than 10,000 students during Fall 2003, were very highly or highly involved with system implementation at the time they responded to the survey, during the first half of 2004. Also, 68.6% of registrars at institutions with enrollment headcount from 5,000 to less than 10,000 reported very high or high involvement with Web-enabled system implementation. A small majority (52.4%) of the registrars at small colleges of less than 5,000 students were also very highly or highly involved with system implementation (Pearson Chi-Square Value = 54.950, $df = 6$, two-tailed, $p = .000$) (Cramer's Value = .390, $p = .000$).

Table 26 compares enrollment headcount with community college registrars' very high or high agreement with six role harmony and clarity statements. This analysis indicated that across the board, a very high percentage of registrars knew their responsibilities. However, fewer registrars agreed with the way things were done. Also, the results indicated that at the largest colleges 46.3% of the registrars very highly or

highly agreed that they work with clear directives. This may be a challenge for larger colleges.

Table 26: College Enrollment Headcount by Very High or High Agreement With Role Harmony and Clarity Statements

Very High or High Agreement With Role Harmony and Clarity Statements:	Enrollment Headcount Categories				Total
	<5,000	5,000-10,000	>10,000	No Answer	
1. Knows Responsibilities.	96.4%	100.0%	95.1%	40.0%*	95.6%
2. Uses Appropriate Time Management.	76.2%	80.4%	70.7%	40.0%*	75.1%
3. Works with Clear Directives.	64.3%	62.7%	46.3%	20.0%*	58.6%
4. Agrees With the Way Things Are Done.	63.1%	47.1%	51.2%	20.0%*	54.7%
5. Knows What Is Expected of Oneself.	76.2%	76.5%	61.0%	40.0%*	71.8%
6. Works Under Compatible Policies and Guidelines.	73.8%	62.7%	63.4%	40.0%	67.4%

1. Pearson Chi-Square Value = 109.738, df = 6, two-tailed, $p = .000$. Cramer's Value = .551, $p = .000$. 2. Pearson Chi-Square Value = 108.835, df = 6, two-tailed, $p = .000$. Cramer's Value = .548, $p = .000$. 3. Pearson Chi-Square Value = 84.338, df = 6, two-tailed, $p = .000$. Cramer's Value = .483, $p = .000$. 4. Pearson Chi-Square Value = 111.191, df = 6, two-tailed, $p = .000$. Cramer's Value = .554, $p = .000$. 5. Pearson Chi-Square Value = 111.501, df = 6, two-tailed, $p = .000$. Cramer's Value = .555, $p = .000$. 6. Pearson Chi-Square Value = 82.595, df = 6, two-tailed, $p = .000$. Cramer's Value = .478, $p = .000$. *Expected count less than 5.

The research assessed community college registrars' level of education, compared with very high or high involvement with system implementation. At the time of the study in early 2004, 68.3% of the registrars who held master's or specialist degrees were involved with systems implementation. Also, 60.5% of registrars who held Bachelor

degrees were very highly or highly involved with systems implementation. Just 46.7% of registrars who completed high school or some college reported that they were very highly or highly involved with systems implementation, while just over one-half (55.6%) of those with doctorate degrees were similarly involved (Pearson Chi-Square Value = 60.885, $df = 8$, two-tailed, $p = .000$) (Cramer's Value = .410, $p = .000$).

Table 27 indicates that across all levels of educational categories, community college registrars reported that they knew their responsibilities to a very high degree. Those with master's or specialist's degrees had the lowest percentage (49.5%) of agreement with regard to the way things were done. Those with high school diplomas or some college were least in agreement (53.3%) with the statement that they worked with clear directions. Community college registrars who held doctorate degrees agreed least (55.6%) with the statement that they worked under compatible policies and guidelines.

Table 27: Level of Education by Very High or High Agreement With Role Harmony and Clarity Statements

Very High or High Agreement With Role Harmony and Clarity Statements:	Level of Education Categories					No Answer	Total
	HS-Some College	Bachelor Degrees	Masters or Specialist Degrees	Doctorate Degrees			
1. Knows Responsibilities.	100.0%	97.7%	97.0%	94.4%	25.0%*	95.6%	
2. Uses Appropriate Time Management.	80.0%	74.4%	77.2%	72.2%	25.0%*	75.1%	
3. Works with Clear Directives.	53.3%	67.4%	55.45	66.7%	25.0%*	58.6%	
4. Agrees With the Way Things Are Done.	73.3%	60.5%	49.5%	61.1%	25.0%*	54.7%	
5. Knows What Is Expected of Oneself.	80.0%	81.4%	68.3%	72.2%	25.0%*	71.8%	
6. Work Under Compatible Policies and Guidelines.	86.7%	72.1%	66.3%	55.6%	25.0%*	67.4%	

1. Pearson Chi-Square Value = 135.989, df = 8, two-tailed, $p = .000$. Cramer's Value = .613, $p = .000$. 2. Pearson Chi-Square Value = 135.487, df = 8, two-tailed, $p = .000$. Cramer's Value = .612, $p = .000$. 3. Pearson Chi-Square Value = 104.210, df = 8, two-tailed, $p = .000$. Cramer's Value = .537, $p = .000$. 4. Pearson Chi-Square Value = 139.324, df = 8, two-tailed, $p = .000$. Cramer's Value = .620, $p = .000$. 5. Pearson Chi-Square Value = 138.176, df = 8, two-tailed, $p = .000$. Cramer's Value = .618, $p = .000$. 6. Pearson Chi-Square Value = 105.795, df = 8, two-tailed, $p = .000$. Cramer's Value = .541, $p = .000$. *Expected count less than 5.

The results also include the percentage of community college registrars who reported that they were very highly or highly involved with systems implementation job

duties and responsibilities by gender. Although 62.4% of all 181 community college registrars who responded to the research effort indicated very high or high involvement with systems implementation duties and responsibilities, the male registrars had a slightly higher percentage of involvement (66.7%) than the female registrars (61.3%) (Pearson Chi-Square Value = 44.512, $df = 4$, two-tailed, $p = .000$) (Cramer's Value = .351, $p = .000$).

Table 28 presents the research participants' responses to the six questions regarding role harmony and clarity (or role conflict and ambiguity). The responses were compared by gender. The results indicated that very high or high agreement with the role harmony and clarity statements were similar for men and women with regard to knowing responsibilities and appropriate time management. There was a difference with regard to agreeing that they worked with clear directives. Here 56.1% of the men very highly or highly agreed while 61.3% of the women very highly or highly agreed. There was a difference in agreement with the way things are done. Here, 49.1% of the men very highly or highly agreed, while 58.8% of the women very highly or highly agreed. With regard to knowing what was expected of them, 66.7% of the men very highly or highly agreed, while 75.6% of the women very highly or highly agreed. Finally, regarding working under compatible policies and guidelines, 59.6% of the men very highly or highly agreed, while 72.3% of the women very highly or highly agreed.

Table 28: Gender by Very High or High Agreement With Role Harmony and Clarity Statements

Very High or High Agreement With Role Harmony and Clarity Statements:	Gender Categories			Total
	Male	Female	No Answer	
1. Knows Responsibilities.	94.7%	98.3%	40.0%*	95.6%
2. Uses Appropriate Time Management.	77.2%	75.6%	40.0%*	75.1%
3. Works with Clear Directives.	56.1%	61.3%	20.0%*	58.6%
4. Agrees With the Way Things Are Done.	49.1%	58.8%	20.0%*	54.7%
5. Knows What Is Expected of Oneself.	66.7%	75.6%	40.0%*	71.8%
6. Works Under Compatible Policies and Guidelines.	59.6%	72.3%	40.0%*	67.4%

1. Pearson Chi-Square Value = 109.246, df = 4, two-tailed, $p = .000$. Cramer's Value = .549, $p = .000$. 2. Pearson Chi-Square Value = 107.691, df = 4, two-tailed, $p = .000$. Cramer's Value = .545, $p = .000$. 3. Pearson Chi-Square Value = 80.158, df = 4, two-tailed, $p = .000$. Cramer's Value = .471, $p = .000$. 4. Pearson Chi-Square Value = 108.884, df = 4, two-tailed, $p = .000$. Cramer's Value = .548, $p = .000$. 5. Pearson Chi-Square Value = 109.287, df = 4, two-tailed, $p = .000$. Cramer's Value = .549, $p = .000$. 6. Pearson Chi-Square Value = 83.174, df = 4, two-tailed, $p = .000$. Cramer's Value = .479, $p = .000$. *Expected count less than 5.

The study also assessed the level of involvement in systems implementation for community college registrars with varying numbers of years in office. It appears that registrars with 6 to 10 years of experience were most involved with systems implementation at the time of the study. A total of 76.7% of these registrars reported very high or high involvement with this duty and responsibility. This was followed by registrars with just one to five years of experience on the job. Of the latter, 67.3%

reported that they were very highly or highly involved with system implementation at the time of the study (Pearson Chi-Square Value = 65.558, $df = 10$, two-tailed, $p = .000$) (Cramer's Value = .426, $p = .000$).

Role harmony and role clarity were evaluated for community college registrars with varying years of employment in their offices. Table 29 indicates that there was a difference in knowledge of responsibilities for those with less than one year of experience. Though they were less likely than more senior registrars to have a very high or high agreement with this role perception indicator, in fact 71.4% did agree that they knew their responsibilities. However, it appears that a very high or high level of time management skills improved with years of service. Those with the greatest number of years in office had the highest percentage of agreement (81.6%) with the time management skills role harmony indicator. Although clarity of directions seemed to be lacking across the board, the newest community college registrars reported the greatest challenge in this regard. Just 28.6% of those in office less than one year agreed very highly or highly that directions were clear. The same held true for agreeing with the way things are done. Just 28.6% of the newest community college registrars very highly or highly agreed with a statement concerning agreement with the way things were done. Again, experience seems to make a difference in knowing what is expected and having a perception that they work with compatible policies and guidelines. Just 42.9% of the newest community college registrars knew what was expected of them, and 42.9% of the same group indicated that that they worked under compatible policies and guidelines.

Table 29: Years in Office by Very High or High Agreement With Role Harmony and Clarity Statements

Very High or High Agreement With Role Harmony and Clarity Statements:	Categories of Years in Office					No Answer	Total
	<1 yr.	1-5 yrs.	6-10 yrs.	11-15 yrs.	>15.yrs.		
1. Knows Responsibilities.	71.4%	100.0%	100.0%	100.0%	93.9%	25.0%*	95.6%
2. Uses Appropriate Time Management.	57.1%*	72.7%	79.1%	73.9%	81.6%	25.0%*	75.1%
3. Works with Clear Directives.	28.6%*	65.5%	65.1%	73.9%	44.9%	25.0%*	58.6%
4. Agrees With the Way Things Are Done.	28.6%*	56.4%	62.8%	65.2%	46.9%	25.0%*	54.7%
5. Knows What Is Expected of Oneself.	42.9%*	72.7%	69.8%	82.6%	75.5%	25.0%*	71.8%
6. Works Under Compatible Policies and Guidelines.	42.9%*	62.7%	65.1%	73.9%	73.5%	25.0%*	67.4%

1. Pearson Chi-Square Value = 157.859, df = 10, two-tailed, $p = .000$. Cramer's Value = .660, $p = .000$. 2. Pearson Chi-Square Value = 137.958, df = 10, two-tailed, $p = .000$. Cramer's Value = .617, $p = .000$. 3. Pearson Chi-Square Value = 112.108, df = 10, two-tailed, $p = .000$. Cramer's Value = .556, $p = .000$. 4. Pearson Chi-Square Value = 140.617, df = 10, two-tailed, $p = .000$. Cramer's Value = .623, $p = .000$. 5. Pearson Chi-Square Value = 139.856, df = 10, two-tailed, $p = .000$. Cramer's Value = .622, $p = .000$. 6. Pearson Chi-Square Value = 104.413, df = 10, two-tailed, $p = .000$. Cramer's Value = .537, $p = .000$. *Expected counts less than 5.

As of early 2004, community college registrars with the most experience with systems implementation were those with the greatest percentage of responses that they were, in fact, very highly or highly involved with systems implementation job duties and responsibilities. Table 30 clearly indicates an increased responsibility for system implementation with increased experience through systems implementation projects.

Table 30: Number of Systems Implementation Projects by Very High or High Involvement With Systems Implementation

Very High or High Involvement with Systems Implementation Job Duties and Responsibilities	Categories for Number of Systems Implementation Projects					No Answer	Total
	0	1	2	3	4+		
	15.8%*	62.3%	75.8%	80.0%	100.0%*	53.8%	62.4%

Pearson Chi-Square Value = 45.538, df = 10, two-tailed, $p=.000$

Cramer's Value = .355, $p = .000$

*Expected counts less than 5.

Finally, Table 31 indicates very high or high agreement with the six role harmony and clarity statements compared with the number of system implementation projects experienced. Clear directives and agreeing with the way things are done appear to be challenges for those who have been involved with at least three projects. Although the numbers of registrars in this category are few, and the expected frequency is less than five, 40.0% of those registrars very highly or highly agree that they work under clear directives, while just 20.0% of these registrars very highly or highly agree with the way things are done. Alternately, 80.0% of these same registrars who have been involved with

at least three systems implementation projects very highly or highly agree that they work with compatible policies and guidelines. Those with no systems implementation experience had the highest percentages of very high or high agreement across all six role harmony and role clarity questions on the research survey. Among the majority of respondents, those who have been involved with one or two Web-enabled system implementation projects, the greatest challenge appears to be agreeing with the way things are done. This problem was reported by 55.8% of those who were involved with one project, and 56.1% of those who were involved with two projects. Clear directives were a challenge for these registrars as well. Just 58.4% of those who have implemented one system reported that they work with clear directives, and just 59.1% of those who have implemented two systems reported that they work with clear directives.

Table 31: Number of Systems Implementation Projects by Very High or High Agreement With Six Role Harmony and Clarity Statements

Very High or High Agreement With Role Harmony and Clarity Statements:	Categories for Number of Systems Implementation Projects						Total Answer
	0	1	2	3	4+	No	
1. Knows Responsibilities.	94.7%	96.1%	98.5%	100.0%	100.0%*	76.9%	95.6%
2. Uses Appropriate Time Management.	84.2%	74.0%	75.8%	80.0%*	100.0%*	61.5%	75.1%
3. Works with Clear Directives.	73.7%	58.4%	59.1%	40.0%*	100.0%*	38.5%	58.6%
4. Agrees With the Way Things Are Done.	63.2%	55.8%	56.1%	20.0%*	0	46.2%	54.7%
5. Knows What Is Expected of Oneself.	78.9%	72.7%	72.7%	60.0%*	100.0%*	53.8%	71.8%
6. Works Under Compatible Policies and Guidelines.	84.2%	67.5%	63.6%	80.0%*	100.0%*	53.8%	67.4%

1. Pearson Chi-Square Value = 41.002, df = 10, two-tailed, $p = .000$. Cramer's Value = .337, $p = .000$. 2. Pearson Chi-Square Value = 40.744, df = 10, two-tailed, $p = .000$. Cramer's Value = .335, $p = .000$. 3. Pearson Chi-Square Value = 32.101, df = 10, two-tailed, $p = .000$. Cramer's Value = .298, $p = .000$. 4. Pearson Chi-Square Value = 43.823, df = 10, two-tailed, $p = .000$. Cramer's Value = .348, $p = .000$. 5. Pearson Chi-Square Value = 40.623, df = 10, two-tailed, $p = .000$. Cramer's Value = .335, $p = .000$. 6. Pearson Chi-Square Value = 32.314, df = 10, two-tailed, $p = .000$. Cramer's Value = .299, $p = .000$. *Expected count less than 5.

Conclusions

The conclusions drawn from this research study of community college registrars involve each of 17 job duties and responsibilities that were surveyed. These conclusions also refer to each of the six role conflict and ambiguity (or role harmony and clarity) measures included in the study, and the selected institutional and registrar background characteristics. Results were compared by incidence of Web-enabled student information system implementation projects and administrative strategies. More specifically, findings compare incidence of very high or high involvement in Web-enabled systems implementation job duties and responsibilities with: (1) several different implementation strategies, (2) very high or high agreement with six role conflict and ambiguity questions, and (3) certain background characteristics. The reporting period was between February and July 2004.

Job Duties and Responsibilities and Systems Implementation Strategies

Community college registrars were very involved with Web-enabled student systems implementation, with highest involvement with in-house implementation strategy. The lowest reported Web-enabled student system implementation involvement was with the consortium strategy. Just 23 of the 181 (12.7 %) reporting community college registrars indicated that their college was not involved in a Web-enabled student system implementation project at the time of the study.

Administration of registrar office policies and procedures appeared to be a fundamental duty of community college registrars, with 95.0% reporting very high or

high involvement with this activity. Also, 94.5% of the registrars reported very high or high involvement with providing overall leadership for the office of the registrar.

Similarly, 82.3% of the community college registrars had very high or high involvement with supervising office staff. Of those whose colleges were involved with a Web-enabled student system implementation at the time of the study, the greatest percentage who were very highly or highly involved with supervising office staff were at colleges with a consortium, or almost equally, those with a combination of implementation strategies.

Community college registrars were most involved with establishing registrar office goals and objectives if they worked in an in-house implementation strategy environment. The registrars at colleges with an outsourced implementation strategy were least involved with establishing registrar office goals and objectives.

Just 67.4% of community college registrars provided overall guidance and direction to on-line processes, with the greatest difference in very high or high involvement occurring between in-house (76.1%) and outsourced implementation strategy (57.1%). Although a great percentage of community college registrars had very high or high involvement with maintaining student records, those with no current project, and those in the process of implementing a Web-enabled project with an in-house implementation strategy reported the greatest involvement with student records maintenance.

Community college registrars overall had very high or high levels of involvement as responsible custodians for all academic records on the computer database. A total of 159 of the 181 registrars who responded (87.8%) bore this custodial responsibility. Those involved with a consortium Web-enabled system implementation strategy indicated

slightly greater incidence of involvement (93.3%) with academic records. Responsibility for the maintenance and security of the official college seal was more prevalent among community college registrars whose colleges had an outsourced Web-enabled system implementation strategy, whereas those who were part of a consortium reported less frequently that they had very high or high involvement with the college seal.

An in-house Web-enabled system implementation strategy appeared to lend itself to a registrar's involvement with conducting staff meetings to discuss information, policies, and procedures. Community college registrars whose colleges were implementing a Web-enabled system with any one of the implementation strategies mentioned above were involved in very high or high incidence of collaborating and acting as liaison with other departments, functions, or groups. Only those with no current projects had substantially less involvement in this activity, and even 78.3% of those registrars reported very high or high involvement with this responsibility.

Two-thirds of all community college registrars who reported for this study indicated that they were very highly or highly involved with resolving system errors or failures. The least involved with this duty were those whose colleges employed a combination of implementation strategies. Even of these, 58.1% reported very high or high involvement with this responsibility. A minority of the community college registrars were very highly or highly involved with developing, delivering, and assessing internal employee training; the lowest percentage was reported from the registrars whose colleges employed a consortium implementation strategy. A minority of registrars provided general management for information services activities. However, for those whose colleges employed an in-house implementation strategy, 43.3% of the registrars were

very highly or highly involved with information technology management responsibility. Those whose colleges participated in a consortium were least involved in managing information services.

The researcher found that just 40.9% of community college registrars were very highly or highly involved with attending workshops and training to enhance technical skills. The greatest percentage of registrars who had moderate to no involvement in this activity worked at colleges that employed an outsourced Web-enabled system implementation strategy. Despite the finding that many were not receiving technical training, a majority (72.4%) of all community college registrars reported that they were responsible for monitoring projects to ensure effectiveness and compliance. Finally, a majority of community college registrars reported that they were very highly or highly involved with developing and producing reports on student enrollment for their college administration. The smallest percent with this reporting responsibility (53.5%) was indicated for colleges that used a combination of implementation strategies. The greatest majority of registrars who were responsible for developing and producing reports on student enrollment appeared to be indicated for colleges with no current Web-enabled implementation project.

Perceptions of Role Conflict and Ambiguity and Web-enabled System Implementation

Strategies

The incidence of Web-enabled implementation projects in progress at the time of the survey was 80.7%. Registrars in a variety of system implementation strategy environments responded strongly that they knew their responsibilities. However, just

75.1% believed they divided their time wisely. Those who worked with a combination of implementation strategies were less likely to strongly agree or agree that they divided their time wisely (69.8%), whereas those who worked in a consortium environment were more likely to report that they knew they had divided their time properly (80.0%). Also, just 58.6% of the community college registrars strongly agreed or agreed that they worked under conditions of clear directives or orders. Those working with a combination of implementation strategies were less likely to strongly agree or agree that they worked under clear directives or orders (48.8%). Those with no project in place at the time agreed most that they worked under clear directives or orders. Similarly, just 54.7% of all registrars agreed with the way things were done, and 65.2% of those with no project in place agreed with this statement regarding the way things were done.

Registrars working in outsourced Web-enabled system implementation environments were most likely to strongly agree or agree that they knew exactly what was expected of them. Alternately, just 58.1% of those who worked with a combination of implementation strategies strongly agreed or agreed that they knew exactly what was expected of them. The consortium appeared to be conducive to the perception that policies and guidelines were compatible, whereas a combination of implementation strategies appeared more likely to create perceptions of incompatible policies and guidelines.

Information Technology Administration Strategies and Web-enabled System
Implementation Strategies

Among all of the community colleges that were represented in the results of this study, 43.6% used an in-house information technology administration strategy on a regular basis whereas 37.0% used an in-house strategy during Web-enabled student system implementation projects. The registrars reported that 23.8% regularly used a combination of strategies and 23.8% reported using a combination of strategies during the most recent Web-enabled system implementation project. In addition, 17.1% used an outsourced strategy on a regular basis, whereas 11.6% reported using an outsourced strategy only for their Web-enabled system implementation project. Reportedly, 9.9% were involved in a consortium on a regular basis whereas 8.3% reported using a consortium only for their current Web-enabled system implementation project.

Community College Registrars' Most Frequent Outside Contacts

Registrars' outside contacts varied somewhat by implementation strategy. Those working with an environment using outsourced, consortium, or a combination of implementation strategies had their most frequent daily liaison contacts with information technology administrators and staff. In contrast, the academic vice presidents, deans, or coordinators were the most frequent outside contacts for those involved with in-house systems implementation and for those with no Web-enabled technology implementation project in process.

Selected Community College and Registrar Background Characteristics and Web-enabled System Implementation Strategies

The findings indicate that certain background characteristics may be related to implementation strategies. It appeared that all colleges tended to retain in-house technology implementation strategies, yet the smaller colleges tended to have more incidence of outsourced implementation projects and even more incidence of no Web-enabled system implementation projects in process.

The level of education of community college registrars varied somewhat, but the majority (55.8%) held masters or specialist degrees. Of colleges that outsourced systems implementation, 61.9% of the college registrars held masters or specialist degrees. Although just 31.5% of the registrars were male, 47.6% of the colleges that employed outsourced implementation strategies had registrars who were men. Colleges that used consortia for system implementation were more represented by female registrars (73.3%) than those who used other strategies, whereas overall, 65.7% of the registrars were women.

College Enrollment Headcount

Respondents' perceived job duties, as well as their levels of role conflict and ambiguity, were compared by college headcounts. Registrars at the largest colleges reported being most involved with system implementation. Among community colleges of all sizes, most registrars reported that they knew their responsibilities. Those at mid-size colleges were better at time management. A greater percentage of registrars at small colleges perceived that they worked under clear directions, agreed with the way things

were done, and also felt that they worked under compatible policies and guidelines.

Those at small and mid-size colleges were more likely than those at the largest colleges to report that they knew what was expected of them.

Level of Education

Registrars with master's degrees were more likely than those with less or more education to report that they were very highly or highly involved with the job duty of Web-enabled systems implementation. Although 95.6% of all registrars reported that they knew their responsibilities, 100% of registrars with high school graduation or some college reported this to be true. Interestingly, 75.1% of all of the registrars reported that they knew they had divided their time correctly, and 80.0% of those with high school graduation or some college reported that they used good time management. However, a little fewer, 72.2% of those with doctorate degrees felt they had divided their time properly. Registrars with bachelor's degrees reported working under clear directions more than others, closely followed by those with doctorates. A minority of those with master's degrees agreed with the way things were done, but the great majority of those with high school graduation or some college reported that they agreed with the way things were done. Registrars with higher levels of education, such as master's and doctorates were less sure that they knew what was expected of them than those registrars with high school graduation and bachelor level college education. Also, registrars with higher levels of education were less likely to very highly or highly agree that they worked with compatible policies and guidelines than registrars with high school graduation or bachelor level college education.

Gender

The 181 community college registrars who responded to this study included 57 men (31.5%) and 119 women (65.7%). Five people (2.8%) did not respond to the gender question. A slightly greater percent of the men than women reported that they were very highly or highly involved with a Web-enabled student systems implementation project at the time of the study. A slightly greater percent of women indicated that they knew their responsibilities, while skills at time management were reportedly nearly the same for men and women. A slightly greater percentage of women felt that they worked under clear directives and also, they agreed with the way things were done, and they knew what was expected of them. Quite a large difference between the male and female registrars was indicated with respect to perceiving that they worked under compatible policies and guidelines. Women were more likely than men to agree with this by nearly 13%. The low percentage of registrars responding with very high or high agreement to several of the role conflict and ambiguity questions may be a cause for concern.

Years in Office

Community college registrars who worked in their offices for 6 to 10 years were more likely to report that they were very highly or highly involved with Web-enabled system implementation. Those with less than one year in their official capacity were least likely to report that they were involved with such a project. Similarly those with less than one year in their office were least likely to report that they knew their responsibilities or that they divided their time correctly. Those with more than fifteen years in their office

were much more likely to very highly or highly agree that they knew they divided their time correctly (81.6%). Those with less than one year in office were least clear about directives, agreed less than others with the way things were done, and agreed the least that they knew what was expected of them. These, the least experienced registrars, also least agreed that they worked under compatible policies and guidelines.

Number of System Implementations

Community college registrars with the most experience with implementing Web-enabled systems tended to be more likely to report that they were involved with such a project at the time of the study. While across the board, the great majority of all levels of experienced registrars reported that they knew their responsibilities, those involved with their first or second Web-enabled system implementation project were less likely than others to know they had divided their time correctly. Those with no experience with system implementation reported with greater incidence very high or high agreement that they worked under clear directives, and that they agreed with the way things were done. More of the registrars with no systems implementation experience agreed that they knew what was expected of them, and that they worked under compatible policies and guidelines.

CHAPTER 5 – SUMMARY AND RECOMMENDATIONS

From the early 1990s until the publication of this research report in 2006, community colleges were among the many organizations that were in the process of implementing Web-enabled technology. This new technology replaced and in some cases joined previous technology. The earlier technology was local in nature or managed with electronic networks or touch-tone telephone systems within organizations or within groups of organizations. Internal configurations, controls, and personnel usually maintained the previous systems. In contrast, the Web-enabled technology required both internal and external controls that monitored information input and access to information output from a global perspective.

The present study focused on community colleges in the United States and particularly the community college registrars. These administrators were advanced and professional mid-level and sometimes executive level administrators. Among their many responsibilities included the security of student records and access to these records. Web-enabled system implementation projects involve both security and access to student records. These implementations were prevalent and the colleges used a variety of system implementation administration strategies including: in-house, outsourced, consortia, or a combination of strategies.

The following research question was proposed: What are the perceived differences, if any, in the functional role of community college registrars involved in

Web-enabled student information systems implementation projects compared to those who are not involved in such projects?

The research sub-questions included:

- What are the self-perceived job duties and responsibilities, role conflict, and role ambiguity of registrars involved in the process of Web-enabled student systems implementation and for registrars who are not involved in systems implementation?
- What is the relationship between the type of information technology implementation strategy: (a) in-house; (b) outsourced; (c) consortium; or (d) combination of strategies, and the registrars' self-perceived job duties and responsibilities, role conflict, and role ambiguity?
- To what extent do registrars who are involved in Web-enabled student systems implementation differ in self-perceived job duties and responsibilities, role conflict, and role ambiguity by selected background characteristics?

The university and community college registrars' job functions identified by Burr (1980) and Lanier (1995) and the job functions, as reported by community college registrars in this study, are compared below.

In 1980, Burr identified the following job functions of community college and university registrars in Florida:

- Selection, supervision, coordination, and evaluation of staff;
- Responsibility for student enrollment and records;

- Undergraduate and/or graduate registration; scheduling of classes, examinations, and classroom facilities, and maintenance of student records;
- Professional and civic activities;
- Counseling and advising students, parents of students, and other interested groups or individuals;
- Participation in program planning and budgeting.

As described in the literature review for this study, Lanier (1995) traced the history of job duties of the collegiate registrar since the year 1200, concluding that the registrar existed as a top level official, controlling enrollment, course records, student records, transcript evaluations and dissemination, degree notation, graduation ceremonies, and system development. As previously discussed, these officers were often responsible for admissions, enrollment management, and institutional reporting until external forces, such as competition for students and regional accreditation bodies, influenced the creation of other departments for these duties in many cases. Similar to the evolution of many business models, the registrar's job has become more specialized while some tasks have been delegated to new positions.

This study revealed the job duties and responsibilities with which community college registrars were very highly or highly involved at the time of the field research. Maintenance of student records was just one of these duties. The top duties and responsibilities, with very high or high involvement, identified by at least 80% of the community college registrars who responded to this study included:

- Administering registrar office policies and procedures (95.0%);

- Providing overall leadership for the office of the registrar (94.5%);
- Collaborating and acting as liaison with other departments, functions, or groups (88.4%);
- Acting as responsible custodian of all academic records on the computer database (87.8%);
- Maintaining student records (86.2%);
- Establishing registrar office goals and objectives (83.4%);
- Supervising office staff (82.3%).

The researcher compared and contrasted the job duties of the 1200 AD collegiate registrar with the 1980 registrar in Florida, and with the job duties of the registrars as reported in 2004. As indicated above community college registrars' job duties and responsibilities were different in 2004 from those in 1980. In 2004 there appeared to be less of a requirement for counseling and advising of students and parents, and less requirement for professional and civic activities than reported earlier. Also, in 2004, there was an increased indication of liaison activities with other offices in the college and with other organizations and colleges. According to Cramer (2005), changes in management and business practices evolved with a Web-enabled student system implementation. Collaboration and communication with all campus *stakeholders* and others on campus, who were involved with implementation, was a major role of project team members during implementation, and the key to success according to Cramer's research.

This study was a mailed nationwide survey questionnaire that controlled for incidence of Web-enabled systems implementation projects and type of systems

implementation strategy, whether in-house, outsourced, consortium, or a combination of strategies.

Coinciding with AACRAO's focus on systems implementation, this study examined the functional role of community college registrars during systems implementation to determine whether and how the role changed. This study also assessed perceptions regarding work places during systems implementation compared with views of work places with no systems implementation project.

In preparation for this study, the researcher identified job duties and responsibilities by studying community college registrars' position descriptions at three community colleges in Florida. Seventeen of the most common duties indicated at those three colleges were included in the survey questionnaire. These duties and responsibilities were to be scored by a sample of registrars nationwide to indicate their level of involvement. The level of involvement in the 17 identified duties and responsibilities were to be compared by incidence of Web-enabled implementation projects in progress at the time of the study, and type of technology implementation strategy used. As mentioned above, those strategies included: in-house, outsourced, consortium, or a combination of strategies.

The independent variable was the incidence of Web-enabled student system implementation projects in process at respondents' colleges at the time of the study. The registrars' functional role, role conflict, and role ambiguity were considered as the dependent variables for each analysis. Responses were to be collapsed from a five-point to a two-point scale. Each duty or responsibility was to be reported as either very high or high involvement, moderate or low involvement. The analysis was meant to compare the

two levels of involvement with existence of a current Web-enabled student information system implementation project. It was also to compare the two levels of involvement for the 17 different duties and responsibilities listed on the survey questionnaire.

The research instrument also assessed perceptions of role conflict (harmony), role ambiguity (clarity), and certain background characteristics. These responses were to be compared by type of technology implementation strategy, and to include those with no implementation project in progress.

The researcher selected a nationwide sample of 250 community college registrars to receive a newly developed survey questionnaire. More than the required number of questionnaires were answered and returned. Registrars were thorough in their responses. For example, there were a large number of open-ended responses to a question regarding contacts outside of the office and frequency of those contacts.

The survey distribution method was successful. Advance notice was not provided. It may have increased the response rate, but the researcher felt that advance notice may have not been well received by some registrars, if they were extremely overextended, as some did indicate.

As summarized in the literature review for this project, Stewart (1982) studied options for managers who held the same functional roles. She maintained that demands, constraints, and perception of choice influenced how managers carried out their roles within their units and outside their units. Results indicated that these choices changed from time to time in a job, that they should be recognized, and the possibilities evaluated. Stewart's findings were consistent with Getzels, Lipham, and Campbell's (1968) in that behavior of individuals in organizations varied with roles and personalities. Results of the

current study agree with Stewart's findings and Getzels, Lipham, and Campbell in that certain background characteristics differed by systems implementation strategies with which registrars were involved. Those with higher educational levels and also those with longer tenure tended to be more involved in technology systems implementation; and also to be more involved in consortia or a combination of systems implementation strategies.

As concluded from the level of outside liaison involvement reported by community college registrars, the research results agree with Max Weber (1920/1968) that authority in bureaucracies is shared through collaboration. However, outside contact identities changed during systems implementation when technology implementation was outsourced or where consortia existed. More contact with information technology occurred during systems implementation, unless it was handled in-house. Overwhelming evidence indicated that community college registrars increased collaboration both externally and internally when implementing Web-enabled student information systems technology with an outsourced administration strategy.

This research study attempted to define roles as previously ventured by Miller, Schroader and Hotes (1982), and to identify issues and conflict areas. Rizzo, House, and Litzman's (1970) role perception questionnaire was the source of six role conflict and ambiguity questions for this study. The questions were posed from the positive role harmony and clarity perspective rather than the negatively oriented role conflict and ambiguity perspective. The power of suggestion may have resulted in responses that were more positively oriented than in reality. Nevertheless, respondents to this study generally answered the six point Likert-type scale very thoroughly, and complied with survey directions. The selected background characteristics questions were readily answered as

well. Results of Chronbach's test for internal reliabilites proved significant for each question. Some of the Chi Square analysis expected frequencies were less than five although categories were collapsed to the extent practicable.

Each of the six questions in the role conflict (harmony) and ambiguity (clarity) section of the survey questionnaire was compared with responses for those who were and were not involved in a Web-enabled student information system implementation project. Background characteristics were reported for those whose colleges were involved with Web-enabled implementation projects at the time of the study, and these characteristics were compared with the results from the role conflict and ambiguity section of the questionnaire.

Narrative data was very extensive. The data concerning contacts outside the office, frequency and reason for the contacts was most extensive. Other narrative data included open-ended comments. This data was reduced to categories with frequency counts. The data regarding the names of the student systems being implemented at the time of this study was received but not reported herein as it was not part of this research question.

This study also responded to Brewer's (1987) recommendation for further research concerning registrars and related to the subject of implementing computer technology. Since Brewer's study revealed that registrars' opinions toward computer technology implementation were factors in project outcomes, this study's finding that system implementation affected registrars' functional role may also be important to the success of such undertakings. Advanced awareness of impending role change may allow registrars the opportunity to prepare for adaptation, helping to allow for optimal integration of new technology.

The high level of responsibility allocated to community college registrars and the tremendous expense of technology innovations make this research study a source of reference for professional development, and consultation for those preparing to become involved in Web-enabled technology implementation projects.

As mentioned in the literature review, Dubrin (1996) projected that during organizational change, new roles for middle managers may downplay the functional role and may also result in establishing a position responsible for reengineering the organization. According to Dubrin, this person is the subject matter expert. Dubrin also said that during organizational change, middle managers' jobs were different as they became somewhat distant from basic supervision. Middle managers then were free to be able to coordinate several teams and work more on planning. This research indicated that although some registrars may become distant from basic supervision, most were very highly or highly involved with supervision, and most registrars were also very highly or highly involved with systems implementation. Several registrars commented in the open ended final section that their jobs were extremely busy and they worked long hours. Some registrars apologized for taking a longer than requested time to return the survey questionnaire because they had so many demands on their time.

In 2003, a study of 130 chief information officers indicated that many existed with a steadily decreasing staff. In these situations, customer service suffered, as the backlog of work orders grew. Security threats from viruses and hackers caused funds for innovation to be channeled into protective devices. Michael Zastrocky, Vice President for Academic Strategies at the Gartner Group claimed that heightening Internet security was very difficult for higher education. Dennis A. Trinkle as cited in Young (2004) observed

that colleges were trailing businesses in implementing new technology because they had reduced their budgets in this area. This concept aligned with Green's (2001) finding that the progress of technology in education was slower than in business and industry.

As colleges reduce their spending, the forward thinking community college registrars who continue to educate themselves at a rapid pace to stay abreast of technology, may be more likely to hold or advance their levels of administrative authority, thereby maintaining positions of leadership in their institutions. The alternative may be reducing their status to that of clerks who are limited to maintaining existing systems, as suggested by Lanier (1995).

Young (2004), in *The Chronicle of Higher Education*, discussed the future of colleges in light of their abilities to stay current with large-scale innovations in information technology in times of limited funding. If community college registrars wish to maintain or increase their influence concerning students' enrollment processes and records, their involvement would be increasingly technology oriented. Since many institutions' budgets have been challenged with regard to technology innovation and training, registrars can look to their professional associations, to higher education credit, and also to certification programs for exposure to leading edge technology and training, especially during their first years in office. Involvement with professional associations may be very important, and the associations themselves very valuable. The national, regional, state, and community college registrars' professional associations may be essential keys to the survival of a community college registrar.

As a response to variously assessed needs, formal higher education administrative or information technology administration programs are available on-line. Technology

education is available from professional associations, consultants, training programs, experienced mentors, and vendors.

Recommendations for research and practice are offered as follows:

1. Further research is suggested to identify how community college registrars and other administrators prefer to develop technology expertise so that training providers can respond as needed.

2. Skills in leading technology change may be an area for further research and development on behalf of college registrars. The registrar who is able to lead such change can help develop widespread readiness for and acceptance of new technology by faculty, staff, students, and community.

3. Further study of registrars' liaison roles may be indicated to aid professional development in areas such as interpersonal relations, negotiating, and diplomacy.

4. Research is also suggested to assess the role of the college registrar with regard to maintaining excellent customer service while implementing Web-enabled technology. Since a basic objective of the new student information systems is student success, the role of customer relations representative may be useful for community college registrars to explore as a way of leading institution-wide attitudes toward excellence in customer service. As Web-enabled technology increasingly allows students, faculty, staff, local community, and the world, to meet and interact with the college without personal contact, registrars may wish to explore new ways to establish and maintain more personal relationships with all constituents that they serve. Rather than avoiding direct contact with students due to the immersion in technology, registrars may need to make a special effort to personalize their on-line services, and to make themselves and their staff

members available to students who prefer to process their transactions in person or by telephone. Another recommendation to create a personal touch would be for the registrars and their office personnel to host periodic focus group meetings, open houses, and also informal social functions for various constituents to promote positive relationships, especially during system implementation projects.

5. Finally, continued research that utilizes the survey questionnaire that was developed for this study would further validate the findings presented in this dissertation, and establish the reliability of the instrument. A survey of the entire population of community college registrars may improve validity, reducing the number of expected fields with less than five responses, especially in the area of outsourced services. Also, university registrars may be an appropriate audience for a repeat of this study. The instrument could be adapted to allow for study of other administrators' functional roles and it may also be useful for studies of role conflict and ambiguity during other types of organizational change processes.

APPENDIX A IRB APPROVAL LETTER



Office of Research

January 15, 2004

Sandra Justice Fahey
5370 Palmetto Street
Fort Myers Beach, FL 33931

Dear Ms. Fahey:

With reference to your protocol entitled, "The Role of Community College Registrars in Relation to Student Information Systems Implementation," I am enclosing for your records the approved, executed document of the UCFIRB Form you had submitted to our office.

Please be advised that this approval is given for one year. Should there be any addendums or administrative changes to the already approved protocol, they must also be submitted to the Board. Changes should not be initiated until written IRB approval is received. Adverse events should be reported to the IRB as they occur. Further, should there be a need to extend this protocol, a renewal form must be submitted for approval at least one month prior to the anniversary date of the most recent approval and is the responsibility of the investigator (UCF).

Should you have any questions, please do not hesitate to call me at 823-2901.

Please accept our best wishes for the success of your endeavors.

Cordially,

A handwritten signature in black ink, appearing to read 'Chris Grayson'.

Chris Grayson
Institutional Review Board (IRB)

Copies: Jess House
IRB File

APPENDIX B SURVEY QUESTIONNAIRE



REGISTRARS

**Brief Survey of
Job Duties and
Responsibilities**

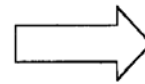
*and
Technology Implementation*

Sandra J. Fahey

Start here.

1. How would you rate your current involvement (in the past month) with the following types of job duties?

Job Duties	Very High Involvement	High Involvement	Medium Involvement	Low Involvement	Very Low Uninvolved	No Involvement
Implement Web-enabled technology system(s).	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Administer Registrar office policies and procedures.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Provide over all leadership for office of the Registrar.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Supervise office staff.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Establish Registrar office goals and objectives.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Provide overall guidance and direction to on-line processes.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Maintain student records.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Act as responsible custodian of all academic records on the computer database.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Maintain and secure the use of the official college seal.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Conduct staff meetings to discuss information, policies and procedures.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Collaborate and act as liaison with other departments, functions, or groups	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Resolve system errors or failures.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Identify system problems and implement corrective actions.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Develop, deliver, and assess internal employee training.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Provide general management for information services activities.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Attend workshops and training to enhance technical skills.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Monitor projects to ensure effectiveness and compliance.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Develop and produce reports on student enrollment for college administration.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>



Continue here.

2. Please list your five most frequent contacts outside of the Registrar's office, and frequency of such contacts (i.e. daily, weekly, etc.) and the nature or purpose of each contact.

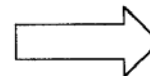
Position/Department	Frequency	Purpose
1.		
2.		
3.		
4.		
5.		

3. Is your college currently involved with a Web-enabled student system implementation project?

- Yes Please specify system name _____
 No

4. Please provide your perception of your job duties as the college registrar.

Perception of current job duties	Strongly Agree	Agree	Somewhat Agree	Somewhat Do Not Agree	Do Not Agree	Strongly Do Not Agree
a. I know what my responsibilities are.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
b. I know I have divided my time properly.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
c. I work under clear directives or orders.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
d. I agree with the way things are done.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
e. I know exactly what is expected of me.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
f. I work under compatible policies and guidelines.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>



Continue here.

5. What type of administrative information technology strategy exists at your college?

- In-house
- Outsourced
- Consortium
- Combination Please explain: _____
- Other _____

6. If you're college is involved with a Web-enabled systems implementation project, what type of technology implementation strategy is present?

- In-house implementation
- Outsourced implementation
- Consortium implementation
- Combination Please explain: _____
- Not involved with an implementation project

7. Please indicate the approximate total credit headcount enrollment at your college:

- < 1,000
- 1,000 - <5,000
- 5,000 - <10,000
- 10,000 - <20,000
- 20,000+

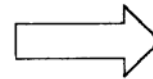
8. Please indicate your highest educational background.

- High school
- Some college _____ (Major)
- Bachelors Degree _____ (Major)
- Masters Degree _____ (Major)
- Doctorate Degree _____ (Major)
- Certification _____

11. Please indicate your gender. Male Female

12. How many years have you held a management/leadership position in a registrar's office?

- > 1 yr.
- 1 - 5 yrs.
- 6 - 10 yrs.
- 11 - 15 yrs.
- >15 yrs.



Continue here.

13. How many Web-enabled student system implementation projects have you been involved with? _____

14. Your comments are requested. Please enter them in the space provided below.

15. Please provide the following information.

Name _____

Title _____

Institution _____

Address _____

Thank you!

Yes, please send me a copy of your research results.

APPENDIX C COVER LETTER AND FOLLOW UP LETTERS

January , 2004

Dear Community College Registrar:

You may be familiar with information systems implementation, especially student information systems. Web-enabled student information systems are being implemented at a number of community colleges. I am a former community college Director of Admissions and Records, now focusing doctoral research on community college registrars.

I am asking community college registrars to complete a brief survey regarding your job duties and responsibilities and whether or not your college is implementing a Web-enabled student information system. The survey also asks about the information technology administration strategy at your college, such as in-house, outsourced, consortium, or combination. A few additional questions ask about your perception of your job duties and brief background characteristics. I would appreciate it if you would take a few minutes to answer questions on the enclosed survey. I believe the survey asks important, useful questions, the answers to which may improve future understanding of information technology systems implementation. There are no known risks, and the participation is voluntary. Responses to questions about your identity are strictly for follow-up purposes and will remain confidential. The questionnaires are numbered for tracking purposes only.

The results of this survey will be published as a doctoral dissertation. As compensation for participating in this research, you are offered a copy of a summary of the research results.

If you have any questions about this research, please contact me at (239) 765-8734 or my faculty supervisor, Dr. Jess House, at (239) 590-7810. Questions or concerns about research participants' rights may be directed to the UCFIRB Office, University of Central Florida Office of Research, Orlando Tech Center, 12443 Research Parkway, Suite 207, Orlando, FL 32826. The phone number is (407) 823-2901.

We realize this survey will take approximately five minutes of your valuable time, but the result should be worth the effort. Enclosed please find a postage paid envelope in which to return the survey. To be useful, your responses must be received by April 30, 2004. Thank you very much for your consideration.

Sincerely,



Sandra Justice Fahey, M.Ed., MBA

_____ I have read the procedure described above.

_____ I voluntarily agree to participate in the procedure.

_____ I would like to receive a copy of the research results described above.

_____ I would not like to receive a copy of the research results described above.

Participant _____ / Date _____

UCF IRB
APPROVED SJD
DATE 15 Jan 2004

June 14, 2004

Dear Community College Registrar,

Approximately four months ago you most likely received a questionnaire that asked about your duties and responsibilities and whether or not your college is implementing a Web-enabled student information system. This is a respectful notice that I did not receive the returned questionnaire from you.

People who have already responded included a variety of feedback regarding job duties and responsibilities and systems implementation. I think the results will be very valuable to Registrars and others. Your response is very important to this research project. Approximately 140 responses were received from the 250 that were mailed. Feedback from almost everyone is necessary so that the results are truly representative of Registrars nationwide. We realize that this survey will take approximately five minutes. Enclosed please find a postage paid envelope in which to return the survey and cover letter.

If you are no longer serving as Registrar or in a related position, or you prefer not to participate, please return the questionnaire in the enclosed envelope and indicate any of the above so that you will not receive future follow-up requests.

There are no known risks, and the participation is voluntary. I would like to remind you that your individual responses would remain confidential. The questionnaires are numbered for tracking purposes only. The results of this survey will be published as a doctoral dissertation. As compensation for participating in this research, you are offered a copy of a summary of the research results.

If you have any questions about this research, please contact me at (239) 765-8734, or my faculty supervisor, Dr. Jess House, at (239) 590-7810. Questions or concerns about research participants' rights may be directed to the UCFIRB Office, University of Central Florida Office of Research, Orlando Tech Center, 12443 Research Parkway, Suite 207, Orlando, Fl. 32826. The phone number is (407) 823-2901.

Thank you very much for your consideration.

Sincerely,

Sandra Justice Fahey, M.Ed., MBA

_____ I have read the procedure described above.

_____ I voluntarily agree to participate in the procedure.

_____ I would like to receive a copy of the research results.

_____ I would not like to receive a copy of the research results.

Participant

Date

July 17, 2004

Dear Registrar,

Over the past five months I have sent several letters, questionnaires and a postcard to you for an important research study. The purpose is to help identify the effect of Web-enabled systems implementation projects on the job duties and responsibilities of Registrars at community and technical colleges. It is important to receive responses from Registrars who are and are not currently involved with such implementation projects. Implications of the study include increased understanding of college administration issues and professional development needs.

The research project is in the final stage and this is the last communication that you will receive as part of a random sample of college Registrars. This final letter is being sent to you because I am concerned that you may have had different experiences than those who have already answered the questionnaire. A response from each person in this small nationwide sample will help provide accurate results.

Your response is voluntary, and it is fine if you choose not to participate. If you feel that I have made a mistake by including you in this research, please return the blank questionnaire with a note. This would really help.

As we conclude this final effort to understand effects of technology implementation on the functional role of community and technical college Registrars, I appreciate your consideration if this request. Thank you for your attention to this research project.

Sincerely,



Sandra J. Falvey, M.Ed., MBA
Doctoral Candidate
Department of Educational Research, Technology and Leadership
College of Education
University of Central Florida
Orlando, Florida

APPENDIX D FOLLOW UP POST CARD MAILER

Last week a questionnaire seeking your perception of registrar job duties and responsibilities and technology implementation was mailed to you. Your college was selected randomly from a list of all community colleges that are members of the American Association of Collegiate Registrars and Admissions Officers (AACRAO). You were selected because you are the college registrar, or you may be the person at your college with the administrative position most responsible for registrar related duties.

If you have already completed and returned the questionnaire please accept our sincere thanks. If not, please do so today. We are especially grateful for your help because it is only by asking people like you to share your perceptions that we can understand registrar related job duties and technology implementation in community, technical, and junior colleges.

If you did not receive a questionnaire, or if it was misplaced, please call me at (239) 765-8734, or send an e-mail to sjfahey1@aol.com and I will get another one in the mail to you today.

Sandra Fahey, Doctoral Candidate
University of Central Florida
c/o 5370 Palmetto St.
Ft. Myers Beach, Fl. 33931

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