

DISSERTATION

VISUALIZING WORK FLOW FOR PROCESS IMPROVEMENT:
A CASE STUDY OF CLASS SCHEDULING AT A UNIVERSITY

Submitted by

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In partial fulfillment of the requirements for

the Degree of Doctor of Philosophy

Colorado State University

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WE HEREBY RECOMMEND THAT THE DISSERTATION PREPARED
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VISUALIZING WORK FLOW FOR PROCESS IMPROVEMENT: A CASE STUDY
OF CLASS SCHEDULING AT A UNIVERSITY BE ACCEPTED AS FULFILLING IN
PART REQUIREMENTS FOR THE DEGREE OF DOCTOR OF PHILOSOPHY.

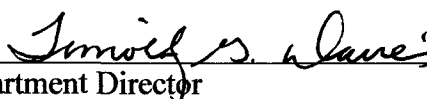
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ABSTRACT OF DISSERTATION

VISUALIZING WORK FLOW FOR PROCESS IMPROVEMENT:
A CASE STUDY OF CLASS SCHEDULING AT A UNIVERSITY

The purpose of this case study was to analyze and map class scheduling by a school in a higher education setting so that the process could be understood, documented, and ultimately improved. Class scheduling is a process by which faculty and staff generate a class schedule. A class schedule is a common source of information from which faculty, staff, and students plan and organize their personal and professional lives. A class schedule has several components including course descriptions, days, times, locations, enrollment capacities, and names of instructors.

The school, part of a university, initiated an analysis of class scheduling to address inefficiencies in the process and occasional errors that appeared in the final class schedule. The school offers numerous options for students interested in educator licensing, graduate degree programs, and professional development through its three main functions and respective academic programs of study. Opportunities for performance improvement often exist at functional interfaces, as described by Rummler and Brache. This qualitative research study took place in two phases from Fall 2006 to Spring 2008. Data were collected using multiple methods from a variety of sources including document reviews, interviews, and focus groups. A total of 34 individuals participated in Phases I and II combined.

Three primary research questions were asked to address the present performance problem involving class scheduling at the school:

1. How does class scheduling operate within the school?
2. What are the problems associated with class scheduling?
3. How can class scheduling be improved?

Answers to these research questions satisfied the aims of the study: the work activities or process steps and their sequence were defined and documented, performance issues were identified along with performance indicators, and finally recommendations were made for future performance improvement. Findings indicated written procedures describing class scheduling were not available and therefore the performance gap could not be properly assessed. Process maps and timelines were created to visualize work flow for further consideration in developing appropriate procedures and improving the overall efficiency and effectiveness of class scheduling.

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DEDICATION

My parents,
John and Paula Waite.

*For their support, inspiration, and encouragement,
I am forever grateful.*

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I am deeply indebted to my family, friends, and colleagues, who graciously stood beside me while I pursued this doctoral degree.

I thank my parents, John and Paula Waite, for their enduring love and support. My father taught me steadfastness, perseverance, and pride. It was his pursuit of excellence in work that instilled in me the importance of trying my best. My mother taught me integrity, sincerity, and kindness, among so many other things too numerous to list. It was her inspiration and encouragement that gave me the inner strength to challenge myself and live my dreams. She is my most cherished friend. I also thank my brother, Michael, for a lifetime of love.

I am extremely grateful to the members of my dissertation committee whose guidance, counsel, and friendship helped me complete this research: Jerry Gilley, my Advisor, who extended unselfishly opportunities to me for my professional growth and development; Carole Makela, who gave tirelessly her time and talent with editing and proofreading; and Dennis Cole and Pat Sample, who served willingly on my committee and lent support and insight during the dissertation process. I have deep gratitude to Jerry Gilley for his hard work in developing the doctoral program, which fulfilled my expectations and then some. I have immense respect for Carole Makela, who sets a wonderful example for us all through her dedication and commitment to academia.

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CHAPTER 1: INTRODUCTION

Overview

The case study examines class scheduling in a school at a university. Class scheduling is a process through which faculty and staff generate a class schedule. A class schedule is a common source of information from which faculty, staff, and students plan and organize their personal and professional lives. As such, it is important the final version be as complete and accurate as possible.

Significance of the Study

Organizations seek to deliver cost-effective, high-quality products and services to meet the needs of their customers. Toward this end, organizations have adopted a wide range of business strategies over the years to improve their performances. In leading a successful change effort, performance needs across the major performance levels of an organization must be considered. The process level may be thought of as the pivotal link between organizational and individual performance; that is, “both strategic and operational issues are best understood at the activity level” (Porter, 1985, p. xv). “If you want to understand the way work gets done, to improve the way work gets done, and to manage the way work gets done, processes should be the focus of your attention and actions” (Rummler & Brache, 1990, p. 62).

A process or series of processes were employed every time a product or a service is generated (Tenner & DeToro, 1997). A process is the transformation of raw materials into finished goods. Moreover, the finished goods of a supplier may constitute the raw

materials of a buyer. Work activities may be confined to a single department or function or they may cut across functional boundaries. As work activities are carried out one after the other along the supply chain, customer-supplier relationships are developed in a unified effort to achieve the overall goals of the organization.

The process level tends to be the least understood and therefore the least managed despite the fact that work gets done through processes (Rummler & Brache, 1990). A process is only as effective as its weakest link regardless of the scope of work to be performed. “Each handoff is an opportunity for error, delay, and unnecessary cost” (Rummler-Brache Group, 2004a, p. 1). An organization achieves mediocrity at best without a holistic view of how processes operate. Inefficiencies occur within the system and contribute to dissatisfaction among internal and external customers alike. “The greatest opportunities for performance improvement often lie in the functional interfaces – those points at which the baton (for example, “production specs”) is being passed from one department to another” (Rummler & Brache, 1990, p. 9). It is reasonable to believe a process could operate more efficiently if team members were familiar with each process step as well as the relationship among the process steps to better position them for the hand-off. Visualizing work flow has, therefore, several potential advantages:

- A relationship map will show the customer-supplier relationships.
- A process map will reflect how the process actually operates.
- A process map will indicate inefficiencies in the process (e.g., redundant steps, steps out of sequence, and linear versus parallel processing).
- A process map will highlight disconnects in the process.
- A process map will elicit thought about the process by interviewees.
- A process map will help communicate the findings of the study to others.
- A process map will help others understand how the process operates.
- A process map will help others see how their work fits into the process as a whole.

Maps of organizations or processes are valuable tools used to capture and communicate information. Nonetheless, visualizations alone will not uncover what is broken or indicate what to do about it; mapping is not a substitute for methodology (Rummler-Brache Group, 2004b). Consulting models for performance improvement generally include a period of analysis, a period of planning an intervention and introducing change, followed by a period of evaluating the results. Ironically, the analysis phase is often overlooked so that performance issues can be resolved as quickly as possible. Although omitting the analysis phase can lead to a quick fix by temporarily masking the symptoms of a problem, a lack of in-depth analysis seldom results in a long-term solution because insufficient opportunity exists to uncover the root cause of a performance gap. “The output of careful analysis is the critical information that accurately defines, frames, and guides effective performance improvement interventions” (Swanson, 2007, p. xv). Analysis, together with process maps, offers the additional benefits:

- a disciplined, systematic approach to understand and document work flow,
- a way of learning about what is actually going on as opposed to what should be happening,
- a reminder about customer focus,
- a means to place a process in context of the organization in which it operates,
- an opportunity to establish rapport with stakeholders and solicit their support early on in the performance improvement process,
- an avenue to steer clear of preconceived solutions, and
- a means to establish process metrics.

Statement of the Research Problem

Class scheduling is a process common among all educational systems. A class schedule provides the course offerings for a particular semester, the days, times, and locations of classes, the names of instructors, and important dates, such as add/drop dates

and deadlines for withdrawal. Faculty, staff, and students depend on having a complete and accurate class schedule made available to them prior to the start of a new semester. A complete and accurate class schedule can aid faculty and staff in planning their work lives and answering students' questions about registration. Similarly, the availability of such a schedule can assist students in executing their previously charted academic path by enabling them to register for courses that best coordinate with their personal and/or professional lives.

A school in a comprehensive graduate research university recognized the need to put together a class schedule more effectively and efficiently. This represents a *present performance problem* (Swanson, 2007) that has potentially severe consequences to the school, its employees, and its students. Inefficiencies can lead to delays in finalizing the class schedule. Poor performance can also result in important omissions, errors, and inconsistencies in the final version of the class schedule. Each of these consequences could have a ripple effect, which would also add to the workload of those who are left to resolve the performance issues. For example, adding a course that was accidentally omitted from the final schedule may require shifting resources or class schedule components to avoid conflicts with another course.

Purpose of the Research

The purpose of this case study is to analyze and map the class scheduling process so that it may be understood, documented, and ultimately improved. Understanding the performance of a process will define all of the work activities in the process and their interrelationships (Tenner & DeToro, 1997). Documenting the class scheduling process will provide faculty and staff with insight of what to do and how to do it. The analysis

findings will aid in determining the appropriate performance indicators and the subsequent planning of an appropriate intervention strategy.

Research Questions

Three primary research questions will be considered to address the present performance problem. The first question pertains to how the class scheduling process is carried out (*actual state*). The second question relates to how the class scheduling process should be carried out (*desired state*). It also accounts for discrepancies between the actual state and the desired state. The third question focuses on possible improvements to the class scheduling process.

1. How does class scheduling operate within the school?
 - a. Who is involved?
 - b. What work activities are undertaken?
 - c. What is the sequence of related work activities?
2. What are the problems associated with class scheduling?
 - a. What are the performance indicators?
 - b. What is the performance gap?
 - c. What is the root cause(s) of the performance gap?
3. How can class scheduling be improved?
 - a. What are the drivers that encourage optimal performance in class scheduling?
 - b. What are the barriers that impede optimal performance in class scheduling?
 - c. What recommendations can be made to improve class scheduling?

Definitions of Key Terms

Academic program of study (also, specialization): a set of prescribed courses related to a particular field of study.

Analysis: taking apart a phenomenon and examining its constituent parts; in the context of performance improvement, finding out what is happening and what should be happening.

Boundaries: the limits of the case under study defined both temporally and spatially.

Case: a phenomenon occurring over a specified period of time within a physical setting (Miles & Huberman, 1994); in this particular case study, the phenomenon referred to is the process of class scheduling.

Class: a period during which students meet for instruction under the guidance of an instructor. Traditionally, a group of students meet with their instructor in person on a regular basis to complete a course. With the advent of technology, students may communicate on a one-to-one basis with their instructors from a distance any time or by arrangement.

Context: the physical setting in which a phenomenon occurs (Miles & Huberman, 1994); in this particular case study, the phenomenon referred to is the process of class scheduling.

Course (also, instructional course): an educational program of instruction in a particular field of study.

Curriculum: the aggregate of academic programs of study offered by the school participating in the case study.

Instructional course: see course.

Performance: the quality of execution of an action, operation, or process. (Oxford English Dictionary Online, 2007)

Performance gap: a problem to solve or an opportunity to pursue; the difference between the actual level of performance and the desired level of performance.

Performance indicator: a variable by which the success of a product or service can be gauged. (Oxford English Dictionary Online, 2007)

Physical setting (also, site): the school within higher education where the case study will take place.

Process: defines and measures “sequences of steps, activities, and methods that produce a specified goal, result, consequence, or output for a particular internal or external customer or market” (Dean, 1999, p. 322).

Site: see physical setting.

Specialization: see academic program of study.

Workshop: an educational seminar in a particular profession or area of interest that facilitates interaction and sharing of ideas among participants.

Delimitations

Class scheduling is a process common in all realms of education. It creates a central cohesive source of information from which faculty, staff, and students plan and organize their daily lives. Class scheduling will be examined at one particular school over a period of time from the fall semester 2006 until the spring semester 2008.

The scope of the research will focus on the process of class scheduling within the context of the school. It will be limited by the school’s physical boundaries to consider the school or subsystem as an integral whole separated from the university or larger system as well as the university’s other subsystems. In this sense, the case study will only pertain to work flow within the school. The case study will not include faculty and staff outside the school unless they are able to inform the case study, nor will it include the students served by the school.

The Three Levels of Performance Framework developed by Rummler and Brache (1990) will be used to set the spatial boundaries of the case study within the school. The framework will help isolate class scheduling with respect to performance levels and performance needs. Across performance levels, the case study will examine the process level within the context of the organization level. It will not examine the job/performer level that encompasses individual job descriptions, task inventories, and so forth. Within

the process level, the framework will help isolate class scheduling from the other processes that occur within the school. In summary, the performance variable of interest represents the process level and design need.

Limitations and Assumptions

The findings of this study may not reflect an accurate picture of the class scheduling process at the time they are communicated once the research has been completed. Organizations are dynamic systems that continually evolve and adapt to their changing environments. There is a strong likelihood changes will be introduced by the school while the research is ongoing. Such changes may influence certain aspects of class scheduling, either directly or indirectly.

Visualizing work flow is a skill dependent on representing the collective voice. Maps must be developed with the input from people who execute the process as well as oversee it. Interviews and focus groups will be limited to faculty and staff who will be willing and available to meet.

The study is the school's first formal project involving the analysis and mapping of a selected process for the purpose of improving performance. The findings and subsequent recommendations for performance improvement will directly reflect the participants' forthrightness, candor, and detail in describing their experiences with class scheduling.

Performance indicators include specific features, values, and attributes of class scheduling that are expected by customers. An assumption is made that these measures of process effectiveness established prior to initiating the research will remain the same

throughout the study. As a result, students will not be asked to participate in the study even though they are external customers at the end of the supply chain.

Researcher's Perspective

I have worked with a number of faculty and staff and attended meetings on a regular basis throughout the course of my research. I have become familiar with many issues including some that have impacted the class scheduling process. Still, I believe I will be able to remain objective in analyzing the data and summarizing the findings of this case study. The research design, which utilizes multiple research methods and sources of information, will be of additional benefit.

CHAPTER 2: LITERATURE REVIEW

General Systems Theory

General systems theory describes the commonalities among all kinds of systems. Basic components of all systems include input, throughput or processes, output, and the environment, which are illustrated in Figure 1. Input is the raw materials transformed by the system. Processes are used by the system to convert the raw materials into an end product that is usable by either the system itself or the environment, or both. Output is the end product that results from a completed series of processes. The environment includes everything that lies outside the system's outermost boundary and may affect the system or be affected by the system at any given time.

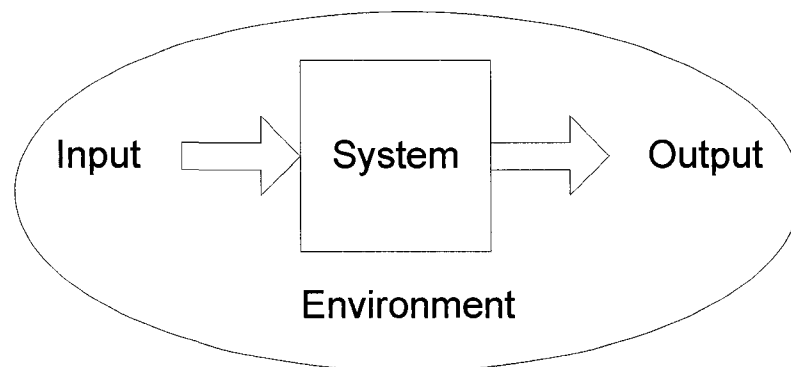


Figure 1.

Basic System Components

An organization is an example of a complex system made up of separate interrelated parts. Bela H. Banathy, who wrote extensively on systems theory, was quoted as saying, "The joining and integrating of the web of relationships creates emergent properties of the whole. These properties of the whole may not be found in any analysis of the parts" ("Systems Theory," December 13, 2006). Organizations are open systems that interact with their environments; they draw resources from their environments and replenish their environments with products and services. Organizations are also dynamic systems as they are in a constant state of flux to maintain equilibrium with their environment. A complex system typically has a feedback mechanism to help either maintain its current state (if highly effective) or regulate change from its current state to a desired state with respect to internal and external influences.

The goal of a complex system is its reason for being; it may be implicit or explicit. For example, organizations often develop a mission statement to express their goals. "According to Kotler (1992), an organizational mission acts as an invisible hand that guides widely scattered employees, working independently yet collectively, toward the organization's goals" (in Gilley & Maycunich, 1998, p. 101). An organization's competitiveness, especially in today's global marketplace, ultimately depends on the efficient delivery of cost-effective, high-quality products and/or services that satisfy the needs and expectations of its customers. The ability of an organization to carry out its mission by producing such outputs is a key determinant of its effectiveness (Gilley, 2001).

Performance Improvement

Organizational effectiveness may be enhanced by continuous performance improvement and change. Performance improvement may be directed at any level of an organization, whether its aim is at overcoming human error, equipment failure, managerial malpractice, inadequate policies and procedures, or alternatively capitalizing on a new opportunity. However, change at one level seldom occurs in isolation. Although at the micro-level an organization is comprised of individuals who are ultimately responsible for the throughput and obtaining the expected results, Rothwell (1966b) believes every level contributes to the organizational mission (in Gilley, 2001, p. 90). Any performance improvement endeavor must anticipate how changing one part of the organization may impact other parts of the same organization since they are all interrelated and potentially influence one another.

Performance improvement endeavors are often thwarted for a variety of reasons. Rosenberg (1996) suggests an underlying theme may be lack of in-depth analysis to identify the root cause of an issue before adopting a solution or intervention (in Gilley & Maycunich, 2000, p. 275). For example, a common misconception is that failure to achieve desired business results equates to failure by the organization's employees. Training is promoted as the solution to the problem with the intent of improving performance at the individual level. In the end, training is determined to be either insufficient or inappropriate altogether in closing the performance gap. Another reason performance improvement efforts sometime fail is too simplistic approaches are taken to solve what tends to be complex problems.

The Three Levels of Performance Framework

Rummler and Brache (1990) conceived the Three Levels of Performance Framework (Three Levels Framework), which is grounded in systems theory, to help comprehend the complexities of an organization. This framework provides a holistic view of an organization and its subsystems, and visually communicates the way work actually gets done. Understanding the way work actually gets done is a necessary precursor to performance improvement (Rummler & Brache, 1990). The Three Levels Framework comprises nine performance variables that address three performance needs at three different performance levels. Figure 2 depicts the nine performance variables. The three levels of performance are represented by the rows. The organizational level provides a macro-view of the system, whereas the job level provides a micro-view of the system. The process level falls somewhere in between the organizational and job levels. These three levels are described in greater detail below. The three performance needs are represented by the columns. Goals are tied to the business strategy, design reflects the structure that is in place, and management refers to the active participation of management to ensure continuous performance improvement and lasting change. In leading a change effort, all nine variables must be considered.

Organizational Performance

Organizational performance considers performance at the macro-level of an organization, also referred to as the performance management system. The performance management system is concerned with establishing measures of performance and developing a performance tracking system that uses measures as the basis for planning, feedback, performance improvement, and rewards (Rummler & Brache, 1990).

	The Three Performance Needs			
The Three Levels of Performance		Goals	Design	Management
	Organization Level	Organization Goals	Organization Design	Organization Management
	Process Level	Process Goals	Process Design	Process Management
	Job/Performer Level	Job/Performer Goals	Job/Performer Design	Job/Performer Management

Figure 2.

The Three Levels of Performance Framework by Rummler and Brache

Source: Rummler & Brache (1990)

Relationship map.

A relationship map is one of three tools that exist within the Three Levels Framework. A relationship map does not show reporting relationships, as does an organizational chart. Rather, it illustrates a horizontal view of the organization and its subsystems (Rummler & Brache, 1990). It makes the interfaces among the subsystems and their dependencies visible. Moreover, a relationship map identifies resources drawn from the environment as well as end products and/or services returned to the environment. In other words, it reveals the customer-supplier relationships found in the organization's external environment, as shown in Figure 1. A relationship map is especially helpful in transforming a silo culture into one of collaboration by identifying and understanding the interfaces among functions (Rummler & Brache, 1990).

Process Performance

Process performance considers performance at the intermediate level of an organization and is concerned with throughput. Processes are the steps taken by employees to carry out their work. “The transformation of inputs into outputs is the basic starting point in describing how an organization functions” (Gilley, 2001, p. 74).

Process improvement helps document, analyze, and improve the performance of cross-functional processes, while process management establishes an infrastructure for ongoing process improvement.

Process map.

A process map is the second tool of three that exists within the Three Levels Framework. It conveys how work actually gets done (Rummler & Brache, 1990). A process map takes into account both formal and informal procedures to accomplish work. Work activities within and among functions are illustrated and the sequence of the work activities is revealed.

Human Performance

Human performance considers performance at the micro-level of an organization. “Human performance is synonymous with outcomes, results, or accomplishments generated by people in work settings” (Gilley, 2001, p. 80). As indicated earlier, it is essential for goals at the individual level to be aligned with organizational goals.

Human Performance System.

The Human Performance System process map is the third tool of three that exists within the Three Levels Framework. This tool will not be used in the study.

Analysis

Improving performance is a repetitive process whereby change is introduced to increase organizational effectiveness. The performance improvement process generally includes five basic phases, which are sometimes labeled by the acronym ADDIE:

analysis, design, development, implementation, and evaluation, as shown in Figure 3.

The analysis phase defines the performance issue to be examined and generates relevant knowledge about the actual state versus the desired state. The design phase and development phase, sometimes referred to jointly as the planning stage, craft the intervention(s) to be implemented. The implementation or action phase introduces planned change intended to close the performance gap between the two states. The evaluation phase assesses whether the desired state has ultimately been achieved.

Clearly no one “right” way exists to address all types of performance issues; nevertheless, taking a disciplined, systematic approach from beginning to end and asking appropriate questions can make the difference between success (closing the performance gap and achieving the desired state) and failure. Unfortunately, interventions are erroneously selected in practice based on preconceived notions of the problem or opportunity and hastily implemented. Individuals responsible for implementing the interventions are then left with the awkward, if not painful, realization of having wasted their time, energy, and money adopting the wrong “solution.” Mistakes made at the front end of the performance improvement process are generally less costly than those made at the back end because the negative effects tend to be cumulative. “Because the analysis phase defines, frames, and directs the remaining steps, it is considered the most critical” (Swanson, 2007, p. 7).

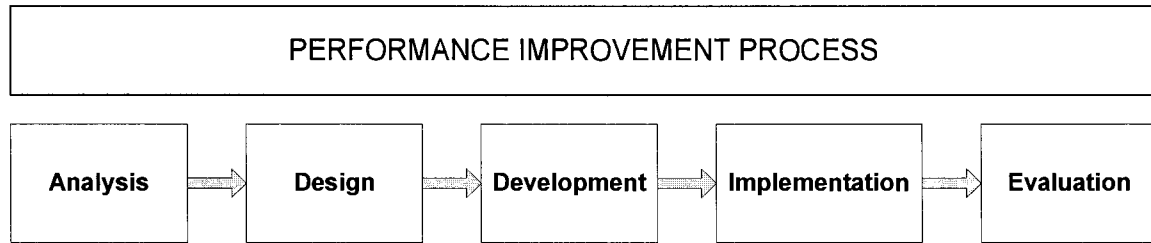


Figure 3.

Five Basic Phases of the Performance Improvement Process

Source: Swanson (2007)

The first of the five phases of the performance improvement process is analysis, which is composed of four basic components identified in Figure 4. Swanson (2007) describes these components in his book, *Analysis for Improving Performance*. The first component, diagnose organizational performance, involves articulating the initial purpose, assessing the performance variables, specifying the performance measures, and determining the performance needs (Swanson, 2007). The diagnostic component informs the second component, construct performance improvement proposal, which may reveal process performance issues and/or related workplace expertise requirements. The third and fourth components, document work process (see Figure 5) and document work expertise, respectively, extend the analysis phase (Swanson, 2007).

The performance diagnosis component may be likened to Rossett's (1999) conception of performance analysis intended as a first pass to gain clarity and focus on a particular set of circumstances before expending significant resources. Rossett (1999) discusses performance analysis in her book, *First Things Fast*, and contends it is the precursor to needs assessment, or "the front end of the front end" (p. 4), just as Swanson (2007) suggests performance diagnosis is the first component of analysis.

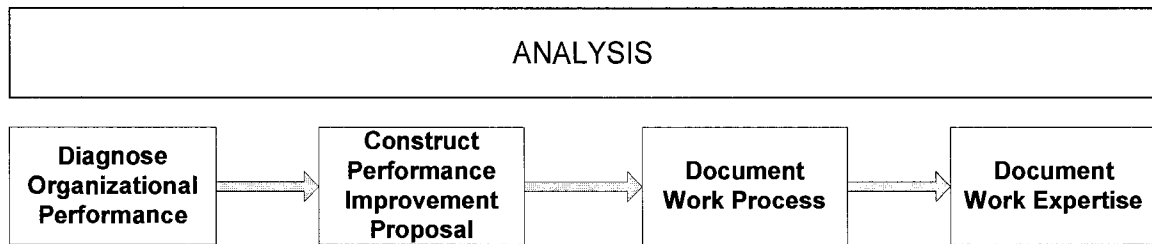


Figure 4.

Four Basic Components of the Analysis Phase

Source: Swanson (2007)

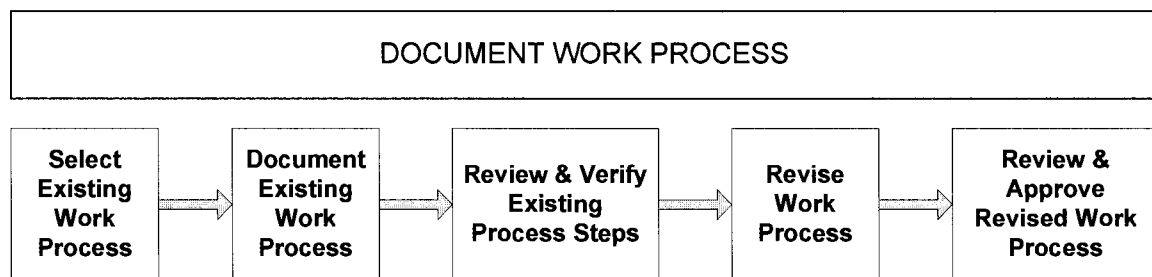


Figure 5.

Five Basic Steps to Document Work Process

Source: Swanson (2007)

A diagnostician must take into account the performance goal, performance variables, and the performance taxonomy, among other considerations. A performance goal specifies the desired state or standard to be achieved in terms of measurable criteria for success to either solve a problem or take advantage of an opportunity. Both a problem and an opportunity (performance issues) represent performance gaps between the actual and desired states, as suggested previously. According to Bjorkquist and Murphy (1987) and Swanson (1982), performance issues may be classified into three types: (a) present

performance problems, (b) improvements to the present performance, and (c) future performance requirements (in Swanson, 2007, p. 60). Present performance problems are just that, problems of any size necessitating immediate action. Improvements in present performance and future performance requirements stem from taking inherently longer term views of situations to identify problems or opportunities proactively instead of reactively. Swanson (2007) suggests differentiating the type of a performance issue to help articulate the purpose of a performance diagnosis.

Determining directly relevant performance variables similarly aids in streamlining the up front work of analysis. It is important to note, however, performance variables are interpreted differently in the literature. Rummler and Brache (1990) describe nine performance variables in a 3 x 3 matrix representing levels and needs (see Figure 2). Swanson (2007) expands their work with 20 enabling questions in a 5 x 4 matrix representing performance variables and performance levels. Swanson's (2007) use of performance variables, which include mission or goal, system design, capacity, motivation, and expertise, corresponds with the framework's performance needs but makes more explicit the intrinsic factors of an organization. Swanson's (2007) mention of performance levels is consistent with the framework's performance levels except for the addition of a fourth dimension, the team level, between the job/performer or individual level and the process level. McLean (2005) defines team level as "groups of workers functioning interdependently and sharing a common purpose" (in Swanson, 2007, p. 62). Cummings and Worley (2004) refer to the team level as the group or department level, which they define as work groups consisting of a relatively small number of job performers working together on a shared task. Teams perform work

within and/or across departmental boundaries depending on their assigned responsibilities and the organizational structure.

The three performance needs (goals, design, and management) described by Rummler and Brache (1990) represent determinants of effectiveness of the system or a particular level. In other words, an organization *needs* specific standards, structure, and management practices at each of the three levels to perform at a high level and remain competitive. These preconceived needs serve as levers to improve performance when implementing an intervention. In contrast, the performance needs according to Swanson (2007) are largely unknown until the performance issue is examined in terms of both performance level and performance taxonomy. Once specified, the needs signify general requirements to be met in order for performance to be improved. Both usages of the term expose deficiencies in performance and set the direction for more in-depth analysis.

A Taxonomy of Performance was developed to help navigate the performance improvement process, classifying a performance issue into one of five tiers: understand, operate, troubleshoot, improve, and invent (Swanson, 2007). The initial three tiers are said to maintain the system, while the last two tiers are meant to change the system. The tiers are arranged in a pyramid with each tier providing a foundation for the next. That is, change cannot occur at the highest level of performance (i.e., invent) unless certain basic elements needed to support the change effort exist (e.g., understand). The taxonomy builds on the original concept of management, which is one of the three performance needs identified in the Three Levels Framework (Rummler & Brache, 1990).

CHAPTER 3: METHODOLOGY

The chapter begins with a brief overview of the methodology that utilizes the Three Levels of Performance Framework (Three Levels Framework) to direct the course of empirical inquiry for the study. The chapter proceeds with a description of the multiple method research design (Morse, 2003) and more specifically, a discussion of the rationale for choosing a case study design to improve performance of class scheduling and promote meaningful change (in Creswell & Plano Clark, 2007, p. 12). The remainder of the chapter details the study site and participants, the methods of data collection and analysis, and study validity and reliability.

Research Methodology

The process of improving performance can be overwhelming and confusing given the dynamic and complex nature of an organization unless a systematic approach to identifying performance issues is taken. Furthermore, improving performance may be targeted at any one level of an organization but ultimately the intervention must be designed with all levels in mind since change seldom occurs in isolation. The methodology selected to address these challenges utilizes the Three Levels Framework. Rummler and Brache (1990) conceived this framework as a way to view an organization holistically yet simplistically by level (organization, process, and job/performer) and performance need (goals, design, and management). The framework breaks the process of improving performance down into identifiable and manageable steps. Relationship and process maps, which are tools through which the Three Levels Framework is applied,

visually communicate the way work actually gets done by revealing an organization's constituent parts or functions within a real-life context and more importantly, the relationships that connect the parts. Since the greatest opportunities for performance improvement often exist at the interfaces among functions (Rummler & Brache, 1990), a change initiative should consider not only each of the functions separately, but the coordination of work activities among them within the context of the organizational system.

Research Design and Rationale

Performance Improvement: Analysis of the Class Scheduling Process

Organizational inputs are converted to specified outputs through processes. Analyzing processes is fundamental to understanding and improving them to ensure customers' needs are met as effectively and efficiently as possible. This case study analyzed the class scheduling process. Its design reflects the basic elements of the performance improvement process described in Figures 3 through 5, albeit arranged somewhat differently as dictated by the present performance problem. The study consists of two distinct phases; the details of Phases I and II are depicted in Figures 6 and 7, respectively.

Phase I initially began as a school project for the purpose of documenting, in sequence, the existing cross-functional work activities (*actual state*) in an effort to *understand* the process. Phase I of the performance improvement effort was triggered by the sponsor who, along with other faculty and staff, recognized the school's class scheduling process was operating subpar. (For the purpose of this study, faculty is considered the teaching body of the school and staff refers to the administrative force

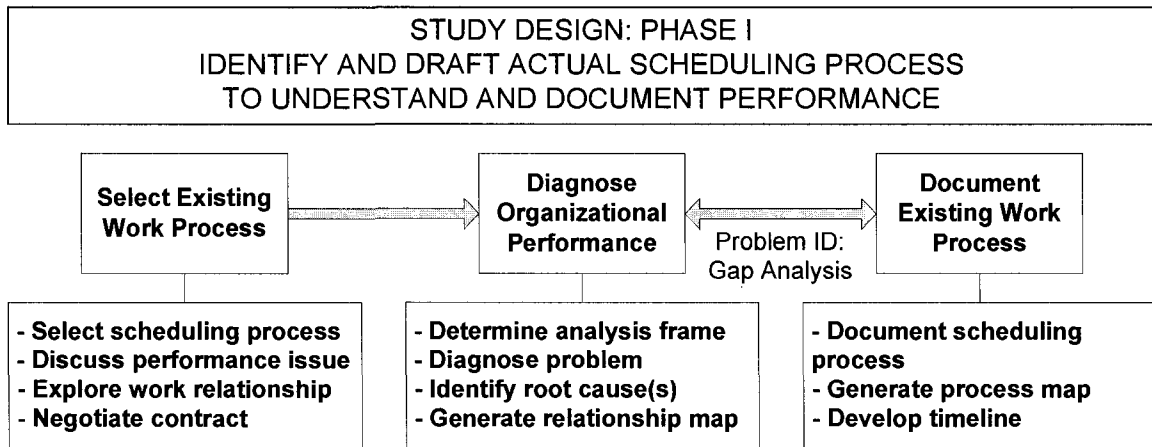


Figure 6.

Study Design: Phase I

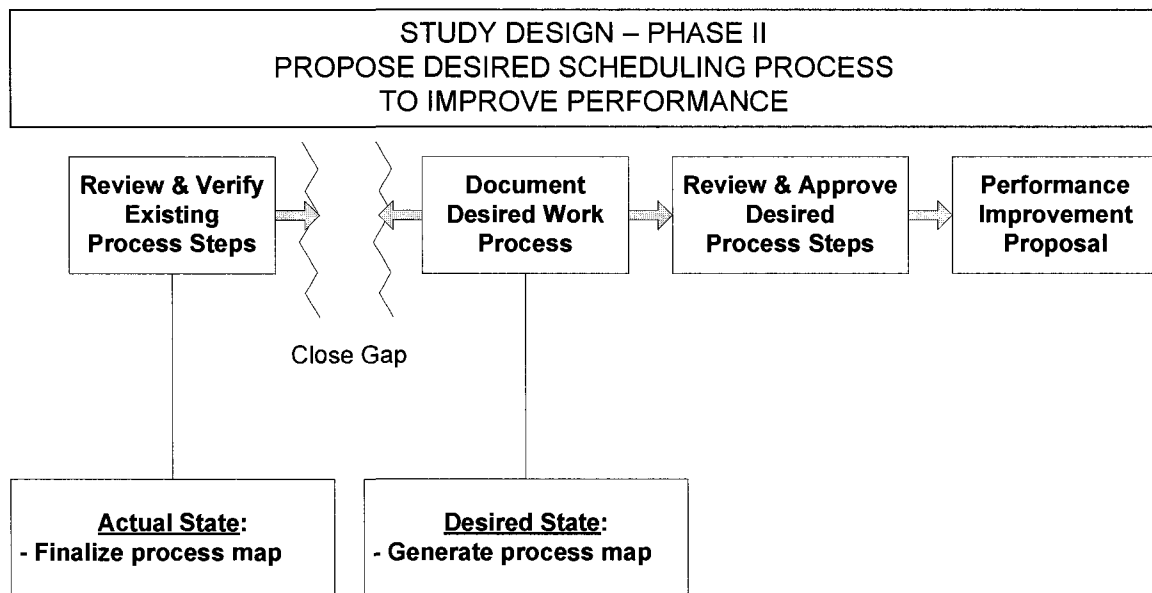


Figure 7.

Study Design: Phase II

including individuals in learned professions.) Omission of a course(s) from the final class schedule occurred from time to time, but nobody understood why. Moreover, few individuals in the school knew how courses were scheduled. A preliminary meeting was held with the sponsor at the end of the spring semester 2006 to discuss the school project. This helped to classify the type of performance issue as a *present performance problem*, whereby the output sometimes fell short of expectations (Swanson, 2007). Mutual agreement between the sponsor, the school's Interim Director, and the researcher was reached to focus the analysis on documenting class scheduling to "see the work flow—how the work gets done" (Rummler & Brache, 1990, p. 17). Exploration of study parameters and means of gaining access to data sources ultimately led to introductions to key informants within the school directly following the meeting.

Phase II of the study verified the preliminary work from Phase I and considered the ideal cross-functional work activities (*desired state*) in an effort to *improve* the work flow. Specifically, Phase II involved reviewing and verifying the existing work activities documented in Phase I and their sequence with primary stakeholders. This step inherently made public within the school the findings reached thus far in the study, which helped faculty and staff reflect on the way their work currently gets done and plan for possible future changes. Phase II also entailed documenting the desired work activities within and across functional boundaries. Moving from the actual state to a desired state will help improve the class scheduling process by narrowing the performance gap with the ultimate aim of increasing customer satisfaction (Rummler & Brache, 1990, p. 49; Swanson, 2007, p. 104).

Figures 8, 9, and 10 illustrate the multiple methods of data collection and analysis for Phases I and II. Moreover, the three figures outline the appropriate inputs, research methods, and outputs at each of the three performance levels. The format of Creswell and Plano Clark's (2007) visual diagrams, which were used to illustrate the procedures, methods, and products of mixed methods studies, was taken to create Figures 8, 9, and 10. Moreover, Morse's (1991) notation system was adopted to indicate the relative importance of the multiple methods research design (in Creswell & Plano Clark, 2007, p. 41). Primary emphasis has been given to collecting and analyzing data at the process level, which is indicated with uppercase letters (i.e., QUAL). Secondary emphasis has been given to the methods at the organizational and job levels, which were studied for contextual purposes and therefore represented by lowercase letters (i.e., qual).

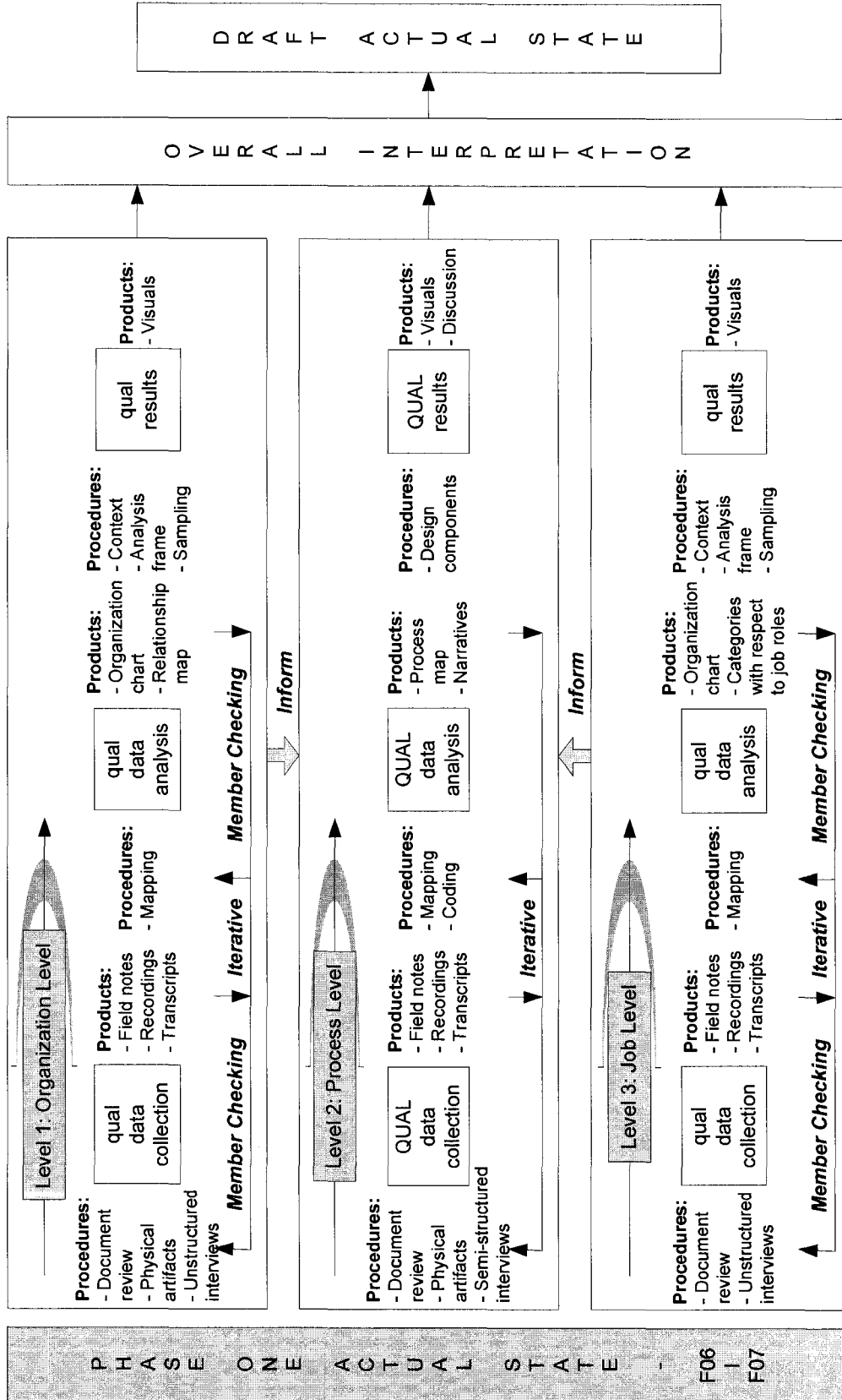


Figure 8.

Phase I – Draft Actual State (Process Analysis)

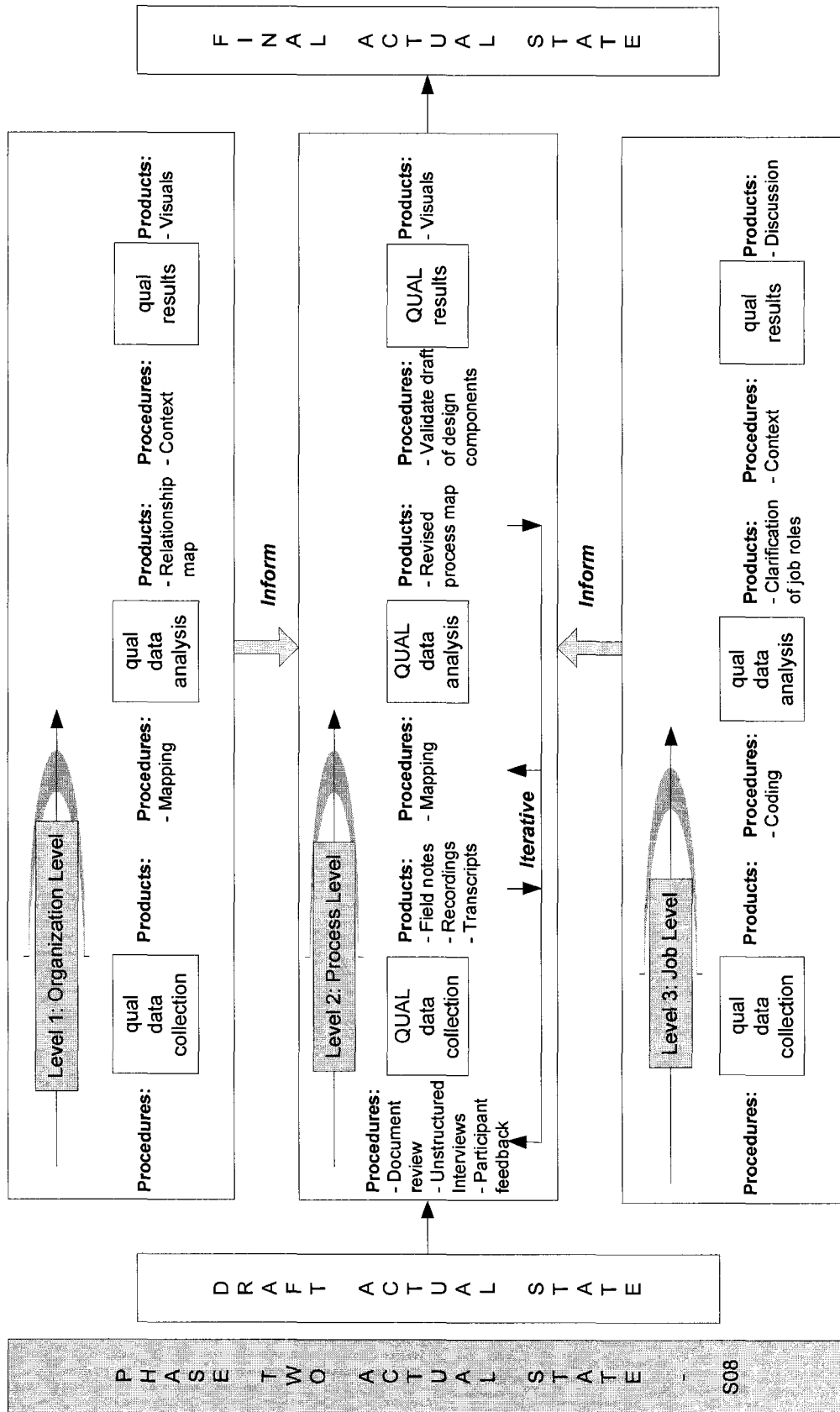


Figure 9.

Phase II – Final Actual State (Process Verification)

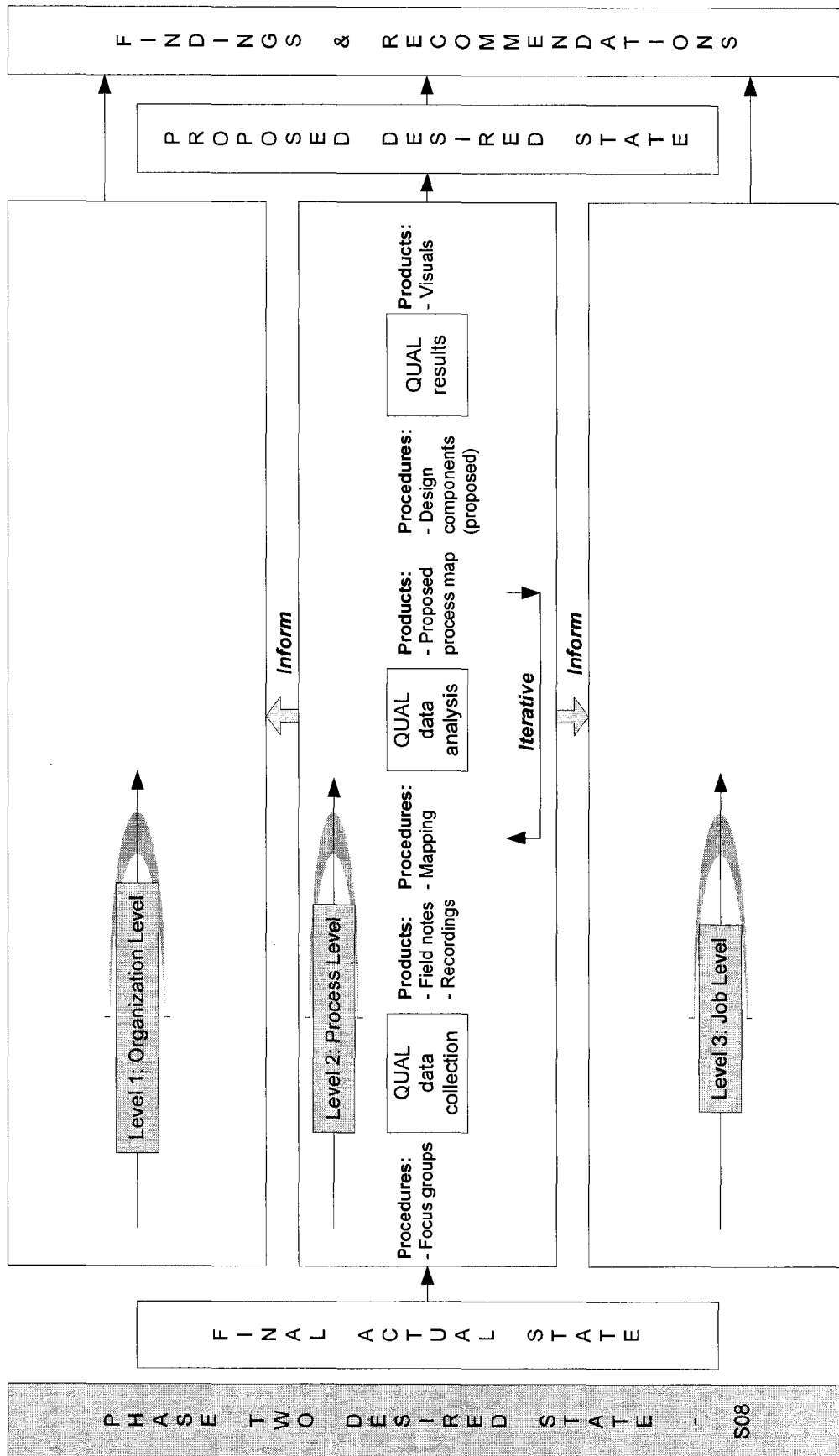


Figure 10.

Phase II – Proposed Desired State (Process Synthesis)

Performance Improvement: Case Study Design

The case study was selected as an appropriate research design to address the specific aims of the study: initially explain how class scheduling is actually carried out, increase the understanding of the process, and subsequently explore the possibilities for improvement. Rummler and Brache (1990) stress performance improvement can only occur if the way work actually gets done, as opposed to how it is supposed to get done, is initially understood. One rationale for choosing the case study as a research strategy is its strength with respect to capturing complexity. The second rationale is it meets Yin's (1989) three case study selection criteria: (a) a "how" or "why" question is being asked, (b) the set of events is contemporary, and (c) the investigator has little or no control over the situation (p. 20). The last rationale for selecting the case study is it closely resembles the strategy a performance consultant might follow when conducting a SWOT (strengths, weaknesses, opportunities, and threats) analysis. Both are investigative by nature, requiring multiple sources of data, and are flexible yet systematic.

The focus of this study, or *case*, is the process of class scheduling by one school in a higher education setting. Class scheduling represents a single case because it is just one of many processes carried out at this particular location. Stake (1995) suggests a case is any unit of research including processes that can be defined as a coherent entity (in David, 2006). A cross-section of a three-dimensional 3x3 matrix or cube, Figure 11, indicates the analysis frame and subsystem boundaries of the class scheduling process. The Three Levels Framework helps to isolate a process for the purpose of analysis by differentiating process-level design components (Level 2, *crosshatched box*), which is the focus of this study, from the organization- and job/performer-level design components

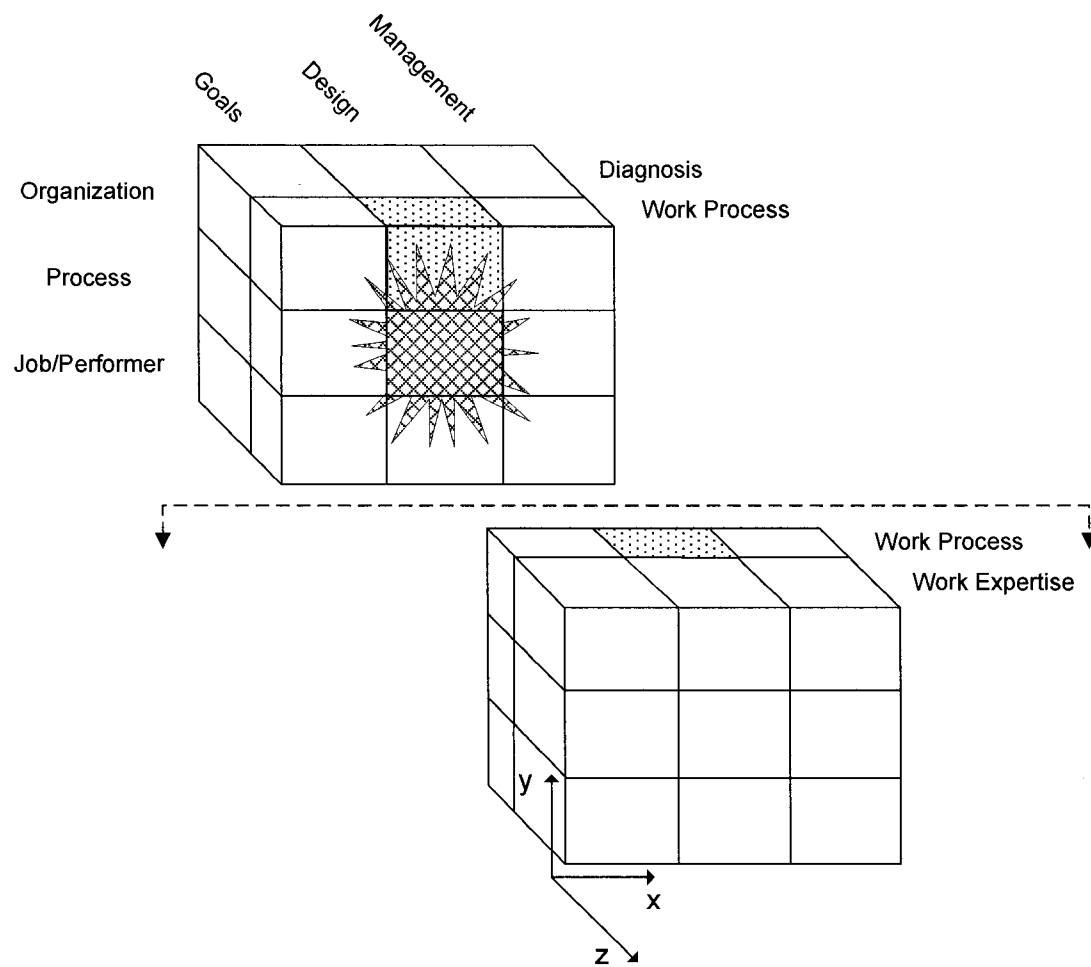


Figure 11.

Analysis Frame and Subsystem Boundaries of the Class Scheduling Process

(Levels 1 and 3, respectively). Stake (1995) reminds us, "any such 'bounded system' can never be seen as wholly separate from the context of which it is a part" (in David, 2006, p. xxv). Indeed, Level 1 provides the context in which the case is situated (*dotted box*), and Level 3 comprises individuals who are ultimately responsible for the scheduling process (throughput) and obtaining the expected results. Hence, the starburst effect is displayed on the boxes adjacent to the Level 2 box to highlight the somewhat porous boundaries.

Information may be collected from one of the three levels at any point in time. However, it is customary to begin with a macro perspective (Level 1) and work toward a micro perspective (Level 3) as needed to analyze a performance problem or opportunity. Figure 12 offers an alternative representation to Figures 8 to 10 and highlights the multi-level design of the study.

Obtaining a thorough understanding of any process entails learning more than simply who is involved and to what extent, answers to which could be obtained using survey techniques. It also necessitates going beyond describing the various work activities. Gaining such insights require tracing the sequence of work activities over time as well as identifying the critical interfaces, which exist in the white space on an organizational chart (Rummler & Brache, 1990). Once an accurate interpretation of the way work actually gets done is made, usually via multiple methods of data collection and analysis, recommendations on possible approaches to improving class scheduling may be provided.

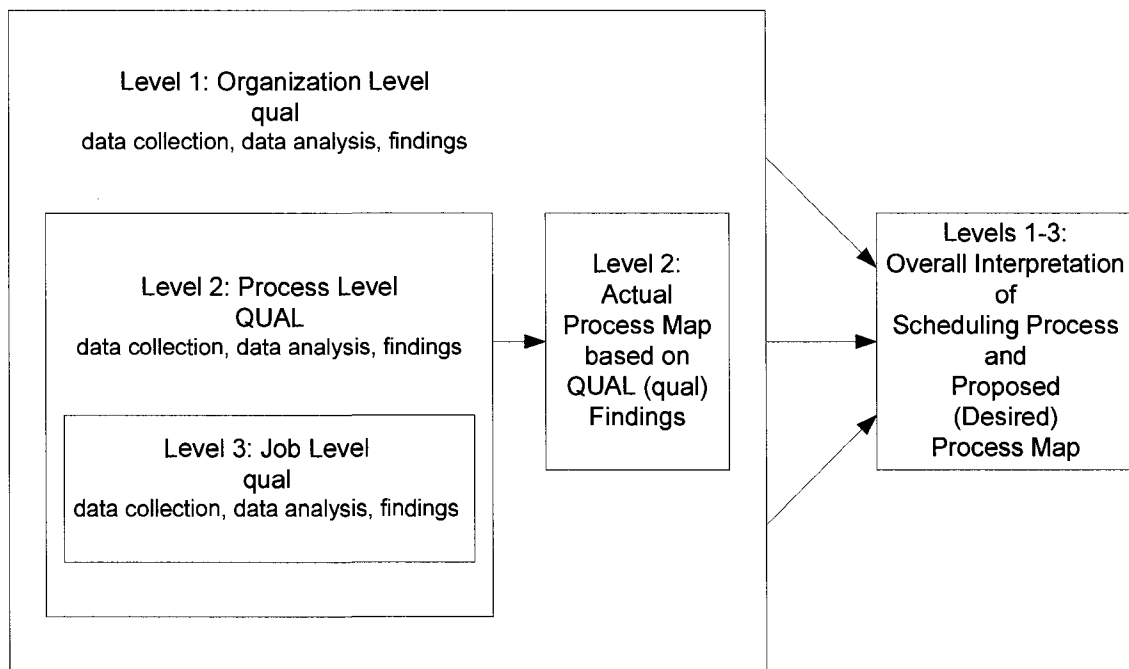


Figure 12.

Case Study Design

Site and Participants

Physical Setting

The study was situated within a school that is a part of a leading institution of higher education and research located in the western region of the United States. The university offers a broad range of academic programs for undergraduate, graduate, and professional students both on and off campus through its eight colleges. Each school or department within a college specializes in particular areas of study in a variety of disciplines and offers instructional courses that are of interest to students studying in such fields. The school where this study took place hosts options for students interested in educator licensing, graduate degree programs, and professional development.

Participants

The theoretical population of participants of interest included all teaching faculty affiliated with the university. Teaching faculty were employed by the university in a variety of capacities: full-time, tenured; full-time, tenure-track; full-time, temporary; full-time, special; part-time, temporary; part-time, special; and graduate teaching assistants. The theoretical population also included all staff employed by the university who provided leadership and/or support services. Participants included male and female adults.

The accessible population comprised certain faculty and staff with offices at the school. Specifically, this included full-time faculty who were tenured, tenure-track, temporary, and special, as well as full- and part-time staff who were thought to play a role in class scheduling. Part-time faculty were not considered because of the variability in their appointments including length of contract and work location.

A combination of strategies of purposeful and theoretical sampling of the school's faculty and staff as opposed to probability sampling was thought to be most appropriate for studying the performance issue under examination. Merriam (1998) suggests two levels of sampling for a case study: "'the case' to be studied" must first be selected (p. 65), and sampling within the case must then be done. In the present study the case was decided upon entry (i.e., class scheduling). Within-case sampling was then considered. Miles and Huberman (1994) describe within-case sampling as being (a) nested, (b) theoretically driven, and (c) iterative. As regards the first point, class scheduling was performed by employees within functions within a school within a college, and so forth. In reference to the latter two points, theoretically driven and iterative approaches to data collection tied in well with the performance improvement process. "Sampling is investigative; we are cerebral detectives, ferreting out answers to our research questions" (Miles & Huberman, 1994, p. 29). Erickson (1986, as cited in Miles & Huberman, 1994) describes a funneling sampling sequence, working from the outside into the core of a setting, which is analogous to both the analysis frame depicted in Figure 12 and the data collection methods discussed below.

Phase I (Fall 2006 - Fall 2007).

The accessible population was 38 individuals: 18 full-time, tenured (including Coordinators, Program Chairs, Program Directors, and 2 Interim Directors sequentially in the same position, jointly referred to as Leaders) and tenure-track faculty, 11 full-time, temporary and special faculty, and 9 full- and part-time staff.

In the beginning of Phase I (Draft Actual State, Fall 2006), 2 key informants (n = 2) were initially chosen on the recommendation of the initial contact (and expert; Leader)

(reputational case selection [Goetz & Lecompte, 1984, as cited in Merriam, 1998]) to provide a general sense of the performance issue and context. Diagnosing the performance issue then required opportunistic sampling (Kuzel, 1992; Patton, 1990 in Miles & Huberman, 1994) to follow new leads and take advantage of the unexpected while gaining familiarity with the case (n = 4).

Subsequently in Phase I (Draft Actual State, Spring 2007 to Summer 2007), 22 faculty and staff from the three different areas of study and administration were invited to be interviewed to gain an understanding of the process-level design components. Convenience sampling was initially used across functions to begin documenting class scheduling as it actually occurs by conducting semi-structured interviews. Sampling was theoretically driven within functions as information continued to be gathered through semi-structured interviews. The sample continually emerged throughout Phase I as the need to drill down increased. Sampling proceeded until saturation was reached (Lincoln & Guba, 1985 in Merriam, 1998, p. 64) (n = 20).

In Fall 2007, a second meeting took place with one of the Leaders from the school (n = 1) to report on the status of the project. The conversation was recorded to capture salient points. The initial meeting with this same person occurred a year earlier.

Phase II (Spring 2008).

The accessible population was 42 individuals: 20 full-time, tenured (including Coordinators, Program Chairs, Program Directors, and one Director, jointly referred to as Leaders) and tenure-track faculty, 9 full-time, temporary and special faculty, 12 staff, and one external staff member knowledgeable about class scheduling. A letter of agreement from the school was obtained prior to recruiting any participants.

During Phase II (Final Actual State, Spring 2008), faculty and staff affiliated with the school were contacted as needed to review, update, and/or clarify data collected during Phase I and draft process maps of the actual state of class scheduling. Unstructured interviews were conducted according to the same theoretically driven sampling strategy used earlier. Informal discussions with faculty and staff focused on specific areas of class scheduling still in need of clarification rather than on the class scheduling process in general. In addition to conducting unstructured interviews, participant feedback was sought. Draft process maps showing how class scheduling is currently carried out were sent to every participant on-site in the accessible population. This gave faculty and staff within the school an opportunity to review and comment on these and other draft materials. The draft process maps of the actual state were revised based on participants' feedback and ultimately finalized.

Later in Phase II (Proposed Desired State, Spring 2008), primary stakeholders were targeted and invited to come together to share their experiences with class scheduling and provide suggestions to improve the process. Focus group participants were selected according to certain criteria including their knowledge of the process. Another aim was to select representatives from each of the different functions and hierarchical levels, such as the Program Directors, Program Chairs, and key staff directly involved in class scheduling. The number of participants was limited to 8 for each of the two focus groups to ensure an effective group discussion. Feedback was synthesized following the focus groups to formulate an improved class scheduling process. This information was depicted in process maps and timelines, which were included in the performance improvement proposal.

Data Collection

A major strength of the case study design is it permits the researcher to use a variety of sources, data collection strategies, and types of data as part of the investigation. Different sources of data offer information from a wide range of perspectives that incorporate all factors likely to bear on achieving an effective solution to the performance issue under examination (Stringer, 2007). Moreover, multiple method research and data types allow *how* and *why* questions to be answered (Yin, 1989). Such considerations were given in designing the present study to analyze work flow as it occurs naturally in a dynamic, complex system.

Table 1 summarizes the phases of the study, the timing of data collection, the data sources, the data collection methods, and the data types. Data collection from a variety of different sources using several research strategies is described. In addition to document reviews and field notes, a combination of three types of interviews was utilized in the study. They progressed from an unstructured format to a more structured format with individuals in Phase I and finally to group interviews in Phase II based on the need to delve deeper, reflect, and confirm findings. The option to meet with individuals as needed to obtain information and/or clarification was incorporated in the design of the study. Individual and group interviews are possibly the most widely used data collection technique in organizational development (Cummings & Worley, 2004); they help capture the very essence of a performance issue.

Table 1.

Overview of Data Collection

Phase	Timing	Data Source	Method	Data Type
Phase I & Phase II	F06-S08	<u>Public Records</u> - Web sites <u>Physical Artifacts</u> Brochures Course bulletins <u>Internal Records</u> - Email correspondence - Procedures - Reports - Meeting minutes	· Document Reviews	Qualitative - text - diagrams - flowcharts
Phase I	F06	<u>Staff</u> Reputational Sample (n = 2) <u>Directors</u> Opportunistic Sample (n = 4)	· Unstructured, One-on-One Interviews (8 total) (45 minutes – 1 hour) · Meeting (1 total)	Recordings (4 total) Qualitative - text - flowcharts - maps
Phase I	S07-Su07	<u>Faculty and Staff</u> Convenience Sample, Theoretical Sample (n = 20)	· Semi-Structured, One-on-One Interviews (20 total) (30 minutes – 1 hour) · Meeting (1 total)	Recordings (21 total) Qualitative - text - maps
Phase I	F07	<u>Leader</u> (n = 1) Convenience Sample	· Meeting (1 hour)	Recording Qualitative
Phase II: Actual	S08	<u>Faculty and Staff</u> Theoretical Sample (Est. n ≤ 15)	· Unstructured, One-on-One Interviews (45 minutes – 1 hour)	Recordings Qualitative - text - maps
Phase II: Actual	S08	<u>Faculty and Staff</u> Criterion Sample (Est. n = 41)	· Participant Feedback	Qualitative - text - maps
Phase II: Desired	S08	<u>Faculty and Staff</u> Criterion Sample (Est. n ≤ 16)	· Focus Groups (≤ 1 hr 30 min ea.)	Recordings Qualitative - text - maps
Phase I & Phase II	F06-S08	<u>Informal Documents</u> Document Summaries Interview Notes Focus Group Notes	· Field Notes	Qualitative - text - flowcharts - maps

F=Fall, S=Spring, Su=Summer; 06=2006, 07= 2007, 08= 2008

All interviews followed a similar procedure. Faculty and staff were contacted individually and briefed about the study so that arrangements to meet could be made accordingly for those who chose to participate. Interviews were conducted during standard business hours on-site in participants' offices, or other mutually acceptable locations, free from distractions. Before the interviews, participants were asked for their permission to record the sessions and assured the information they shared would be aggregated to protect confidentiality. To prevent anyone outside of the interviews from knowing who provided what information, participants were identified by numbers (e.g., Participant 1) that were assigned sequentially by the researcher. During the study, a list that links participants' names to these numbers was maintained to ensure confidentiality of the participants and that the research records were complete. The list was kept separate from the research records. Following the interviews, recordings were transcribed using a transcription machine. Tapes, original transcripts, and computer files of the transcripts were stored in a safe place off-site. Upon completion of the study, the list and tapes were destroyed.

Field notes that resulted from document reviews as well as informal and formal dialogue with participants were maintained throughout the study. These notes were taken while gathering data to log procedures and document personal thoughts and follow-up questions for participants. The notes aided the researcher in remembering key points and facts as well as organizing thoughts and reflections. Field notes were handwritten and electronically generated.

Phase I (Fall 2006 - Fall 2007)

Document reviews.

In Phase I of the study (Draft Actual State, Fall 2006 to Fall 2007), documents were preliminarily reviewed to collect diagnostic data about the school in an unobtrusive manner. Specifically, documents were reviewed for the purposes of understanding the context (*levels 1 and 3*) in which class scheduling (*level 2*) operates and determining the analysis frame of the study. At the organizational level (*level 1*), public records from the school's Web site, physical artifacts (e.g., program brochures), and internal records (e.g., organizational procedures) were sought to identify functions and their academic programs of study and related courses. At the job/performer level (*level 3*), similar records were sought to identify employees, their positions, and vertical reporting relationships. Documents including email correspondences and class schedules were also gathered as a result of some of the interviews. This information helped set the stage for further analysis by means of interviews.

Unstructured, one-on-one interviews.

In Phase I of the study (Draft Actual State, Fall 2006), two unstructured, one-on-one interviews were conducted with key staff ($n = 2$) who could provide a general overview of the school, its functions, and the current class scheduling process. These were followed by a meeting ($n = 1$) and six additional interviews ($n = 3$) with 4 different Leaders; four interviews were recorded for subsequent transcription. Two visits were required in two instances given the complexity of the participants' roles to ensure the information they shared during the interviews was adequately covered and verified. Leaders were able to provide needed clarification about the information obtained through

unobtrusive measures. Moreover, they provided additional insights about their particular functions in addition to the respective academic programs of study and course offerings. Interviews were limited to one hour.

Draft organizational charts and relationship maps of the actual state were also reviewed with participants and checked for accuracy at this time. Not only are research diagrams an effective tool for conveying thoughts, actual or perceived, to others, they have the added benefit of serving as stimulus materials in interviews. This process of graphic elicitation might have encouraged contributions from participants that may not have otherwise been obtained (Crilly, Blackwell, & Clarkson, 2006).

Semi-structured, one-on-one interviews.

In Phase I of the study (Draft Actual State, Spring 2007 to Summer 2007), semi-structured, one-on-one interviews were chosen to allow for (a) direct questioning as regards scheduling; (b) clarification of job roles and work activities related to scheduling, as needed; (c) further probing of performance issues; and (d) exploration of new issues as they emerged during the interview. A predetermined list of open-ended questions was prepared in advance of the semi-structured interviews and is provided in Appendix A. The questions were formulated from a systems theory perspective with the Three Levels Framework in mind (Rummler & Brache, 1990; Stolovitch, 1999). The list included 13 primary questions and several secondary questions and was arranged into three sections: section 1 covered background information, section 2 focused on class scheduling, and section 3 allowed participants an opportunity to express their views about how the process currently functions and how it could possibly be improved. The questions in section 2 were aimed at process-level design components and arranged according to

inputs, throughput (i.e., employees' respective work activities), and outputs. This method of organization was intended to facilitate data analysis through mapping and coding techniques.

Twenty-two faculty and staff were sent invitations for interviews. Twenty semi-structured interviews were held with 20 participants ($n = 20$); lasting 38 minutes on average, ranging from 20 to 60 minutes in duration depending on the informants' level of involvement with scheduling and thus the need for in-depth questioning. At a minimum, interviewees were asked the same set of predetermined questions listed in Appendix A, although the order varied somewhat depending on the direction each discussion took. Participants were asked additional probing and explorative type questions based on the nature of individual responses to the predetermined questions. The 20 semi-structured interviews were recorded for subsequent transcription. One additional visit was made with one of the participants to observe a training session on computer entry related to class scheduling using a new system. The meeting lasted one hour and was recorded for future reference, if needed.

Phase II (Spring 2008)

Document reviews.

In Phase II (Final Actual State and Proposed Desired State, Spring 2008), internal records, such as email correspondences, reports, and meeting minutes, were collected as needed for both decision making purposes on sampling and as an evidential trail leading to the final performance improvement proposal. Information pertaining to the status of faculty and staff, whether full- or part-time employees in administrative, permanent, or temporary positions, for example, were obtained to determine an appropriate sampling

strategy for the two focus groups. During and after the interviews, evidence in the form of email correspondences, lists of course offerings, and the like were requested from participants to document work flow.

Unstructured, one-on-one interviews.

In Phase II (Final Actual State, Spring 2008), unstructured one-on-one interviews were conducted similarly as before where faculty and staff could review and/or clarify information and fill in any existing gaps related to Phase I. Signed informed consent were obtained from individuals selected to participate prior to conducting the interviews, which were limited to one hour. Interviews were recorded for subsequent transcription. Copies of transcripts were hand delivered to respective participants to check for accuracy.

Participant feedback.

In Phase II (Final Actual State, Spring 2008), every participant on-site in the accessible population were provided with copies of the draft process maps and other related materials and asked to check them for accuracy. Individuals received invitation letters and the draft documents via email and in their mailboxes. They were instructed to return their signed informed consent forms if they chose to participate in the study and submit any comments to the researcher either via email or by returning the marked up draft documents directly. Review and verification of the draft documents including the draft process maps of the actual state were estimated to take about 15 minutes. These materials were revised based on participants' feedback and ultimately finalized, such that the work activities and their sequence reflected a realistic view of how class scheduling currently operates within the school.

Focus groups.

In Phase II (Proposed Desired State, Spring 2008), two focus groups, each having a maximum of 8 participants, were conducted. The primary objectives of the focus groups were to verify the draft materials pertaining to the actual state and generate ideas about ways in which class scheduling could be improved. Participants selected to take part in the focus groups received invitation letters via email and in their mailboxes. Attempts to accommodate and coordinate everyone's busy schedules were made. The draft process maps and other related materials intended for the 41 faculty and staff were sent out at least a week in advance of the focus groups for the participants to review.

Prior to a focus group, participants who did not return their signed informed consent forms were asked to arrive at the focus group early to do so. At the beginning of each focus group, the researcher made several introductory remarks. These covered the purpose of the study, a basic description of what a focus group is, the process to be followed or specific aims, several housekeeping items (e.g., collect any outstanding signed informed consent forms, mention that participants are free to withdraw from the study and leave at any time, remind participants the group discussion will be recorded), and general ground rules (e.g., ask participants not to reveal personal information about other participants within and outside the focus groups to ensure confidentiality, state participants agree to disagree).

During a focus group, the researcher facilitated the conversation with the assistance of a non-participant. Participants were initially asked to reflect on how class scheduling is currently carried out (actual state) by completing several worksheets related to class scheduling on their own. They were then asked to consider several open-ended

questions related to how class scheduling should be carried out (desired state) and share their thoughts and opinions with the group. To help facilitate the group discussion toward achieving these goals, the worksheets and open-ended questions were developed with three guiding questions in mind. Tenner and DeToro (1997) and Rummmler and Brache (1990, p. 53) suggest asking the following questions:

1. Are any outputs produced that are unaccounted for?
2. Are any work activities performed that are unaccounted for?
3. Is this the most efficient and effective process for accomplishing the process goals?

Following the focus groups, feedback was synthesized to formulate an improved class scheduling process. The draft process maps of the desired state, timelines, and suggestions for improvement were included in the performance improvement proposal.

Validity and Reliability

Developing maps that are useful and meaningful for the purpose of improving performance requires input from a number of faculty and staff associated with class scheduling. To this end, multiple sources of information and perspectives were sought to provide as an accurate account of the process as possible. Member-checking was used in Phase I for the unstructured interviews, where copies of transcripts were made available to participants following the interviews. Additionally, multiple methods of data collection were used in the study. Focus groups were conducted with the specific intent to review the preliminary findings (i.e., draft process maps of the actual state) before final recommendations were submitted for consideration.

The study is a within-case analysis of a single process within one school; as such, the findings are not generalizable to other groups within the field of education. The

methods of the study may be adapted to study class scheduling in other departments across campus at the same university and at institutions of higher education. Moreover, the findings may be viewed as an example of process configuration. Since every organization is different, its processes must be tailored accordingly.

Data Analysis

Data analysis involves filtering all of the information gathered into meaningful bits of data. Both mapping and coding were the primary analytic methods employed such that the recordings and qualitative text collected from multiple sources were turned into useful maps, timelines, and narratives. Process maps and timelines of the actual and desired states of class scheduling answered the first research question and part of the third research question, respectively. Deductive and inductive approaches were used to address the remaining questions in narrative form. The primary output to be expected following data analysis in relation to the research questions is illustrated in Table 2.

Mapping

Data gathered were studied, interpreted, and turned into visual representations of the information. In this way, abstract data were explored and understood and customer-supplier relationships within and among functions were identified.

Levels 1 and 3.

In Phase I (Draft Actual State), data collected from physical artifacts, internal records, and unstructured interviews were used to construct traditional organizational charts. Specifically, the charts summarized the information pertaining to the organization and job/performer levels, such as size, reporting relationships, and functions. The charts in turn aided in creating relationship maps to show critical interfaces among work groups

and identified system inputs and outputs at the macro-level. Relationship maps serve as precursors of process maps following a top down approach consistent with this study.

Table 2.

Research Questions and Primary Analytical Output

Research Question	Analytical Output
1. How does class scheduling operate within the school?	
a. Who is involved?	Actual Process Maps
b. What work activities are undertaken?	Actual Process Maps
c. What is the sequence of related work activities?	Timelines
2. What are the problems associated with class scheduling?	
a. What are the performance indicators?	Narrative
b. What is the performance gap?	Narrative
c. What is the root cause(s) of the performance gap?	Narrative
3. How can class scheduling be improved?	
a. What are the drivers that encourage optimal performance in class scheduling?	Narrative and/or List
b. What are the barriers that impede optimal performance in class scheduling?	Narrative and/or List
c. What recommendations can be made to improve class scheduling?	List Timelines

Level 2.

In Phase I (Draft Actual State), data collected from semi-structured interviews were used to draft process maps of the actual class scheduling process. In the first stage of Phase II (Final Actual State), feedback on the drafts from the faculty and staff was used to finalize the process maps of the actual state in response to the first research question, “How does class scheduling operate within the school?” In the second stage of

Phase II (Proposed Desired State), input from the focus groups was considered in developing process maps of the desired state. These maps addressed, in part, the third research question, “How can class scheduling be improved?” Timelines were also created to address this question. The process maps and timelines were included in the final performance improvement report along with an outline of recommendations.

Coding

Description begins the analytical process of taking apart the raw data and interpretation ends the process through synthesizing the information about the case and the context of which the case is a part. Creswell (1998) utilizes a data analysis spiral to describe the procedures for analyzing qualitative text to produce narratives. The steps to be performed by the research, as they relate to the case study, are summarized below.

1. Managing data: organize data using index cards, binders, and computer files.
2. Reviewing data: read through the data to gather thoughts and a sense of general direction for analysis and develop a tentative list of codes.
3. Memoing: reflect and write notes about key concepts and ideas.
4. Describing data: describe the case under examination within the context of the larger system.
5. Classifying data: begin to take apart text to classify the data by using categorical aggregation and identify patterns of categories as they emerge (Stake, 1995, in Creswell, 1998).
6. Interpreting data: make sense of the information using direct interpretation and develop naturalistic generalizations (Stake, 1995, in Creswell, 1998). The narratives will respond to the second and third research questions; namely, “What are the problems associated with class scheduling?” and “How can class scheduling be improved?” The narratives will accompany the actual and desired process maps in the final report to communicate the findings and recommendations for performance improvement.
7. Presenting data: create visualizations and representations to display information.

CHAPTER 4: FINDINGS

The purpose of this case study was to analyze and map class scheduling by a school in a higher education setting so that the process could be understood, documented, and ultimately improved. Class scheduling is a process through which faculty and staff generate a class schedule. Understanding the performance of a process helps define the work activities and their interrelationships (Tenner & DeToro, 1997). Documenting class scheduling for faculty and staff lends insight about what was done and how it was done. The findings aided in creating several recommendations along with process maps and timelines for developing an appropriate intervention strategy.

Three primary research questions were considered to address the present performance problem.

1. How does class scheduling operate within the school?
 - a. Who is involved?
 - b. What work activities are undertaken?
 - c. What is the sequence of related work activities?
2. What are the problems associated with class scheduling?
 - a. What are the performance indicators?
 - b. What is the performance gap?
 - c. What is the root cause(s) of the performance gap?
3. How can class scheduling be improved?
 - a. What are the drivers that encourage optimal performance in class scheduling?
 - b. What are the barriers that impede optimal performance in class scheduling?
 - c. What recommendations can be made to improve class scheduling?

To answer these research questions, the case study involved gathering information from numerous sources using a multiple method approach. Document reviews, one-on-one interviews, and focus groups were utilized to collect data about class scheduling.

Sample Characteristics and Research Methods

A preliminary meeting was held with the sponsor in June 2006 to discuss a present performance problem involving class scheduling on-site. Phase I initially began in the fall semester 2006 as a school project for the purpose of documenting, in sequence, the existing cross-functional work activities (*actual state*) in an effort to *understand* the process. Data collection continued to the end of the fall semester 2007. Phase II was conducted during the spring semester 2008 to verify the preliminary work from Phase I and consider the ideal cross-functional work activities (*desired state*) in an effort to *improve* the work flow.

The school faced several challenges during this period, one of which involved personnel changes. The characteristics of the accessible population for Phases I and II are summarized in Table 3. At the time of Phase I, the accessible population totaled 38 individuals: 18 full-time, tenured (including Coordinators, Program Chairs, Program Directors, and 2 Interim Directors sequentially in the same position, jointly referred to as Leaders) and tenure-track faculty, 11 full-time, temporary and special faculty, and 9 full- and part-time staff. Fifteen of the 38 faculty and staff in Phase I were male (39%) and 23 were female (61%). At the time of Phase II, the accessible population comprised a total of 42 individuals: 20 full-time, tenured (including Coordinators, Program Chairs, Program Directors, and one Director, jointly referred to as Leaders) and tenure-track faculty, 9 full-time, temporary and special faculty (excluding the researcher), 12 full- and part-time staff, and one external staff member knowledgeable about class scheduling. Eighteen of the 41 individuals from the school in Phase II were male (44%) and 23 were female (56%).

Table 3.

Population Characteristics

Phase (Time)	Full-Time Faculty						Full- and Part-Time Staff		
	Tenured and Tenure-Track (frequency)			Temporary and Special (frequency)			Administrative and Professional (frequency)		
	M	F	Total	M	F	Total	M	F	Total
Phase I (F06-F07)	10	8	18	5	6	11	0	9	9
Phase II (S08)	13	7	20	4	5 ^a	9 ^a	1	11	12
Net Change	+3	-1	+2	-1	-1 ^a	-2 ^a	+1	+2	+3

^a The school had nine temporary and special faculty excluding the researcher.

Before November 2006, the school had a series of Leaders in interim positions and five vacant full-time, tenure-track faculty positions. By Fall 2007, the interim positions were made permanent, two faculty received tenure, five new faculty hires filled vacancies, three tenure-track faculty resigned, and several full-time tenured and tenure-track faculty changed roles and/or took on new roles as Coordinators, Program Chairs, and Program Directors within the school. Moreover, four full-time temporary and special faculty changed positions and three new individuals including the researcher were appointed to temporary and special positions. Several shifts also occurred with full-time staff due in part to transitions occurring within the school itself and also because of initiatives across campus. The integrity of the class scheduling process within the school was seriously tested as the personnel changes were made and many of the programs continued to expand.

Another challenge concerning class scheduling was the school's inherent complexity. The school is but one system in a much larger system or suprasystem (Rummler & Brache, 1990) and operates within the confines of the larger system. Yet, the school has many parts and behaves with apparent autonomy. Class scheduling is one example where the school acts relatively independently to develop its own class schedule. The school and other departments across campus coordinate their class schedules directly at the university level through its support system, which includes the Registrar's Office, and not at the college level. This nested view is illustrated in Table 4, which reveals the school's constituent parts or functions within the real-life context of the university. A participant captured the complex nature of the school with the statement:

We almost are a College with Units, but we're not. We're still a Unit with Programs, and so... We're big; we're complex.

Class scheduling is performed by faculty and staff associated with various functions within the school, which resides within a college. The functions share a common vision and mission but deliver different services according to their individual charters. For example, a function may serve as administrative support for a number of other functions within the school. Other functions exist to serve undergraduate, graduate, and professional students through their academic programs of study, specializations, and/or teacher licensing and credentialing programs. Class scheduling is carried out by the school within and across functional boundaries depending on the different charters and the organizational structure as well as coordinated with the university.

Tables 4 and 5 describe the characteristics of the actual sample for Phases I and II, respectively. Data were collected from faculty and staff representing the three main

functions including individuals with leadership and/or administrative duties who serve everyone. An unstructured interview was also conducted with one participant at the university level (see Table 4).

Phase I (Fall 2006 - Fall 2007)

The multiple methods of data collection and analysis for Phase I are summarized.

Document reviews.

In Phase I of the study (Draft Actual State, Fall 2006 to Fall 2007), the school's Websites, brochures, and course bulletins were reviewed to obtain general information about the school and its academic programs of study and related courses. These types of materials provided background information and contextual insight that began laying the foundation and developing the frame of reference for subsequent research focused on understanding class scheduling.

Unstructured, one-on-one interviews.

In Phase I (Draft Actual State, Fall 2006), 6 participants agreed to meet. Eight unstructured interviews were conducted with 5 participants and one meeting was held with one of the school's Leaders to share information about the project (n = 6). Four of the nine discussions that took place with 2 school Leaders were recorded and transcribed. The interviews were limited to 1 hour.

Special attention was paid to Educator Licensing and Continuing Education (see Table 4), as these functions coordinate their courses with a multitude of individuals within the school as well as across and off campus. Four of 6 participants were identified as Leaders (i.e., Coordinators, Program Chairs, Program Directors, or the Director) when they were interviewed and could help clarify aspects about the functions as the research

Table 4.

Sample Characteristics by Function and Data Collection Method

1		University		
		College		
		School ^a		
Data Collection	n	Graduate Programs	Educator Licensing	Continuing Education
		Function	Function	Function
		Faculty/Staff n	Faculty/Staff n	Faculty/Staff n
Phase I:				
· Unstructured Interview	(3)	0	1	1
· Meeting	(1 ^b)	0	0	0
· Semi-Structured Interview	(2)	10	5	3
Phase II:				
· Unstructured Interview	(0)	1	1	0
· Participant Feedback	(4)	17	3	2
· Focus Group	(1)	5	2	1

Note: (n) denotes the number of participants with leadership/administrative duties at the school level serving more than one function. These participants may be either faculty (currently teaching courses or not) or staff.

^a Faculty may have appointments in one function but also responsibilities in other functions to teach courses.

^b Researcher met with participant #7 twice to discuss the school project; one of the two meetings was recorded.

Table 5.

Sample Characteristics by Appointment, Gender, and Data Collection Method

Data Collection	Full-Time Faculty						Full- & Part-Time Staff					
	Tenured & Tenured Track			Temporary & Special			Administrative & Professional					
	N	M n	F n	Total n	%	M n	F n	Total n	%	M n	F n	Total n
Phase I:												
• Unstructured Interview	5	0	2 ^a	2	100	0	1 ^a	1	100	0	2	2
• Meeting	1	1 ^b	0	1	100	-	-	-	-	-	-	-
• Semi-Structured Interview	22	6	4	10	91	1 ^c	4	5	83	0	5 ^d	5
Phase II:												
• Unstructured Interview	3 ^e	1	0	1	100	-	-	-	-	0	1	1
• Participant Feedback	41	10	3	13	65	2	4	6	67	0	7	7
• Focus Group	16	1	3	4	80	0	2	2	50	0	3	3

Note: N denotes selected sample; n denotes actual participants; M – Males; F – Females; % – Response Rate.

^a Researcher met with participants #4, #5, and #6 twice for interviews; interviews with participants #4 and #5 were recorded.

^b Researcher met with participant #7 twice (Fall 2006, Fall 2007); the second meeting was recorded.

^c Tape of interview with participant #1 broke; no transcript was available for coding and subsequent data analysis.

^d Researcher met with participant #14 twice, once for an interview and once for observation; both meetings were recorded.

^e Researcher met with participant #2 who is external to the school; interview was recorded.

evolved. One of the 6 participants was male (17% of respondents) and the other 5 were females (83% of respondents) (see Table 5). The number of participants solicited for unstructured interviews in Phase I, the number of participants who took part in the study, and the response rates for the three subgroups are summarized in Table 6.

Table 6.

Participants by Appointment for Phase I: Unstructured Interviews

Appointment	Participants		
	Solicited (N)	Participated (n)	Response Rate (%)
Tenured and Tenure-Track Faculty	2	2	100
Temporary and Special Faculty	1	1	100
Administrative and Professional Staff	2	2	100

General information was gathered about the school, its faculty and staff, the various functions within the school, and class scheduling from the document reviews and unstructured interviews. Field notes were taken as needed during the interviews with faculty and staff for the purposes of recalling information and generating questions to facilitate subsequent interviews. Open-ended questions were primarily aimed at the organizational and job levels to learn as much as possible about the school, its people, and the academic programs of study within each of the functions. Questions about the organization (level 1) uncovered much needed context about the case. Inquiries about who did what (level 3) provided detailed descriptions of participants' responsibilities pertaining to class scheduling. Organizational charts and relationship maps were created following the initial interviews and checked for accuracy during the second visits. The organizational charts and relationship maps are provided in Appendixes B and C,

respectively. This contextual information, in addition to a review of the literature, helped lay the groundwork for developing the list of questions to be used in the semi-structured interviews.

Semi-structured interviews.

In Phase I (Draft Actual State, Spring 2007 to Summer 2007), 20 of 22 participants who were selected responded to the researcher's invitation for an interview (91% response rate overall). Twenty semi-structured interviews were conducted with 20 individuals ($n = 20$); they lasted 38 minutes on average, ranging from 20 to 60 minutes in duration. All 20 semi-structured interviews were recorded for subsequent transcription. One tape broke, which left 19 transcripts available for coding to analyze the data. One additional visit was made with one of the 20 participants to observe a training session on computer entry related to class scheduling using a new system. The meeting lasted one hour and was recorded but not transcribed. Instead, statements from the recording that could possibly inform the case were extracted and made available for data analysis.

Tables 4 and 5 provide sample characteristics by function and appointment, respectively. All three main functions (Educator Licensing, Graduate Programs, and Continuing Education) were represented with participants from each agreeing to be interviewed. Two of 20 participants served all three main functions, and 6 were considered Leaders (i.e., Coordinators, Program Chairs, Program Directors, or Director) at the time of the interviews. Seven of 20 participants were male (35%) and 13 were female (65%). A total of 10 tenured and tenure-track faculty participated in the interviews (91% response rate), 5 temporary and special faculty were interviewed (83% response rate), and 5 administrative and professional staff were included (100% response rate).

The percentages of participants by appointment are 50%, 25%, and 25% for the three subgroups, respectively. The response rates for semi-structured interview participants in Phase I are summarized in Table 7.

Table 7.

Participants by Appointment for Phase I: Semi-Structured Interviews

Appointment	Participants		
	Solicited (N)	Participated (n)	Response Rate (%)
Tenured and Tenure-Track Faculty	11	10	91
Temporary and Special Faculty	6	5	83
Administrative and Professional Staff	5	5	100

The semi-structured interviews involved asking participants a series of predetermined, open-ended questions that were structured to obtain background information about them and their appointments, understand and document class scheduling (level 2), and suggest improvements about the process (see Appendix A). The arrangement of the questions was maintained while transcribing the recorded interviews to facilitate data analysis through mapping and coding techniques. Before the text from transcripts could be analyzed and made into useful maps and narratives, the 20 transcripts were imported into a commercially available computer program. Codes were created so that the data could be aggregated and collapsed.

Primary codes were initially assigned to each of the 13 predetermined, open-ended questions using a deductive approach and are listed in Table 8.

Table 8.

Primary Codes for Qualitative Analysis

Section 1: Background Information

1. Q01 – Years Taught
2. Q02 – Programs Taught
3. Q03 – Outlook

Section 2: Class Scheduling

4. Q04 – Desired State – Purpose
5. Q05 – Desired State – Procedures
6. Q06 – Desired State – Sequence
7. Q07 – Actual State – Inputs
8. Q08 – Actual State – Throughputs
9. Q09 – Actual State – Outputs
10. Q10 – Actual State – Timing
11. Q11 – Actual State – Feedback

Section 3: Recommendations

12. Q12 – Functionality (Current Performance Issues)
 13. Q13 – Suggestions (Future Improvements)
-

The text from the transcripts was then compiled accordingly. For example, all 19 responses (20 transcripts minus the one broken tape) to the first predetermined, open-ended question, *How many years have you taught at this school?*, were combined into one document file coded as, *Q01 – Years Taught*.

Secondary codes were also created using a deductive approach so that excerpts of the data that were linked to specific research questions could be aggregated. In this way,

the researcher could more easily and accurately respond to certain research questions. A list of the secondary codes that was generated is provided in Table 9. The text from the 19 transcripts was then reviewed and coded using the same computer program, and like data were combined into eight document files. For example, one document file included all text related to drivers and another document file contained text related to barriers.

Table 9.

Secondary Codes for Qualitative Analysis

Research Question 1

RQ1 – Actual State – Courses

RQ1 – Actual State – Dates and Deadlines

RQ1 – Actual State – Work Flow

- Work Activities
- Sequence

Research Question 2

RQ2 – Desired State – Performance Indicators

Research Question 3

RQ3 – Desired State – Drivers

RQ3 – Desired State – Barriers

RQ3 – Desired State – Changes

- Past
- Future

RQ3 – Desired State – Suggestions

The predetermined list of open-ended questions, which were asked during the semi-structured interviews, was formulated from a systems theory perspective based upon the Three Levels Framework (Rummler & Brache, 1990; Stolovitch, 1999) to respond to the research questions. The primary codes were created to directly parallel the open-ended questions and indirectly address the research questions. The secondary codes were created to directly respond to the research questions in greater detail. The primary and secondary codes in relation to their objectives are summarized in Table 10.

Phase II (Spring 2008)

The multiple methods of data collection and analysis for Phase II are summarized.

Document reviews.

In Phase II of the study (Final Actual State and Proposed Actual State, Spring 2008), miscellaneous Websites containing class schedules, registration information and dates, payment options, important dates, policies, and procedures were examined to obtain specific details related to class schedule components, dates, and deadlines. These materials were used as needed to identify and describe components of the class schedule and relevant decision points and develop timelines, which could be referenced by faculty and staff after the study.

Unstructured, one-on-one interviews.

In Phase II (Final Actual State, Spring 2008), three participants who emerged as being knowledgeable about class scheduling but had not yet been interviewed were asked to participate. All three participants responded positively, and three unstructured interviews were conducted ($n = 3$). They lasted 45 minutes on average, ranging from 30 to 60 minutes. All three unstructured interviews were recorded, transcribed, and

Table 10.

Research and Interview Questions, Qualitative Codes, and Analytical Output

Research Question	Semi-Structured Interview Question	Data Analysis Code	Analytical Output
1. How does class scheduling operate within the school?	3; 7-11	Q03; Q07-11; Courses Work activities; Sequence Work activities Dates/Deadlines; Sequence	Actual Maps Actual Maps Timelines
a. Who is involved? b. What work activities are undertaken? c. What is the sequence of related work activities?			
2. What are the problems associated with class scheduling?	3; 4-6; 12	Q03; Q04-06; Q12; Performance indicators	Narrative Narrative Narrative
a. What are the performance indicators? b. What is the performance gap? c. What is the root cause(s) of the performance gap?			
3. How can class scheduling be improved?	4-6; 13	Q04-06; Q13 Drivers	List
a. What are the drivers that encourage optimal performance in class scheduling? b. What are the barriers that impede optimal performance in class scheduling? c. What recommendations can be made to improve class scheduling?		Barriers Changes; Suggestions	List List List Timelines

Note: Semi-structured interview questions 1 and 2 provided demographic information.

coded as necessary using several of the primary and secondary codes listed in Tables 8 and 9, respectively. The data were used to supplement the findings to date in response to the research questions. Two of the three participants had appointments within the school and the third person worked off-site with an appointment at the university level (see Table 4). One individual was male (33%) and two were female (67%) (see Table 5). The response rates for unstructured interview participants in Phase II are summarized in Table 11.

Table 11.

Participants by Appointment for Phase II: Unstructured Interviews

Appointment	Participants		
	Solicited (N)	Participated (n)	Response Rate (%)
Tenured and Tenure-Track Faculty	1	1	100
Temporary and Special Faculty	-	-	-
Administrative and Professional Staff	2	2 ^a	100

^a One was external to the school.

Participant feedback.

In Phase II (Final Actual State, Spring 2008), 41 faculty and staff who work on-site were sent packets containing drafts of relationship maps, process maps, and a list of courses offered by the school for review and comment. The relationship maps that were circulated illustrated two of the school's three main functions: Graduate Programs and Educator Licensing. Educator Licensing was further detailed to depict Teacher Licensure given its program complexities. The three relationship maps are provided in Appendix C. A relationship map of Continuing Education was not created as a result of changes that

were made to it and the Division of Continuing Education of the university. The process maps that were distributed included one from the school's perspective and one from a function's perspective. Graduate Programs was chosen as an example to show its break down by programs. Both of the draft process maps represent a macro view of class scheduling and are provided in Appendix D.

The list of courses was drafted and included in the packet for two reasons. First, discrepancies between sources were found while reviewing printed and electronic information that described the various courses. For example, the general course catalog listed a particular course as being offered during the fall semester; whereas, the school's Website specified fall and spring semesters. The general course catalog is said to be the primary source of information about academic programs of study and related courses but refers to secondary sources as points of references for more updated information. The school's Website would be one such example. Problems have apparently arisen in the past, however, when faculty, staff, or students relied solely on the information from one source to plan their lives and/or chart their studies beyond a semester or two. It was mentioned that consequences to students when a course they planned to take is not offered can be significant and even delay their graduation.

So, the only thing that has changed is one of the Doctoral courses that I taught... switched semesters, basically... they re-looked at that as a program.

It wasn't, but I think now it kind of is... Yeh, now, we've sort of been doing this fall, spring offering now.

Second, preliminary findings from Phase I suggested some of the school's courses, such as research methods courses, cut across several academic programs of study, yet none of

the cross-listings were readily available. No one person had a clear picture of the interconnections of courses among the different functions within the school.

We're in charge of staffing (course x), which more sections are using. So, we have (course y) at the Master's level, plus (course x). Some programs are using both courses, some are only using one, but you don't know which one.

In light of these preliminary findings, details concerning all of the courses offered by the school were gathered from the general course catalog, the school's Website, and internal documents and then compiled into one summary document. Details for each course included the course subject code (prefix) and number, year for alternating offerings, semester(s), format for non-traditional courses, and designation for variable credit courses. The summary document displayed these details in a matrix with the course subject codes and numbers listed by row at the left and the academic programs of study identified in columns across the top. The cells provided the remaining details that were considered program specific. The matrix was utilized to identify the relationships between courses and programs; in other words, it provided the school with its first glance of the interconnections of courses among programs within and across the three functions. The summary document of courses with cross-listings was sent to faculty and staff as a draft so that the information could be checked for accuracy. Participants were instructed to mark-up the materials in their packets with their comments and/or corrections. An example of the matrix with course offerings is provided in Appendix E.

Several staff who received packets responded immediately and declined to participate because their job did not involve class scheduling and they knew little if anything about the process. The overall response rate was 63%, which represented 26 of

41 participants who received packets. Several participants returned their packets with comments and/or corrections written on the enclosed materials, while others indicated the information relevant to their programs was accurate. The number of participants solicited, the number of participants who took part, and the response rates for this aspect of the study are summarized in Table 12.

Table 12.

Participants by Appointment for Phase II: Feedback Response

Appointment	Participants		
	Solicited (N)	Participated (n)	Response Rate (%)
Tenured and Tenure-Track Faculty	20	13	65
Temporary and Special Faculty	9	6	67
Administrative and Professional Staff	12	7	58

Focus groups.

In Phase II (Proposed Desired State, Spring 2008), 16 participants who were thought to be involved in class scheduling to varying degrees were sent invitations to attend one of two focus groups. Four individuals responded almost immediately and declined to participate because they either were unavailable to meet on the proposed dates or felt they had very little to contribute in the area of class scheduling. Three other individuals responded but only after the focus groups were held. The dates proposed for the focus groups were near the end of the semester, which made it difficult for some to coordinate with their schedules. Two separate focus groups were held with the remaining 9 participants (56% response rate) in addition to the researcher and an assistant; 5 were involved in the first focus group ($n = 5$) and 4 were in the second focus group ($n = 4$).

The first focus group ran slightly over 1 ½ hours and the second focus group lasted 1 ½ hours. Both group discussions were digitally recorded and available for playback as needed.

Table 4 provides sample characteristics by function. The selected sample from the school was chosen to include faculty and staff by appointment as well as from each of the three functions plus the centralized administrative support function. This was because class scheduling is carried out within and across functional boundaries. This goal was achieved despite the response rate. Faculty and/or staff from the various functions (Educator Licensing, Graduate Programs, Continuing Education, and Centralized Administrative Support) attended one of the two focus groups. Four of the nine participants were identified as Leaders (i.e., Coordinators, Program Chairs, Program Directors, or the Director) at the time the focus groups were held. One of the participants was male (11%) and 8 were female (89%).

Table 5 provides sample characteristics by appointment. A total of 4 tenured and tenure-track faculty (80% response rate), 2 temporary and special faculty (50% response rate), and 3 staff were included (43% response rate). Although this latter subgroup received 7 of 16 invitations (44%), 3 staff attended. Two of 4 staff who did not attend declined because they were not involved with class scheduling. The informed consent form clearly guided individuals not to take part in the study if they had no knowledge about class scheduling. Although this stipulation contributed to a lower than expected response rate, it allowed for rich dialogue among the attendees. The other two staff were not available to attend either of the two focus groups. The response rates for focus group participants in Phase II are summarized in Table 13.

Table 13.

Participants by Appointment for Phase II: Focus Groups

Appointment	Participants		
	Solicited (N)	Participated (n)	Response Rate (%)
Tenured and Tenure-Track Faculty	5	4	80
Temporary and Special Faculty	4	2	50
Administrative and Professional Staff	7	3	43

Class Schedule Components

Information about academic programs of study and their associated instructional courses is readily available to faculty, staff, and students through the university's general course catalog (print and online versions). Class schedules (online for summer, fall, and spring; also print for summer) indicating when and where to attend particular classes, for example, are also available. Class schedules are important to faculty, staff, and students so that everyone can plan their daily and future activities. Table 14 lists the types of information found in the general course catalog and a class schedule.

Course Information

The general course catalog is a valuable resource for obtaining information about courses in the various programs. Table 14 lists several course components useful to faculty, staff, and students, such as subject code, number, and title. The school selected eight subject codes to group its courses by program. Table 15 presents the eight subject codes and programs. The course number indicates the content level of material presented in a course. Table 16 provides the four ranges of numbers and respective content levels. Courses vary in scope of related work and are assigned credits accordingly. For example,

credits for a lecture-laboratory-discussion combination may be distributed differently than credits for a recitation. The State sets forth minimum requirements to be met as regards the number of course credits. Courses also vary according to the frequency in which they are offered. Some courses may be offered every year and others in alternating years. Courses may be held during the fall (F), spring (S), and/or summer (Su) semesters. Lastly, course prerequisites are provided in the general course catalog and are enforced for undergraduates, thus preventing their registration if not met.

Table 14.

Class Schedule Information

Information	Course (General Course Catalog)	Class (Class Schedule)
Course Components	Course Subject Code Course Number Course Title Course Credits Year: Alternating Offering Semester Course Prerequisites ^a Non-traditional Offering ^b	Course Subject Code Course Number Course Title Course Credits Year: Alternating Offering Semester Course Prerequisites ^a
Class Components		Course Reference Number Section Number Enrollment Restrictions Date (MM/DD) Day(s) Time Location (Classroom) Enrollment Cap ^c Instructor

^a Prerequisites must be met prior to registering for a specific course.

^b Courses may be offered using non-traditional formats (e.g., online), often at a distance.

^c Enrollment capacity may be restricted by classroom/laboratory capacity.

Table 15.

Course Subject Codes

Course by Program	Subject Code
Adult Education and Training	EDAE
Career and Technical (Vocational)	EDCT
Community College Leadership	EDCL
Counseling and Career Development	EDCO
Educator Licensing ^a	EDUC
Higher Education	EDHE
Organization Performance and Change	EDOD
Research Methodology	EDRM

^a Educator Licensing includes a breadth of education courses often not specific to a given program area but to the school.

Table 16.

Course Number by Content Level

Course Number	Content Level – General Guidelines
100-299	Lower Division
300-499	Upper Division
500-699	Graduate I
700-799	Graduate II

Class Information

The information about courses found in the general course catalog and described above is also contained in a class schedule. Additionally, when courses are offered, enrollment restrictions, (classroom) locations, enrollment capacities, and the names of instructors are provided. Table 14 lists the class schedule components, which will be discussed further in the next section on decision points for class scheduling.

Responses to Research Questions

1. How does class scheduling operate within the school?

We have so many courses; we have so many instructors, sort of moving in and out; time changes... As soon as I get those comments and those kinds of emails, I send them immediately. I don't sort of put them in a file and do them on Fridays at 10:00am; I do them immediately to expedite.

The first primary research question posed three sub-questions. These included:

- a. Who is involved?
- b. What work activities are undertaken?
- c. What is the sequence of related work activities?

a. Job performers?

The findings suggest everyone was involved in class scheduling to varying degrees with the exception of a few staff, whose jobs did not entail performing any part of the process. Faculty were either directly or indirectly involved in the process depending upon their appointment and type of decision-making that took place.

Ultimately, faculty who taught knew what they were teaching, and when and where to go even if they learned this information days before classes began. Staff were typically involved in the process if they provided direct administrative support to Leaders or were responsible for handling specific aspects of class scheduling.

Direct involvement included all Leaders of the school who had program and staffing responsibilities. The drafts that initiated the process were sent to the school's Main Office, where personnel in turn distributed them to the different functions for review. The Coordinators and Program Directors then sent the drafts to their respective Program Chairs. Each Leader responded to the drafts accordingly with any comments. Direct involvement also included other faculty who actively took part in deciding the

courses (and sections) they taught. The nature of deciding who taught what varied among programs for several reasons including a Leader's need to become familiar with the program after having stepped into a new role, the size and/or complexity of a program, the number of courses (or sections) specific to a program, and a Leader's style.

But, even since I first came on board, everyone has had an opportunity to negotiate or try to promote themselves into a class that they would really love to teach. So someone could come and say, "you know, I've been teaching such and such for a long time but I've always wanted to teach X".

The schedule is totally dependent upon my call, and the faculty are (told what they will be teaching) accordingly.

Indirect involvement included faculty who taught but did not participate in any decision-making. The extent of participation varied among faculty. Reasons for the variation were divided into four categories: default; seniority; ownership; and Leader's style, as mentioned above. The term ownership was used two different ways in conversations held with participants. In one sense, the word meant a faculty member was responsible for managing a course that cut across more than one program. In another way, the word implied a faculty member felt entitled to continue teaching a particular course because of time spent developing it, a long history in doing so, and/or expertise.

- Default:

I'm not really sure how the behind the scene decisions are made about who teaches what and again, a lot of mine are by default, so they just pencil my name in and assign me to the classes.

- Seniority:

I remember when I first started... I was basically told then that because I was new I just had to take whatever section that people who had taught it before didn't want.

Seniority, I guess, used to determine that. I don't know how that's happening now because there's really not much seniority left.

- Ownership:

A lot of classes don't have ownership like all of mine do.

I think in our school some people make assumptions that this is my course and I'm the only one who will teach it.

Other examples of indirect involvement were faculty who did not teach a particular semester and as a result, were not involved in the process at the time. In settings of higher education in general, as is the case in most other types of organizations, faculty may take leaves of absences depending on their individual circumstances or they may be granted sabbaticals. Faculty may also shift a percentage of their teaching responsibilities to other areas including advising, scholarship, and service depending on their contractual obligations. Regardless of the situation, an absence or change in teaching responsibilities required some changes to the class schedule depending on what was negotiated.

b. Work activities?

Work activities are the process steps taken by faculty and staff within the school to transform information from various sources into a class schedule. A bird's-eye view of class scheduling suggested an efficient and effective process. The draft process maps of the actual state were revised with input from faculty and staff to include important dates and deadlines for developing the fall and spring class schedules (see Appendix F).

Process Steps

The steps are summarized:

1. The formal kick-off of the process was when the Registrar's Office sent its 1st draft of the class schedule to the Main Office for review by the school. Because the university organizes courses to be held one year in advance, development of the class schedule in May 2007 was for the spring semester 2008. The draft sent was essentially the Spring 2006 class schedule, which was retrieved from the computer system. A clear set of instructions including a deadline accompanied the draft class schedule. The school was asked to check the draft, which included the information provided in Table 14, as well as special course deadlines and grading options.
2. The Main Office then forwarded the draft or sections of the draft to every function (Educator Licensing, Graduate Programs, and Continuing Education) for review. The Main Office requested functions send back their comments a few days prior to the Registrar's Office deadline to allow some time for compilation.
3. The school's three main functions differed in scope, breadth, and depth and as a result, performed this step differently. Generally, this step involved reviewing the 1st draft of the class schedule and updating it based on future projections.
 - Educator Licensing communicated with its faculty on an as needed basis and indicated its intentions of including them more in the future as the process continues to be improved. Educator Licensing also coordinated with many other units across campus and with area school districts.
 - Graduate Programs forwarded the 1st draft to its Program Chairs for review. Each Program Chair handled this step differently for several reasons including

size and complexity, as discussed earlier. Updating the 1st draft was a relatively straightforward for some because they had a master schedule already in place ranging from two to four years into the future. These programs tended to be the ones using a cohort model, where a group of students begin a program together and take the same courses throughout until completion. Completing a class schedule to include start and end dates, days, times, section numbers, and enrollment restrictions typically remained constant. Projecting these components of the class schedule was simplified because the class size was known. Assigning instructors was also done ahead time with the exception of programs that had vacancies or role changes among faculty.

- Continuing Education coordinated distance courses with resident instruction (RI) or on-campus courses offered by other programs in the school. Similar to Educator Licensing, Continuing Education also worked with area school districts. Each semester Continuing Education developed its own printed bulletin of courses in conjunction with others within and outside the school. Distance students refer to this bulletin rather than the university class schedule for registration information about courses.
4. Once the Main Office received everyone's changes, it compiled all of the information into one document and returned it to the Registrar's Office.
 5. The cycle repeated itself with a 2nd draft after the school's requested changes were incorporated.
 6. At some point along the way, the Finance function is consulted for purposes of budgeting, staffing, and payroll.

7. The 2nd draft was finalized by the Registrar's Office and subsequently made available for faculty and staff to view online. The final class schedule is later made available to students for registration.

Decision Points

Decisions were made by Leaders throughout the class scheduling process. Some decisions were made well in advance of receiving the 1st draft, several decisions were made in between receiving the 1st and 2nd drafts, while yet others were not made until much later in the process. This section describes the class schedule components and their relation to decision that the school had to make at one time or another.

In general, all requests to change a class schedule initially start at the school level but require various lead times to pass through appropriate channels depending on their nature. The majority of requests are sanctioned at the university level. Table 17 lists the class schedule components with respect to the appropriate channels or levels for change requests.

Table 17.

Class Schedule Components by Level

Information Available to Faculty, Staff, and Students		
Course Information (General Course Catalog)	Class Information (Class Schedule)	Sanction
Course Subject Code	Course Subject Code	<u>University Level</u> Curriculum Committee
Course Number	Course Number	Curriculum Committee
Course Title	Course Title	Curriculum Committee
Course Credits	Course Credits	Curriculum Committee
Year: Alternating Offering	Year: Alternating Offering	Curriculum Committee
Semester	Semester	Curriculum Committee
Course Prerequisites ^a	Course Prerequisites ^a	Curriculum Committee
Non-traditional Offering ^b		Curriculum Committee
	Course Reference Number	Registrar
	Section Number	Registrar
	Enrollment Restrictions	Registrar
	Date (MM/DD)	Registrar
	Day(s)	Registrar
	Time	Registrar
	Location (Classroom)	Registrar
	Enrollment Cap ^c	Registrar
		<u>School Level</u> School
	Instructor	

^a Prerequisites must be met prior to registering for a specific course.

^b Courses may be offered using non-traditional formats (e.g., online), often at a distance.

^c Enrollment capacity may be restricted by classroom/laboratory capacity.

When the school decides to offer a new program or a new course within an existing program, a request form needs to be completed and submitted to the Curriculum and Catalog Administration Office at the university level. Information required on the form includes:

- Course subject code
- Course number
- Course title
- Course description
- Course credits
- Year: alternating offering
- Semester
- Course prerequisites
- Format: non-traditional offering

Policies and procedures are in place to help guide the school's decision if a request must be submitted to make a change. Requests via the form must always be submitted to initiate a new course. Additional guidelines are available to assist in completing the form, such as for determining a course number. The University Curriculum Committee ultimately sanctions the request. Once approved, the information is added to the general course catalog by the Curriculum and Catalog Administration Office. The course subject code, course number, course title, number of credits, prerequisites, and sometimes offering automatically populate in the system for Classroom Scheduling in the Registrar's Office.

When the school needs to make changes to an existing class schedule or during the period when a new class schedule is being drafted, it typically does so with the assistance of the Registrar's Office. The school provides Classroom Scheduling with the date range (MM/DD) for the length of a course, such as a full semester or a 4-week term during the summer session. The school also determines the following information:

- Enrollment restrictions
- Day(s)
- Time
- Location (classroom)
- Enrollment capacity
- Instructor

The course reference number (CRN) and section number are automatically generated in the system. The only information the school actually enters is the instructor.

After the Registrar's Office initiates the class scheduling process by sending a 1st draft, the school's Leaders must check all of the components for accuracy and determine if any of them should be changed. The components that most often require changes are the day(s), time, location, instructor, and sometimes enrollment restrictions. These five components can and do fluctuate based on student enrollment. And, a change to one component can and does impact other components of the class schedule.

We have had to hire people at the last minute and split classes because they were too large.

Day(s)/Time/Locations

Guidelines are followed during the fall and spring semesters for scheduling days and times of classes to maximize the use of classrooms. These guidelines are not imposed during the summer session when more classrooms are typically available.

Undergraduate classes are usually held either on a Monday/Wednesday/Friday (MWF) or a Tuesday/Thursday (T/R) schedule. In reference to the school, undergraduate classes tend to be offered during the day and graduate classes are mostly offered late afternoon and in the evening. Laboratories and recitations are allowed a bit more flexibility to best meet students' needs. Educator Licensing must consider lectures, laboratories, and

recitations, in addition to coordinating the schedules of student teacher supervisors with area school districts. Many of these activities need to be scheduled during the districts' school hours. Classroom Scheduling in the Registrar's Office makes use of general assignment classrooms to accomplish its task of coordinating space for everyone at the university. In other words, the university *controls* eight of the school's classrooms (in its building). The school *controls* five of its classrooms. One of the eight classrooms is designated for the Division of Continuing Education. Requests to add, delete, or change any of the components from the final class schedule are handled using the same guidelines to avoid conflicts and thus may or may not be granted; in other words, days, times, and classrooms other than those preferred may be assigned if necessary.

Instructor

Instructors are assigned to courses by Program Directors or Program Chairs depending on the function. This usually occurs after the number of sections is projected and the days and times are determined. Programs that use a cohort model often identify instructors in advance unless there is a vacancy or role change. Other programs that are more complex or have a greater number of sections face greater challenges in assigning instructors to courses. Deciding who teaches what and when is often accomplished by considering faculty appointments. For example, tenured and tenure-track faculty have load requirements that must be met. A percentage of total load includes teaching a certain number of credits unless otherwise negotiated. If a course (or section of the same course) is cancelled because not enough students enrolled, the instructor must be reassigned to teach another course (or section) to fulfill his/her teaching responsibilities. This may result in having to reassign or reappoint other faculty accordingly.

Student Enrollment

The number of students enrolled in a course generally needs to meet a minimum limit but not exceed a maximum capacity. The university has established guidelines for the fall and spring semesters to determine when a course (or section of the same course) should be cancelled based on low student enrollment. The school may at its discretion choose to use these guidelines or not. The school has specified its own minimum limits for the summer session. Table 18 includes the minimum requirements for student enrollment used to decide whether a course shall be offered or make. The school has also determined a maximum capacity for student enrollment, which may vary depending on the content level, type of class, and location. Students may register for courses up until the add/drop period ends, which is about two weeks after classes begin, so long as no enrollment restrictions are in place.

Table 18.

Minimum Enrollment Requirements

Semester	Course Number / Content Level		Minimum Enrollment (Number of Students)	
FALL / SPRING University Guidelines			Lecture	Lab
	(100-299)	Lower Division	15	10
	(300-499)	Upper Division	10	8
	(500-699)	Graduate I	5	5
	(700-799)	Graduate II	5	5
SUMMER School Guidelines	(100-299)	Lower Division	20	
	(300-499)	Upper Division	15	
	(500-699)	Graduate I	10	
	(700-799)	Graduate II	8	

c. Sequence of related work activities?

The majority of work activities occurred between the times when the school received a draft class schedule from the Registrar's Office and the deadline for its return with requested changes. The sequence of steps was referenced above while discussing the work activities and decision points. Dates for receipt and deadlines for return of the 1st and 2nd drafts are included at the bottom of the final process maps (actual state) in Appendix F. Clear instructions were sent with the drafts by the Registrar's Office to the school's Main Office and subsequently to the school's Leaders. Notices of important information, such as dates and deadlines, were also sent periodically by the Registrar's Office to the school's Main Office for the Leaders. Dates and deadlines from such documents as well as other sources were compiled into timelines for the fall, spring, and summer semesters. A timeline that shows the periods when the 1st and 2nd drafts were reviewed during each of the semesters was also created. The timelines of the actual state for preparing the spring, summer, and fall class schedules are provided in Appendix G.

2. What are the problems associated with class scheduling?

What was fairly common, 18 months to even a year ago, is that I would have a pretty clear perception of what I was doing, but the perception wouldn't end up matching reality.

Well-written procedures are key to developing well defined processes for continually driving performance improvement. And by improving performance, an organization can save money and help increase customer satisfaction. Processes should be designed to conform with objectives, standards, and regulations, and documentation helps communicate compliance. Formal procedures also help ensure jobs get done

quickly and correctly. They include several basic elements, such as an articulated purpose, key term definitions to limit confusion, and measures of effectiveness to quantify outputs. Moreover, they clarify departmental responsibilities and answer the all-important question, “How do I do what I am supposed to do?”

The findings indicate the school does not have a written procedure specific to class scheduling. Rather, work is carried out informally despite a couple of attempts to formalize the process. One participant recalled a time before Phase I began when meeting minutes describing the procedure for class scheduling were emailed to the school; however, the procedure could not be found. Another participant provided a copy of a flow diagram that was created based on someone else’s notes; however, this document was outdated as a result of role changes among several faculty and staff. Several comments by participants support the findings; their responses pertaining to the existence of a written procedure are presented (Question 5, Appendix A).

Not that I’m aware of. I haven’t seen anything.

There really isn’t a written procedure. It’s been a verbal procedure; it’s been something we’ve been working on in meetings and prior to Fall 2006.

I don’t recall... and I may not have paid attention to it (written procedure for class scheduling), and so I need to come clean.

I’ve been a part of it (class scheduling), so I kind of know it. And I don’t know that anyone ever really sat down with me and explained it, but (I know by) just having been a part of it for a good number of years.

No, I’ve never seen any kind of formal... or even informal... written documentation or communication (about class scheduling).

Two participants referenced their steep learning curve as a barrier to performance and attributed this to having had no procedure in place.

And, that there was not really a written process in place.

It wasn't written and some of it was based on conversations.

One participant described her experiences this way:

And, there were certainly plenty of people around who knew... they were part of that process and you could gather that information. But there would also be times when you would talk to two who both knew the same process but it would look different.

The second primary research question posed three sub-questions. These included:

- a. What are the performance indicators?
- b. What is the performance gap?
- c. What is the root cause(s) of the performance gap?

a. Performance indicators?

Performance indicators are measures used to gauge the success of a product or service. In other words, they help assess if the organization achieved what it set out to accomplish and in a way that maximized its resources. If the desired state has been achieved, performance indicators also help determine whether or not performance is being maintained at acceptable levels.

One might expect many performance indicators to exist since class scheduling has many different components (see Table 17) and stakeholders. The findings reveal several performance indicators existed but others did not. Without a formal procedure, certain performance indicators were overlooked and sufficient details about others the school knew existed were not provided. Further, the findings suggest requirements were explicitly stated and implied, which evoked trust for some but also led to misunderstandings.

Performance indicators identified through multiple data collection methods primarily related to deadlines that had to be met while the class schedule was being drafted. Several important deadlines for the school were set by the Registrar's Office so that the class schedule could be finalized and ultimately made available to university faculty, staff, and students. Key dates and deadlines that surround class scheduling were incorporated into timelines (see Appendix G). Comments pertaining to such dates and deadlines in reference to all or some of the different class schedule components follow.

(In May 2006) they had a draft for the Spring 2007 because the university generates the draft at least two semesters ahead of time. But I don't know that they had anybody down to teach anything yet. They just had the classes, sections, and times, and days. But they didn't actually have anyone assigned to them yet.

Yes, the timing expectations (from the Registrar's Office) are clear and the instructions are clear; it's usually a full page email of instructions.

"... and then a 2nd draft comes out, and that's when you need to be pretty clear about what you're doing because that's what is going to get published.

Accounts from two participants reflected an inherent trust in the system:

Or somebody asks... you know, they say, "We need the schedule by this date." So, I may not know the schedule by heart but I'm made aware of it.

Yes. So, there's some trust in all of this; people knowing their jobs and doing... There's enough people watching up and down the line that I can't remember a time when we didn't get it done and it caused major problems.

Statements by two other participants indicated contrasting views and experiences surrounding the cutoff date for determining if a course (or a section of the same course)

needed to be cancelled based on reaching minimum enrollments. Cancellation of courses (or sections) invariably leads to adjustments in the class schedule.

We usually know (whether a course will make or not by the add/drop deadline for fall and spring), or by the first day of the courses. And then, summer is basically just the start date of the courses. If you don't have the numbers by that date, it will be cancelled. And sometimes it is like a day or two before because people, and graduate students in particular, they just register at the last minute.

I never knew of a date, and that's why it shocked me that this happened before class even started.

Remarks by other participants concerning changes to the class schedule described the more implicit nature of the process and expected deliverables. Examples are provided.

As regards changes (to the class schedule), there's no timeline on that. I guess that whenever they (faculty and staff) know about it, they need to let me know about it. And then, it should be acted on fairly quickly so that it can get (online) early so that the students know that there's some sort of change.

Students will know when the course is offered; they may think I'm teaching it and somebody else may teach it, but that's a minor issue.

b. Performance gap?

Performance improvement involves understanding what is happening (actual level of performance) in relation to what should be happening (desired level of performance). A performance gap is the difference between the two states, which may represent a problem or an opportunity. Short of achieving desired results, problems tend to occur and need to be addressed.

The performance issue concerning class scheduling was classified as a *present performance problem* (Swanson, 2007). The school initiated an organizational process analysis in light of problems that kept occurring. In the absence of a formal procedure and many of the performance indicators needed to describe the desired level of performance, an established basis for comparison was inherently lacking. Because the two states could not be compared and contrasted, the nature and size of the gap or gaps could similarly not be assessed. Consequently, the research question involving the determination of the performance gap will address the symptoms that were uncovered rather than the problems. The findings of the case study are presented Tables 19 and 20.

Table 19.

Performance Issues with Class Scheduling Components

Class Scheduling Components	Performance Issues	Possible Reasons
What? • Section offering (Projection) • Course subject code	Discrepancies among sources of information	Typographical errors Sources updated at different times Inconsistent course offerings
When? • Year/Semester • Date (MM/DD)	Inconsistencies in courses (or sections)	Change to course (or section): • enrollment issues (high/low) • conflict with other offerings
When? • Day(s) • Time	Overlap of classes (two sections offered at same time) Partial overlap of classes Insufficient time between classes	Change made by school: • change in day(s)/time of one section • addition of new section Change made by other departments: • change in day(s)/time of one section • addition of new section Change made by Registrar's Office: • change in day(s)/time of one section Limited or no communication: • across programs or functions • across departments on campus • with the Registrar's Office • with area school districts

Table 19. (cont.)

Class Scheduling Components	Performance Issues	Possible Reasons
Where? · Location (Classroom)	Faculty uncertain when classes will be held	Information omitted from draft schedule Change made by Registrar's Office
	Students uncertain when classes will be held	Information omitted from draft schedule No contact made with distance students
	Faculty uncertain where classes will be held	Information omitted from draft schedule Change made by Registrar's Office
	Students uncertain where classes will be held	Information omitted from schedule No contact made with distance students
Who? · Instructor	Overlap of instruction (both sections at same time)	Oversight or error in class scheduling Limited or no communication: · among/with Leaders
	Faculty uncertain what courses they will be teaching	Delay in assigning instructor to course Limited or no communication: · among/with Leaders Information omitted from draft schedule
	Students uncertain about who is teaching what courses	Delay in assigning instructor to course Information omitted from draft schedule Change made to schedule by school Two instructors swap courses (sections)

Table 19. (cont.)

Class Scheduling Components	Performance Issues	Possible Reasons
How many students? · Enrollment	Course (or section of same course) added	Exceeded enrollment cap: · function expansion - new program · program expansion - new course · program growth - more sections · cancelled section elsewhere
	Course (or section of same course) cancelled	Fell below minimum enrollment: · decreased enrollment · cancelled course in a program · cancelled program in a function
	Leaders unclear about enrollment Temporary faculty uncertain about job prospects	Registration deadlines: · date classes begin (late fee imposed) · end of add/drop period Aware of cancelled program elsewhere
	Instructor uncertain about offering of course (or section) Instructor unequipped with back-up plan	Low enrollment before classes begin

Table 20.

Performance Issues with Class Scheduling in General

Class Scheduling in General	Performance Issues	Possible Reasons
Dates / Deadlines	Missed deadlines to the Registrar's Office	Program complexity Learning curves due to role changes Summer session: · many faculty and staff out of office Forgetfulness Viewed as low priority Little emphasis Little accountability
	Faculty and staff unclear about deadlines Faculty and staff unfamiliar with any deadlines	Little awareness and/or discussion New to school
Process	Faculty and staff unclear about process Faculty and staff unfamiliar with any process Misunderstandings Inefficiencies Faculty requests last minute changes in assignment Faculty sidesteps appropriate channels	Little awareness and/or discussion New to school Inefficient process Little understanding of process Little accountability

Despite the noted problems listed above, all of the participants responded positively when asked for their overall impression about how well the class scheduling process was functioning (Question 12, Appendix A).

It seems to function well. People are alert.

It's in transition. I think it's a lot better because it is becoming more transparent to more people. ... So, it's definitely getting better, but everybody is in a learning curve now because they are learning new information about their being involved in it, and engaged in it; whereas before, it wasn't that way. So, it will be awhile before it becomes smoother, I think. But, it is getting better.

It's fine for me.

I think it's functioning pretty well. But my perspective really is for one program; I couldn't tell you if it's functioning well for other programs, or how students in other programs or faculty in other programs might see it. I've not noted positive or negative comments.

It's functioning better than it was, but still it frustrates me. ... We have so many specializations, and so many people involved, and so many Program Chairs involved, that's what causes the confusion and problems that we have.

For the majority of students, (it's) fine. But it always could be better. And for the regular school year, (it's) fine. Wait a minute, for between departments, it's fine. Within, could be... there's still... that summer schedule is still a big problem.

Good.

We're working more cooperatively now. It seemed like before things kind of just... happened.

c. Root cause(s) of the performance gap?

Performance improvement also involves determining the root cause of the performance gap. In this way, appropriate interventions can be developed to close the performance gap. Because the performance gap could not be precisely determined, neither could its root causes.

It (a missing course from the class schedule) always works itself out; it's always fixable. It's just sometimes that it may be at the last minute.

3. How can class scheduling be improved?

I want it to be a process, not an individual email that can get lost.

The third primary research question posed three sub-questions. These included:

- a. What are the drivers that encourage optimal performance in class scheduling?
- b. What are the barriers that impede optimal performance in class scheduling?
- c. What recommendations can be made to improve class scheduling?

a. Drivers that encourage optimal performance?

Drivers are factors that positively influence or encourage present or future performance, which are listed in Table 21. Present drivers included deadlines imposed from the university level, leadership, certain program characteristics, and recruitment/hiring efforts. A future driver would be written procedures that could promote a common understanding about class scheduling among faculty and staff.

Table 21.

Performance Drivers of Process

Performance Drivers	Potential Impact on Performance
Deadlines	Initiates process Facilitates coordination
Leadership	Fosters supportive culture Increases dialogue and healthy debates Increases transparency of process Increases ownership of process
Program characteristics: · cohort model · manageable size and complexity · flexibility	Allows predictability Allows sustainability Allows fluidity
Recruiting/Hiring: · fewer to no vacancies	Enables stability Allows predictability
Written procedures	Increases process knowledge Increases awareness Promotes common understanding

b. Barriers that impede optimal performance?

Barriers are factors that negatively influence or impede present or future performance, which are outlined in Table 22. Findings suggest the following were barriers to class scheduling: having no written procedures, experiencing relatively high faculty turnover, determining load percentages for teaching and other responsibilities together with course assignments, creating the 1st draft of the class schedule based on historic records rather than prospectively, and having limited access to faculty with nine-month appointments during the summer. A couple of these barriers were already being addressed during the course of the case study.

c. Recommendations to improve class scheduling?

Findings suggest opportunities exist to improve class scheduling in terms of both efficiency and effectiveness. Several recommendations are provided herewith and discussed further in the last chapter.

- Many faculty and staff are unfamiliar with class scheduling and therefore tend to approach the wrong individuals with questions. Written procedures with timelines could help create an initial awareness about the importance of class scheduling and ultimately lead to a common understanding. Timelines in Appendixes G, H, I, and J and the description of work flow in Appendix K were drafted to facilitate discussions.
- Although work activities are coordinated during periods when drafts are requested by the Registrar's Office, they are not always carried out efficiently. Many times tasks are carried out immediately and on an individual basis as needs arise. Timelines could aid in planning efforts and help make better use of valuable resources. The timelines presented in Appendixes H, I, and J highlight important considerations.

Table 22.

Performance Barriers of Process

Performance Barriers	Potential Impact on Performance	Initiatives by School
No formal written procedures: · instructions and/or descriptions of work activities · dates and deadlines	No common understanding Unclear/missed deadlines Inefficiencies No performance indicators No celebration of successes	Analysis
Faculty turnover	Instability Unpredictability Overload Errors and omissions in class schedule	Leadership Recruiting/Hiring
No clear delineation with parallel and/or sub-processes: · e.g., budgeting, staffing, payroll	Delays	Load sheets
1 st draft of class schedule based on historic records	Errors and/or omissions on final draft	
Timing : · summer session	Delays and/or postponements	

CHAPTER 5: DISCUSSION

The purpose of this case study was to analyze and map class scheduling by a school in a higher education setting so that the process could be understood, documented, and ultimately improved. The school initiated an organizational process analysis after recognizing it had a *present performance problem* (Swanson, 2007). Missed deadlines sometimes occurred and omissions, errors, and inconsistencies were occasionally included in the final version of the class schedule.

The process level may be thought of as the pivotal link between organizational and individual performance. Porter (1985) contends, “both strategic and operational issues are best understood at the activity level” (p. xv). Despite this, Rummler and Brache (1990) suggest the process level is the least understood and therefore offers the greatest opportunity for performance improvement.

Summary of the Study

The case study was set in a school at a university in the western region of the United States and focused on improving performance of class scheduling. Boundaries of the process were determined and confined to work activities that occurred within the school by faculty and staff. An analysis at the process level was conducted utilizing the Three Levels Framework (Rummler & Brache, 1990). Participants included full-time tenured, tenure-track, temporary, and special faculty who taught courses and maintained offices at the school. Participants also included full- and part-time staff who played a role in class scheduling.

The study was completed in two phases: Phase I examined the current class scheduling process (actual state) and Phase II considered the ideal class scheduling process (desired state). Problems and their root causes can best be determined by identifying the performance gap between the two states. Data were collected from a variety of sources using multiple methods from the beginning of the fall semester 2006 to the end of the spring semester 2008. In Phases I and II, document reviews and unstructured interviews were conducted to gather information. Additionally, semi-structured interviews were conducted in Phase I and focus groups were held in Phase II. Participant feedback was sought toward the end of the study to review draft materials and check them for accuracy. Samples varied depending on the type of information needed to help answer the research questions. A total of 34 individuals participated in Phases I and II combined (21 in Phase I, where 7 of 21 from Phase I were not available for Phase II; 27 in Phase II).

Description of Class Scheduling

Class scheduling is a process through which faculty and staff generate a class schedule. A class schedule is a common source of information from which faculty, staff, and students plan and organize their personal and professional lives. A class schedule has several components including course descriptions, days, times, locations, enrollment capacities, and names of instructors. Several of these components are interdependent and hinge on different factors including student enrollment. A change in one component often requires changes to other components. For example, cancellation of a course (or section of the same course) because of low student enrollment might necessitate changing the day, time, and/or location of another course (or section) to avoid conflicts.

Summary of the Findings

Three primary research questions were asked to address the present performance problem involving class scheduling at the school. Several secondary questions were considered as well. The research questions and findings are summarized.

Class Scheduling: Actual State

The first primary research question was, *How does class scheduling operate within the school?* That is, the question addressed how class scheduling was carried out at the time the study was conducted. Understanding the way work actually gets done is a necessary precursor to performance improvement (Rummler & Brache, 1990).

This primary research question fulfilled in part the first two purposes of the study. The first purpose was to understand the process. It involved defining the work activities or process steps and their interrelations. The second purpose was to document the process. Communicating the process steps and their sequence to faculty and staff would lend insight as to what was done and how it was done and promote a common understanding among them. Three specific sub-questions were asked to guide data collection and analysis efforts. These questions along with their respective findings are presented. Final process maps and timelines of the actual state were developed and are provided in Appendix F and G, respectively.

Who is involved?

It was clear all school Leaders and faculty with teaching responsibilities were involved in class scheduling either directly or indirectly. Leaders who oversaw academic programs of study consequently managed class scheduling. Leaders predicted the number of sections needed, when and where they were held, and who covered them for

instruction. Faculty who did not oversee any programs needed to know what courses they would teach to plan accordingly. Some faculty actively negotiated their courses with Program Chairs or Program Directors, while others did not.

Full- and part-time staff participated in the study. Their involvement in class scheduling depended on designated job responsibilities. Staff from each of the functions including the administrative support function assisted with or managed the process.

What work activities are undertaken?

From a vantage point of someone non-involved, class scheduling appeared to be a rather simple process (see Appendixes F and G). In fact, some faculty who were not actively engaged in class scheduling saw it as a one to two step process.

I have no idea how they go about it (making decisions about who teaches what sections), if it's just a random kind of thing, or people just pick...

I never looked at it (class scheduling) as a process; I just think somebody now and then looked at building a matrix, and told me where to go, and it's clear. So, I never saw it as a process.

And it's funny; these are things that I just kind of automatically do, so when you think of it as a systematic process, I don't even think about it.

In general, class scheduling involved receipt of a 1st draft by the Main Office, distribution of the draft to the three functions, and possibly another forwarding of the draft to the Program Chairs who were directly responsible for managing the programs. The receivers of the draft were requested to review and check the draft for accuracy and/or make any anticipated changes directly on the draft so they could eventually be incorporated into the final class schedule. Everyone's comments were returned to respective senders of the information. The Main Office ultimately received all of the

information and was responsible for compiling it into one document. The document was then returned to the Registrar's Office, where the process originally initiated.

Closer inspection of class scheduling revealed a more complex process. This was primarily due to the many components of a class schedule, some of which were known but others that required making projections. Timing and student enrollment were factors in determining the number of sections needed. Many students, and especially graduate students, registered at the last minute. Students could register for a course up until the day before classes began without being assessed a late registration fee. Students could also register after classes began if done by the end of the add/drop period. The later students registered for a course, the greater uncertainty grew for faculty surrounding whether or not it would still be offered. The impact of cancelling a course (or section of the same course) ranged from no impact at all to significant adjustments to other courses and/or to an instructor's teaching responsibilities that same semester or later.

What is the sequence of related work activities?

The sequence of related work activities is important in determining efficiency of a process. Additional steps or overlapping efforts could be detected if the sequence is known. Timelines help in understanding the sequence of a process; they typically include important dates and deadlines useful in coordinating efforts.

Findings indicated the majority of the dates and deadlines related to class scheduling (see Appendix G) were imposed from the university level rather than being self-imposed by the school. Although the school acts rather autonomously as regards the process, it nevertheless needs to coordinate its class schedule with that of the other departments across campus. Such coordination is handled by the Registrar's Office.

Class Scheduling: Desired State

The second primary research question was, *What are the problems associated with class scheduling?* This question addressed the performance gap between how class scheduling was carried out as opposed to how it should have been carried out at the time the study was conducted. The nature and size of a performance gap provides a clearer picture of problems that exist than if only the current way of doing things was known. The second primary research question extended beyond identifying a performance gap to determining its root causes. A problem cannot be properly addressed and solved long-term unless its cause-effect relationships are traced back enough steps to uncover the real underlying reasons.

This primary research question fulfilled in part the second and third purposes of the study. The second purpose of the study was to document the process, as described above. This entailed documenting the desired state in relation to the actual state, which was documented per the first primary research question. The third purpose of the study was to analyze the process. Identifying established performance indicators would provide a basis against which the actual state could be judged to determine the performance gap. Three specific sub-questions were asked to guide data collection and analysis efforts. These questions along with their respective findings are presented.

What are the performance indicators?

In general, written procedures are common places to find performance indicators. A lack of procedures hampers efforts to achieve a common understanding of the process among faculty and staff who may be involved to varying degrees. At the school level, there was no set of written procedures for class scheduling. The school instead relied on

prompts by the Registrar's Office. Similarly at the job/performer level, there was a large amount of variability as to how class scheduling was handled. Some faculty and staff relied on others telling them what to do and when; where other faculty and staff took a more active approach. Several Leaders even created schedules for themselves and their faculty that looked out as far as four years.

Incomplete or outdated procedures, or an absence of these, may lead to inefficiencies in the system and unintended outputs. Process efficiency and effectiveness are terms used to describe how well a process performs. More specifically, efficiency is measured within a process and means "the elimination of waste—waste of money, waste of people, and waste of time" (Tenner & DeToro, 1997, p. 93). Effectiveness is measured by examining outputs of a process and their features, values, and attributes expected by customers (Tenner & DeToro, 1997).

Prompts imposed at the university level or by individuals within the system were not performance indicators per se; however, some of the dates and deadlines served as parameters to gauge the process's success. On occasion the school missed deadlines by close to a week and returned its marked-up drafts to the Registrar's Office late. Fortunately, the Registrar's Office had enough other work to do such that missed deadlines did not cause any significant hardships or negative effects. Imagine if every department on campus was late--What would be the consequences to the faculty, staff, and students if a class schedule was not available on time? What would be the indirect impact to the school and university? Existing dates and deadlines from multiple sources were compiled into several timelines for reference purposes. The timelines for preparation of the spring, summer, and fall class schedules are provided in Appendix G.

Not only should a class schedule be available on time, it should also be as complete and accurate as possible. Completeness can be determined if the components of a class schedule are known when students are permitted to register. Accuracy may be determined if and when errors in the final class schedule are found. A call to the Main Office by a student asking when and where a particular class is being held is a good indication something is amiss assuming he or she is using available information. Components of a class schedule were identified and differentiated in Tables 14 and 17.

What is the performance gap?

A performance gap was not determined since established performance indicators, a written procedure, or other types of similar documents describing class scheduling were not available. Nevertheless, several performance issues were noted and recorded in Tables 19 and 20. The performance issues were categorized according to the class schedule components, which represented decision points. The what, when, where, and who types of questions had to be answered for a class schedule to be complete. The question pertaining to the number of students enrolled in a course was just as critical from the school's perspective. If a course did not have enough students enrolled, then it was cancelled on occasion. Guidelines for minimum enrollment set forth by the university and the school existed to help with decision-making.

What is the root cause(s) of the performance gap?

For reasons discussed above concerning the performance gap, root causes could similarly not be accurately described.

Class Scheduling: Proposed Desired State and Recommendations

The third primary research question was, *How can class scheduling be improved?* This question fulfilled in part the third purpose of the study. The third purpose was to analyze the process and make recommendations for performance improvement. This entailed interpreting the findings from the analysis and identifying drivers and barriers of performance. Recommendations based on this information could be used later when developing an appropriate intervention strategy. Three specific sub-questions were asked to guide data collection and analysis efforts. These questions along with their respective findings are presented.

What are the drivers that encourage optimal performance?

Factors that most encouraged performance (see Table 21) were deadlines imposed at the university level and leadership within the school. Deadlines provided by the Registrar's Office pertaining to the 1st and 2nd drafts initiated the process and provided unity and coordination among the different functions. Leadership has made a special effort to make many of the school's processes more transparent to faculty and staff. This in turn has led to an increase in understanding of many areas including determining load percentages. Lastly, program characteristics in some cases helped drive the process. Programs based on a cohort model made it easier to project components of the class schedule further in the future.

What are the barriers that impede optimal performance?

Factors that hindered performance were identified (see Table 22). The greatest impediment to optimal performance was not having documentation describing class scheduling. As such, *optimal* was never clearly defined. Faculty and staff could not

recognize when optimal performance was achieved; they could only sense when it was not. When problems were encountered, faculty and staff often reacted immediately to resolve the performance issues. Maps, timelines, an updated list of course offerings, and other materials developed during the study will hopefully provide a solid platform upon which to build additional tools and procedures.

Another barrier to performance was faculty turnover and its inherent instability. Not only did vacancies create more work for faculty and staff, it made it very difficult to project accurately and in a timely fashion who would teach what. Consequently, the class schedule seldom included the names of instructors. TBA (To Be Announced) was noted rather than names, which resulted in several phone calls to the school by students wanting to know this information. Since the study began, five new hires joined the school with several more due to arrive in the Fall 2008.

Another challenge was determining load percentages for teaching, advising, scholarship, and service responsibilities while assigning courses (or sections of the same course). Many faculty and staff considered the two as being one in the same, yet they are different and should remain distinct. Determining teaching responsibilities requires figuring out how many courses instructors will teach; where determining course assignments involves identifying who will teach what. The two decisions necessitate very different considerations and discussions by Leaders and faculty. Moreover, load percentages have strong implications for budgeting purposes and payroll; course assignments do not necessarily. For load percentages to inform course assignments, decisions concerning teaching responsibilities should precede deadlines for adding instructors to the class schedules. In the present study, this was not always the case.

Another factor that resulted in occasional errors and omissions in the final class schedule was the creation of the 1st draft based on historic records. The initial draft sent to departments across campus including the school for review was generated from the final class schedule of the same semester a year prior. While reasons for developing the 1st draft this way were just, a retrospective view posed some challenges while the class schedule was being finalized. The human factor essentially came into play as a result and the accuracy of revisions was reliant upon individuals' abilities to recall information. For example, courses offered in alternating years were not always captured in the 1st drafts. It was up to faculty and staff to consciously be aware of this fact and make the necessary revisions so that these courses appeared in subsequent drafts. These types of revisions were easily overlooked because no changes in course offerings were made per se; rather, changes in the class schedule were necessary from one year to the next.

Timing presented hurdles in class scheduling. One timing issue pertained to student enrollment. By allowing students to register for courses without penalty up until the day before classes began, low enrollment was always a source of concern. Additionally, adding or cancelling courses (or sections) at the last minute had many consequences creating a ripple effect. Another timing issue related to the summer session. Many faculty have nine-month appointments and are usually out of the office during the summer. A class schedule for the spring semester starts to be drafted in early May, and the 2nd draft begins at the end of July. Moreover, a class schedule for the subsequent summer session initiates in early August. Thus, much activity takes place during the summer months when many are not on appointment. This has led to delays in decision-making and communication as regards the class schedule.

What recommendation can be made?

Recommendations were given for improving class scheduling in response to the third primary research question. These were developed following consideration of the drivers and barriers already identified as well as input from focus group participants. Several changes that either served as drivers of performance or addressed issues related to barriers were implemented during the course of the study as a result of other initiatives. Examples provided include recruitment and hiring efforts to fill vacancies at the school level and a new computer system for class scheduling at the university level. In addition to these changes, recommendations that were made are listed below in no particular order of priority.

- Adopt, communicate, implement, and evaluate written procedures with timelines for class scheduling. Timelines in Appendixes G, H, I, and J and the description of work flow in Appendix K were drafted for reference purposes to aid future discussions. Consider relationship and process maps of the actual state in finalizing written procedures of the desired state (see Appendixes C and F).
- Distinguish class scheduling from other processes including staffing and budgeting, which require determining load percentages for teaching and other responsibilities for faculty. Align the different process accordingly.
- Consider having load percentages drive course assignments. The school currently asks its Leaders to submit load sheets. Load sheets document load percentages and the names of courses assigned to instructors and are due at the end of May each year. Load sheets have been used with partial success perhaps because load percentages and course assignments both need to be determined at the same time. Moreover,

the deadline at the end of May often follows the dates when class schedules are made available online. For example, the timeline in Appendix H shows important dates and deadlines that were followed for the preparation of the Fall 2007 class schedule.

According to this timeline, the Fall 2007 class schedule was made available online to students on March 6, 2007. However, load sheets with names of instructors were not due to the Main Office until May 31, 2007. The school should encourage faculty and staff to follow its policy of providing load sheets with two year outlooks, which would serve as a precursor to determining course assignments. Additionally, the school should consider eliminating course assignment information from the load sheets so that the two processes operate independently.

- Solicit support from students to register for courses as early as possible so that faculty and staff can determine the status of courses based on enrollment numbers.

Currently, students often wait to register for courses until the day before classes begin. Raise awareness with students about the possibility of course cancellations by sending them notices before the registration deadline. The timeline in Appendix I indicates the last notice to students be sent two weeks prior to the start of classes.

- Assign courses to instructors before class schedules are made available online to students. This step was mentioned above with respect to load sheets but is listed separately because it represents a different step in the class scheduling process. The timelines in Appendix J provide the dates when instructors should be posted online for the Fall 2007, Spring 2008, and Summer 2008 class schedules.
- Draft class schedules with a minimum one year outlook for the fall, spring, and summer concurrently rather than by semester. Consider carrying out the majority of

the work during the fall semester and make subsequent refinements as needed.

Currently, much of the work is performed during the summer session while many faculty and staff are out of the office. For example, preparation of the Spring 2008 class schedule took place in July and August of 2007. Preparation of the Summer 2008 was initiated in early August of 2007 and finalized during the first couple of weeks of the fall semester. Preparation of all three class schedules during the fall semester would relieve the amount of work during the summer session. A timeline that provides an overview of important dates and deadlines for all three semesters is included in Appendix J.

Limitations

Several changes that affect class scheduling were made during the course of the study. Examples include a new campus-wide computer system in Fall 2007 for class scheduling for faculty, staff, and students, changes in structure and responsibilities of certain functions, changes in leadership at the school, function, and program levels, and changes to select programs and course offerings. Therefore, the organizational charts, maps, and timelines may not be reflective of the case at the conclusion of the study.

The study included full-time faculty who taught courses and maintained offices at the school. Neither part-time faculty nor Graduate Teaching Assistants participated. Their participation in interviews and focus groups may have offered another perspective about class scheduling. The study also included full- and part-time staff who played a role in class scheduling.

The Three Levels of Performance Framework was used to set the spatial boundaries of the case study. The performance variable of interest represented the

process level and design need on the 3 x 3 matrix. The organizational level and goal need cell, process level and goal need cell, and job/performer level and goal and design need cells were not analyzed but potentially could have added additional insight in developing the recommendations.

Conclusions/Implications

The adage, *work smarter, not harder*, certainly holds true today, even more so than it did just a decade ago. In an ever increasing competitive environment, organizations are faced with the tough challenge of having to increase productivity while not placing too many demands on workers. Increased productivity makes organizations more profitable but the greater demands on workers can leave many feeling overwhelmed. This in turn can foster frustration and discontent among workers and eventually lead to high turnover. It is no longer enough for workers to learn how to manage their time more wisely; organizations also need to reevaluate the efficiency and effectiveness of their processes.

Steps to improve the process were already under way in the school to varying degrees before the study began. A historic perspective indicated, however, class scheduling was never easy for the school and at times presented significant challenges despite tremendous efforts by some faculty and staff. While the process generally was functioning well according to participants, problems occurred that resulted in frustration. The problems always were fixable, as one participant stated, but “it’s just sometimes that it may be at the last minute.”

The process steps and their sequence are defined and illustrated with maps and timelines to understand and document class scheduling; that is, to visualize work flow for

process improvement. The study findings and recommendations are provided for subsequent consideration in developing an appropriate intervention strategy.

Possible benefits of the study to faculty and staff include an increased awareness about class scheduling both within and across functions, a better understanding of the process and decision points, realization of how dynamic the system really is, and greater efficiency of their work. Potential advantages to the school were similar in addition to increased satisfaction by internal and external stakeholders.

Recommendations for Future Research

Areas for further investigation related to class scheduling include analyses of the interconnections among the school and departments across campus as well as with area school districts. Other areas worthy of a closer look are the class scheduling processes at the school level (i.e., Continuing Education) and at the university level (i.e., Division of Continuing Education) for distance instruction off-campus. Possibilities to coordinate efforts and optimize the use of resources pertaining to class scheduling for resident instruction (RI) on-campus and distance instruction off-campus might exist and should be investigated.

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APPENDIX A

Semi-Structured Interview Questions

Semi-Structured Interview Questions
Class Scheduling

SECTION 1

BACKGROUND INFORMATION

1. How many years have you taught at this school?
2. In what programs of study have you taught during the F06 – Su07 academic year?
(*Provide list of academic programs of study and specializations to elicit response.*)
3. How much advance notice (*by semester, in months*) are you typically given to know with certainty what courses you will be teaching? Do you know the days, times and where these courses will be taught? How (*e.g., verbally, in writing*) has this information been communicated to you?

SECTION 2

DESIRED PERFORMANCE

4. What is the purpose of the class scheduling process in your opinion?
5. How (*e.g., verbally, in writing*) and when (*by semester, in months*) has the class scheduling process been described to you? (*Request any written documents.*)
6. What is your understanding of the sequence of related work activities undertaken by the school?

ACTUAL PERFORMANCE

The next set of questions focuses on the class scheduling process as it actually occurred during the F06 – Su07 academic year. These questions pertain to work flow from the time you were prompted to take action and become involved in the process until you received feedback on what courses you would be teaching.

7. INPUT:

- 7a. Describe the information or request you received (*e.g., email, clear verbal instruction*) during the F06 – Su07 academic year that prompted you to take action. Was the instruction clear? (*Request any written documents.*)
- 7b. From whom did you receive the information or request?

8. THROUGHPUT:

- 8a. Describe the action(s) you took after receiving the information or request.
- 8b. What special resources did you require to perform your work?
- 8c. Who did you involve to assist in carrying out your work?
- 8d. What barriers existed that hindered your efforts?

9. OUTPUT:

- 9a. What work did you produce as a result of your action(s)? In other words, describe the end product and/or service you provided.
- 9b. To whom did you provide the end product and/or service?

10. TIMING:

- 10. Recreate for me an estimated timeline of the events that took place from the time you initially received the information or request that prompted you to take action until you received feedback on what courses you would be teaching.

11. FEEDBACK:

- 11. What (*internal and external*) feedback have you received about the class scheduling process?

SECTION 3

COMMENTS/SUGGESTIONS/RECOMMENDATIONS

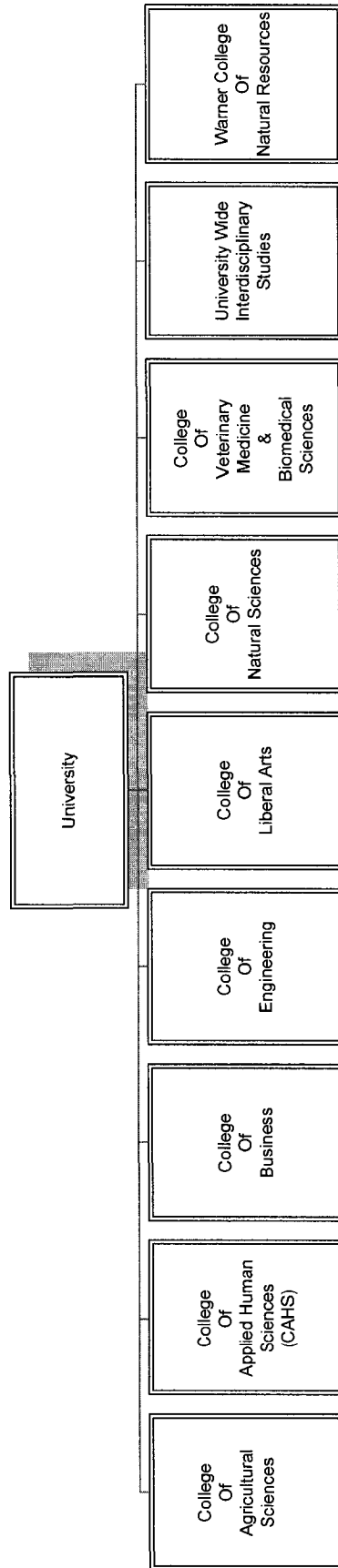
- 12. How is the class scheduling process functioning now in your opinion? (*Request any written documents if compliments or criticisms are provided.*)
- 13. Do you have any other thoughts, suggestions, and/or recommendations about possible future improvements to class scheduling?

APPENDIX B

Organizational Charts

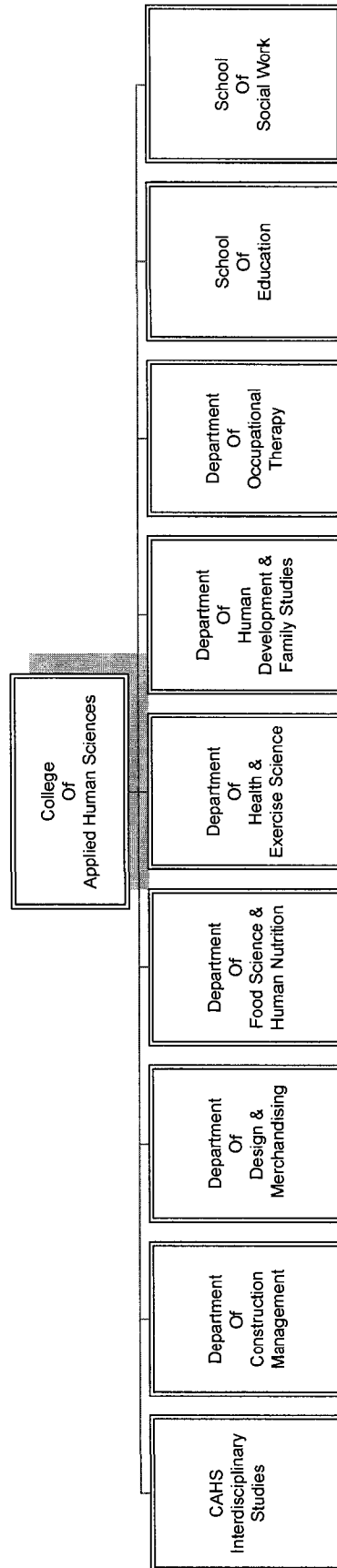
(Actual State)

Organizational Chart: University



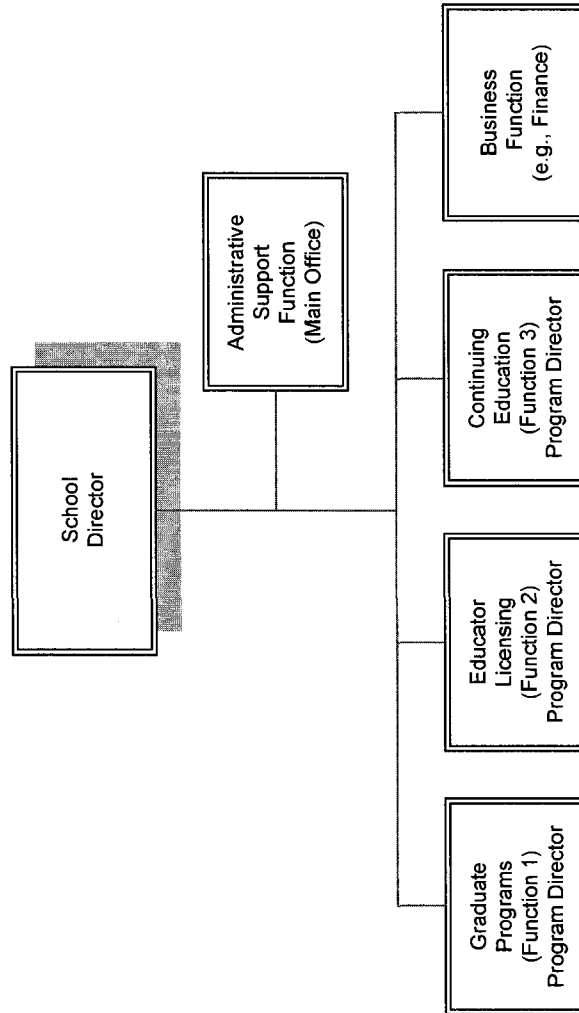
Fall 2006

Organizational Chart: College



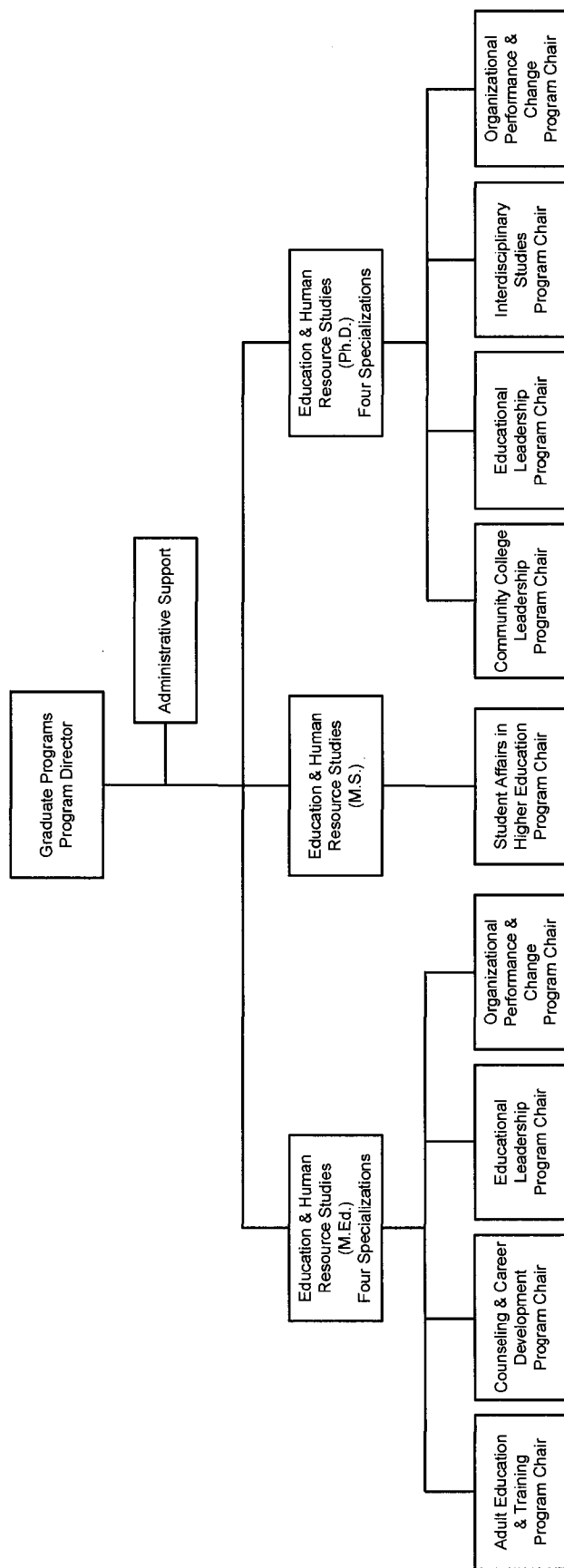
Fall 2006

Organizational Chart: School



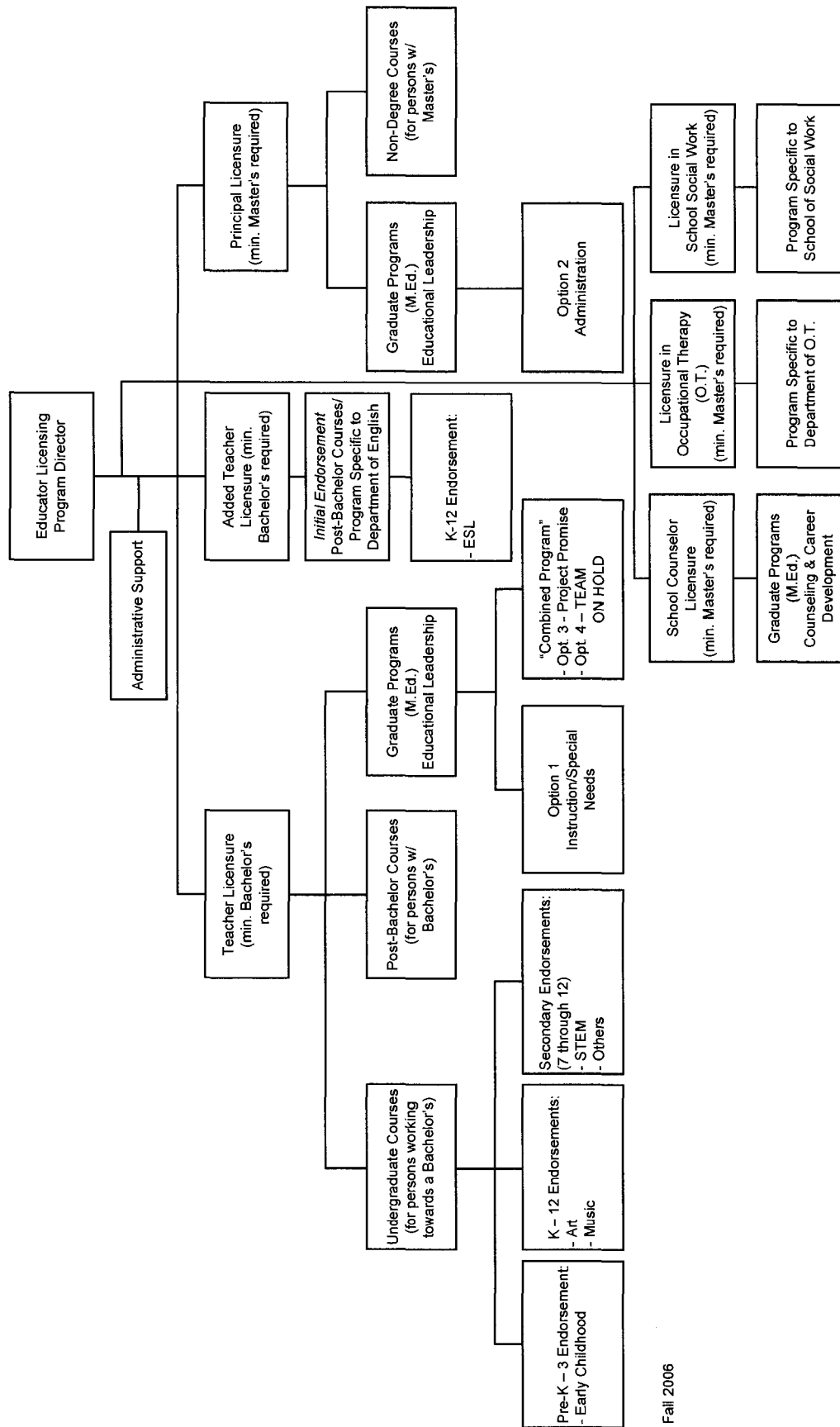
Fall 2006

Organizational Chart: Graduate Programs



Fall 2006

Organizational Chart: Educator Licensing



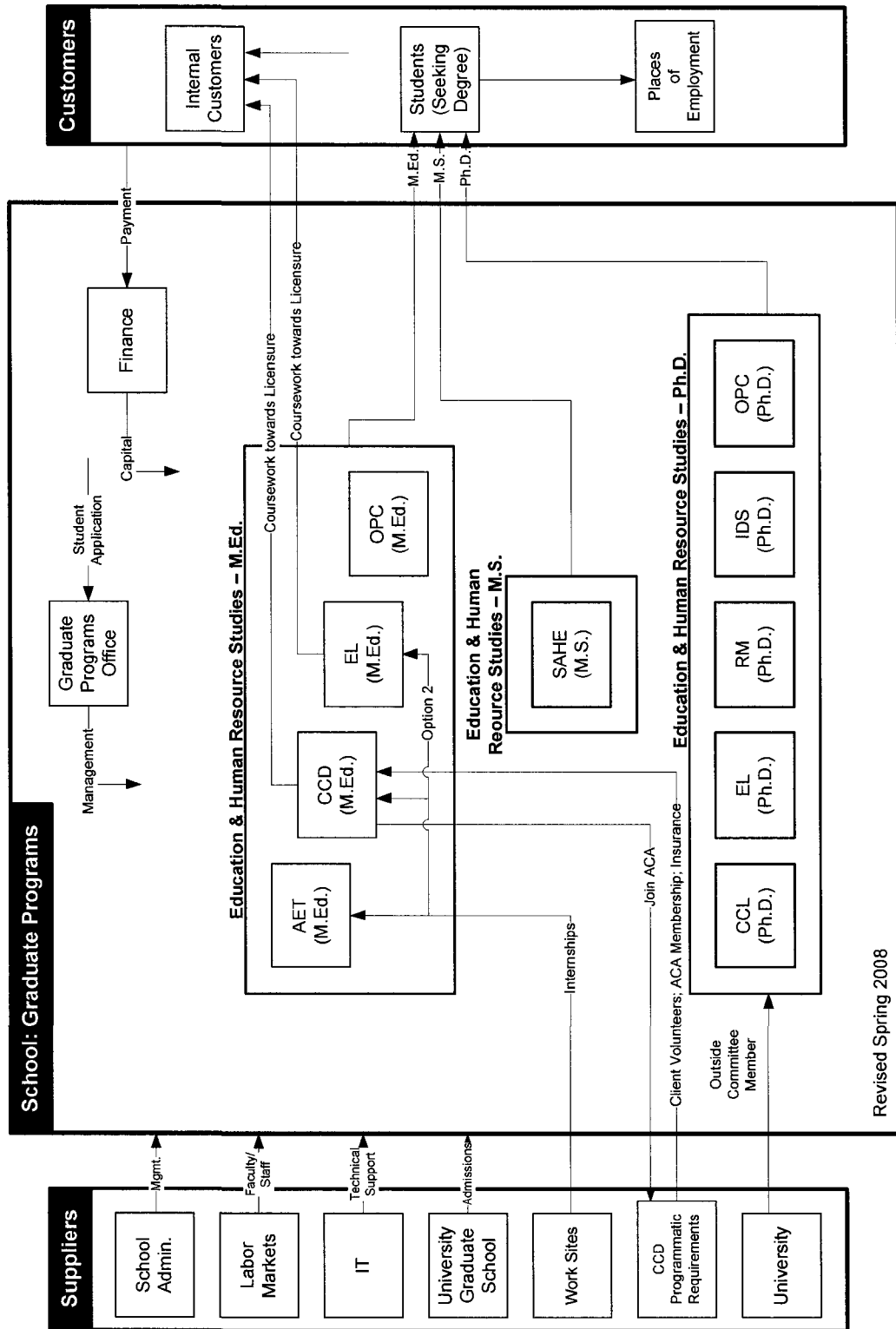
Fall 2006

APPENDIX C

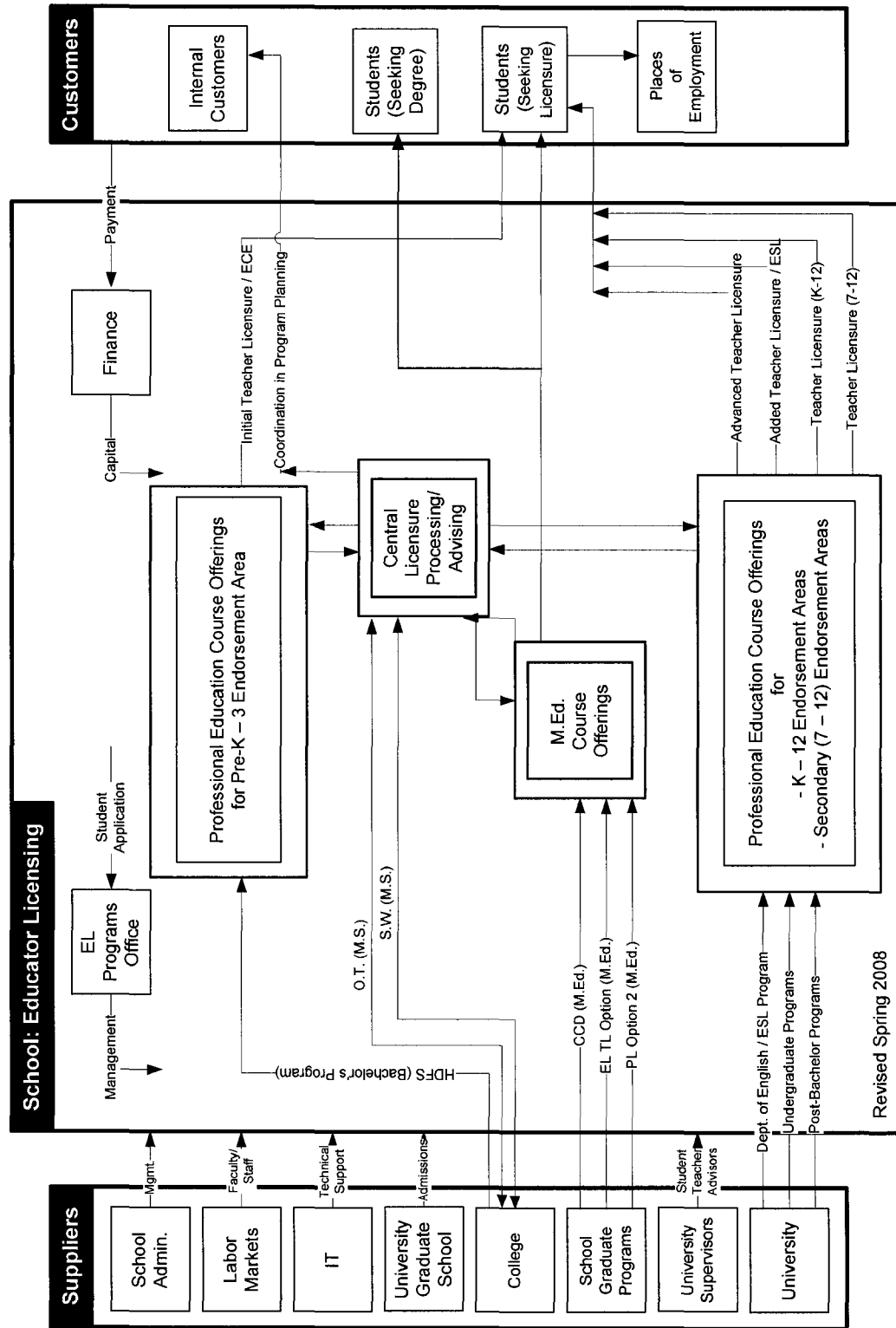
Relationship Maps

(Actual State)

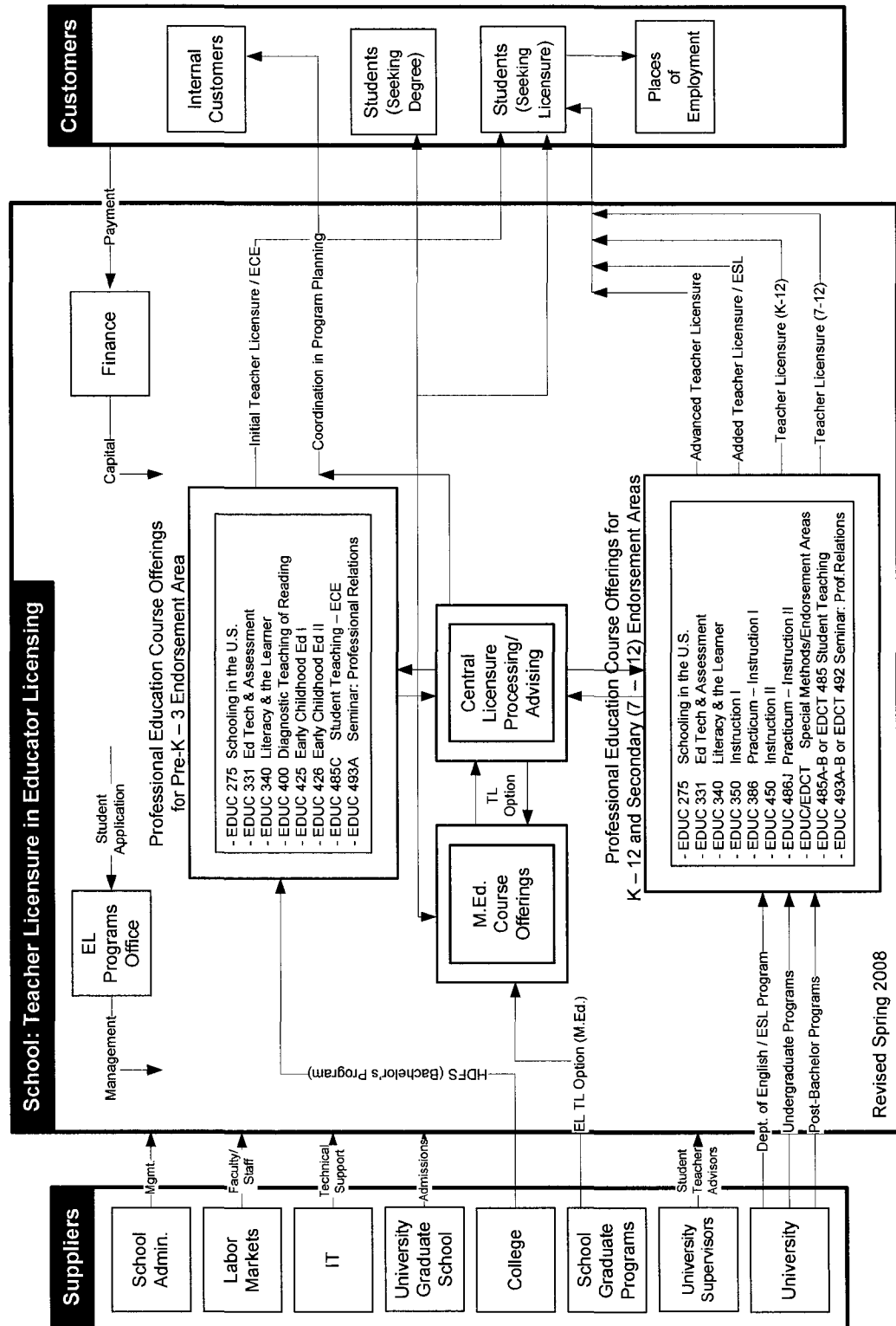
Functional Relationship Map



Functional Relationship Map



Functional Relationship Map

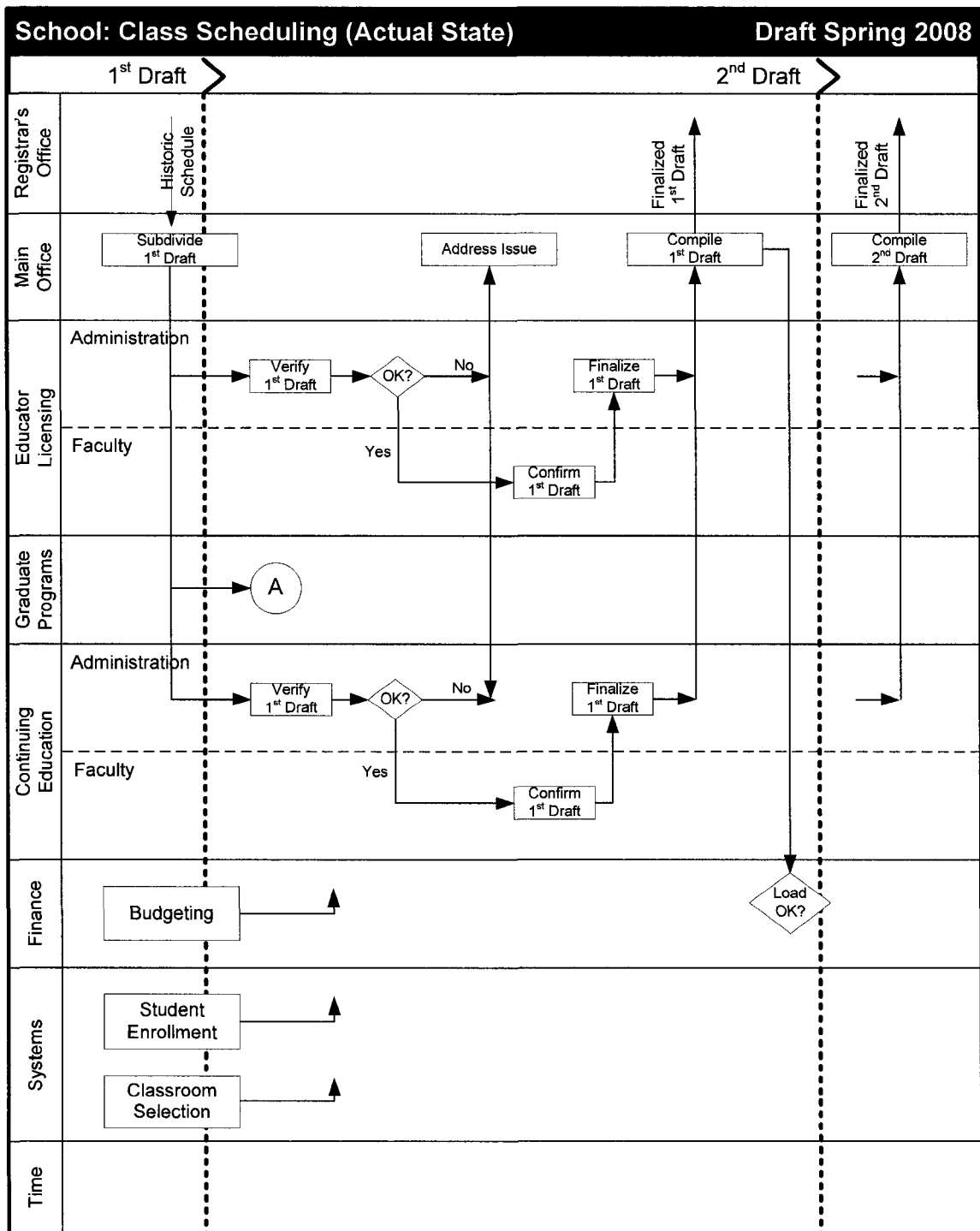


APPENDIX D

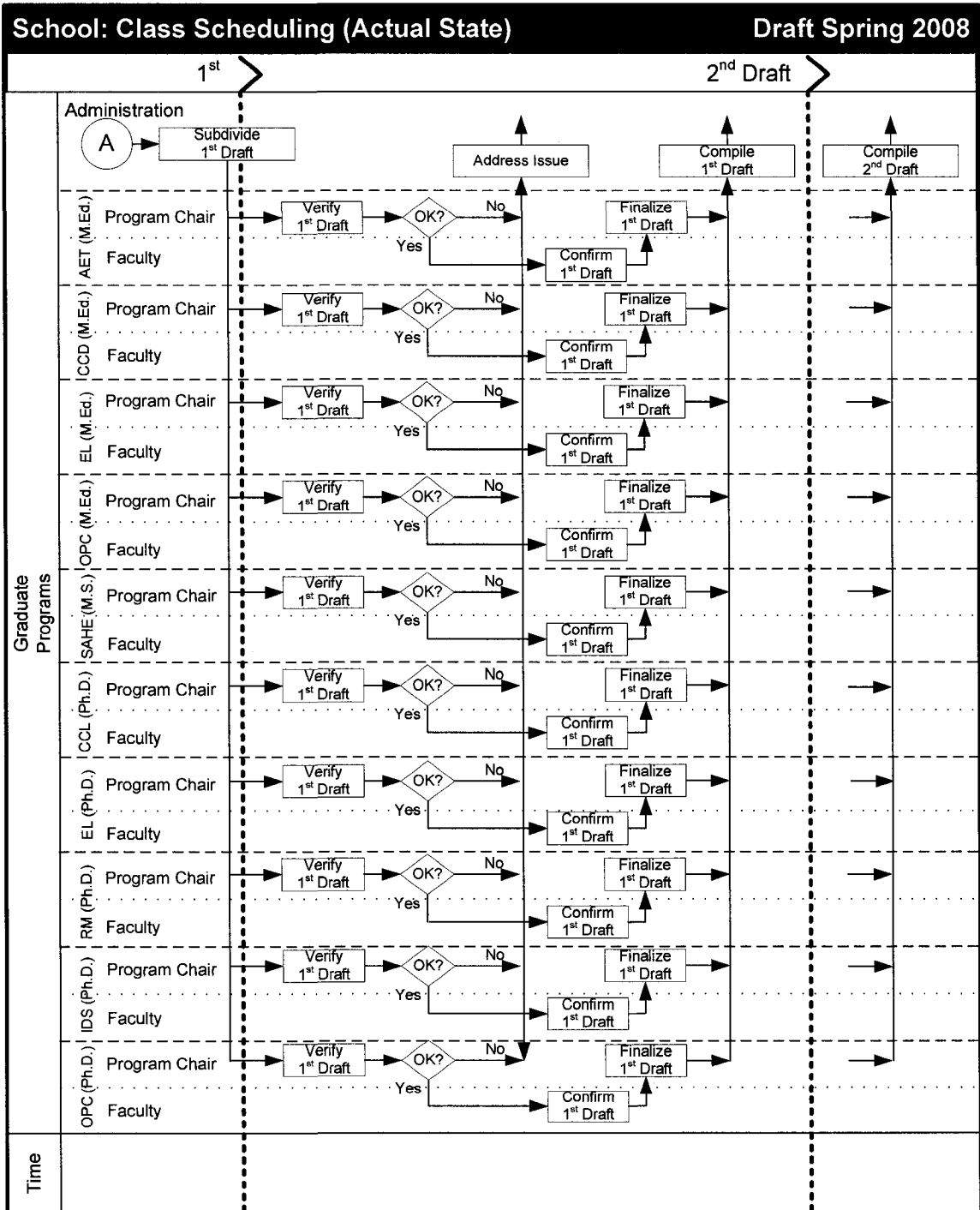
Draft Process Maps

(Actual State)

Cross-Functional Process Map



Cross-Functional Process Map



APPENDIX E

Example - List of Course Offerings by the School

(Actual State)

Course	See Key	Function 1 Misc.	Function 2 Program 1	Function 2 Program 2	Function 2 Program 3	Function 2 Etc.	Function 2	Function 3 Misc.
Undergraduate/Post-Bachelor Level Courses								
Course 1		F, S, Su						
Course 2	V-IS	V						
Course 3	V-S	V						
Etc.								
Master's Level								
Course 1			X	X	X			
Course 2				X		F		
Course 3	V-W		V					
Etc.								
Doctoral Level								
Course 1								
Course 2							F	
Course 3	V-D							
Etc.								

Please verify shaded boxes: Are courses offered for programs and semesters indicated?
 Comment and/or make corrections directly on document and then return it to (name of researcher).
 Thank you!

KEY

X = Course Offering

F = Fall

S =

Spring

Su = Summer

° Offered in 2007 and alternate years thereafter (odd years)
 * Offered in 2008 and alternate years thereafter (even years)

NT	Approved for Non-Traditional Offering (C = Correspondence; O = Online; T = Telecourse; V = Videotape)
V-D	Variable/Dissertation
V-IS	Variable/Independent Study
V-S	Variable/Seminar
V-W	Variable/Workshop

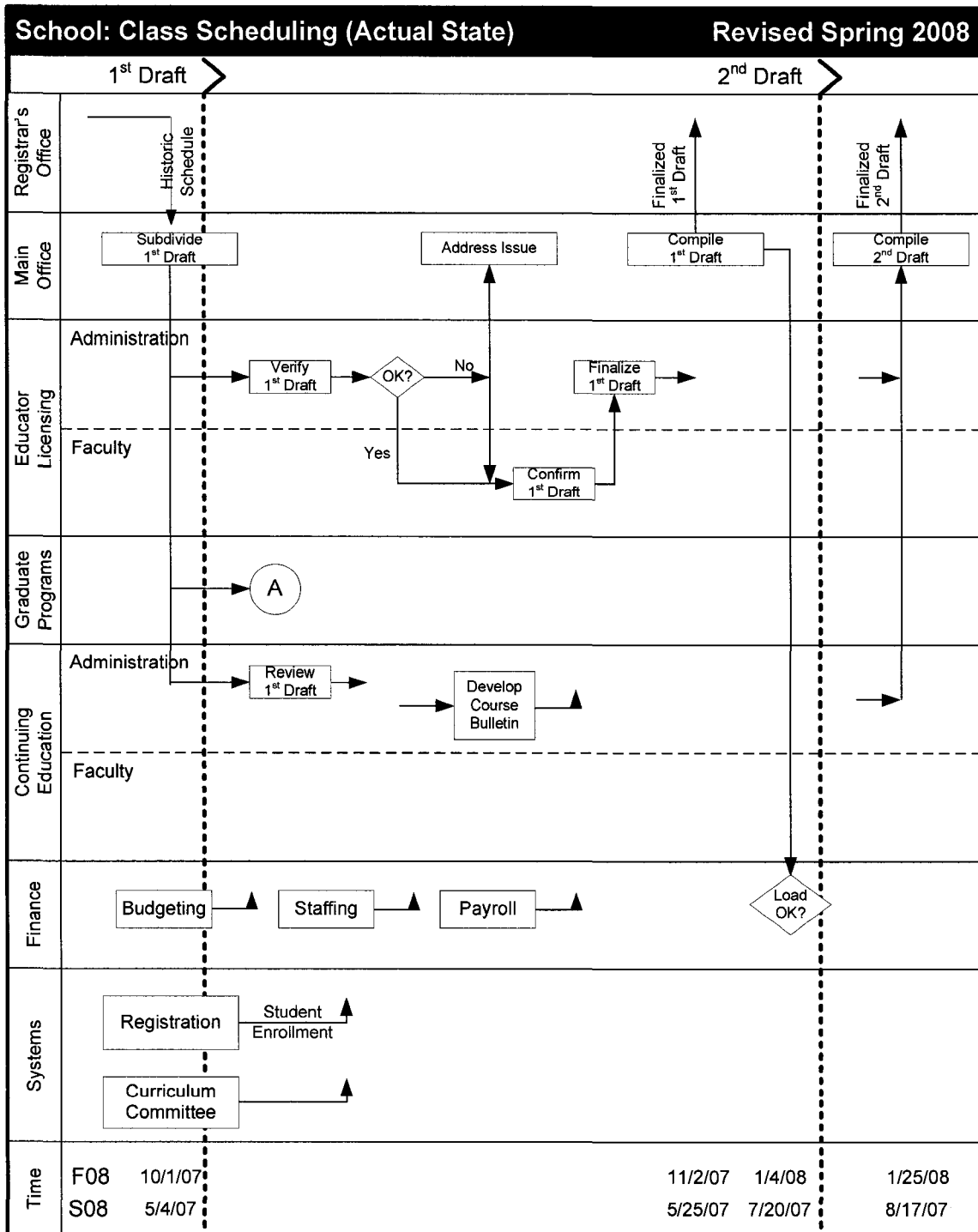
Please verify shaded boxes: Are courses offered for programs and semesters indicated?
Comment and/or make corrections directly on document and then return it to (name of researcher).
Thank you!

APPENDIX F

Revised Process Maps

(Actual State)

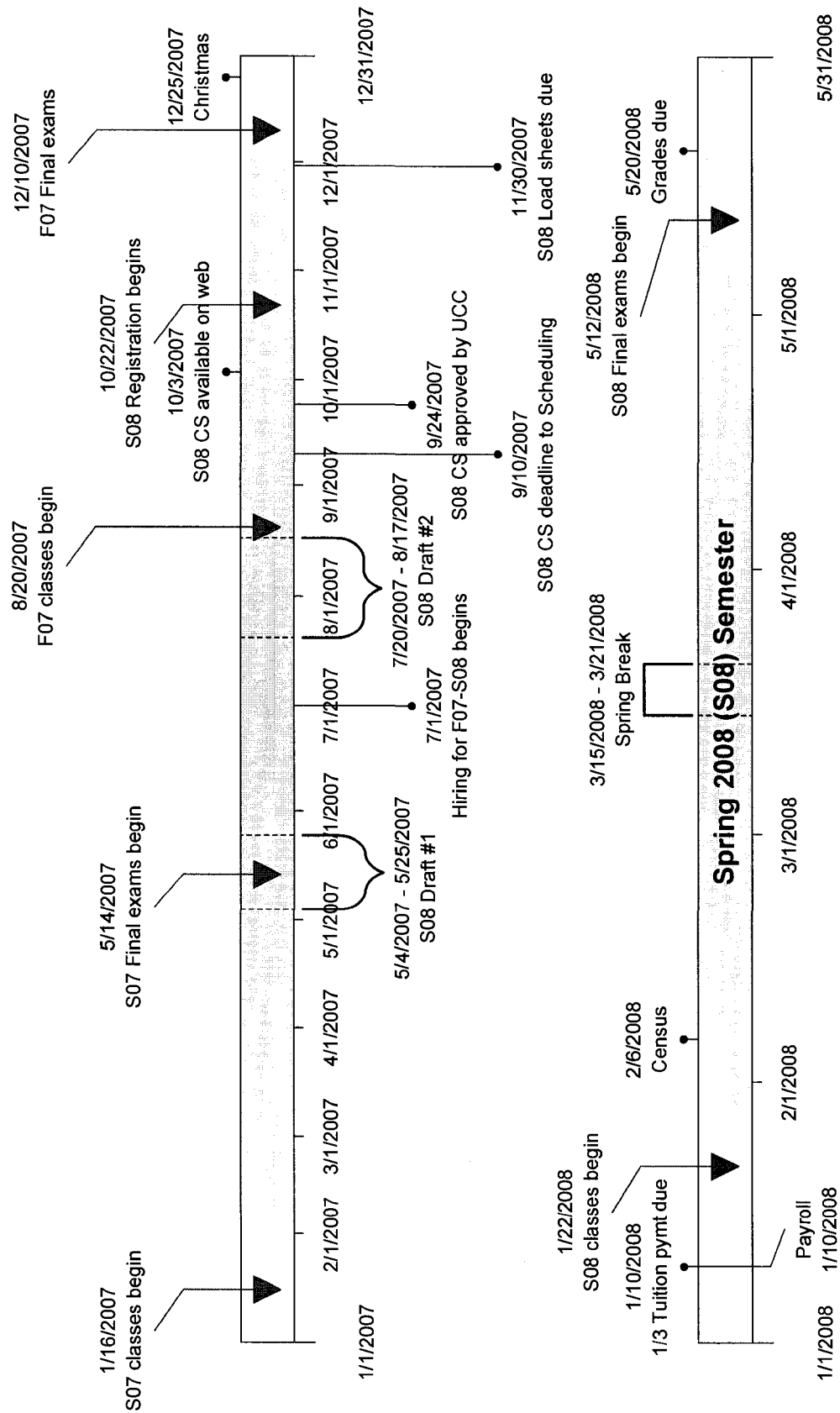
Cross-Functional Process Map



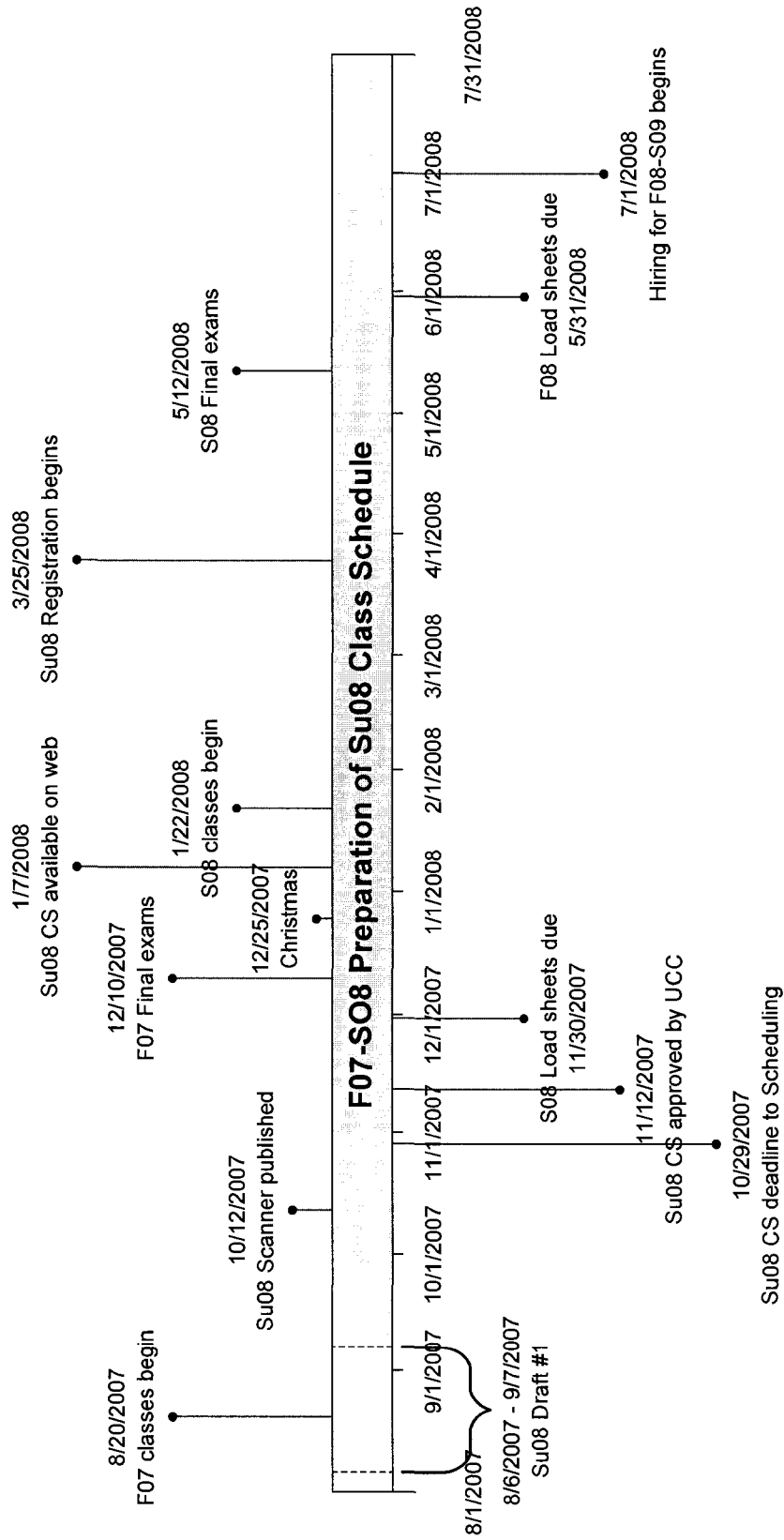
APPENDIX G

Timelines of Class Scheduling (Actual State)

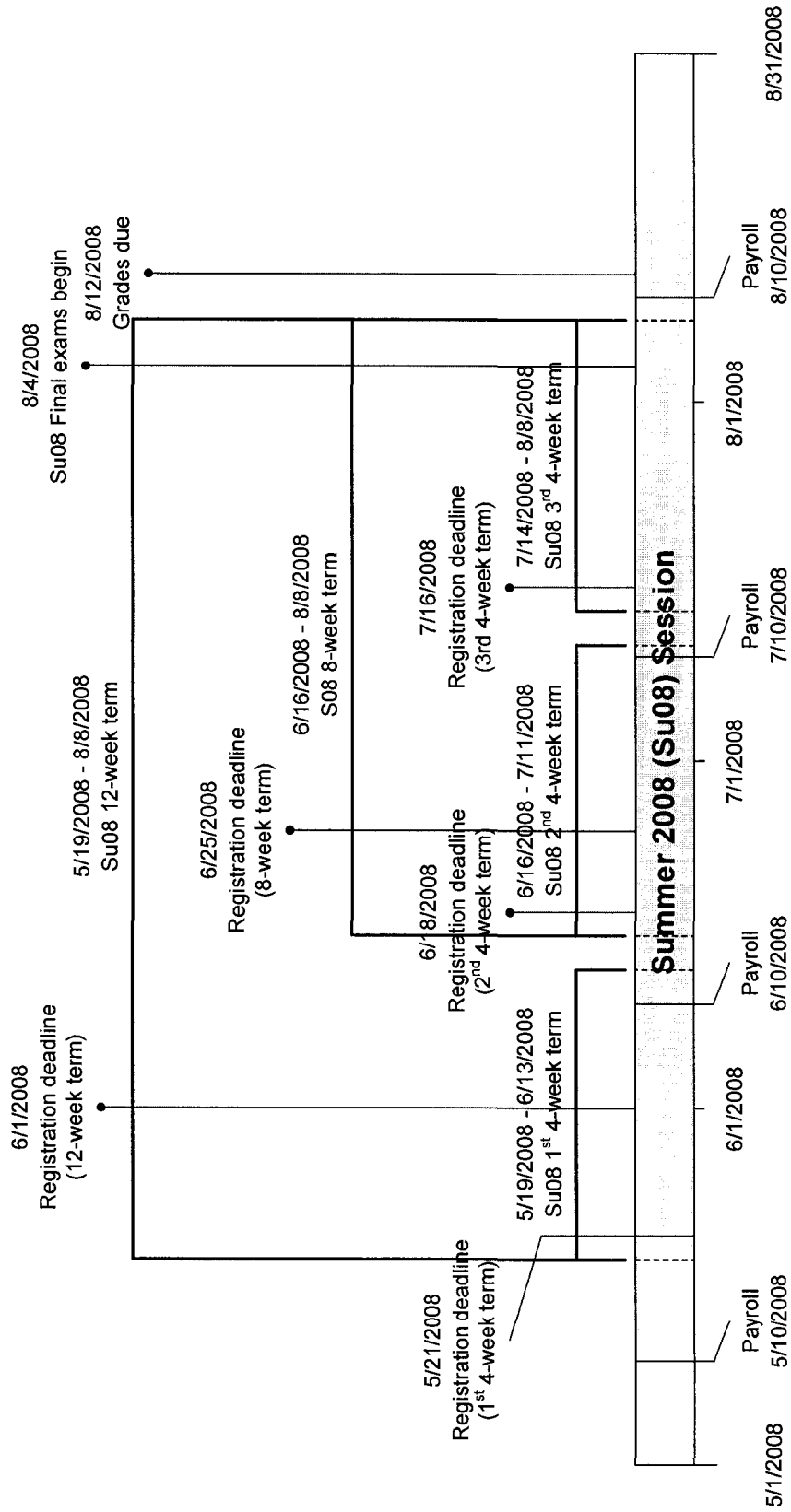
Spring 2007 (S07) – Fall 2007 (F07) Preparation of S08 Class Schedule



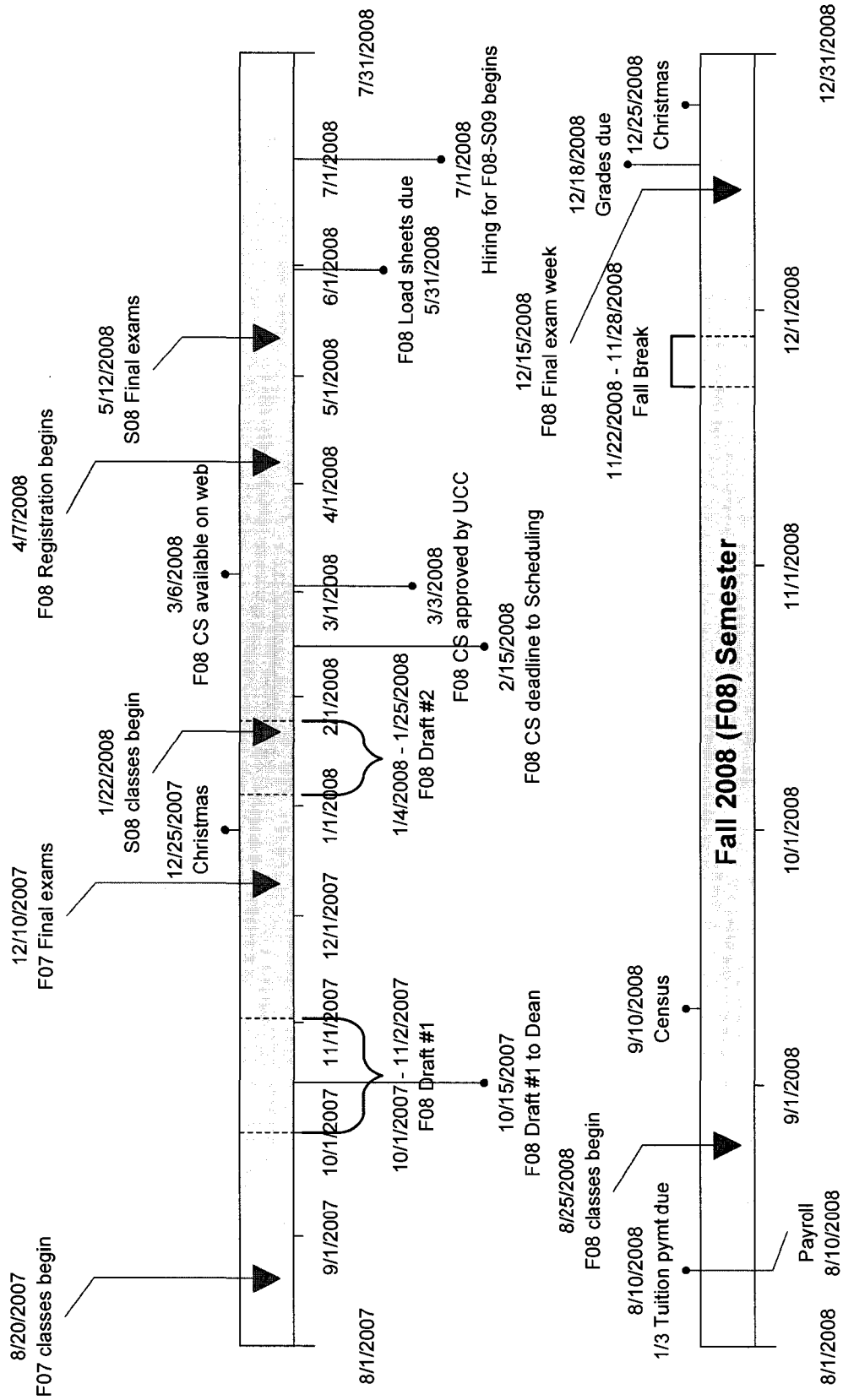
F07-SO8 Preparation of Su08 Class Schedule



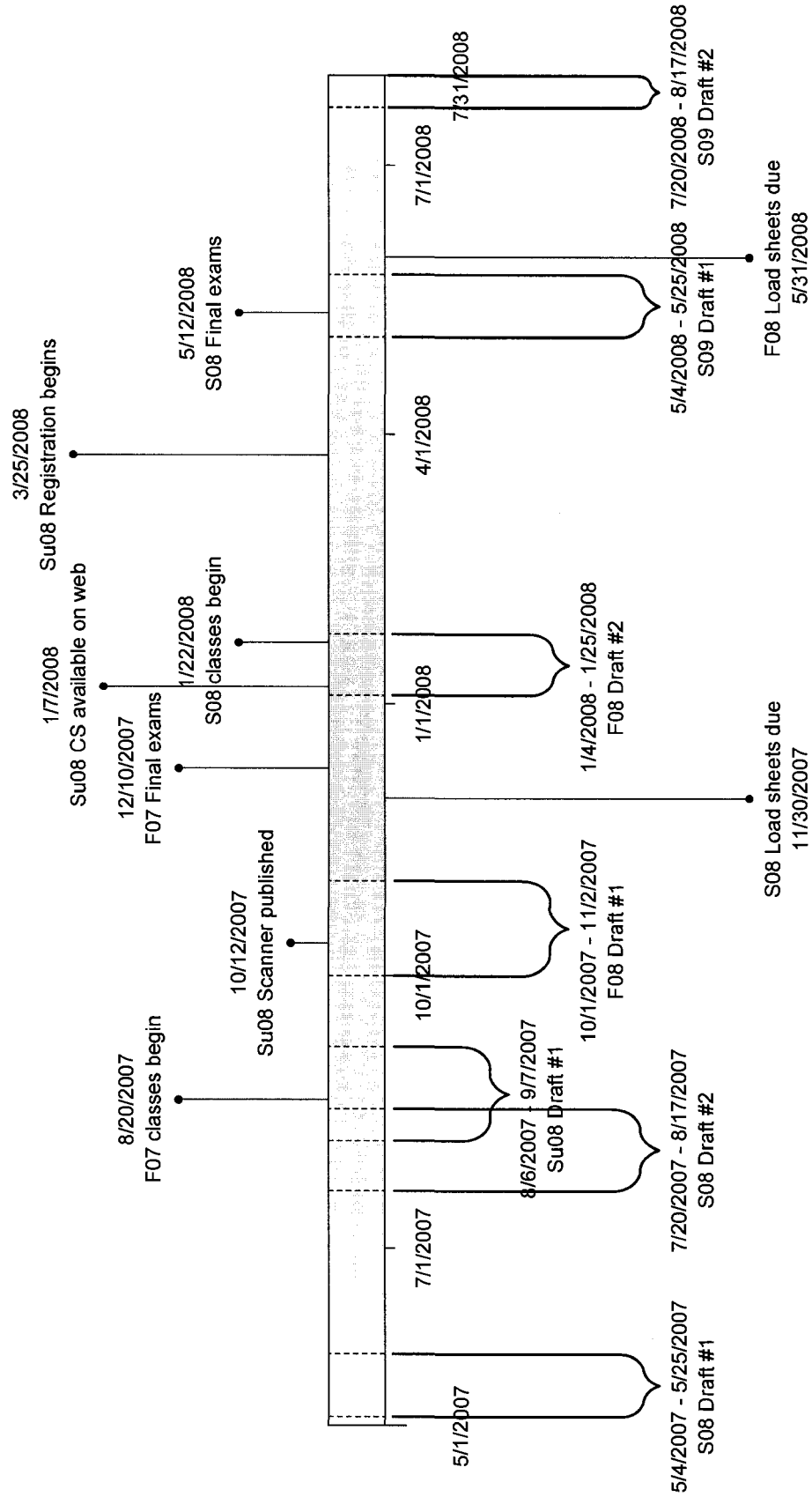
Su08 Class Schedule (Prepared Fall 2007 (F07) – Spring 2008 (S08))



Fall 2007 (F07) – Spring 2008 (S08) Preparation of F08 Class Schedule



Overview of F07-S08 Preparation of Class Schedules for S08, Su08, & F08



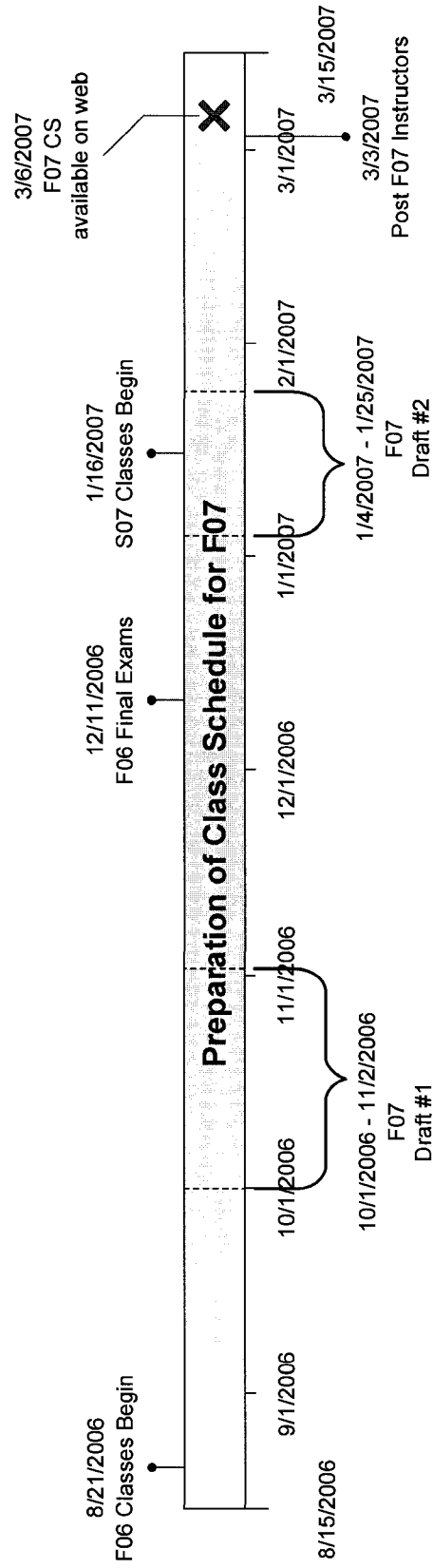
APPENDIX H

Proposed Timeline of Class Scheduling

Load Percentages

(Desired State)

E.g., Preparation of F07 Class Schedule & Deadline for Load Percentages



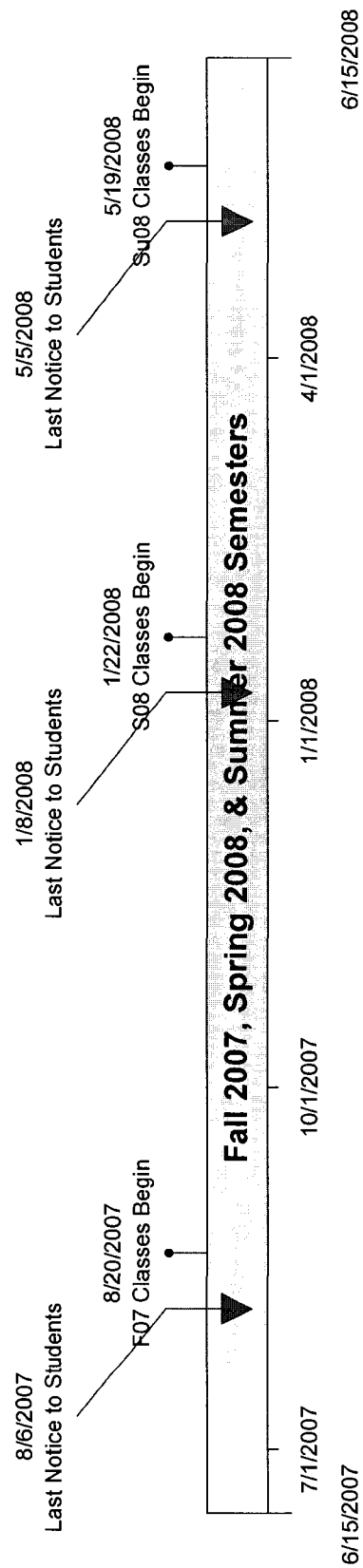
APPENDIX I

Proposed Timeline of Class Scheduling

Notice to Students

(Desired State)

E.g., Enrollment Requirements and Notices to Students



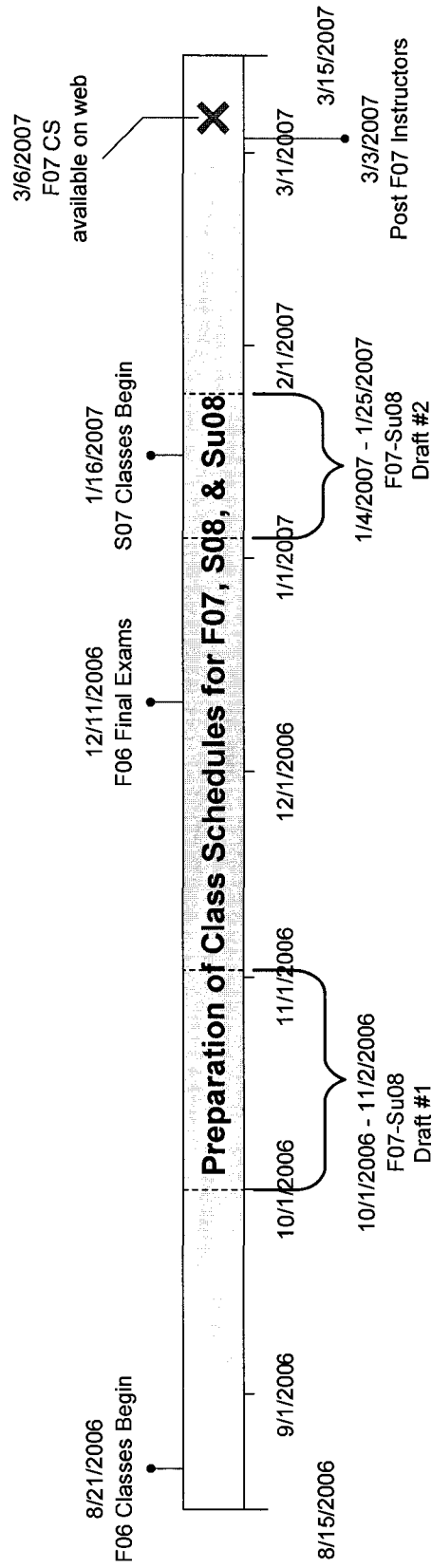
APPENDIX J

Proposed Timeline of Class Scheduling

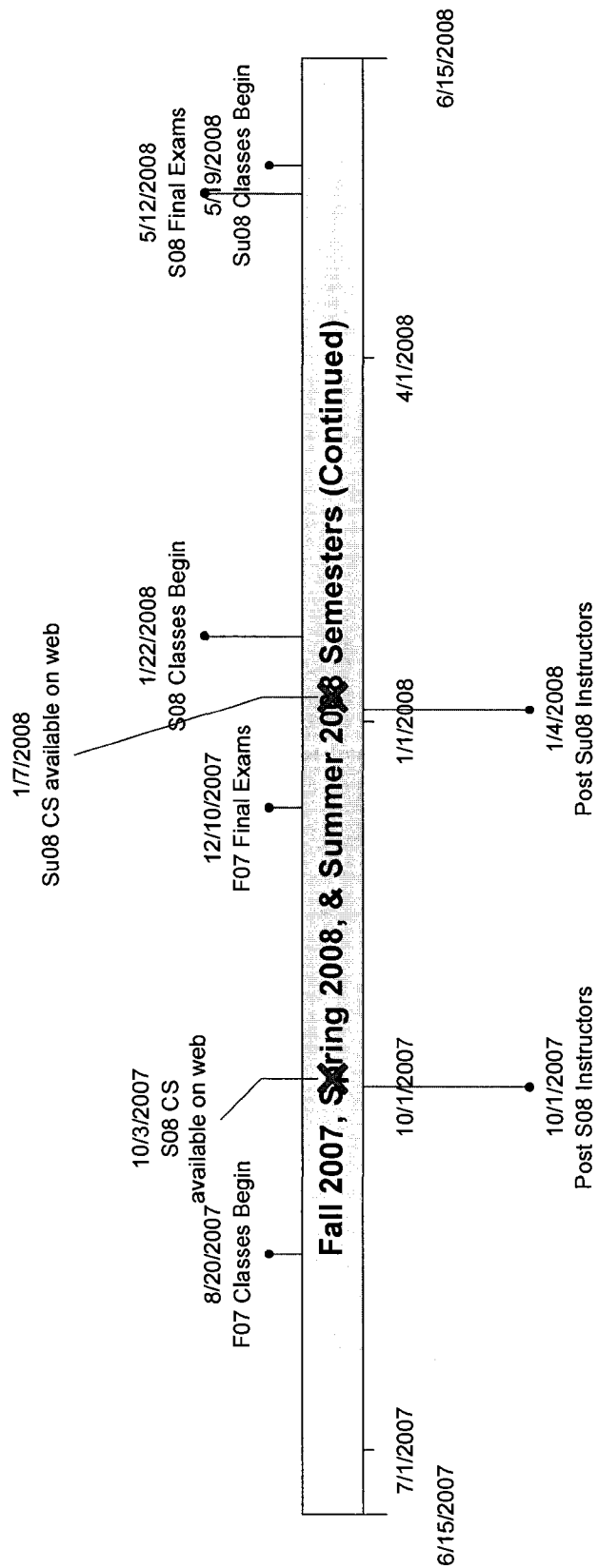
Course Assignments

(Desired State)

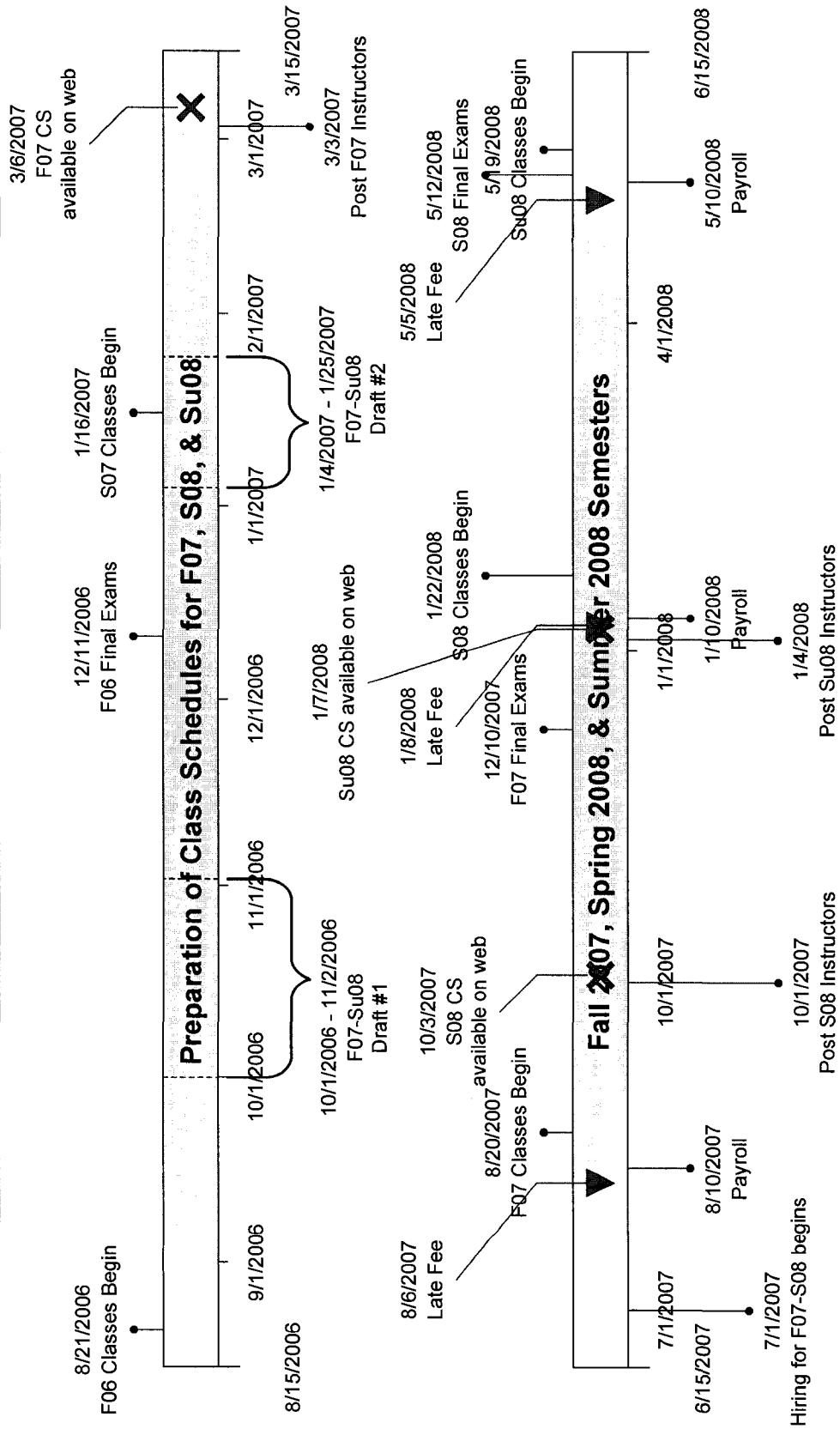
E.g., Deadline for F07 Course Assignments & Instructor Postings



E.g., Deadline for S08 and Su08 Course Assignments & Instructor Postings



E.g., Overview of Dates and Deadlines with One Year Outlook



APPENDIX K

Proposed Outline of Work Flow (Desired State)

UNIVERSITY LEVEL

Develop Class Schedule:

1st DRAFT

Registrar's Office

1. Send class schedule draft #1 (same semester of prior year) to department (school)
2. Compile departments' comments on class schedule draft #1
3. Q&A/corrections/changes with department (school) about draft #1, if needed
4. Send class schedule draft #2 (with changes) to department (school)
5. Compile departments' comments on class schedule draft #2
6. Q&A/corrections/changes with department (school) about draft #2, if needed
7. Send printed class schedule final draft to school (close loop; online = NOTICE)

DEPARTMENT (SCHOOL) LEVEL:

Develop Class Schedule:

1st DRAFT

1. Main Office
 - Send class schedule draft #1 (same semester of prior year) to Functions for review
 - Clean Functions' comments on class schedule (if instructions weren't followed)
 - Compile Functions' comments on class schedule draft #1
 - Respond to Registrar's Office with comments on class schedule draft #1
 - Respond to CE with comments on draft course bulletin
2. Function 1: Graduate Programs
 - Review class schedule draft #1 (or related information)
 - Send class schedule draft #1 to Program Chairs for review
 - Raise top level issues with School Director
 - Compile Program Chairs' comments on class schedule draft #1
 - Respond to Main Office & Finance with comments on class schedule draft #1
3. Function 2: Educator Licensing
 - Review class schedule draft #1 (or related information)
 - Send class schedule draft #1 to Program Chairs for review
 - Send class schedule draft #1 to Course Leaders for review
 - Raise top level issues with School Director
 - Compile Program Chairs' comments on class schedule draft #1
 - Respond to Main Office & Finance with comments on class schedule draft #1
 - Communicate with other departments on campus
 - Communicate with area school districts
 - Q&A/corrections/changes with Registrar's Office about drafts #1 or #2, if needed

4. Function 3: Continuing Education
 - Review class schedule draft #1 (or related information)
 - Raise top level issues with School Director
 - Develop course bulletin (three times per year for fall, spring, and summer)
 - Processing
 - Reviewing
 - Printing & Publishing
 - Delivery
 - Build courses into computer system
 - Work with DCE
5. Program Chair
 - Review class schedule draft #1 (or related information)
 - (Re) Negotiate what courses (intra- and inter-program) to teach for self
 - Provide input to Program Director (depending on Function's protocol)
 - Determine what courses faculty will teach (or who will teach what course?)
 - Determine if day(s) and times for classes are acceptable
 - Verify load percentages
 - Raise top level issues with Program Director
 - Resolve or reach short-term compromise
 - Table discussion until after summer session for longer-term
 - Respond to Graduate Programs with comments on class schedule draft #1
6. Faculty
 - (Re) Negotiate what courses (intra- and inter-program) to teach for self
 - Determine if day(s) and times for classes are acceptable
 - Verify load percentages
 - Respond to Program Chair

2nd DRAFT

7. Main Office
 - Send class schedule draft #2 (with changes) to Functions for review
 - Compile Functions' comments on class schedule draft #2
 - Respond to Registrar's Office with comments on class schedule draft #2
8. Function 1: Graduate Programs
 - Review class schedule draft #2 (or related information)
 - Send class schedule draft #2 to Program Chairs for review
 - Raise top level issues with School Director
 - Compile Program Chairs' comments on class schedule draft #2
 - Respond to Main Office & Finance with comments on class schedule draft #2

9. Function 2: Educator Licensing

- Review class schedule draft #2 (or related information)
- Send class schedule draft #2 to Program Chairs for review
- Raise top level issues with School Director
- Compile Program Chairs' comments on class schedule draft #2
- Respond to Main Office & Finance with comments on class schedule draft #2

10. Function 3: Continuing Education

- Review class schedule draft #2 (or related information)
- Raise top level issues with School Director

11. Program Chair

- Review class schedule draft #2 (or related information)
- (Re) Negotiate what courses (intra- and inter-program) to teach for self
 - Provide input to Program Director (depending on Function's protocol)
 - Determine what courses faculty will teach (or who will teach what course?)
 - Determine if day(s) and times for classes are acceptable
 - Verify load percentages
- Raise top level issues with Program Director
 - Resolve or reach short-term compromise
 - Table discussion until after summer session for longer-term
- Respond to Graduate Programs with comments on class schedule draft #2

12. Faculty

- (Re) Negotiate what courses (intra- and inter-program) to teach for self
- Determine if day(s) and times for classes are acceptable
- Verify load percentages
- Respond to Program Chair

FINAL DRAFT

13. Main Office

- Send class schedule final draft to Functions plus Administration (close loop)

14. Function 1: Graduate Programs

- Send class schedule final draft to Program Chairs and staff (close loop)

15. Function 2: Educator Licensing

- Send class schedule final draft to Program Chairs and staff (close loop)

16. Function 3: Continuing Education

- Send class schedule final draft to staff and any others as appropriate (close loop)

17. Program Chair

- Send class schedule final draft to faculty (close loop)

Update Class Schedule Before It's Made Available Online:

18. Enrollment restrictions?

19. Add instructors to respective sections, if incomplete

- Consult with Finance as appropriate
- Search for instructors in teaching pool to fill voids
- Recruit and hire faculty to fill voids

Verify Class Schedule After It's Made Available Online:

Consider Changes to Class Schedule After Registration Begins:

20. Monitor enrollment numbers (Instructors, Program Chairs, Program Directors)

- Add additional section if high enrollment
 - Instructors, Program Chairs, Program Directors to discuss issue as appropriate
 - Consult with Finance as appropriate
 - Determine who will teach new section
 - Verify load percentages
 - Initiate making changes through appropriate procedures
 - i. Request days(s), time, classroom
- Maintain same section with overrides to accommodate students (space allowing)
 - Instructors, Program Chairs, Program Directors to discuss issue as appropriate
 - Consult with Finance as appropriate
 - Contact students accordingly
- Cancel section if low enrollment
 - Instructors, Program Chairs, Program Directors to discuss issue as appropriate
 - Consult with Finance as appropriate
 - Contact students accordingly
 - Determine what instructor assigned to cancelled section will teach instead
 - Verify load percentages
 - Initiate making changes through appropriate procedures
 - Consider place holder for section to maintain same day(s), time, classroom