

The Formal Organization of Knowledge

An Analysis of Academic Structure

Introduction and Objectives

Over the past two decades, higher education scholars have turned their attention to the study of knowledge legitimation, specifically the role of organizational contexts in the social construction of knowledge. Examples include the analysis of emerging fields (Boxer, 1998; Gumport, 1988; Slaughter, 1997), the analysis of change within established academic fields (Clark & Neave, 1992; Novick, 1988), and the study of curricular change (Conrad & Haworth, 1990; Tierney, 1989). Few recent studies address the formal structure of academic organizations. Those studies that have addressed this domain tend to focus on the nature of the imperatives for priority setting and selective reinvestment that accompany academic restructuring and retrenchment (Gumport, 1993; Slaughter, 1993). Yet they do not examine whether there are concomitant changes in knowledge classification.

Research on the dynamics of knowledge legitimation has effectively demonstrated that knowledge has social origins, and its advancement does not unfold naturally in a self-propelled trajectory (Kuhn, 1962; Mannheim, 1936; Mulkay, 1979). In addition, these studies offer several

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anchoring assumptions that support a line of inquiry for higher education research. First, postsecondary organizations are a primary societal arena in which knowledge is developed. That is, universities and colleges both reflect and reconstitute classifications of knowledge and in so doing establish categories of expertise and knowledge worth knowing. Second, organizational context plays a role in what comes to count as knowledge. Influential factors range from the shared understanding of mission and institutional legacies to the allocation of material resources (money, space, etc.) across fields of study. Third, academic organizations tend to respond to knowledge change with additive solutions, while the complete elimination of structural units is rare. This is due in part to the proponents of academic fields who actively work to promote their ideas and protect their turf. At the same time, existing departments have a self-sustaining momentum as they achieve both local recognition as an established field and material resource flows for tenured faculty lines.

Taken together, these three premises suggest that the study of higher education can benefit from further analysis of the interdependence between organizational context and what counts as knowledge. In this article, we bring to the foreground the formal organizational structure and examine its significance for knowledge legitimation. Our primary objectives are to provide a rationale for the study of academic structure and to illustrate how our conceptual interests translate into empirical inquiry. We argue that changes in what counts as knowledge are reflected in the bureaucratic and programmatic structures of universities.

This article is organized as follows. We begin by introducing the concept of academic structure, which anchors our theoretical and empirical approach. Next, we review the literature that provides the intellectual ancestry of our work. We then identify and develop two research questions as a basis for exploratory analysis: (1) how does the formal organization of knowledge change or remain the same over time? and (2) are there differences across knowledge areas? We present illustrative case study data from a comprehensive state university and conclude with a discussion of implications for further research, for campus leaders and for theoretical development.

The Functions of Academic Structure

We propose the concept of academic structure as the main conceptual anchor in this line of research. Two propositions about the functions of academic structure are central to our argument. First, several structural dimensions of academic organizations shape what counts as knowledge.

Second, modifying the academic structure enables universities to reconcile competing imperatives for stability and change. Some elaboration about each proposition is warranted.

First, the multi-dimensionality of formal organizational structure has been neglected in higher education research, even though it is well known to those who work and live in academic organizations. Many different structural units exist within academic organizations: departments and programs, faculty lines and budgets, course requirements and sequences. Together they make explicit the division of responsibilities, rules and roles, flows of information, and resources. Although such structural elements contribute to rationality within an organization, they do not assure it. Dynamism at several levels is noteworthy. Over time, there may be normative changes across the academic workplace, such as an increased emphasis on the commercialization of knowledge and other revenue-generating activities. There may also be varying degrees of social harmony and conflict within units; some of these may even prompt structural change. Within a department, for example, there are changes in course offerings, course content, and pedagogy. Across departments there are emerging faculty research interests and interdisciplinary collaborations. Such dynamics within the informal structure potentially reconstitute what knowledge becomes recognized and valued.

In this study we focus on formal structure because of its significance for knowledge legitimation. Acknowledging the co-evolution of knowledge and structure, we highlight the role of structure in shaping the intellectual terrain and supporting those ideas that become established as recognizable fields and specializations. We examine two dimensions of the formal organizational structure—the array of academic departments and the array of degree programs offered. These two dimensions are distinct yet interrelated. Both are highly visible components of academic organizations, and they are comparable not only over time but across a diverse range of higher education settings. Moreover, academic departments and degree programs signal continuity or change over time in intellectual jurisdictions (albeit with contested borders), and as such they serve as organizing principles to those inside and outside higher education.

Our second proposition is that modifications of academic structure accomplish a critical organizational function for universities and colleges, providing a powerful symbolic mechanism that signals the intention, if not the actual ability, to reconcile competing expectations from the external environment. When it comes to knowledge functions, academic organizations have a well-established social charter to embody both stability and change for society. While they are expected to preserve existing knowledge for transmission to future generations, univer-

sities and colleges are also expected to incorporate and advance new knowledge and to engage in priority setting and retrenchment when mandated.

Historically, the ideal structural response to these institutional expectations has been additive. Yet over the past three decades changing economic conditions and enrollment fluctuations have prompted academic leaders to question the long-term feasibility of addition *ad infinitum*. The realities of constraining organizational factors, such as money and space, have pressured universities to select among existing commitments those most worthy of continued investment. Times of priority setting often entail pruning academic units that are perceived to have proliferated excessively and weeding out those that have been deemed obsolete. In the contemporary era, such targeting and consolidation of academic units have been justified due to fiscal constraint and rationalized by criteria that may characterize units as of poor quality, less central to mission, or too costly. In fact, mandates for such priority setting have become so widespread in the 1990s that some experts have declared that the principle of additive solutions has been replaced by a new principle: "change by substitution;" that is, if something new is added, something old must be eliminated (Levine, 1997; Massy, 1996). In this way, the pressure to adapt runs directly counter to the organizational inertia embedded in established structures, thereby posing an apparently irreconcilable challenge for the organization.

Our study offers an original conceptualization and empirical approach that sheds light on the structural capacity of academic organizations to reconcile these tensions. By examining multiple dimensions of academic structure over time, this study illustrates how academic structure enables the organization to respond to expectations for continuity and change.

Intellectual Ancestry: Studying the Formal Organization of Knowledge

Two sets of literature inform our conceptual and empirical approach. The first is the new sociology of knowledge, which illuminates the relationship between postsecondary organizations and knowledge legitimation. The second is research on academic change in higher education organizations, which provides the rationale for a line of inquiry that is both longitudinal and multidimensional.

The New Sociology of Knowledge

Unlike the traditional sociology of knowledge, which examines the link between the development of ideas and the particular social locations or interests of individuals or groups (Mannheim, 1936; Weber, 1946),

the new sociology of knowledge examines how kinds of social organization make whole orderings of knowledge possible (Swidler & Ardit, 1994). As a scholarly domain, this conceptualization asks how institutional structures and practices support and reconstitute categories of knowledge. This line of inquiry addresses the role of institutional settings in shaping the content and form of ideas, not only those structures of knowledge developed by specialists but also the structures of knowledge or consciousness that shape the thinking of laypersons. Sociologists refer to this focus as a “middle” level of analysis, in between analyses of large-scale macro forces such as the economy and individual-level interests. This middle level, what Smelser (1997) calls “meso-sociology,” warrants examination in its own right for its function as a powerful shaper of cognitive categories and social boundaries with consequences for both micro and macro levels.

From this perspective, academic organizations are a primary site for the creation and evolution of knowledge categories. Some theorists claim that these functions are most apparent in educational organizations (Lodahl & Gordon, 1972; Meyer, 1977), especially at the postsecondary level, given that colleges and universities define categories of expertise and certify individuals for participation in the labor market. Yet, the creation and evolution of knowledge classifications are evident in other societal domains. For example, in his studies of high culture, DiMaggio (1987) has argued that artistic classification systems are mediated by the organizational settings in which art is produced and genres are enacted. These processes have organizational as well as cognitive significance. Extending DiMaggio’s insights to academic organizations, the ritualization of knowledge categories occurs through the creation and maintenance of departments and degree programs. In these settings, the knowledge categories and their labels contribute to what counts as knowledge. They not only provide a location where participants generate local knowledge of departmental procedures and program completion expectations, but they also designate the knowledge most worth knowing within the field. The latter is achieved by requiring proficiency of students in certain subjects and by hiring faculty with particular research and teaching interests. So, while these institutional settings structure the educational milieu for learning, they also shape the landscape of “what is thinkable.” (Swidler & Ardit, 1994, pp. 314–315).

It is worth noting that the formal organization of academic knowledge in the United States occurs at several educational levels (elementary, secondary, and postsecondary), although these levels are not structurally aligned. For example, social studies in high school has no corresponding category in college. Knowledge categories become more prominent in

the uppermost levels of education. At the lower levels of education (K-8), the organization of knowledge is less apparent, as grade levels dominate in structuring educational activity (e.g., fifth graders are educated separately from first graders). Moreover, some knowledge categories are considered co-curricular activities that tend to occur outside the regular classroom setting (e.g., physical education, art, music). Although academic subject matter and departmentalization do become visible at the secondary school level (Siskin, 1994), it is in postsecondary settings where academic categories move to the foreground in structuring educational activity, and grade levels move to the background. Academic departments (chemistry, history, economics, for example) and degree programs (degree subjects of the bachelor's, master's and doctorate) are the basic building blocks. Thus, the knowledge categories in higher education are organizing principles for students' learning, faculty work, and credentialing.

Knowledge categories also have symbolic value for the organization with respect to the environment—even if there is little or no productive activity in some of those areas. Consistent with institutional theory (Meyer & Rowan, 1977, 1978), the academic structure itself can have important consequences for the organization's legitimacy. For example, the maintenance of a full range of knowledge categories in the academic structure can enhance the legitimacy of a campus that strives to be seen as a comprehensive university. Similarly, the establishment of new programs may further the aspirations of those campuses seeking to emulate the academic offerings of higher status campuses (Clark, 1987).

Within the study of higher education, the centrality of these knowledge legitimation dynamics is a fundamental, yet to date peripheral, concern. The most visible contribution to advance this line of thinking is developed by Clark (1983). According to Clark, the conventional approach that dominates higher education research is to focus on people-processing functions: students undergo personality development, learn skills, develop human capital, or obtain degrees for status attainment and upward mobility (e.g., Astin, 1977; Feldman & Newcomb, 1976; Pascarella & Terenzini, 1991). In contrast, Clark proposes that knowledge-processing functions should be seen as the defining core of academic organizations. He argues that knowledge is “the prime material around which activity is organized. . . . Knowledge materials, and advanced ones at that, are at the core of any higher education system's purposes and essence. This holds true throughout history and across societies” (1983, p. 13). These knowledge-based activities have a wide array of intellectual, professional, economic, and social consequences. Following Meyer (1977), Clark suggests: “As educational institutions in

general evolve, they develop categories of knowledge and thereby determine that certain types of knowledge exist and are authoritative. They also define categories of persons privileged to possess the bodies of knowledge and to exercise the authority that comes from knowledge. Educational structures, in effect, are a theory of knowledge, in that they help define what currently counts as knowledge” (1983, p. 26).

Thus, it is essential to consider the emergence of new categories that constitute the formal organization of knowledge. Certain historical periods have been characterized as times of dramatic knowledge expansion, where external political and economic demands for knowledge have penetrated the academy. The decades following the end of World War II are often characterized as a period of knowledge explosion in the United States. In addition to expanded research activities and a concomitant diversification of academic specialties, there was a proliferation of enrollments and career-oriented degree offerings (Geiger, 1993; Harclerod & Ostar, 1987). At the same time, widespread interdisciplinary efforts, such as cultural studies, feminist studies, and science studies, have had far-reaching impact for what counts as knowledge in several domains and have even sought to unravel, if not dismantle, established borders that heretofore defined academic jurisdictions. By the latter part of the twentieth century, scholars have proclaimed a new knowledge-based economy in which the production and consumption of knowledge have become the primary mechanism for economic development, technological innovation, occupational advancement, political action, and societal change (Drucker, 1994; Gibbons et al., 1994). This implies that the categories and content of the existing academic landscape are increasingly salient to those in the wider society.

Taking such a knowledge-centered approach, we seek to advance this line of inquiry by examining continuity and change in the formal organization of knowledge in contemporary U.S. universities.¹ Our central empirical aim is to examine how accepted knowledge categories and organizational structures co-evolve.

Research on Academic Change in Higher Education Organizations

The second body of literature that informs this study is research on organizational change, specifically in university and college settings. Two lines of inquiry are foundational to our approach. One encompasses competing organizational theories of inertia and adaptation. The other provides empirical analyses of academic change. Together this literature suggests the need for research on academic change that is longitudinal, multidimensional and considers variation across academic fields.²

Theorists offer opposing understandings of change dynamics within universities and colleges. On the one hand, there are those theorists who emphasize organizational inertia. They suggest a tendency for large, complex organizations with contested goals and ambiguous technologies to resist fundamental change in their technical core (Hannan & Freeman, 1989) and an inclination to retain the organizational arrangements established at their founding (Stinchcombe, 1965). These theorists find ready examples in higher education, because colleges and universities show a tendency to retain the essential structural characteristics of their origins. Clark Kerr's (1987) well-known observation emphasizes the point:

About 85 institutions in the Western World established by 1520 still exist in recognizable forms, with similar functions and with unbroken histories, including the Catholic church, the Parliaments of the Isle of Man, of Iceland, and of Great Britain, several Swiss cantons, the Bank of Siena and 70 universities. Kings that rule, feudal lords with vassals, and guilds with monopolies are all gone. These 70 universities, however, are still in the same locations with some of the same buildings, with professors and students doing much the same things, and with governance carried on in much the same ways. (p. 184)

In both rhetorical discourse and scholarly research, the structure of academic organizations has been much maligned for its inertia, failing to respond effectively to changes in student demographics, labor market requirements, and technological advancements. Academic organizations have been criticized for bloated bureaucracy, professional stagnation and ineffective management (Bergmann, 1991; Gumport & Pusser, 1995; Pew, 1990). Not all characterizations of inflexibility in academic structures carry negative connotations, however. Enduring organizational features, such as classical curricula, faculty tenure, and the importance of symbols, rituals, and traditions, may be seen as embodying cherished academic ideals. Thus, while observers may lament the inherent inertia of enduring structures, others may view organizational inertia as an essential source of cultural stability, continuity in professional identities and knowledge classifications.

In contrast to organizational theories of inertia, adaptation theorists suggest that organizations manipulate their structures and processes in the face of strategic imperatives (Miles & Cameron, 1982), such as those generated by shifts in the availability of key resources (Pfeffer & Salancik, 1978). In times of changing environmental conditions, adaptation theorists are among those who advocate restructuring and applaud the flexibility of academic organizations. Structural changes, such as reengineering, networking, and outsourcing, have been offered as adap-

tive responses to environmental demands (Gumport & Pusser, 1997). Amidst the vocal calls that higher education must change in order to survive, several scholars have argued that the structural complexity of academic organizations and systems has enabled them to adapt responsively through the addition and subtraction of subjects that reflect shifting intellectual pursuits (Clark, 1983; Kerr, 1987).

Although the opposing assessments of inertia and adaptation offer alternative frameworks, a common denominator between the two is the need for evidence on the extent to which there is continuity and change in the structure of academic organizations. These theories affirm the centrality of structure and the potential to modify structure to enact the many institutional functions expected of academic organizations. With this in mind, we can examine how higher education organizations structurally respond to the paradoxical imperatives faced by the U.S. higher education system to adapt to the changing needs of society while remaining a stable social institution.³ In light of these theoretical arguments, there is much to learn from the empirical study of structural change in higher education organizations. Below we review three studies (Blau, 1973; Hefferlin, 1969; Metzger, 1987) that are significant to our approach in that they supply models for identifying and measuring change in major dimensions of academic structure. More generally, they also have value in their assertion that academic structure should be studied empirically in its local organizational manifestations.

Blau (1973) has examined the elaboration of formal bureaucratic structures, specifically the relationship between organizational size and structural change. Blau's findings confirm that, as in government agencies, increases in the size of academic organizations lead to increased differentiation, academic specialization, and bureaucratization. His focus on the addition of academic departments suggests that this is a critical step in the institutionalization of new fields and disciplines. Blau's study serves as a springboard for our own investigation, as we seek to improve upon two of its major limitations. First, his study is cross-sectional and thus unable to capture innovation and institutionalization, which are longitudinal phenomena. Second, his singular focus on departmental units, though a vital contribution, offers a limited conception of how knowledge is organized within colleges and universities. We propose that programmatic and curricular offerings are also important structural manifestations of academic innovation.

In a similar spirit, Hefferlin's (1969) study of change identifies the curriculum as a primary structure around which legitimate knowledge is formally organized. Like Blau, Hefferlin was interested in the process of knowledge change in the form of expansion, differentiation, and special-

ization. However, Hefferlin focuses on course offerings and examines those fields that are eliminated from the knowledge structure, either through mergers with other subjects or wholesale removal from the academic program. Among Hefferlin's key findings is that curricular reform is most likely to occur under conditions of organizational instability and vulnerability. This argument is of particular interest because it stands in some contrast to Blau, who suggests that organizational "innovation"—or the creation of new departments—occurs in periods of relative stability. Of course, the authors' different conceptualizations of organizational change help explain this divergence. Blau conceptualizes change in terms of organizational innovation, whereas Hefferlin's argument presents change in the context of academic reform. Such divergent explanations of change in the organization of knowledge suggest the need for a multidimensional conceptualization of academic structure. That is, we think changes in the formal structure of departments must be examined separately from changes in academic program offerings, for those elements may likely be subject to different organizational and societal forces.

Finally, Metzger's (1987) historical analysis of changes in the professoriate affirms that the study of academic change should be both longitudinal and multidimensional. Metzger analyzes the proliferation of academic units due to knowledge growth accompanying the expansion and specialization of the professoriate, and he emphasizes the differentiation and specialization of academic knowledge as it is formally organized in the disciplinary affiliations of university faculty. His historical approach illustrates the value of studying knowledge change over an extended period of time.⁴ He also offers a more refined explanation of how knowledge specialization occurs. For example, he distinguishes between (1) *subject parturition*, in which subspecialties are spawned from more inclusive subjects; (2) *program affiliation*, in which new academic programs are created to accommodate training in the "learned" professions (law, medicine, divinity), and (3) *subject dignification*, in which previously marginalized subjects or new subjects gain currency in traditional academic settings. Although Metzger does not consistently distinguish between the basic structural forms of knowledge and seems to imply that the same forces drive changes in degree programs and departments, his distinction among types of specialization suggests that it is worthwhile to examine the life course of accepted knowledge categories within the academic landscape.

Implicit in these three pioneering works is the foundational notion that the formal organizational structures of departments and degree programs are defining features of academic organizations. Although they

identify a number of potential lines of empirical study, none of these researchers problematizes whether the dimensions are linked to one another, whether modifications in structure are critical to the legitimacy of the academic organization, or how changes in the academic structure affect a larger system of knowledge legitimation.

Mapping Academic Structure

Having reviewed the relevant literature, we consider two questions: How does the formal organization of knowledge change or remain the same over time? Are there different patterns across knowledge areas?

Two Related Dimensions: Bureaucratic and Programmatic

To answer these questions, we develop the concept of academic structure as a representation of the formal organization of knowledge in colleges and universities. If the delivery and production of knowledge through teaching and research are core educational functions of colleges and universities, then we can identify two related but distinct elements that structure these core functions: (1) *bureaucratic* (e.g., schools, divisions, and departments), and (2) *programmatic* (e.g., degree programs offered). A great majority of organizational inputs and outputs are mediated through these two structural elements. Both elements reflect the differentiation and stratification of knowledge, embody political contests over organizational resources and power, and help form the identity of participants as well as the organization as a whole.

The first element of academic structure is bureaucratic. In postsecondary organizations, the bureaucratic structure takes its shape in academic departments and other formal units that consume resources, manage personnel, and occupy physical space. This conceptualization is consistent with a Weberian approach, highlighting the circumscribed domains of administrative responsibility, personnel, and procedures that structure organizational authority and work. Bureaucratic units also include other hierarchical levels, such as divisions, schools, and colleges. Departmental units are typically organized around an established field of study and are responsible for the administration of academic degree programs, the hiring and support of faculty, and the flow of resources—a large proportion of which are fixed in tenured positions. Thus, the bureaucratic structure is characterized by both vertical and horizontal differentiation. This results in nested levels of bureaucracy, the higher levels of which represent schemes for organizing related groups of knowledge activity and their administration.

Almost all academic activity in a college or university is tied in some

way to a formal bureaucratic unit. All regular faculty appointments have departmental ties, and the administration of each student's degree program flows through the departmental bureaucracy. Thus, the addition or elimination of a formal unit is a significant event. For the most part, however, departments do not merely appear and disappear; rather, the organization of units evolves over time as departments change names, merge with other departments, or split into multiple units. Such changes are related to the legitimation and de-legitimation of knowledge categories as well as to significant economic and political factors that are both internal and external to the organization (Gumpert, 1993).

The second element of academic structure is programmatic. As an empirical dimension for study, we focus on the array of degree program offerings. Like the bureaucratic structure, academic programs are horizontally differentiated by subject. However, vertical differentiation in this structural dimension takes a different form. In the most common hierarchy, degrees are vertically differentiated by certification level—the associate's degree representing the fewest requirements for certification, followed by the bachelor's, master's and doctoral degrees. Differential status of knowledge can be inferred from degree level, because the adoption of graduate degree programs in a particular field is often interpreted as a stronger commitment to that field by the organization.

Like departments, the array of degree programs offered changes over time. Programs are added and eliminated, albeit with fewer consequences for the allocation of resources or personnel than the addition or elimination of an entire department, division, or school. Nonetheless, degree program offerings are important for several reasons. They signify areas of faculty interest and expertise, locate students within the academic organization, and contribute to the external identity of the organization. In fact, the highest degree level offered is a primary determinant in the Carnegie Classification of Institutions as well as a substantive factor in the choices of students and parents as they consider alternative educational programs. Additionally, students carry their degrees with them into their work and social lives, which serves as an important mechanism for the diffusion and legitimation of knowledge classifications into other societal domains. Thus, changes in both the bureaucratic structure and the programmatic structure represent important organizational dynamics as well as broader shifts in what counts as knowledge.

Of course, these two dimensions of academic structure are closely related. In practical terms, departments administer degrees. Resources and personnel (faculty and administrative staff) are committed to the establishment and management of departments in order to offer a curriculum

and degrees in a given knowledge area. However, the experience of academic administrators and professionals tells us that the internal factors involved in adding new departments are much different than those involved in changing academic program offerings. University-wide committees that are charged with planning, priority setting, budgeting, and promotion and tenure decisions tend to affect the establishment (or elimination) of departments more so than degree programs, which tend to require approval (and renewal) from curriculum committees often working through academic senates.⁵ Thus, when considering the structural location of changes in the organization of knowledge, the programmatic structure and the bureaucratic structure must be examined separately.

Certainly an argument can be made that our focus on departments and degree programs is limiting because it does not provide a comprehensive view of academic change. Many other organizational elements, such as individual course offerings, independent research units, continuing education, and professional development programs are essential to the academic mission of institutions and represent additional structural arrangements through which knowledge change processes occur. Despite the obvious importance of these elements, we think that departments and programs are two primary dimensions that are the most highly visible in structuring educational activity, identities of students and faculty, and the external identity of the campus. Together, bureaucratic structure and programmatic structure enable academic organizations to fulfill their multiple functions: as settings for educational practices of teaching and learning, for organizational practices to coordinate and manage academic work, for elaborating careers and professional identities, and, in turn, for supporting and reconstituting knowledge categories.

The Case Study Site: San José State University

We collected longitudinal data from one site on these two dimensions of academic structure—the bureaucratic and programmatic structures—and we closely examined the nature of change over time in each. The site is San José State University (SJSU). The oldest public institution of higher education in California, San José State was founded in San Francisco in 1857 and named the California State Normal School in 1862. Originally a teacher training school, the institution moved to San José in 1871 and sustained its primary focus on teacher education throughout much of the early 20th Century. By 1935 the name of the college had changed from San José State Teacher's College to San José State College, signifying the beginning of an era in which the academic offerings

expanded beyond teacher education to general and occupational degrees. In 1949, just before the start date of our data collection efforts, the college offered its first Masters of Arts degrees. The Master of Science degree was added in 1955. Of major significance for this study was San José State College's addition to the California State College system (now called the California State University system) in 1961. Between its admission in the CSU system in 1961 and the year the institution achieved "university" status in the system, 1972, a reorganization of academic departments occurred to accommodate the expanded mission.

While the early 1970s saw the end of a period of mission clarification and reorganization, major shifts in the social, cultural, and economic environment were only beginning in the region SJSU served. The Santa Clara Valley was in the midst of a dramatic transition from a thriving agricultural community to the center of the emerging high technology industry. In 1977 Apple Computer officially took off and began to revolutionize the region and the personal computer industry, and the region was firmly establishing itself as the center of the booming biotechnology field. The demographics of San José changed as well, as Latino and Asian populations grew appreciably. As a comprehensive state university whose mission is to serve the local needs of the labor market, we would expect such changes to be reflected in the academic structure. Indeed, an inspection of the SJSU mission statements over two decades reflect attention to these changing local dynamics. At the same time, however, the growth of global economies and the importance of attracting national and international student markets are also evident in SJSU's mission statements. These regionally specific changes, coupled with aspirations to expand its geographic reach, provide an important backdrop to our study of academic change at this site.

Before turning to the data, it is important to indicate where this case study site fits in the context of all master's colleges and universities (the 1994 Carnegie Classifications MCU I and II). As shown in Appendix A, the comparative data for the past twenty years suggest that SJSU operates on a larger scale than other MCUs. It has a larger than average enrollment (almost four times larger). It spends slightly more on instruction per FTE student, and the proportion of expenditures spent on instruction is higher than the average for all MCUs. The data for the past decade suggest that SJSU has been subject to similar economic pressures as the other MCUs. Instructional expenditures per FTE student declined, and instruction's share of total expenditures declined. Over the past decade, state appropriations per FTE student declined more so at SJSU than the average for MCUs. While we are not suggesting that SJSU is representative of the universe of MCUs, such data suggest that

SJSU has experienced the contemporary economic constraints that are so common nationally (Harclerod & Ostar, 1987). Thus, we think it is an appropriate site for an exploratory inquiry into patterns of continuity and change in academic structure.

Data and Methods

In order to investigate the extent of continuity and change in academic structure we conducted both qualitative and quantitative analyses spanning a forty-five year period. Data were drawn from several sources. The primary data source was the SJSU course catalogues published between 1952 and 1997. We collected data from ten catalogues, representing nine evenly distributed five-year intervals. The following academic years are represented in the sample: 1952–1953, 1957–1958, 1962–1963, 1967–1968, 1972–1973, 1977–1978, 1982–1983, 1987–1988, 1992–1993, and 1997–1998.

College course catalogues provide a comprehensive historical record of many aspects of academic organization. They list all available course and degree offerings as well as detailed information on the organization of schools, departments, and programs. These data allowed us to track changes in the formal bureaucratic organization, including what departments existed each year, and during each five-year interval whether or not departments were added, eliminated, merged, split, or renamed. Catalogues also allowed us to track similar changes in degree programs offered. The data for both the bureaucratic structure and programmatic structure were coded separately to produce a longitudinal history of academic change. For the bureaucratic structure data, we recorded the exact name of each academic operational unit that appeared in the ten catalogues. An academic operational unit is defined as any formal administrative unit that administers courses or degrees, has dedicated faculty lines, and occupies a physical office located on campus.⁶ For the programmatic data, we recorded the names and degree levels of every program offered during each academic year studied. Over the 45-year period, SJSU offered academic programs at four major degree levels: Bachelor of Arts, Bachelor of Science, Master of Arts, and Master of Science. Therefore, the maximum number of degree programs offered in any given subject during each year was four.⁷

A key objective of the analysis was to track change in the bureaucratic and programmatic dimensions of academic structure with respect to the evolution and legitimation of broader knowledge categories. To that end, we classified the names of departments and degree programs using a taxonomy of seven knowledge areas: Humanities, Social Sciences,

Engineering/Computer Science, Life Science, Physical Science, Health Science, Professional and Applied Fields. (See Appendix B for a discussion of the Knowledge Taxonomy.)

Much of the quantitative data compares the net change in the number of departments or degree programs within the seven knowledge areas over time. It is important to note that this method of comparing the number of departments or degree programs of a certain type obscures some interesting aspects of knowledge evolution as reflected in changing academic structures. Therefore we also conducted a more refined analysis of structural change by tracking whether, from one period to the next, the appearance or disappearance of departmental units occurred as the result of the addition of a new field, a name change, the merger of two or more departments, the dissolution of a department into two or more new departments, or the elimination of a department. A detailed history of each unit was recorded and analyzed over the 45-year period, noting changes in name, faculty, office location, and curricular offerings. This qualitative analysis not only helped us gain conceptual clarity on the interdependence between academic structure and knowledge change, but also allowed us to gain a more refined sensibility of the nature and range of academic structural changes.

Finally, we collected supplementary quantitative data on changes in faculty composition and degree production. Archival records provided to us by SJSU enabled us to record data on full-time equivalent faculty (FTEF) for each department between 1977 and 1997. Changes in the allocation of full-time equivalent faculty to different departments served as a measure of SJSU's resource commitment to different knowledge areas. Degree data from the Integrated Postsecondary Education Data System (IPEDS) were used to track changes in degree production from 1966 to 1997. Unfortunately, data on degree production and faculty were unavailable for the earliest years of our study, and departmental-level financial data were unavailable for the entire period under study.

Data Analysis and Interpretation

The case study data from 1952 to 1997 illustrate the nature of temporal changes in academic structure as well as the importance of separately examining data on the bureaucratic structure and the programmatic structure.

Co-Evolution of Knowledge and Academic Structure

Before presenting the quantitative data, we offer qualitative examples from the course catalogues to suggest that changes in the organizational

structure reflect different processes of knowledge legitimation. In the SJSU data, we identified five processes by which knowledge categories and academic structures co-evolve. These types are distinct, although not necessarily mutually exclusive.

Knowledge *differentiation* is reflected in the process by which departments and degree programs are split into multiple, new entities representing more specialized fields of study. For example, between 1957 and 1962, the Department of Engineering was split into five new departments (Electrical Engineering, Industrial Engineering, Civil Engineering, Mechanical Engineering, and Chemical Engineering). A more recent example of differentiation occurred in SJSU's Physical Education degree program offerings. Between 1982 and 1992 the degree programs in Physical Education were differentiated into five programs (Athletic Training, Movement Science, Pedagogy, Adult Adapted/Corrective Therapy, Society Studies and Sports Management). These examples point to a proliferation of units that reflect an increasing specialization of knowledge and mirror emerging career specialties.

Another type of change is knowledge *promotion*, which also occurs in both the bureaucratic and programmatic structures. When a bureaucratic subunit labeled a "department" is changed to a "division," "school" or "college," or when a degree program formerly offered at only the undergraduate level is offered in subsequent years at the graduate level, the knowledge area is promoted. For example, between 1992 and 1997 the Department of Nursing became the School of Nursing. In degree program offerings, promotion is the most common type of expansion in the overall academic program structure. Since SJSU began offering MA and MS degrees in the 1950s, the ensuing expansion of graduate education was accompanied by a corresponding growth in graduate degree programs offered. Across many knowledge areas, this entailed a vertical promotion of subjects to master's offerings.

A third type of knowledge change is knowledge *evolution*, which is reflected primarily in name changes. This often signals a substantial change in the knowledge associated with a category or a change in professional or occupational legitimacy. The transformation of the Librarianship Department to the Department of Library Sciences between 1982 and 1987, and then to Library Information Sciences by 1992 provides an example of this point. Similarly, between 1977 and 1982, the Home Economics Department was changed to the Department of Nutrition and Food Science.

Fourth, knowledge *consolidation* is evident primarily in departmental mergers, and is often accompanied by name changes. Between 1977 and 1982, for example, six separate departments in the School of Business

were consolidated into three: Accounting, Management, Marketing, Office Administration, Manpower Administration, and Finance, Insurance and Real Estate became Accounting and Finance, Organization and Management, and Marketing and Quantitative Studies. By 1997 these three units underwent further name changes when the latter department was renamed Marketing, Management Information Systems, and Decision Sciences. The consolidation and name change mirrored changes in business school programs nationally.

Another example of consolidation occurred in the Physical Education departments. In 1977 there were three departments associated with physical education: The Department of Physical Education for Men, the Department of Physical Education for Women, and the Department of Physical Activities. By 1982 these three had merged into one, called the Department of Human Performance. The elimination of the gender distinction in departmental nomenclature is also evident in the degree programs offered, a shift that is of no surprise given wider societal changes in gender awareness and political activity (e.g., *Ms. Magazine* was founded in 1971; the *Rowe v. Wade* ruling came in 1973; and in 1978 the National Organization for Women declared a state of emergency in an attempt to gather support for ratification of the Equal Rights Amendment).

A final example of consolidation is Environmental Studies, which merged into a single department with Geography in 1972. However, Environmental Studies at SJSU continued to search for an organizational home, intermittently breaking off as its own department. Between 1977 and 1982 it split from Geography, merged again, then split again by 1992. This illustration serves as a reminder that the organizational life course of an interdisciplinary field is neither linear nor predictable.

Finally, *stability* of knowledge categories is reflected in the persistence of departments or degree programs that do not evidence any of the above four types of change. The departments of Music, English, Chemistry, Occupational Therapy, and Social Science are examples of departments that have persisted at SJSU without changes in name, departmental merger, dissolution, or promotion during the 45 years studied. Of course both pedagogy and the content of the courses offered in these departments and programs have surely changed over time, but the stability of each category itself is noteworthy.

These qualitative examples illustrate a range of possible organizational trajectories for different academic fields. While some may reflect organizational dynamics that are idiosyncratic to San José State, other examples reflect larger national trends in knowledge evolution and societal expectations. It is also important to note that changes in labels and structures serve to advance knowledge evolution as much as they reflect

them.⁸ Specific to comprehensive state universities, Harclerod and Ostar (1987) stress that the broad mission of these campuses reinforces the public's expectation that they will adapt to meeting changing economic and societal needs. Although this mandate is clear, it is less clear how to manage academic structures for such flexibility. On the one hand, it could entail name changes that correspond to a changing knowledge base, as in library and information sciences. On the other hand, it could involve restructuring a group of established units to correspond to changing domains, as in business and physical education. The latter involves not only resource reallocation (money and space) but also redefining faculty's organizational location, which is difficult given the fixed nature of tenured appointments. In this sense, there are more obstacles to modifying the bureaucratic structure than there are for modifying the programmatic structure.

Continuity and Change in Bureaucratic and Programmatic Structures

Turning to the quantitative data, the data on bureaucratic structure suggest an overall pattern of early growth followed by relative stability. In the period between 1952 and 1997, the total number of departments rose from 25 to 61. This follows expected patterns of bureaucratic expansion and differentiation explained by Blau (1973). A closer look at the 45-year time period shows that expansion in bureaucratic structure slows and then subsides in the period after 1967, with a net growth of only 7 departments between 1967 and 1997 (54 to 61). As noted earlier, SJSU went through a period of mission clarification and reorganization related to its addition in 1961 to the CSU system and its promotion in 1972 to university status. This may help explain the different pattern—upheaval and then stability—for each of these two periods.

A more refined picture of the departmental structure can be found by looking at change in the number of departments representing different knowledge areas (See Figure 1). Over the entire 45-year period there is very little net change in the number of departments in the life sciences, physical sciences, and health sciences. It is important to note, however, that these three areas represent a very small proportion of the total number of departments. Departments in engineering and computer science, the social sciences and the humanities more closely reflect the overall pattern of early growth and then stabilization in the period after 1967. Between 1972 and 1997 there was a net growth of two departments in engineering and computer science (8 to 10), and a net decline of one department in the humanities (13 to 12) and social sciences (12 to 11). Departments in professional and applied fields, primarily business and

education, represent the largest subset of the bureaucratic structure. After a period of steady proliferation in professional education departments at SJSU between 1952 and 1977 (8 to 23), a reorganization within the business school caused a sharp decline by 1982 (23 to 18) followed by stability in recent years.

Although the aggregated data presented here indicate similar patterns of stability across knowledge areas, the qualitative examples offered earlier do suggest more volatility in departments (name changes, mergers, and dissolutions) associated with the professions than in the arts and sciences. The relative stability of the departments in the arts and sciences could be accounted for by the nature of the knowledge itself. It is possible that the departments of English, social science, and music were stable because their categories were broad enough to encompass ensuing knowledge and content changes. Conversely, the changes in departments within the applied and professional fields may reflect their predisposition to adapt more readily to changes in the external environment, such as advancements in information technology and changes in career opportunities.

Moving from the data on bureaucratic structure to programmatic structure, the longitudinal data on degree programs offered illustrates a trend of steady expansion, consistent with the predictions of Metzger (1987) regarding disciplinary specialization. Unlike the stabilizing trend in the departmental data in the latter period, growth in degree programs offered continued after 1972. This disparity suggests that changes in the programmatic structure and bureaucratic structure show different patterns and may respond to different stimuli.

A more refined perspective can be gained by looking at changes in the degree programs offered in different knowledge areas. (See Figure 2.) Especially in the period after 1982, a general trend of stability is evident in the life sciences, physical sciences, and health sciences. Alternatively, degree programs offered in the humanities, professional and applied fields, and to a lesser extent social sciences and engineering, demonstrate patterns of steady expansion throughout the period under study.

One noteworthy pattern in the degree program data is the proliferation of humanities degree program offerings. We have speculated that growth in professional and applied fields dominates expansion trends in the bureaucratic and programmatic data because they are more responsive to external influences, either directly from labor market changes or indirectly as mediated by preferences of career-oriented students. However, at SJSU the most dramatic increases in degree program offerings are in the humanities. This could be seen as evidence that counters the widespread concern that the humanities are stagnating (Engell & Dangerfield, 1998).

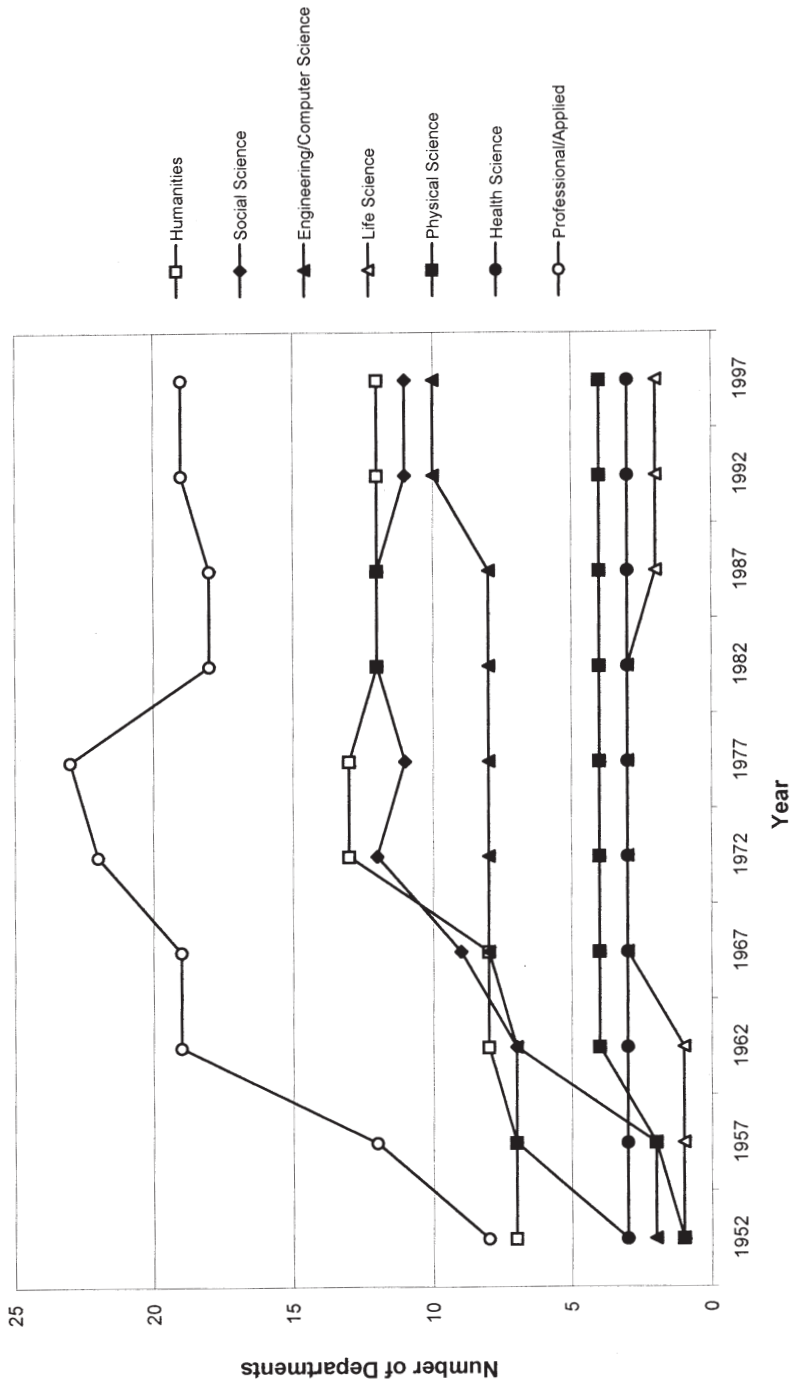


FIG. 1. SJSU Departments by Knowledge Area 1952-1997

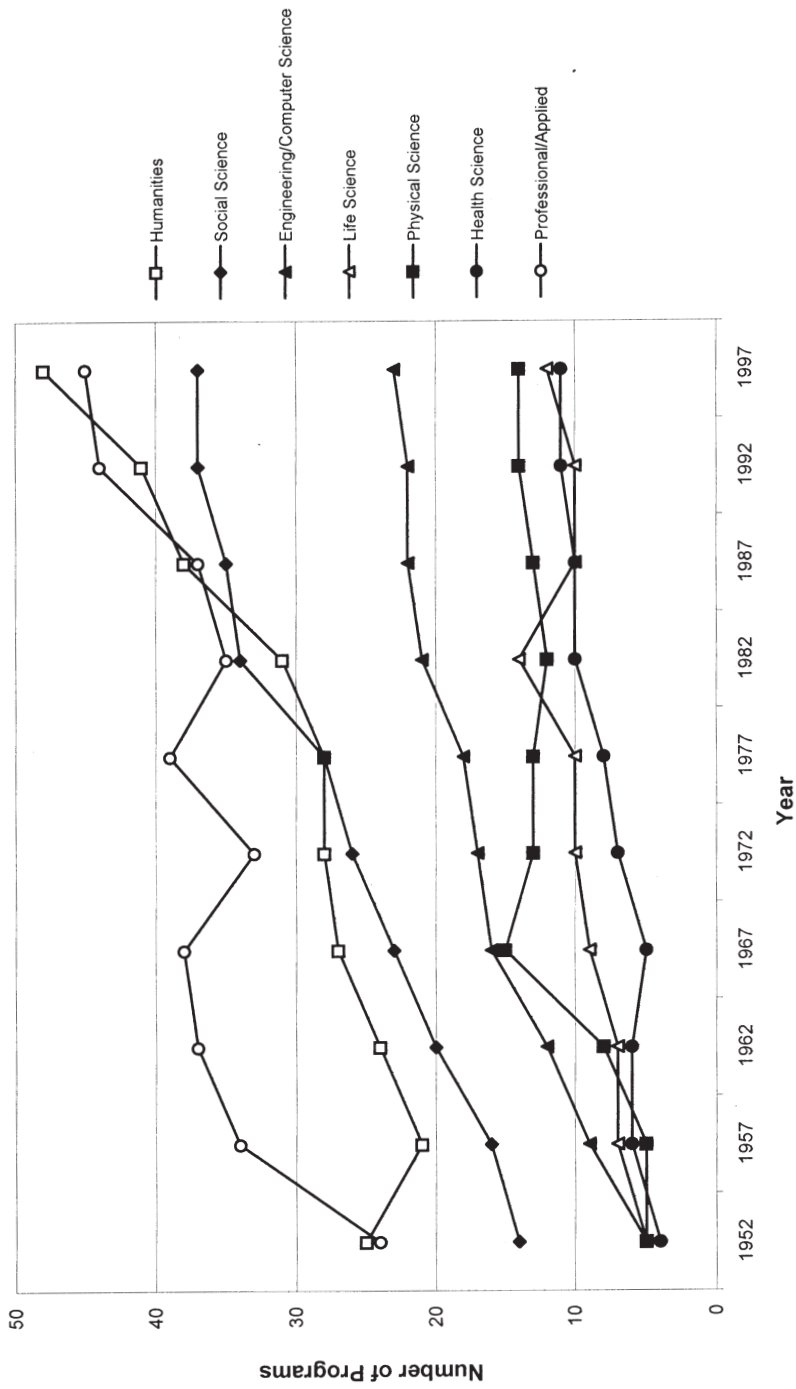


FIG. 2. SJSU Degree Programs Offered by Knowledge Area 1952-1997

There are several possible interpretations of this pattern. First, from a market perspective, anticipated student demand plays an important role in decisions about the establishment and disestablishment of academic programs. For example, increases in humanities degree programs may be the result of increased student demand for particular humanities degrees. Although not a direct proxy for demand, degree production data does serve as a measure of productive activity within those units. Degrees awarded in the humanities have generally declined at SJSU over the 45-year period. Between 1972 and 1987 the number of humanities degrees awarded declined by over 50%, from 993 to 415. Thus, in spite of such declines in degree production, the number of humanities degree programs continued to increase. An alternative market explanation might hold that adding new programs may be a strategic initiative by the university to cultivate new student demand. Computing the ratio of degrees awarded to degree programs offered more explicitly illustrates that if there was strategic intent, it did not succeed. Between 1972 and 1987 the number of degrees awarded per degree program offered in the humanities decreased by almost 70%, falling from 35.5 to 10.9. This evidence suggests that a simple market explanation is not sufficient for understanding the complex dynamics of academic program change.

A second possible explanation is that the expansion of degree program offerings in the humanities may reflect an increase in more specialized graduate education. When we disaggregate the data on degree programs offered by level, we see that an increase in the number of graduate programs far outpaced growth in undergraduate degree program offerings. At SJSU, undergraduate degree programs were added at a rate of 0.56 per year, whereas graduate degrees were added at a rate of 2.38 degree programs per year. It does not appear, however, that the growth rate of graduate degree program offerings in the humanities is any greater than that in the professional or applied fields.

Third, the increase in degree program offerings in the humanities may be the result of changing faculty interests and activities. This interpretation could have several dimensions, all tied to recent national trends in knowledge. For example, faculty participation in interdisciplinary programs within the humanities, such as various ethnic and regional studies programs, has become increasingly legitimate. Concurrently, as a result of protracted debate over the canon, the humanities have become increasingly fragmented. Both trends reflect a decline in consensus over what counts as knowledge. As such, these trends could yield a corresponding proliferation of degree programs generated by faculty who wanted to move out of established programs.

Although each of these interpretations has merit and deserves examination in its own right, we offer a fourth explanation derived from institutional theory that emphasizes the symbolic functions of academic structure. We propose that modifications in the degree programs offered signal—to internal and external constituents—changes in the institution's commitment to different knowledge areas. In the case of the humanities, the increase in degree programs despite declines in degree production reflects SJSU's attention to liberal arts, whether they be for general education in critical thinking, moral development or personal enhancement. This concentration of activity is especially noteworthy given the unprecedented production of career-oriented degrees during this period.

Evidence that the expansion of degree program offerings in the humanities at SJSU has more symbolic than practical function significance can be found by more closely analyzing data on degree production and full-time equivalent faculty (FTEF) allocation by knowledge area. Of particular interest is a comparison of the humanities and professional/applied fields at the graduate level, which represent the most substantial proportion of academic activities at both SJSU and nationwide at other comprehensive universities (Harclerod & Ostar, 1987). We have already noted that in both the humanities and professional fields, degree programs were added steadily and that expansion occurred primarily at the graduate degree level. However, while professional degree production at the graduate level increased (from 415 in 1977 to 496 in 1997, an increase of 20%), graduate degree production in the humanities declined (from 125 in 1977 to 85 in 1997, a decline of 30%). Thus graduate degree programs in the humanities were added while graduate degree production in those areas decreased.

Additionally, by looking at change in FTEF allocations per degree at SJSU between 1977 to 1997, we see that the number of faculty allocated to humanities degree programs declined almost 50% between 1977 and 1997, whereas FTEF per degree program declined by only 14% in professional and applied fields. Thus, although SJSU continued to add degree programs in the humanities as quickly as it did in professional and applied fields, both the number of degrees it awarded in these areas and the number of faculty allocated to teach in those programs declined. This suggests, therefore, that the structural expansion of humanities degrees does not necessarily correspond to student demand or to fluctuations in the allocation of resources. Rather, it represents a continued or expanded symbolic commitment to those degree programs in the knowledge areas traditionally associated with liberal education.

Relationship Between Bureaucratic and Programmatic Structures

The relationship between degree program offerings and departments is also of interest. We attempted to capture this relationship more precisely by computing the ratio of degree programs offered to the number of departments across the seven knowledge areas. In a given year, this ratio shows the average number of degree programs offered in a particular knowledge area relative to the number of departments in that same area. The change over time in this ratio illustrates whether or not the evolution of knowledge categories, as reflected in the programmatic and bureaucratic structures, follow similar patterns. Especially in the period after 1972, the separate data for degree programs and departments show steady growth in degree program offerings in contrast to relative stability in the number of departments. The ratio of degrees to departments captures this set of trends (see Table 1 below).

In the period prior to 1972, the proportion of degree programs to departments shows a decline for most knowledge areas. For example, between 1952 and 1972 the value for the Humanities declined from 3.6 to 2.2 and Social Science from 4.7 to 2. Between 1957 and 1972, the value for the Life Sciences declined appreciably from 7 to 3.3 and for Engineering from 4.5 to 2.1. The declines are accounted for by a pronounced increase in the number of new departments created in this era. We have already noted that this historical period for SJSU represents the early stages of organizational development capped by a period of reorganization: SJSU expanded its mission beyond its primary activity of teacher education into a comprehensive state university. The resultant expansion in enrollments was accompanied by an increase in resources and organi-

TABLE 1
SJSU Degree Programs Offered per Department by Knowledge Area 1952–1997

Knowledge Area	1952	1957	1962	1967	1972	1977	1982	1987	1992	1997
Humanities	3.57	3.00	3.00	3.38	2.15	2.15	2.58	3.17	3.42	4.00
Social Science	4.67	2.29	2.86	2.56	2.17	2.55	2.83	2.92	3.36	3.36
Engineering/ Computer Science	2.50	4.50	1.71	2.00	2.13	2.25	2.63	2.75	2.20	2.30
Life Science	5.00	7.00	7.00	3.00	3.33	3.33	4.67	5.00	5.00	6.00
Physical Science	5.00	2.50	2.00	3.75	3.25	3.25	3.00	3.25	3.50	3.50
Health Science	1.33	2.00	2.00	1.67	2.33	2.67	3.33	3.33	3.67	3.67
Professional/ Applied Fields	3.00	2.83	1.95	2.00	1.50	1.70	1.94	2.06	2.32	2.37

zational capacity that entailed a dramatic proliferation of the bureaucratic structure. In this era, degree program offerings also grew steadily, and our data show a notable change in the academic program. However, the major trend in this period is dominated by expansion of the bureaucratic structure.

In contrast, the period after 1972 shows a distinct pattern in which the ratio of degree programs offered to the number of departments increased for most knowledge areas. The most pronounced are the humanities, which increased from 2.15 to 4, and the life sciences, which increased from 3.3 to 6.⁹ These increases may result from faculty specialization, which is likely to manifest itself first in the degree program offerings and later in the bureaucratic structure. The elaboration of bureaucratic structure requires more resources (e.g., money and space), whereas degree programs can be added at less cost, can satisfy faculty interests, and can be changed more quickly to accommodate shifts in state needs and industry trends.

This discontinuity between the nature and rates of change in bureaucratic and programmatic structure may indicate a structural capacity of academic organizations to mediate competing imperatives for stability and change. That is, while the bureaucratic structure is relatively fixed in the resource flows, tenured faculty positions, and vested interests for turf protection, the programmatic structure is more open to adaptation. Thus, the multidimensionality of academic structure enables universities to reconcile the divergent forces of inertia and adaptation.

Conclusion and Implications

The patterns evident in the illustrative data from this case study support the continued use of a multidimensional conception of academic structure as well as the use of multiple methods for investigating the longitudinal nature of knowledge change. Both the qualitative and quantitative phases of our study suggest ways to examine continuity and change in the formal organizational structure. Given that there are different patterns of change between bureaucratic structure and programmatic structure, we conclude that the multidimensional nature of academic structure provides an essential scaffolding for universities to function as complex social institutions: as settings for educational activities of teaching and learning, for organizational practices to coordinate and manage academic work, for elaborating careers and professional identities, and for legitimating enduring as well as emerging knowledge categories.

In conclusion, we offer implications for further research, for campus

leaders, and for theoretical development. First, there are several implications for empirical inquiry on the formal organization of knowledge. We derive these out of the limitations we encountered in gathering and analyzing data for this case study. Although the use of a single case obviously limits generalizability and does not produce definitive empirical claims, the case study data illustrate one approach to operationalizing structural features of the academic landscape. Clearly, if one wants to make generalizable claims or to study causes, the sample of campuses must be expanded. Yet limitations in the availability and comparability of data remain a significant obstacle to constructing a large data set. National data collected at the institution level are not disaggregated to the department level. Additionally, any study of knowledge change must, by its very nature, consider a long period of time. Unfortunately, data collection practices of institutional research offices tend to change over time, and many institutions keep surprisingly poor historical records. For this study we manually collected data on changes in the departmental structure and academic programs for a 45-year period by analyzing campus archives and college catalogs for each of the years in the study. Certainly, the construction of a large longitudinal dataset of bureaucratic and programmatic change across many types of campuses would open limitless possibilities for studying the co-evolution of knowledge and academic structure. For example, researchers might investigate how change in academic structure varies between organizational types (such as comparing community colleges to research universities), which has implications for understanding how knowledge structures become stratified within educational systems.

In exploring options for further research, several design issues must be carefully considered. For this quantitative data analysis, we calculated changes in the number of departments or degrees representing each knowledge category as *net* increases or declines, which obscures many intricacies of change that occurred within a knowledge area for each period. In a given year, the net change in departments representing the humanities could have been *plus one*, even if three new departments were added, two removed, and several renamed. Thus a net change does not reflect the volatility that may be occurring. Our use of qualitative examples served in part to compensate for this. Yet, with a larger dataset, future research could use more advanced quantitative methods to analyze longitudinal change within academic organizations. For example, by coding each departmental or programmatic name change, merger, or split as a discrete entry or exit event, event history analysis can be employed to compare the rate of change in departments and degree programs across different knowledge areas, and models can be developed to

predict differential causes—both internal and external to the organization—of structural volatility or stability within knowledge areas.

A second set of implications addresses the potential interests of campus leaders in coordinating the various dimensions of academic structure. In universities structural modifications tend to be made incrementally, within shared governance practices as well as through phases of academic planning initiatives. However, the results for the organization and its participants are cumulative. From the perspective of campus leaders, a number of concerns may arise: Is there a widening gulf between enduring departmental structures and vital educational processes (teaching and learning)? Is program expansion excessive? In our opinion administrators and faculty need not malign either the enduring nature of bureaucratic structures or the proliferation of degree programs, for they each serve a vital function. The former enables the organization to sustain legitimacy for its enduring commitments, while the latter simultaneously permits much-needed flexibility to launch experimental or short-term programs that can be responsive to shifting faculty interests, student demand, or labor market needs.

Finally, this study suggests important implications for advancing theoretical work on knowledge legitimation. Since institutional settings shape knowledge classifications, it is worthwhile to develop a more refined conceptualization of the interplay between context and knowledge categories. Educational settings are ideal sites for examining the co-evolution of knowledge with academic structure. The work of new sociologists of knowledge suggests that the analysis of the institutional settings may yield new insights about the interdependence between context and ideas, specifically how structure and content reinforce social hierarchies as well as the authoritativeness of knowledge (Swidler & Ardit, 1994). In addition to these lines of inquiry, we still do not know which organizational structures best support the advancement of knowledge and whether there are salient differences in these dynamics across academic fields.

Against this backdrop, it is essential to consider how the dynamics of knowledge legitimation implicate segments of the academic structure selectively. External stakeholders look to higher education for certain kinds of knowledge (e.g., literary theory, historiography), while they look to other social institutions—such as the media, art associations, or religious organizations—for other kinds of knowledge (e.g., popular culture, high culture, faith-based knowledge). In some domains, developments in knowledge tend to be produced by both higher education and another social institution. For example, in biotechnology or computer science, research universities and industry are both involved, either as

competitors or as collaborators. While the issue writ large may be the extent to which higher education can protect its monopoly as a knowledge legitimator, these domain differences also suggest the potential for increased disparity across knowledge areas in how academic units are valued by their external stakeholders. While such a differential valuing could be readily accommodated by modifying the programmatic structure, a more fundamental shift in societal expectations would entail mission redefinition and thus more dramatic alterations of the bureaucratic structure as well.

With this in mind, the changing knowledge functions of universities and colleges are ripe for further theorizing. Although higher education is known well for its knowledge transmission (teaching) and knowledge production (research) functions, it is the overall knowledge legitimation function that we seek to emphasize in this article. That is, apart from the all-important content of educational objectives, universities and colleges play a major intellectual role for society in the maintenance of their academic structures. They determine which knowledge categories obtain and sustain resources, they determine which content within knowledge categories is deemed most worthy of knowing and pursuing, and they in essence provide a knowledge vocabulary for the wider society. The fascinating reality is that all of this occurs in an *ad hoc* manner, on several organizational levels, through incremental decisions by educators and campus leaders. So, while there are plenty of informal changes within knowledge areas that are not (yet) visible in structural changes, the visible structural forms do have cumulative consequences for the organization and for society.

APPENDIX A

San José State University (SJSU) Compared to Master's Colleges and Universities (MCU)

Year	FTE Students		Instructional Expenditures per FTE Student		Instruction's Share of E & G Expenditures ^a		State Appropriations per FTE Student	
	SJSU	MCU	SJSU	MCU	SJSU	MCU	SJSU	MCU
1977	20,219	5,387	\$4,957	\$4,324	56%	50%	\$7,238	\$5,659
1982	18,123	5,551	\$5,569	\$4,193	53%	49%	\$6,851	\$5,940
1987	19,082	5,635	\$6,029	\$4,535	56%	49%	\$8,404	\$6,541
1992	22,510	6,523	\$5,375	\$4,221	61%	48%	\$7,058	\$6,314
1997	19,719	6,433	\$5,135	\$4,362	48%	38%	\$5,708	\$6,022

SOURCE: National Center for Education Statistics IPEDS data provided through NSF WebCASPASR database system. Financial data reported in constant 1997 dollars. Data for MCU's reported as mean values.

^aAdjusted educational & general expenditures (minus Pell grants & nonmandatory transfers)

APPENDIX B

Knowledge Taxonomy

The names of departmental units and degree programs were classified into seven knowledge areas: Humanities, Social Sciences, Physical Science, Life Science, Health Science and Professions, Engineering and Computer Science, and Professional and Applied. This offered a consistent and standardized method of coding the data and enabled us to make substantive comparisons of knowledge change over time.

This taxonomy was derived from the NCES Classification of Instructional Programs (CIP)(Morgan, Hunt, & Carpenter, 1990), which lists over 900 subject-matter names and classifies them into 52 broad categories. We collapsed these 52 categories into 7 in order to make the analysis and presentation feasible. In order to translate these CIP categories into our seven knowledge areas, we utilized the disciplinary classification scheme used in the Integrated Postsecondary Education Data System's earned degrees database. Also based on the CIP, this database further collapses the broad categories into 20 major disciplines. From this list of 20 disciplines, we then eliminated as major categories those disciplines that were nowhere represented in the departments or programs in our site (such as Law and Architecture), and we further consolidated several categories where meaningful groupings were apparent. For example, whereas in the IPEDS database Religion/Theology and Arts and Music are treated as separate major categories, we consolidated them into the Humanities knowledge area. This enabled us to construct a database that matched all 900 subject-matter names in the CIP to 7 broad knowledge areas. Below is the list of 7 knowledge areas and their associated CIP categories.

Humanities

area, ethnic, and cultural studies	multi/interdisciplinary studies
English language and literature/letters	philosophy and religion
foreign languages and literatures	theological studies and religious vocations
liberal/general studies	visual and performing arts
mathematics	

Social Sciences

communications	psychology
communications technologies	social sciences and history
library and archival sciences	

Engineering and Computer Science

computer and information sciences	engineering-related technologies
engineering	military technologies

Life Sciences

agricultural business and production	biological sciences/life sciences
agricultural sciences	conservation/renewable natural resources

Physical Sciences

physical sciences	science technologies
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Health Sciences

health professions and related sciences	
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Professional and Applied Fields

architecture and related programs	parks, recreation, leisure, fitness studies
business	personal and miscellaneous services
business management, administrative services	precision production trades
construction trades	protective services

APPENDIX B (Continued)

education	public administration and services
home economics	transportation and materials moving workers
law and legal studies	vocational home economics
marketing operations/marketing and dist.	vocational/trade
mechanics and repairers	

To code each data point, we searched the database for the department or program name, and assigned it to the corresponding knowledge area. If a department or degree name did not appear in the database, we classified it using the college or school in which it resided within our site. For example, if a multidisciplinary program was not listed in the database, but it resided in the College of Social Sciences at our case site, we classified it in the Social Sciences knowledge area.

It is important to note that any static knowledge classification scheme warrants scrutiny. The CIP itself has experienced significant changes over the time period we studied. The CIP is the predecessor of the "Taxonomy of Instructional Programs in Higher Education," created in 1968 as part of a comprehensive data collection effort by the federal government known as the Higher Education General Information Survey (HEGIS). The original CIP replaced the HEGIS taxonomy in 1979, and went through significant revisions in 1985 and 1990. Work on the most recent revision ensued in the year 2000.

Our taxonomy of 7 knowledge areas suggests enduring and broadly accepted categories over a long historical period, making them appropriate for this type of illustrative analysis. Yet there is a significant but unavoidable contradiction between our conception of knowledge change (defined as changes in the accepted categories of knowledge embodied in academic structures) and a methodology that employs static albeit broad knowledge groupings. Future conceptual and methodological work is required to reconcile this disconnect between theory and methodology.

Notes

¹Although the term "knowledge" may connote for many participants within universities the structures of academic science or knowledge production by research units, our focus on knowledge categories is meant to denote the traditional academic building blocks that serve as the primary academic home for the administration of curriculum, instruction, faculty hiring, and disciplinary research. Of course, given the diversity of within U.S. higher education, the range of academic units that are considered "traditional" may vary by institutional type, thereby suggesting the need for further empirical research.

²For a comprehensive review of empirical and theoretical work on the differences between academic disciplines, see Braxton and Hargens (1996).

³The notion that universities have the structural capacity to negotiate competing imperatives for change and stability is pervasive throughout this article. This idea resonates with the structural-functionalist approach of Parsons and Platt (1973) in *The American University*.

⁴Few treatments of academic change have taken such a long view of academic change processes. For a notable exception, see Frank, Wong, Meyer, & Ramirez's (2000) cross-national comparative study of changes in the history curriculum of universities in 89 countries between 1895 and 1994.

⁵Departments and degree programs go through different external review mechanisms that may include several levels of hierarchy, particularly for public universities and colleges, extending from district-level and system-level approval to state-level coordinating bodies. Although such formal processes may include explicit criteria that serve as the basis for decision making, it is common knowledge that personal preferences and personnel issues may also come into play in these processes.

⁶The use of dedicated faculty lines helped us to define “programs” as either operational units or curricular elements. Interdisciplinary programs often resembled departments as they were represented in the college catalogues, but generally all faculty lines belonged to other operational units and no dedicated office location existed. If a “program” did have dedicated faculty lines and office space, it was coded as an operational unit.

⁷SJSU also offered certification programs in certain occupational areas which were not included in this study.

⁸This point highlights the challenges of disentangling cause and effect in the relationship between university structures and the wider society (Gumpert, 2000). In this article, we invoke the notion of co-evolution to suggest that changes in legitimate knowledge at the societal level influence structural change in universities, while changes in the organization of departments and programs affect what counts as legitimate knowledge. Because our primary purpose is to develop a research agenda at the intersection of organizational theory and the sociology of knowledge, our exploratory research design and methodology do not aim to determine causal direction.

⁹The ratio was computed as follows: humanities went from 28 programs and 13 departments to 48 programs and 12 departments; life sciences went from 10 programs and 3 departments to 12 programs and 2 departments.

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