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RESEARCH ON ACADEMIC PROGRAMS: An Inquiry into an Emerging Field

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Broadly defined, academic programs or curricula denote those educational experiences that encourage purposeful learning. Academic programs are forms at the core of higher learning that organize the acquiring, transmitting, and applying of knowledge. Moreover, by housing and defining academic knowledge, curricula serve as the major arena for academic decision-making and expression of institutional values, the focal point in the professional lives of most students and faculty, and the *raison d'être* of American colleges and universities. In short, although a form, the curriculum reflects the very substance of the educational enterprise. Form and substance, in turn, become synonymous, and any discussion of curricular forms becomes a substantive discourse as well (Pirsig, 1976).

There is a large and diverse body of scholarship on college and university academic programs. This corpus includes both an applied strain of essay and opinion and a growing number of studies. Since the mid-1960s especially, the subject has engaged scholars not only in higher education but also in such disciplines as history, sociology, and political science. Still, the literature on college and university curriculum is unquestionably amorphous. Aside from a paper by Toombs (1982), which helped in the preparation of this review, not a single journal article or book offers a comprehensive review of the research on academic programs.

In light of this lacuna, we undertake to isolate and describe the major threads of research on academic programs and to acknowledge major and representative studies within each of those threads. Our secondary purpose is to examine critically each line of research by inquiring into the condition of scholarship and making suggestions for future research. Therefore, we seek above all to bring a fresh analytical perspective to extant knowledge about academic programs in colleges and universities. "The arrangement of material is new. . . .

Just as the same thoughts differently arranged form a different discourse, so the same words differently arranged form different thoughts," wrote Pascal (*Pensees*, 1670; Pantheon ed., 1950, p. 358). We hope that the comparisons invoked offer an illuminating and meaningful perspective that will engage scholars in the field.

FRAMEWORK AND METHOD

This review is largely exploratory and is not an "integrative review" in the sense of being aimed at inferring generalizations about substantive issues from studies that address those issues (Jackson, 1980, p. 438). Therefore, the various techniques of integrative reviews, such as meta-analysis (Glass et al., 1981), were inappropriate to our purposes. Nevertheless, a framework and method were needed both to organize and analyze the literature and to flesh out major areas of research on academic programs.

As Toombs (1982) suggested, research on academic programs is analogous to field study in the social sciences. Zelditch (1962) developed a framework for classifying field-study information, a framework that provides a useful point of departure for organizing studies of academic programs. In brief, the Zelditch framework identifies three broad categories of information or data: (1) incidents and histories, (2) distributions and frequencies, and (3) generally known rules and statuses. This typology is limited only to placing data into classes and is not intended as a structure for classifying what can be "inferred" or "explained" from such data. As we noted earlier, however, consideration of the forms of any phenomenon (whether it be the forms of curricula or of research on curricula) likewise includes consideration of the substance of that phenomenon.

Our overall analytical framework derives not only from the Zelditch classification scheme but also from a perspective that views colleges and universities as information-processing organizations (Miller, 1978). In essence, this perspective rests on the proposition that curricular forms are basically a "shared language" used to describe academic programs (Katz and Kahn, 1966). This shared language provides abstract concepts that academe employs as part of the process of "informing" or shaping higher learning. Similarly, it can be said that our review involves organizing a part of the shared information on curricula in order to distinguish the discernible shapes of curriculum research.

In describing some of what we know about these information-processing organizations, we also consider colleges and universities and the curricula lodged in them as evolving social systems (Miller, 1978; Boulding, 1984). Compatible with this view is the supposition that colleges and universities have only two principal categories—information and matter-energy—of those many elements comprising their makeup (Miller, 1978). We further propose that the kind of information transformation that occurs signals the kind of change or learning—individual and organization—that takes place.

Within the context of this analytic framework, we employed the constant comparative method to delineate major threads of research and to identify major and representative studies. While this method, as first developed by Glaser and Strauss (1967), is an inductive approach aimed at discovering theory, it is appropriate to our purposes even though we are not developing theory. In brief, the constant comparative method is a process by which the researcher systematically sorts and analyzes data while moving from the empirical to the conceptual and theoretical level through the identification of underlying patterns in the data. (For a discussion of the constant comparative method, see Conrad, 1982; Glaser and Strauss, 1967.)

Our literature review draws from four sources. First, we used two indices, *Dissertation Abstracts International* and the *Educational Research Information Clearinghouse*, to identify studies of academic programs published between 1974 and 1984. Second, over the same period, we searched for articles on curriculum in seven scholarly journals: *Review of Higher Education*, *Journal of Higher Education*, *Research in Higher Education*, *Review of Educational Research*, *Teachers College Record*, *American Educational Research Journal*, and *History of Education Quarterly*. Third, references cited in the above two categories pointed to additional books, articles, and book chapters. Finally, we perused the recent social science and higher education literature to identify the most current publications.

Our review of the literature yielded some 465 publications concerned with academic programs. We reduced this number through two major delimitations. First, we excluded the extensive body of essay and opinion on curriculum. Second, we omitted all other applied strains of scholarship, such as the literature on program evaluation and guidelines for curriculum planning. Applying these limitations, we reduced the total number of relevant books and articles examined to 210 publications.

Consistent with our analytic framework and the guidelines of the constant comparative method, our data collection and analysis focused on the following research question: What are the major lines of inquiry to which researchers continue to adhere in scholarship on academic programs? The systematic review of the 210 publications included in the final pool led to the identification of six major lines of inquiry.

This paper is divided into three major sections derived from Zelditch's tripartite classification scheme. For each of the six lines of inquiry, we identify major and representative studies, critique the literature, and make some suggestions for future research.

INCIDENTS AND HISTORIES

Zelditch (1962) defined the study of "incidents" as the consideration of individual cases at particular times and places. One such type of incident identified

in this review is the case study of academic program innovations. A second type of incident, of the same kind but of a more complex configuration, denotes "sequences of incidents" or "histories" of academic programs. Finally, a third kind of incident, a complex configuration based on repeated observations spanning multiple cases, is that of studies of the process of academic change. These three lines of research, all of which fit within Zelditch's scheme (1962) for classifying information, are considered below.

Case Studies of Innovation

Whether as detailed case studies or as unfettered descriptions of innovative academic programs, the scholarship of the last 15 years evinces a fascination with curricular innovation and reform. Despite the attention given to the topic, however, relatively few studies place program innovations in any sort of context: the majority focus more on isolated incidents than on either patterns within eras or evolving histories. In instances where scholars have attempted to isolate contemporary trends—that is, to define trends during the very era in which such (purported) trends have been manifested—the objectivity of the description or analysis is suspect. It is difficult to make clear, useful distinctions between mere incidents and the more important trends when one is standing amid the phenomenon being described. No less telling, because each incident or trend is usually treated as separate from the evolving history of a program, most studies fail to provide the historical context essential for a deeper understanding of the innovation process.

In studying innovation, we must be constantly on the alert for surprises. Innovative programs are, in one view, "happenings" or events that did not have to occur just when they did (Boulding, 1984; March, 1978). The very celebratory tone of the innovation literature provides testimony to the value placed on freshness. Boulding (1984) asserted that information, to be information, must be surprising. Thus, when surprises do occur, an ability to discern and identify such surprises as such lies at the heart of acquiring "know-how" (Simon, 1981) about the system. The fact that so many surprises do appear in the literature lends credence to the notion of indeterminacy or uncertainty as regards curricular innovation. Yet, at the same time, it also suggests that we should inquire into whether the innovative incidents described really are surprises. They may be variations on a durable curricular form. This consideration may be a critical one, for durability does bias our images of what we know and how we know it. Making conceptual distinctions between variation and innovation involves a willingness, first, to evaluate our own methods for making meaning, and next, to determine the extent to which we are able to learn from surprise, and then, to analyze the curricular characteristics that we have invented to organize learning.

How, then, have scholars described innovative incidents? One widespread tendency has been to provide brief descriptive portraits, usually of popular reforms. For example, Brick and McGrath (1969, p. 2) surveyed 882 colleges to develop a "picture of novel and creative practices" in liberal education. They identified numerous curricular innovations, such as interdisciplinary studies and freshman seminars. Drawing on secondary sources, Heiss (1973) published a lengthy listing (including brief descriptions) of popular reforms that still stands as the most comprehensive inventory of curricular innovations in higher education.

In their study of undergraduate education, Levine and Weingart (1973) examined seven areas of experimentation at twenty-six schools. The areas investigated include advising, general education, comprehensive examinations, concentration, and student-centered curricula. Levine and Weingart went beyond mere description in their fieldwork: they also examined the successes and failures of the various innovations as perceived by those involved in the programs.

Bergquist et al. (1981) and Conrad (1978b) have offered vignettes of innovative programs and practices derived from secondary sources. Bergquist and his colleagues gave little indication of their methods, so it is difficult to relate their findings to how they came by the knowledge. Conrad, in contrast, explicated his approach to identifying curricular innovations and delineated his definition of an innovation—a useful clarification for researchers seeking to remain alert to surprises. By the same token, the framework offered by Bergquist et al. may prove useful to researchers. The authors identified six dimensions of curricula and curricular innovation: time, space, resources, organization, procedures, and outcomes.

For some years Levine's *Handbook on Undergraduate Curriculum* has functioned as the curriculum encyclopedia for some in the field. Levine shed some light on historical and comparative perspectives worthy of consideration by those studying the curriculum, and he attempted to distinguish successful innovations from ephemeral ones. As in so many treatments of innovation, however, Levine's handbook offers little more than brief descriptions of innovative practices, such as new forms of general-education distribution requirements and novel calendar arrangements.

Studies by Conrad and Wyr (1980), Fitzgerald (1980), and Gaff (1983) focus on innovations in a limited segment of the curriculum: liberal and general education. While these studies have somewhat better articulated methodologies than the aforementioned works, the representativeness of what is reported remains in question, and not much sense of the richness of contexts and consequences is provided. "Know-what" and "know-how" about the system (Simon, 1981) remain separate, and to make distinctions between information

(e.g., a new informing structure) and repetition (e.g., variations on an older, durable structure) in these studies is a trying task.

There also exists a body of more extensive descriptive and analytic portraits of curricular innovations. These treatments are based, for the most part, on ethnographic research and are richer than the studies mentioned thus far. Furthermore, these works emphasize "telic" as well as "popular" reforms (Grant and Riesman, 1978), a distinction that offers a useful point for explanation, analysis, and departure. In differentiating between the two, Grant and Riesman (1978) suggested that

some of the reforms have a large resonance, representing attempts not only to change the university but to set forth new ideals. We call these telic reforms, reforms pointing toward different conceptions of the ends of undergraduate education, to distinguish them from the more popular reforms of the last decade. [p. 15]

The distinction between popular and telic is reminiscent of the difference some theorists note between information and entropy. According to these theorists, "negentropy," or information, moves in the direction of a less probable course (surprise), while "entropy" moves in the direction of a more probable course. Information has descriptors such as form, regularity, accuracy, pattern, order, and organization (Miller, 1978). Despite these properties, which seemingly denote a high degree of stability, information constantly expands. Consequently, it is important to know what is new and what is not. What is imitative, form- or rule-following? What is not? Grant and Riesman's definition (1978) of telic reform implies information; their definition of popular reform does not. The systematic analysis of this issue may itself comprise a productive research avenue: Where did values, ideals, and norms change, and where did procedures and routines change but not the organizing principle?

Numerous studies have emphasized in-depth analysis of curricular innovations. For example, two largely quantitative treatments, one by Lehmann and Ristuben (1983) and the other by Bush (1979), emphasize popular reforms in consortia. Although neither is a seminal piece, each evidences some useful description and analytic grist essential to the comparative millwork required to refine our notions about academic innovation. In order to carry these two studies further to ascertain what is information and what is not, we would need an initial set of distinctions in two areas: that of the notion of consortia as new and that of the notion of newness as regards the particular incident(s) we are investigating. An analogy to elucidate: The writing of a new poem may provide not new information so much as new meaning (Miller, 1978); likewise, a new curricular arrangement may fall into a category marked less by new information than by new meaning.

We can combine and recombine information to yield new meanings that eventually may turn into new forms. This phenomenon—the evolution from old to new—is not well documented in curriculum research. In turn, it remains difficult to be on the alert for surprise when the background necessary for differentiating the old from the new has not been filled in. To be sure, some of the finer treatments do move in this direction. While based on secondary sources, Bell's case studies (1968) of three telic reforms in general education (at Columbia, Harvard, and the University of Chicago) provide an encompassing perspective. In straining these institutional experiences through the sieve of historical and sociological contextual analysis, Bell came to attribute meaning to reforms in provocative ways. The third chapter of his book, "Tableau of Social Change," reflects a thoroughness of traditional sociological analysis rarely seen in the literature on academic programs. On the one hand, the self-documented processes of Bell's thought as he categorized information might prove useful to those wishing to better understand how we have tended to think about curriculum innovation. On the other hand, the implied developing curricular hierarchies or sociological inevitabilities that surface in Bell's work may well overshadow, by comparison, any surprises on which learning might turn.

From a perspective less provocative than that of Bell, Belknap and Kuhns (1977) reviewed a telic reform in general education at Columbia University. Using a quasi-historical emphasis, Belknap and Kuhns traced the evolution of general education at Columbia and suggested that revitalization has been a prevailing theme. Again, the question arises: Did people (at Columbia, in this instance) try to breathe new meaning, more relevant to a particular age and locality, into old, durable forms that traditional norms and values in the university would accommodate? Or did they attempt to create information (new informing patterns) in suitable, workable ways that altered the traditional norms and values of the university? Or did they try to do both?

The remaining literature reviewed here in brief involves the extensive work spearheaded by four individuals: Riesman, Grant, Gusfield, and Gamson. Much of the "refined grist" heretofore mentioned as necessary to promote thinking about curricula may emerge from ethnographic works of high quality. Riesman et al. (1971) offered first-rate case studies of popular institutions, Oakland and Montieth, that began in the late 1950s. While the authors stated their concerns as being those primarily related to faculty, their work lends valuable insight into incidences of institutional response to social change. Specifically, in interpreting how these two institutions responded to an influx of "new students," the authors not only delved critically into several aspects of information processing in academe but illustrated the dilemma that would-be reformers faced as they struggled with the interfacing of traditional with unfamiliar forms.

Grant and Riesman (1978) stressed the important distinction between popular and telic reforms as they wove rich ethnographic tapestries. Their wonderfully descriptive case studies, both of three telic reforms (St. John's College, Kresge College at Santa Cruz, and the College for Human Services) and of several popular reforms (New College, Santa Cruz and two experimental public colleges in New Jersey) display sustained analytic temper.

Finally, Grant et al. (1979) and Gamson et al. (1984) have presented well-done case studies of popular reforms. Grant and his associates looked at competence-based reforms, Gamson and her colleagues at fourteen innovative programs in diverse institutions. The strength of both of these works lies in their authors' attempts to render contextually grounded analyses. Furthermore, these studies convey a sense of the importance of two considerations that would surely benefit curriculum researchers: (1) the shared language of curricula, which can be applied across institutions with variations in meaning from one place to another and (2) the similarities of curricular design across institutions, with variations in application from one place to another.

Histories

A second matter demanding attention in research on academic programs involves knowledge of how a curriculum has evolved to its current state. Institutional histories and historical descriptions of the underpinnings of an institution's curriculum can provide a meaningful historical context for the present. As Miller (1978) wrote, a college or university "carries its history with it in terms of altered structure and consequently of altered function also" (p. 23). For purposes of research, then, it may be useful to distinguish the structures of a college or university as they exist at any single point in time or space. Yet another useful distinction involves the recognition that information and structure are connected so that one can speak of the structure(s) (or forms) of the curriculum—a conceptual or temporal configuration. For example, the structure of knowledge in a discipline involves patterns of conceptual variables. The department that houses the discipline involves patterns of spatial variables. Indeed, much of the business of higher education involves translating information from one state or place or configuration to another. Moreover, patterning among conceptual or temporal variables can compare with patterning among spatial variables. For instance, transforming a written design for a curriculum into a desired sequence of educational experiences or happenings is, in a very real sense, a translation of conceptual variables to spatial variables and the reverse (Miller, 1978, pp. 22–23). Since this translation process is a difficult one to delineate empirically, the distinction between spatial and temporal dimensions, between physical space and conceptual space, remains an important one for researchers.

For example, an institution's charter represents a blueprint similar to DNA. As DNA provides a chemical blueprint for human growth and development, so

does the charter establish a conceptual template by which one can organize the institution and its curriculum in a manner faithful to the legal mandate. Also, like DNA, charters evolve to keep pace with the environment. Often collective perceptions or public mandates (which themselves are evolving) greatly influence what can and will occur on college campuses (Kamens, 1974).

Moreover, the evolutionary nature of colleges and their curricula makes them rather unpredictable beasts, inasmuch as the factors that contribute to their makeup are so many and varied and events border on the random: such evolutionary systems have as a part of their histories events that did not have to occur when or even in the manner in which they did. We can view evolution itself as basically a process in which information and its derivatives provide the "know-how" for the informing structure(s). And if, indeed, "printing is the social equivalent of DNA" (Boulding, 1984, p. 20), then one can see how the process of information replication in academe expands what we know, as we wish to know it, even as the future state of the system becomes increasingly probabilistic.

To be sure, most series of events have identifiable trends, so that we can assume that some events are more likely to occur or recur than are others. Certainly histories can enhance our ability to prognosticate, even though such commentaries suffer from imperfections in the record and limitations of human evaluation. We must be careful as we read them, moreover, about placing a high value on phenomena we recognize and like and placing a low value on phenomena we dislike or find unfamiliar. Nevertheless, beyond these residues or effects of past events, what do we have? The "right stuff" from which fruitful historical research on curricula derives no doubt demands two basic characteristics of the researcher: the patient scholar's well-honed penchant for humble skepticism (Phenix, 1971) and the self-aware lover's awe at subtle surprise. Otherwise, we will not be able to learn from surprise, adapt our perspectives, and eliminate our more unrealistic images of how things are and how they might affect our future (Boulding, 1984).

We begin our review of curricular histories by identifying two distinct approaches to the history of higher education: the so-called traditionalist perspective and the revisionist perspective. While a linear or continuous motif seems to underlie substantial portions of each approach and thus makes them somewhat similar, the interpretations of these two schools provide points of divergence, contrast, and comparison. To begin with, the traditionalists seem to be infinitely more readable than the revisionists because of their use of anecdote and personality to provide the glue to bind their theses; by contrast, revisionist histories often tend to be dry reading, perhaps as a result of quantitative approaches. Nevertheless, each approach suffers from what we could call the objective reality syndrome, an approach that tends to obscure any surprises that might surface, either now or in the past. To be sure, the revisionists (to their credit) have uncovered some unanticipated quantitative data, but they fail to

apply their statistics in a nonlinear fashion that illuminates the probabilistic manner in which evolving processes converge to result in a historic event. Our view of information transformation looks upon surprises as improbable convergences, which, in turn, suggests the need for a different kind of historical synthesis from the one that is currently evident.

The traditional histories of higher education are, for the most part, well known. In his history of American colleges and universities, Rudolph's discussion (1962) of curricula interpenetrates his entire volume. Veysey (1965) focused on the period from 1865 to the early twentieth century; in so doing, he offered some organizing concepts that may prove useful to future researchers. Brubacher and Rudy (1976) linked historical data cross-sectionally, lending a clear sense of overriding themes.

Two slim volumes of historical essays, one by Handlin and Handlin (1970) and the other by Thelin (1982), sketch broad perspectives of the evolution of higher education. Each volume occasionally addresses the topic of curriculum, though more thoroughly in Handlin and Handlin's than in Thelin's work. Each work attempts to place academic programs within the context of their respective societies; each also points to the difficulties inherent in relating contemporary themes or issues to past events.

These general histories of higher education share two important features. First, all point to the significant stature of the academic program in the legacy of higher education. Second, all emphasize the vital relation of the curriculum to society. Nevertheless, all share an unfortunate defect: thoroughness of historical synthesis remains a rare occurrence.

This lack of thoroughness, in part, has provided fuel for the revisionist inquiries. Blackburn and Conrad (1985) provided some insight into the traditionalist-revisionist debate. By using such organizing categories as curriculum and instruction, learning, leadership, and exclusiveness, Blackburn and Conrad provided useful tools for the analysis of evolving academic programs and examined the evidence for the revisionists' claims. They suggested that curriculum should be a primary test site for the nascent revisionist perspective.

In defending the antebellum college, the revisionists assume the very reverse of several traditional postures toward higher education's past. They suggest that the curriculum was not hostile to science, that teaching was not uninspired, that the extracurriculum was not impoverished, that students were not cloistered in closely held residences, that enrollments did not fail to remain abreast of population growth, and that college birthrates had not been incontinent and death rates extremely high (Metzger, 1984, p. 420). Still, revisionist research scarcely evidences thoroughness of historical synthesis. It is too early to tell whether revisionist reinterpretations depict historical reality more accurately than do traditional perspectives.

At this juncture, the importance of the revisionists' postures lies in their willingness—indeed, their zest—in rethinking issues of evolutionary academic systems. For example, Potts (1981) examined enrollments to assess the popularity of antebellum colleges. Yet, while Potts persuasively questioned the traditional evidence, he did not provide counterevidence with which to revise the standard posture. Perhaps Burke (1982) stands foremost among those calling for a revised perspective. He described, and gave supporting evidence for, the antebellum colleges as “flexible and dynamic” institutions (p. 6); as anything but adrift in a sectarian or provincial, conservative backwater; and as a collegium responsive to the nation's expanding economy. Moreover, Burke took Tewksbury (1932) to task by refuting the latter's reported birth and death rates for institutions in the first half of the nineteenth century.

A modest number of general histories specifically address the curriculum; two representative ones are by Butts (1939) and by Rudy (1960). In particular, Butts's portrayal of the debates between Hutchins and Dewey in the 1930s and his overall historical development of the college curriculum stand as exemplary traditionalist interpretation. Similarly, Rudolph's (1977) standard history of curriculum from 1636 to 1977 has offered the revisionists a potentially vulnerable target.

In contrast, Oleson and Voss (1979) refined their research aperture to review selectively the organization and development of knowledge in colleges and universities from 1860 to 1920. Oleson and Voss paradoxically pointed to the absence of research on some basic “informing” structures of college and university curriculum that fall under the rubric of the organization and structure of knowledge. Given the contemporary emphasis in several disciplines on the technologies of information and on information organization, one wonders about the comparative void of similar analysis of information “technologies” and organization in college and university curricula. Certainly, scant commentary exists in histories of American higher education. For example, Sloan (1971) discussed current difficulties in higher education and its analytic literature and reconstructed several historical incidents. However, his article stops short of doing more than suggesting a need for better reinterpretation and analysis of some older organizing forms of curricula.

Finally, there are the more specialized histories of general or liberal education. Thomas (1962) traced the development of general education from 1800 to 1930 and then examined more recent practices in general education in eighteen colleges and universities. In addressing the problem of liberal education in the modern university, Wegener (1978) provided a selective history of the evolution of American higher education. In doctoral dissertations, LeBlanc (1980) and Koch (1979) have traced the recent history of general education and have occasionally offered fresh perspectives.

Perhaps most engaging of recent dissertations is Kimball's work (1981), which represents fine scholarship marked with a clarity of analysis seldom seen in conjunction with the topic of liberal or general education. Of particular interest to students of the history of curricular forms (for liberal and general education) is Kimball's delineation of two ideals and two accommodations. These ideals and accommodations—"artes liberales," "liberal-free," "artes liberales accommodation," and "liberal-free accommodation"—encourage us to consider the ontological grounding of curricula. If carried further, such treatments of evolving curricular histories might become less suggestive of continuous or consistent processes. We might be able to envision better how events have happened as a result of improbable occurrences. To a large extent, Kimball's thorough discussion accomplishes this very task, even as he carefully separated issues of definition and philosophy of liberal education. Furthermore, and no less important, Kimball's work underscores the need for more inquiry into the historic foundations of the information transformation process in academe.

Academic Change

Contemporary studies of academic change would also benefit from the examination of change as a process of information transformation. Until the late 1960s, there was a paucity of research on the dynamics of change in higher education. To be sure, opinion pieces and case studies of innovation broached the topic, but few scholarly works examined change as a process. The last 15 years, however, have witnessed a sharp upturn. The current scholarly focus on change, which includes studies of the initiation and implementation of curricular innovations and reforms, is one manifestation of the more general focus on processes of organizational change.

Given the "newness," the apparent timeliness, and the volume of research, diversity of scholarship on the topic is hardly surprising. Not only do the various change studies often employ different theoretical frameworks, but some focus on the initiation stage, others on the implementation stage, and still others on both stages. Moreover, while nearly all studies seek to delineate factors associated with change, emphases shift from one study to the next. Some scholars examine agents of change, some the process of change, some the obstacles to change, and some most or all of these dimensions. Despite this diversity, however, students of academic change seldom address the phenomenon as a process of information transformation (except indirectly as a communication phenomenon).

In related research, which one might use as a point of departure in addressing this oversight, Argyris (1976) has equated change with learning and, in so doing, has drawn a distinction between kinds of observable learning behaviors. Argyris's use of the terms *single-loop* and *double-loop learning behaviors* (p. 363) is not unlike some theorists' use of the terms *positive* and *negative feedback* (Miller, 1978). Single-loop learning (or change) behavior appears to be

more imitative, routine, or rule-abiding, characteristics that also mark a negative feedback loop. Double-loop learning behavior looks more like rule- or policy-changing behavior, which is akin to a positive feedback process. In an attempt to maintain dynamic equilibrium, negative feedback is adaptive and adjustment-oriented; positive feedback processes serve to upset dynamic equilibrium. Unchecked positive-feedback processes result in chaos and ultimately in a system's demise. Although the higher education literature attempts to delineate the positive and negative aspects of change, such evaluations rarely encourage comparisons to positive or negative feedback processes as they relate to organizational or curricular change.

Extant reviews of the literature on organizational change, both changes in higher education in general and academic change in particular, abound and vary in perspective (Conrad, 1980; Dill and Friedman, 1979; Lindquist, 1978, pp. 1-30; Nordvall, 1982; Parker, 1980). Given the volume and diversity of the research, we limit ourselves to proposing some initial organizing foci. We begin by discussing several major, encompassing studies. Next, we examine some representative studies in two major areas of research on change—change in general education and academic change in community colleges. Finally, in partial summary and as a touchstone both for criticism and for thinking about future research, we consider a review of the research by Dill and Friedman (1979).

Of the comprehensive studies, Hefferlin's study (1969) is a landmark one, the first comprehensive, theoretically framed study of the modern period. Hefferlin looked at 110 institutions to examine the sources, processes, correlates, and agents of academic change. In the wake of Hefferlin's work, other studies soon followed, turning on such generalizations by Hefferlin as follows:

Students are seen as more influential in having courses added to the curriculum than in any other development. Faculty members are most influential in getting a program of study added to the curriculum. Administrators are most influential in getting requirements changed and in adding new units to the institution and trustees and outside agencies are most influential in altering the entire status of the institution [p. 79]

Future research might fruitfully explore Hefferlin's generalizations about influential participants in certain aspects of a change process. His suggestions about who usually attends to certain kinds of information and what the influence of their attention is represent useful points of departure.

In research on academic change based on 11 case studies, Ladd (1970) examined both the reasoning behind the changes and various dimensions of the change process. Following his presentation of individual cases, Ladd made comparisons across cases and identified numerous factors that had either helped or hindered change. He considered the following elements of the change process: institutional climate, committee makeup and procedures, degree of involvement, reports, leadership, and institutional size and character (pp. 197-209).

Lindquist (1978) reviewed existing theories of change and knowledge utilization and then tested these theories through case studies of colleges and universities that had attempted to introduce curricular, administrative, or instructional reform. Lindquist's treatment may prove instructive for future research on change as information transformation. As the following excerpt illustrates, he combined several useful organizing concepts:

Colleges and universities combine deeply rooted norms, values, structures, subgroups and power-relations with great complexity, low formalization and de-centralization of control. Many new ideas penetrate such organizations, but very few can budge the status quo . . . rarely does reform or innovation of much magnitude get implemented. [pp. 29-30]

Lindquist's conclusions broadly correspond to notions of single- and double-loop learning or positive and negative feedback, and they point to the kind and complexity of feedback processes involved.

In a study of the successes and failures of innovation, Levine (1980) focused on the institutionalization, or termination phase, of change. He proffered a theory of change in organizations and then examined his theory in a study of 14 structurally similar innovations in the experimental colleges of the State University of New York at Buffalo. Of significance for future inquiry is Levine's perspective of boundaries in the change process. According to Levine, any innovation abets institutional instability as a result of its encounter with established boundaries. When several such boundaries are confronted at once against a backdrop of scarce resources, conflict emerges. Only boundary expansion, to include the change, or boundary contraction, to exclude the change, can resolve such conflict. Moreover, Levine pointed out two additional dimensions of the change process—compatibility and profitability—which are relevant to any conceptualization of information processing.

One other encompassing study of the change process merits mention here, for its method as much as for its findings. Newcombe and Conrad (1981) used the constant comparative method to study the process of mandated academic change. In studying programmatic changes, they identified conditions that facilitated the effective implementation of Title IX of the Higher Education Amendments of 1972 in eight Virginia colleges and universities. The authors' investigations of feedback cycles and institutional subsystems are an important feature of their research. Newcombe and Conrad suggested stages for a mandated change process, but they stressed the dynamic, situational nature of these stages (pp. 565-572).

Turning to the literature on curricular change in two topical areas—general education and the community college—we cite several representative studies. Studies of change in general education have taken several directions (Conrad, 1978a; Gaff, 1980; Ighodaro, 1980; Manns and March, 1978; Pratt, 1984). The treatments of the topic discussed here reflect varied approaches, both in method and in conceptualization.

Using the constant comparative method, Conrad (1978a) examined changes in general education at four colleges and universities. He identified several processes that link pressures for change to a policy decision for change: conflict and interest-group pressures followed by power exertion, administrative intervention, faculty leadership exercised through interest-group advocacy, and compromises negotiated through administrative leadership.

In examining the initiation and implementation of a diffusion process, Ighodaro (1980) used a case study approach to study change in a core-centered curriculum. He drew from three prevalent models of organization—bureaucratic, collegial, and political—in order to identify organizational variables and then analyzed their impact on the two stages of the change process. Ighodaro found that, taken alone, none of the three traditional organizational models could adequately explain the process of decision making and change. His study also confirmed two widely held beliefs about change: (1) congeniality and effective conflict management facilitate both the initiation and the implementation of the diffusion process and (2) decentralization and low formalization impede the implementation of innovation.

In a study that can best be described as ethnographic, Gaff (1980) consolidated some of the information gleaned from the Project on General Education Models (GEM), a project designed to help facilitate curricular change at 12 diverse institutions. Basing his observations on the work of general education reform committees in the 12 institutions, Gaff addressed the flaws in 43 common strategies for change and suggested alternative strategies. Gaff's proposed strategies for reforming general education provide some useful insights but few surprises—nearly all of his strategies find support in the literature on academic change.

On a different tack, Manns and March (1978) looked at curriculum change in times of adversity. Where many have approached studies of change qualitatively, they employed a quantitative lens as well as a framework that can help to channel thinking about information usage. They found that curricula seem to change more under adverse financial circumstances than in times of favorable economic climate. Moreover, in using a market metaphor to analyze routine curricular changes, Manns and March made some noteworthy departures from the bulk of the change literature. They noted, for example, that the “organized anarchy” of academe results in inconsistent information processes. Such inconsistencies make it difficult to predict how educational ideals and pragmatics will combine to produce the effects we record. In turn, these observations suggest a whole series of possible avenues of research from the viewpoint of the curriculum as a temporal, information-processing structure in colleges and universities. For example, March and Simon's theories (1958) of limited attention, which incorporate their ideas of organizational slack and search, correspond roughly to theories of positive and negative feedback. In turn, research could examine these authors' notions of organizational learning behaviors as they compare to kinds of feedback.

In related qualitative research, Pratt (1984) extended a portion of Manns and March's work in a case study of routine changes over a ten-year period at a single institution. Examining such variables as change in course description, course additions, and change in prerequisite designations, Pratt found that change in one variable—course additions—reflected a concern with enrollment markets. Despite the exploratory nature of Pratt's research and thus the tentative aura surrounding her findings, some useful information-related themes emerged: she discussed notions of positive and negative feedback, of limited or selective attention, and of signs and symbols in curricular organization.

Numerous studies of academic change in community colleges have been conducted in the last several years (Allan, 1979; Chiaro, 1984; Drum, 1979; Roark, 1985; Zoglin, 1981). These studies evince a diversity of focus and analytic framework. For example, Drum (1979) submitted a questionnaire to 188 community colleges to collect data for a trio of reasons: to examine community college services to the elderly, to test the predictive accuracy of claims made by the services-to-the-elderly movement, and to test the power of certain internal and external organizational variables for predicting the introduction of distinctive courses (services) for the elderly. Drum's dissertation research showed that a social movement (represented in this case by services to the elderly) encourages the institutionalization of certain changes.

Yet another study of change in community colleges is also a dissertation, one that merits mention here for its organizing concepts. Allan (1979) viewed planned change as occurring in the manner of a gestalt and used Lewin's well-known model of change (1961) to examine the "unfreezing" phase of the process. In a survey of some ninety respondents, Allan examined whether respondents were "unfrozen" relative to their willingness to participate in a new project. Such a widely respected metaphor as Lewin's may well have paved the way for later studies concerning how limited or selective attention processes influence the ability to change. For example, boundaries "unfreeze" to admit new pieces of information and "refreeze" when new information has found an acceptable fit in the system. Moreover, the system's attention to information is allocated in relation to numerous competing demands on time and energy (March and Simon, 1958). And a system "learns" to select the appropriate information for survival, given all the demands placed on the system. In terms of basic organizing concepts, this approach has the effect of relating our notions of boundary permeability to ideas about positive and negative feedback.

With a narrower focus, Zoglin (1981) primarily examined the agents involved in changing curricular content. She found that "community college decision making is a pluralistic process that permits each segment of the curriculum to respond to a distinct set of determinants of particular relevance to its unique function" (p. 418). Unfortunately, Zoglin's lack of focus on the sources or correlates of change tends to limit her findings. In contrast, Chiaro

(1984) investigated the sources, processes, and agents of curriculum change in a two-year institution. He identified factors and agents associated with change in both a general education program and an occupational educational program.

Lastly, Roark's study (1985) represents one of the more vigorous examples of research in the area. In case studies of three community colleges, Roark examined changes in educational technology. Since technologies can be viewed as discrete areas of information (March and Simon, 1958), Roark's research provides a useful point of departure for future research on information transformation in colleges and universities. Roark identified a range of factors affecting the implementation of new educational technology as a means of better understanding the processes associated with the effective implementation of innovations.

To summarize this treatment of academic change, it is instructive to proceed from a well-known critique of the change literature by Dill and Friedman (1979). These two authors outlined four frameworks for research on academic change that were originally advanced by Gamson (1974): complex organization, conflict, diffusion, and planned change. In regard to the complex organization framework, Dill and Friedman noted that research usually proceeds from an analysis of the rate of organizational change. The variables typically investigated in this mode include age, complexity, formalization, centralization, stratification, system environment, and size; an innovation itself can even serve as a variable of change.

The conflict or political framework emphasizes interest groups as influential forces in the change process. Variables frequently examined in political frameworks include intensity of conflict, job mobility, duration of conflict, level of satisfaction with a change, and effectiveness of change. In addition, this framework tends to focus on the natural history of one particular innovation at a time, emphasizing the formulation of policy over its execution. In short, the conflict framework tends to emphasize the circumstances leading to change more than the implementation of change (Dill and Friedman, 1979, pp. 417-419).

The diffusion framework focuses on the way in which a change "diffuses" throughout a system. Studies using this model have attempted to distinguish between "adopter" and "nonadopter" units. Such variables as cosmopolitanism, location in social structure, and past record of innovativeness have been found to be useful in making such discriminations. Dill and Friedman (1979) pointed to a major limitation of this framework: the assumption that innovation is "good" and in need of adoption by all units (pp. 419-420).

The last framework, planned change, focuses on managing change through a change agent. This model assumes self-motivation by participants and emphasizes intervention and implementation. Depending on the kind of change examined, this framework tends to include such variables as level of intervention

and attitudinal acceptance. Perceptions of the effectiveness of intervention strategies underlie this thread of research, and Dill and Friedman (1979) cited this as a limitation (pp. 420–425).

Dill and Friedman's analysis of the four frameworks is highly instructive, offering many organizing principles for future research. We also offer it for its representation of prevailing approaches to change research. Relatedly, the authors go from their review to propose forms for causal modeling that, while not necessarily assuming linearly related variables, emphasize monotonic relationships; that is, positive effects are always positive and negative effects negative (Dill and Friedman, 1979, p. 424). In our view, the incomplete information that we have about evolving curricula is not sufficient for us to generalize as yet about effects in such a fashion. Moreover, the subject-object dualism implicit in much of the change research remains a distinguishing characteristic of such causal models. If one's conceptual and analytic processes indeed remain ontologically grounded, as some current theory suggests, attempts at such "objective" research will be, at best, relative (Wolf, 1981). The heavy emphasis on qualitative research in the area of change suggests the nature of the difficulty of dealing quantitatively with the learning or change process. We scarcely suggest that quantitative research on change is unnecessary. Rather, we propose that empirical descriptions of change processes need a wide berth and that March (1978) and several of his colleagues in the study of organizational change seem to know the beast, albeit metaphorically.

DISTRIBUTIONS AND FREQUENCIES: NORMS AND OUTCOMES

Distributions and frequencies provide a foundation for comparative analysis in a field. We have identified two types of distributions and frequencies in our review of the literature on academic programs. One type consists of descriptive studies aimed at creating and maintaining normative data about academic programs across postsecondary education. A second type includes studies that examine the "outcomes" or "effects" of curricula on students.

Distributions and frequencies reported in the literature tend to be in a quantitative analytic mode. Even most qualitative-minded researchers underpin their work with some familiar assumptions that support a quantitative paradigm. From our perspective, the most important of these assumptions is that we can most fruitfully view distributions and frequencies as linear and sequential and thus can depict their directionality and/or sequence in logical mathematical statements.

To be sure, comprehensive mathematical pictures can offer useful points of contrast and departure as we seek to capture both curricular patterns and their effects on students. Yet, at the same time, we need to acknowledge the limitations of solely mathematical representations of reality in regard to evolving systems. As Boulding (1984) put it: "It has been said that if a proposition is not

obvious, it is not mathematics, although it may take a considerable amount of intellectual work to show that something is in fact obvious" (p. 20). If something is mathematically "obvious," then the relationship depicted cannot be otherwise.

Herein lies a fundamental turning point for research on information-processing organizations. Wherever humans transfer information, the unpredictable often occurs: relationships are not always the same. In turn, the research on academic programs offers scant evidence of the "obvious" phenomena that are reported in fields such as physics. To complicate things further, contemporary description and explanation continue to suffer the biases of the researcher. In other words, our very notion of how humans transform, combine, or replicate information depends largely on the particular aspect to which we choose to attend, as does any "logical" description of any event. Even when statistics paint a mathematical picture of a curricular incident, the uncertainty absorbed (March and Simon, 1958) as one infers "meaning" from the statistics to elucidate the incident illustrates the burden of determining fixed relationships in evolving systems. In short, accurate measurement and prediction in relation to curricula suffer from the uncertainty and ambiguity inherent in their evolution.

Accordingly, we must view with caution all normative data that emerge in descriptive studies about curricula. The same caveat applies to studies of the outcomes or effects of curricula. Both kinds of studies lend only a snapshot of the remnants, residues, or visible aspects of a process. To extend the metaphor, the learning process for which the curriculum provides a structure remains, at this time, largely unphotographed. Therefore, we may predict the future from chronicled past events or trends with, at best, a considerable amount of uncertainty.

Normative, Descriptive Studies

Researchers and educators can employ the normative data that derive from descriptive studies as partial indicators of "what is" or "what was" about academic programs at particular times and from particular viewpoints, of course. When applied in contexts other than those of the original descriptions or measurements, however, commentaries on past or current curricular patterns do not reveal mathematically "obvious" representations: how people or institutions were operating may be well documented; but whether or how that information pertains to learning in another setting is not "obvious." Whether anyone—students, faculty, or administration—requires the recognition or approval of the people or institutions depicted in descriptive studies in order to encourage desirable learning outcomes in the future is not revealed as "obvious" information either. Nevertheless, we have traditionally used this kind of information to describe "norms" and to compare systems against these norms.

Notwithstanding this caveat, one major tactic of gathering normative evidence has involved the analysis of catalogs over time. Dressel and DeLisle

(1969) and Blackburn et al. (1976) provided a straightforward monitoring of trends in undergraduate requirements. Dressel and DeLisle's study stands as the first of the contemporary catalog studies, while Blackburn and his colleagues began their study shortly after the earlier one left off.

Dressel and DeLisle's investigation was concerned with current practices and with changes over the period from 1957 to 1967. With a sample of 322 institutions, Dressel and DeLisle reviewed the following areas of the undergraduate program: general education, majors, electives, individualizing and integrating experiences, and comprehensive curricular patterns both traditional and unusual. While offering a well-designed, comprehensive empirical study of current and changing requirements, Dressel and DeLisle noted the limitations of catalog analysis:

There exist ambiguities and contradictions, and there is ever the problem of poor organization and of readability. A specific course in history is required, but it is not made clear whether this is in addition to or a part of the humanities requirement which lists history as an alternative. Inquiry in one such case elicited the response that advisors made their own interpretation! [p. 78]

This limiting statement clarifies the difficulties inherent in dealing with systems that continue to produce "happenings" (i.e., events that do not have to occur when they do).

On a tack similar to Dressel and DeLisle's, Blackburn et al. (1976) reviewed changing requirements from 1967 to 1974. While this study did not examine the very same curricular requirements as the earlier one, the research nevertheless suffered many of its limitations. The first phase of the Blackburn study focused on general education, the major, electives, and overall degree requirements at the undergraduate level. Among other interesting findings, Blackburn et al. found a decline in the proportion of general education courses as part of the total undergraduate program, an increase in the number of electives that students may submit to meet degree requirements, and virtually no change in the number of courses required for individual majors (pp. 33-35).

The Carnegie Catalog studies of 1975 and 1980, although unpublished, have been cited in several texts (Boyer and Levine, 1981; Carnegie Foundation, 1977; Conrad, 1983; Levine, 1978). On occasion, the literature discusses data on the major or on general education that are drawn from these two studies. Such occasions are far too few; these two studies deserve better illumination than from the once-removed perspective of selective citation. More direct interpretation of such data within institutions, for example, offers opportunities for contextually grounded contrast and comparison.

The studies by Dressel and DeLisle (1969) and by Blackburn and his colleagues (1976) endeavored to display the range and frequency of certain curricular events, and the authors' interpretations of these data have added the potential for increased depth of analysis. To seek further such depth, Blackburn and his associates (1976) narrowed somewhat the focus of the second

phase of their study. By examining student transcripts from ten institutions (none of them two-year institutions) from 1967 to 1974, they investigated how students partook of curricula. The contribution of this phase of the Blackburn et al. study lies in the progress made toward painting a more detailed picture of events occurring at certain points in time. For example, Blackburn and his colleagues found students increasingly choosing to take electives in areas of specialization or depth rather than in the breadth portion of the curriculum (pp. 29-30). Following the lead of Blackburn, other studies (Beeken, 1982; Grace, 1984; Mapp, 1980) have used transcript analyses to investigate student course-taking behavior.

Qualitative analyses of trends in undergraduate education also appear in the literature (Conrad, 1983; Conrad and Wyer, 1980; Gaff, 1983; Gamson et al., 1984). These studies deserve consideration for their attempts to delve into features lying beneath the visible surface of a curriculum as depicted in a catalog or planning document. Nevertheless, these studies seem to fall short of providing illuminating insights: on the whole, they forego any analysis of the unpredictability of the trends they delineate. In the process, the discontinuous, uncertain nature of events combining to produce a so-called trend receives short shrift. In these studies, trends often look as if they were built by successive stages, with little evidence of contrasting perspectives of the same phenomena. The absence of alternative perspectives with which a system might be usefully contrasted or compared limits the scope of many of these studies.

Conrad and Wyer (1980) sought to identify trends in liberal education by starting from a historical perspective rooted largely in Greek ideals of a liberal education. After reviewing documents from 100 institutions, they presented seven current trends in liberal education: the movement back to a required, integrated group of courses for students; the renewed interest in relating the outcomes of a liberal education to academic programs; the redefinition of liberal education in terms of process; the expansion of the curriculum beyond an emphasis on intellect to embrace the affective domain; the focus on values or moral education; the development of new relationships between the liberal arts and the professions; and the introduction of new ways to "deliver" the curriculum (pp. 25-35).

Concerning information transformation, a more productive research focus may involve less concern with trends in events *per se* and more analysis of the circumstances underpinning shifting events. This observation holds for the four studies mentioned above: Conrad's study (1983) of general education in community colleges, Gaff's study (1983) of general education, Gamson et al.'s study (1984) of fourteen innovative programs, and Conrad and Wyer's examination (1980) of trends in liberal education. All four studies penetrate, in varying degrees, the surface of the events that they delineate. Still, the embedded processes in individual and organizational learning, though raised occasionally as examples, remain largely beyond the careful treatment usually given

to identifying trends. Until researchers adopt an equal consideration of the discontinuous elements that help to forge events—elements that relate to how people and the institutions they create make choices—we stand either to miss or be taken aback by significant events rather than to be pleasantly surprised by them.

Outcomes

This same lack of attention to embedded processes, circumstances, or conditions is particularly evident in the literature on outcomes. The studies of the outcomes or effects of higher education have provided veritable “laundry lists” of characteristics that people think are by-products of the academic enterprise. Indeed, it is vital to know the product of a learning process. Without such knowledge, it is difficult to evaluate the present or to set a future course. At the same time, much of the contemporary research on outcomes or effects may best serve as familiar indicators of some familiar events occurring at certain points, given some equally familiar assumptions. There is an underlying research question that, if appropriately examined, might provide insight into higher learning. This question has barely begun to be asked.

Such a research question is multifaceted. An initial facet involves asking about how students change in college (e.g., What is the impact of college?). Many data have surfaced here. So also have data surfaced antipodally: Does college make a difference (e.g., What is the difference between a college person and a noncollege person?)? Inquiring about a specific condition (attending college or not attending) that could be associated with an effect precipitates still another question: What other conditions contribute to higher learning? Unfortunately, this last question, though addressed repeatedly by researchers, has yielded few “obvious” data on learning, either inside or outside a college setting.

In the reviews of research on the outcomes of college, three major works stand out. Feldman and Newcomb (1969), Bowen (1977), and Pace (1979) have provided virtual compendia on college impact. Again, the studies cited in these volumes encourage linear thinking about college outcomes; they tend to emphasize the outcomes without giving equal treatment to those conditions or variables that may be associated with various outcomes. Feldman and Newcomb (1969), who reviewed 40 years of studies, focused mostly on affective outcomes. Bowen (1977) viewed both affective and cognitive effects, while Pace (1979) concentrated on cognitive ones. Analysis of curricular variables that might be associated with various outcomes is largely missing (except in the Feldman and Newcomb review, which examined the impact of major field of study).

In a major study of the outcomes of college, Astin (1977) confirmed many

of Feldman and Newcomb's observations. From several longitudinal studies conducted between 1965 and 1974, Astin reported results on a number of questionnaire items: persistence in college, satisfaction with college, career plans, degree aspirations, extracurricular activities, self-concept, and attitudes and beliefs. Astin also examined whether various outcomes were related to certain characteristics of colleges (e.g., four-year versus two-year). Similarly, Winter et al. (1981) focused on cognitive and affective outcomes and linked various characteristics of liberal arts colleges to certain effects.

How the topic of curriculum fits in the research on college outcomes is difficult to ascertain. There simply has not been much research that examines the relationship between various curricular features and educational outcomes. Perhaps Chickering (1969), over 15 years ago, gave the best approximation of the current state of this genre of research: "At the outset it must be recognized that research documenting relationships between curricular systems and particular aspects of student development is like Vermont dirt roads in spring—muddy and soft" (p. 206).

We should not be put off by the mud, however. The lack of substantive research on the curriculum as a variable associated with learning processes is plainly evident. Even in the less-attended-to area of cognitive outcomes, there have been few attempts to relate curricula to effects. In turn, the overarching need to fill this gap demands more and different kinds of research. Even mud grows firm under proper conditions. It is premature to conclude, as some have, that the curriculum is not an important factor in learning. Research is badly needed that examines the relationship of the curriculum to learning or information transformation or change (which is the larger question being asked in an impact study): What is the learning or change which takes place, and what seems to encourage this kind of learning or change?

To be sure, some studies conducted in a single setting have attempted to differentiate between two curricular types as they may relate to differential outcomes. Usually the study has compared a traditional curriculum or curricular feature to an innovative one. As yet, research in this area has not come to incorporate comparisons of curricular types across a number of settings.

Two examples in this area are the work of Hendel (1977) and of Berson (1979). Hendel investigated transcripts of a group of graduates from an elective liberal-arts degree program and compared them with the transcripts of traditional liberal-arts graduates. He found that elective program graduates had more individualized programs and concentrated less within an academic discipline than did traditional liberal arts graduates. Further, elective program graduates tended to have slightly lower overall GPAs at graduation than did the comparison group (pp. 257–267). Basically, however, Hendel found few differences between students of the two groups when comparing performance on a number of traditional measures of academic success.

Similarly, Berson (1979) investigated the effects of an experimental, value-oriented liberal-arts curriculum on moral development. Contrasting a standard ethics course of study with the experimental one, and using an instrument designed by Kohlberg to measure moral development, Berson examined the curricular history of two groups of freshmen students participating in the comparison programs. Berson found the experimental curriculum to have no significant effect on moral judgment as measured by Kohlberg's instrument. Further, he suggested that the experimental program exhibited a lack of either any legitimate novelty (i.e., a genuinely changed program) or faculty and institutional support for the new, more interdisciplinary approach.

In noting that faculty, curriculum, and institutional ethics require attention when one focuses on the ethical growth of students, Berson raised an important point for all research in the general area of distributions and frequencies. These kinds of studies need to address what a curricular structure brings (or contributes) to the learning process as well as what the faculty (individually and collectively), the student, and the institutional environment bring.

Thus far, whether the outcomes under scrutiny are cognitive or affective, this genre of research has rarely touched on the learning relationships that describe academe. Instead, research has focused on the products that one might expect to realize from a college education. Without incorporating more information about the producers (faculty, students, administration, alumni, and participating "significant others") and the producing (acquiring, transmitting, and applying information in productive ways), such a body of research will remain inchoate. Thus, we remain uncertain about the underlying nature of the information transformation that occurs when both teacher and student learn—that is, when both walk away from an exchange wiser than they were before the exchange.

As if to address this elusive notion, two other approaches to college impact research have emerged. The first involves studies that have examined the paths of individuals developing through their college (undergraduate) years. As two examples, Perry (1968) and Heath (1968) have provided well-known data on student development that have spawned numerous follow-up studies. Perry looked at intellectual and ethical development, Heath at cognitive and affective development. Each of these studies also examined a male population and proceeded on assumptions of development that involve moving from some relatively simple and concretely related growth phases toward more complex and abstractly related ones, the phases being hierarchically arranged.

The strength of these studies lies in their attempts to seek out the substance that might link to some rather visible forms (e.g., traditional notions of curriculum and human development placed in a four-year period). The obvious limitations of these studies by Perry and Heath reside in their narrowness of research focus—on males in traditionally conceived settings (Harvard and Haverford).

Nevertheless, these studies do comprise a modest beginning toward identifying experiences or characteristics that may be associated with a curriculum. Moreover, if the curriculum is a form that faculty and students will use for purposes of organization, researchers need somehow to associate the substance of the learning process with the visible forms. The compelling caveat for assuming such an association is, stated broadly, that the learning process for which understanding is sought may be, in essence, an evolutionary one that is neither linear nor hierarchical, as many of the developmental studies imply.

Research in this area may take a cue from the findings by Pascarella and Terenzini (1976, 1978) on informal student-faculty interaction and the experience of students in their first year of college. The earlier study (Pascarella and Terenzini, 1976) examined freshmen perceptions of academic and nonacademic experiences associated with varying amounts of informal contact with faculty. The later study (Pascarella and Terenzini, 1978) looked at the relationship between student-faculty interactions and three freshman-year educational outcomes. Each study found positive correlations between student-faculty interaction and such factors as student persistence and self-perception of personal growth. Each study also emphasized the correlational nature of the research and advised caution in attributing causality or directionality to informal interaction and student outcomes.

Students who interact frequently with faculty beyond the classroom may do so because they are extracting academic or nonacademic meaning from classroom exchanges and hence are seeking additional association or exchange with those who abet such a process. Another possibility is the reverse: faculty who interact frequently with students beyond the classroom may do so because they are making meaning (in an academic sense) or personally meaningful use (in a nonacademic sense) of a classroom exchange and seek further association or exchange with those who encourage that. According to this view of information transformation, both faculty and students are learners in a complex exchange organized within certain curricular forms.

Along similar lines of reasoning, Pace's research (1980) has proceeded from the assumption that "what a student gets out of college depends, at least to some extent, on what he or she puts into it" (p. 10). In emphasizing that learning requires both time and effort, Pace suggested that time is a frequency dimension and effort a quality dimension. Using a method that employs fourteen scales related to use of college facilities and opportunities (as part of a more comprehensive questionnaire), Pace attempted to measure quality of student effort. The questionnaire, which was sent to thirteen colleges and universities, also requested extensive information about students' background and perceptions of the college environment. In addition, Pace gathered information concerning each student's "estimate of gains" regarding his or her college progress.

Computing all possible correlations among his measures of effort, environment, and outcomes, Pace reached the following conclusion:

These relationships suggest a basic wholeness about the college experience. Personal and social experiences contribute to intellectual competencies and to general education; academic and intellectual experiences contribute to personal and social development and understanding. . . . [Q]uality of effort is clearly related to degree of attainment—the greater the effort, the greater the gain. Moreover, quality of effort is the most influential single variable in accounting for students' attainment. [p. 16]

Pace expanded on his findings for the National Commission on Excellence in Education (1982) and later in a monograph, *Measuring the Quality of College Student Experiences* (1984). In turn, a number of researchers have examined Pace's measures of quality of effort, sometimes in relation to a value-added concept of learning (Friedlander, 1980, 1981; Shaver, 1979; Lara, 1981; Porter, 1983). Friedlander (1980), for example, found substantial differences among students in quality of effort invested in certain opportunities and found these differences to be related positively to gains that students made toward educational goals. Similarly, Shaver (1979) found that students in different institutions invested their efforts differently.

Finally, the suggestion emerging from this vein of research is one of encouraging researchers to look at, among other things, quality of effort (both student and faculty) and its relation to the curriculum. As noted earlier, curricular forms serve as organizing mechanisms and exist at the center of the academic experience that research seeks to delineate. To be sure, research has produced a number of measures of such things as achievement, quality of effort, and outcomes. Some studies have attempted to link outcomes to particular curricular environments (Baird, 1977; Forest and Steele, 1978). But there is a need to define meaningful associations between the variables of the learning processes to which a particular curriculum provides some shape and even direction (by virtue of the progressive nature of requirements in certain programs). Such associations include comprehensive descriptions of the adaptive behaviors of participants, the exchanges taking place, and the outcomes of the process.

GENERALLY KNOWN RULES AND STATUSES: CONCEPTUAL FRAMEWORKS

One line of scholarship in the higher education literature corresponds roughly to what Zelditch (1962) referred to as "generally known rules and statuses." This scholarship has focused on the development and refinement of concepts and terminology in order to capture key features of academic programs. To be sure, the literature in this vein is, by definition, nonempirical and often includes a prescriptive dimension. Yet, at the same time, this literature represents an important thread in the research on academic programs, not least because it enables us to examine the extent to which the field has begun to develop conceptual

building blocks on which a volume of research can firmly rest. Further, such conceptualization processes offer opportunities for associating problem-solving elements with fitting metaphors and perhaps, at some point, with appropriate theories (Saccaro-Battisti, 1983; Morgan, 1980).

Conceptual Frameworks

In an attempt to provide some closure, this concluding section seeks to pencil in portions of the literature where the communicative thrust has been one of outlining, designing, modeling, or sketching with broad strokes on a conceptual canvas. Mere sketching can in itself prove a useful tool to aid in organizing thought and action. Blau (1960) and Crane (1972), among others, have suggested that the development of a cognitive structure and a system of social interaction are two dimensions of any maturing field of study; indeed, the kind of collective sketching that occurs when a social system supports a field of study can at once help to define the field even as the field continues to evolve beyond successive temporal definitions. The importance of such sketching concerning information transformation in academic organizations lies in the creation of a design and in the taking of risks by so doing, in concert with others likewise willing to brave an exchange of such mental road maps. In essence, the higher learning resides in such exchanges.

So what do people suggest that the exchange of higher education is all about? The first block of literature treated here deals with models drawn mainly from work done in the area of general or liberal education. These specifically focused models tend to emphasize curriculum planning in a normative sense; we present them to lend a sense of special focus in modeling. For example, Vars (1982) outlined five curriculum designs in general education: (1) distribution requirements, (2) required courses, (3) correlated courses, (4) combined courses, and (5) integrative seminars. Through a discussion of the strengths and limitations of the five designs, Vars purported to illuminate alternative approaches to curriculum integration.

In comparison, Hursh et al. (1983) offered a single interdisciplinary model as a means of achieving the aims of general education. Noting that little agreement exists over the methods of such achievement, the authors addressed the integration of curriculum design and learning theory. Hursh et al. suggested, moreover, that

the discipline-based recipe for general education could be improved upon and that one key for doing so [is] the introduction of multiple perspectives upon specific issues in order to exercise, among other things, skills of comparison, contrast, analysis, and above all, synthesis. [p. 44]

The authors juxtaposed the multiple perspectives of the disciplines with the "metaperspectives" characterizing each discipline. These metaperspectives include major disciplinary assumptions, major units of analysis, preferred forms

of experimentation, preferred methods of data collection, preferred methods of data analysis, rules of evidence for asserting fact, relevance to specific problem, and definition of relevant concepts (p. 48). They also emphasized the perpetual aspect of learning in a world of competing goals, rapidly growing information bases, and shifting perspectives.

In a piece that deals with community college curricula, Myers (1979) offered yet another approach to design. He developed and evaluated a model for "curriculum engineering" that tends to address normative system maintenance. Myers's emphasis on the normative is not unusual in the literature. Such approaches can, if conducted in wholesale fashion, encourage a narrowness of perspective that tends to undercut the benefits of designing.

Where information is concerned, an important design perspective continues to be the broad philosophical underpinnings of a modeling process. Few models address personal or educational philosophy explicitly but evince a tendency only to imply that philosophical frameworks undergird the practical, necessary comparative renderings of curricular types (see Bucci, 1981). Since philosophies represent mental blueprints, we wonder at the wisdom of continued implicit allusion to these templates. Should not those drafting curriculum models employ the tools of the philosopher? If such tools were more explicitly evident, the users of the models would at least have more discrete ideas about the modeler's self-conscious distinctions of design. Further, normative models would show some connection with a value system, where philosophy remained outlined alongside values and norms.

One scholar has attempted such philosophical outlining. In a piece that is extremely helpful in explaining the notion of curriculum design, Toombs (1977-1978) arranged five philosophies of curriculum amid his ten design considerations. In his analysis of general education in eight colleges and universities, Toombs described the "problems and paradoxes" inherent in dealing with the curriculum as a field of study or as a structure at the center of the higher learning. Many of these problems, Toombs argued, may well have resulted from individual and collective acceptances of some rather arbitrarily chosen formal orders. Formal orders include such phenomena as the structure of knowledge in a field or modes of practice in a profession (some of which one sees posited as norms). Toombs wisely noted, however, that errors in dealing appropriately with curricula to date lie "not with the formal order but with the attempt to conceive of a curriculum from a limited frame of reference" (p. 20). Moreover, Toombs suggested that design represents an appropriate level of abstraction for dealing with curricula at this point. If it is necessary, as a part of problem setting and solving, to formulate an array of symbols, signs, numbers, and words to represent an event (Simon, 1969), then designing encourages the formation of such sets. In turn, the distant future may hold distinct possibilities for an eventual juxtaposition of carefully crafted curriculum designs with the

constructs of another blueprint, such as evolving information transformation in concrete systems.

Moreover, it is useful, as a prelude to such a juxtaposition, to investigate existing approaches to design. Toombs' design considerations (1977-1978) fall under the general rubrics of content, context, and form (p. 24), components that he drew from various literatures. By way of comparison, Conrad and Wyer (1980) took an anecdotal approach to grouping models of liberal education, defending the appropriateness of this tack in light of the fledgling state of curricular definition and conceptualization. Conrad and Wyer outlined three models of general or liberal education based on actual usage. Their discussion of distributive, integrative, and competence-based models uses content, process, and outcomes as bases of analysis and comparison (pp. 43-49). These authors also made useful distinctions regarding the differences in several well-known attempts at generic—rather than content-specific—curricular modeling.

In a similar but more encompassing vein, a discussion of a number of influential generic curriculum models follows. Such a discussion can help to accomplish several tasks necessary to future comprehensive design efforts by, first, sketching an outline of the evolution of curricular modeling in higher education; second, underscoring the terminology common to modeling; and third, acknowledging any other apparent strengths and weaknesses of contemporary design efforts.

As an approach to curriculum description, planning, and analysis, Axelrod (1968) suggested thinking about academic programs in terms of systemic curricular dimensions or elements. Axelrod's three structural dimensions are content, schedule, and certification; his three implemental elements are group-person interaction, student experience, and freedom and control.

To provide guidance in constructing programs for undergraduates, Dressel (1971) presented a "structure for curriculum analysis." His modest model could function as a planning tool as well as an analytic framework, given his attempt at broad conceptualization. Moreover, the relationship between broad, cogent conceptualization and practical application remains a compelling impetus for ongoing modeling attempts at several levels of academic organization (e.g., department, school, institution, and system). Where information transformation or exchange takes place, such conceptual attempts remain an essential part of information organization.

In his model for curriculum analysis, Dressel (1971) first outlined four continua: individual student and disciplines; problems, policies, actions and abstractions, ideas, and theories; flexibility, autonomy or rigidity, and conformity; integration, coherence, and unity in and from learning experiences and compartmentalization, inconsistency, and discord in learning experiences. Next, he proposed five essential elements of curricula: liberal and vocational

education, breadth and depth, continuity and sequence, conception of learning and teaching, and continuing planning and evaluation (pp. 21–29). Dressel's is one of the early efforts to address systematically such elements as breadth and depth in higher-education curricular models.

Mayhew and Ford (1971) also sought to describe "prevailing curriculum analysis" for a new decade by describing existing programs and critiquing the ideas of such figures as Tyler (1950) and Phenix (1964). They suggested that "with improved techniques of social research, and with improved information systems, it seems possible to obtain a great deal of information as to how the curriculum is working" (Mayhew and Ford, 1971, p. 91). Further, Mayhew and Ford thought that the building blocks of curriculum theory would eventually derive from gathering and disseminating routine evidence from faculty, administration, students, and alumni about what each was doing as it related to the curriculum. Comprehensive institutional research, held Mayhew and Ford, would approximate for faculty the insights that had previously been the province of the philosophers (p. 92).

Unfortunately, more and different kinds of information do not necessarily result in insight, philosophy, or theory. In the extreme, such abundance can result in an information overload that can encourage a retreat from philosophical or theoretical organization, so complex does the task appear, so uncertain do the results seem, so dense is the atmosphere surrounding insight. As noted earlier, people have limitations on their time, energy, and attention and thus will attend only selectively to incoming information (March and Simon, 1958). How would anyone be encouraged merely by the presence of more data to select more or different items to which to pay attention? Indeed, people "learn" what to take in and what to ignore, given a situation. Without some impetus for refocusing on more or different information, people are not likely to change their attention patterns. Mayhew and Ford (1971), while contributing to the discussion on curriculum modeling as it may lead to theory, did little to enhance conceptual organization to this end. They presented a number of helpful kinds of evidence (basically more normative information) for designers to employ but offered few substantive recommendations about conceptual organization. However, Mayhew and Ford did illuminate a number of curricular issues. The following issues have gradually come to be accommodated in more recent curriculum designs: cultural versus utilitarian emphases, general versus specific orientations, elective versus prescribed, elite versus egalitarian, student-oriented versus subject-matter-oriented, discipline-centered versus problem-centered, and scientific versus humanistic (pp. 2–5).

One of those later designs belongs to Bergquist (1977), who combined Mayhew and Ford's issues (1971) with Dressel's continua (1971) and added three curricular approaches that he had identified, all to produce eight categories of nontraditional curricula. Bergquist named his categories or models as follows:

heritage-based, thematic-based, competency-based, career-based, experience-based, student-based, values-based, and future-based. Bergquist (1977) acknowledged that his eight categories represent a "mixed bag of curricular dimensions. Several categories specifically refer to the content of the curriculum, while others refer to the way in which decisions are made about the curriculum or ways in which students are likely to learn" (p. 85). Bergquist then suggested five other dimensions worthy of design consideration: curricular breadth, locus of control, instructional process, curricular structure, and curricular outcomes.

Concerned with curriculum planning and analysis, Conrad (1978b)—like Bergquist—considered innovations in the development of his schema. Conrad's framework provides for traditional and nontraditional curricula by using four continua reminiscent of Dressel (1971) and five organizing principles that compare to those of Bergquist (1977). Conrad (1978b) proposed groupings "not primarily distinguished from one another at a broad philosophical level. . . . The crucial distinctions . . . lie in the way knowledge is organized and communicated" (pp. 13–14). Conrad differentiated five alternative principles for organizing the undergraduate curriculum: academic disciplines, student development, great books and ideas, social problems, and selected competencies.

The use of continua and typologies as means of approaching program planning surfaces frequently in the literature. In a later book, for example, Dressel (1980) expanded on his earlier continua. More recently, Bergquist et al. (1981) presented a typology of six curricular types, types that reflect a hierarchy of six curricular dimensions. These dimensions, which can serve as a generative system for curriculum categorization, include time, space, resources, organization, procedures, and outcomes (pp. 6–7).

Bergquist and his colleagues (1981) suggested that their dimensions are hierarchical "with reference to the profundity of change required when a decision is made to alter existing curricular structures within one or another dimension" (p. 6). For example, time and space changes are viewed as lower-order dimensions (and thus easier to change) than are procedures and outcomes. One should note, however, that this observation holds for change according more to prevailing Western than to Eastern conceptions of time and space. If, as many of these designers have noted, the curriculum needs to respond to multiple cultures, then such dimensions as these may function differently. Curricular structures will necessarily shift to accommodate multiple perspectives of time, space, organization, resources, procedures, and outcomes. Some of these shifts (relating to other perspectives) may not include the same linear progressions or hierarchical arrangements of curricula that we have traditionally depicted.

In an attempt to address a shift in perspectives, Conrad and Pratt (1983) incorporated many of the characteristics of the earlier-mentioned models and

added the decision maker to the schematics. This approach has the effect of associating individual learning and organizational learning. Their suggestion that deciding and thus designing is an "everything-at-once" phenomenon introduced metaphor as an important design tool. In effect, by noting the holographic nature of human decision-making, these authors pointed to a contemporary means of dealing with the complexities of comprehensive curriculum design. That is, the linear thrust of current design efforts (to include Conrad and Pratt's model) might be alleviated by a holographic approach to design. To be sure, curricular conceptualization seems a long way from holographic presentation. For example, it remains difficult to draw full-dimensional pictures representing philosophy, epistemology, learning theory, or politics in a way that benefits current notions of design. In the meantime, however, our designs can begin to delineate the hand-in-glove layers of a fuller picture of these many aspects of a learning process.

In a modest way, the Toombs, Dressels, and Bergquists have begun this layering process. More recently and in reconceptualized summary, Conrad and Pratt (1983) have underscored internal and external curricular considerations, to include administration, faculty, students, alumni, and other important groups (business, the community, and the professions). Conrad and Pratt also noted the simultaneity of processes—political, social, educational, curricular, and professional—in an organized system for learning, outlined curriculum variables that relate to form and content, and wedded many of the continua and essential elements of other models to represent the interface of instructional practices, curriculum organization, and human resources. Such formative interfaces include considerations of content coverage, time dimension, locus of learning, instructional strategies, faculty expertise, and student development. These two authors also presented the delivery systems of a curriculum as options occurring along continua dealing with flexibility of program, design of program sequence, evaluation procedures, calendar, and credit options (pp. 27–28). Finally, Conrad and Pratt asserted that feedback is an important design consideration as it affects one and many parts of a system. In their model, outcomes begin to look as much like a means of feedback as they do like ends of a learning process.

Largely absent from the curriculum literature and thus from design efforts to date are "high context" (Hall, 1976) representations of a complex exchange process (Boulding, 1970) between people and groups. Transformation of information in academic institutions seems to be a process of exchange that is realized at once internally, individually, distinctively and externally, collectively, and differentially. Each person transforms information in his or her own unique way; yet, at the same time, the process occurs in relation to groups (at various levels of organization) that also are transforming information in ways unique to the group. Individual learning probably influences group learning, and group learning processes probably influence individual learning. Research

needs to come to scholarly terms with such a paradoxical notion.

The size of the system can give some valuable clues about realistic approaches to designing for regenerative learning. Generalizations about individual learning, for example, do not seem appropriate to predictions regarding organizational learning, because open systems and closed systems have different properties. The smaller, individual system has the greater potential to function in a relatively open fashion. An individual functions in an environment that is relatively stable from her or his vantage point. The larger a system is, however, the more it may tend to function in a relatively closed fashion. Larger systems have larger social, political, economic, biological, and physical structures to consider. The more closed a large system, the more it is its own environment. And the more difficult it becomes to form accurate images of the system, much less to evaluate the images. Not only do we lack familiar references for how the large system works, but it is also difficult to acknowledge in an orderly fashion all of the evolving processes that we recognize that might contribute to an event. It is important, then, to remain aware that systems of different size apprehend information differently (Boulding, 1984; Miller, 1978). The critical interface that curriculum design can address, nevertheless, is that of the decision maker (faculty member, student, administrator, or graduate) in an institutional setting. Design, by definition, represents an attempt to depict the properties of a system and simultaneously to convey some knowledge to those who wish to choose among system options. In this view, those involved in conceptualizing curricular organization and functioning need to focus more on the adaptive behaviors of the institution, to monitor institutional and curricular history, and to continue to consider creative options (March, 1984, p. 2).

Finally, the conceptual effort must be decisively tentative. While this may sound like a contradiction in terms, the central suggestion here is not: Simply, the designer must ensure that curricula are open to change. Indeed, the evidence over the last 15 years suggests that curricula are changing—as demographics, public perceptions, and societal demands are changing: “The view that what has been always will be is not borne out by the record of evolution, as the disappearance of the dinosaurs certainly indicates” (Boulding, 1984, p. 20). Moreover, trends will end; regenerative designs need only to take note of the trendy or the trend setters. Models need to allow for surprise. And modelers need to risk sharing with each other any good fortune that comes their way in the form of insight about uncertain pathways. In this regard, today’s researchers of higher education curricula, having come a long way, have much solid work to monitor, many possible futures to consider directly, and numerous energetic colleagues with whom to embrace the immediate inquiry.

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