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ABSTRACT

Given recent Federal Government and business community emphasis on integrated vocational and academic education, a telephone survey of community colleges was made to explore what forms such integration is taking. Information was gathered through telephone contact with 45 community college officials recruited through a mailed questionnaire to a randomly selected sample of 295 community colleges and institutes and 4 site visits. The results indicated a variety of approaches to integrating occupational education; these were summarized as eight models: (1) general education requirements; (2) applied academic courses; (3) cross-curricular efforts--incorporating academic skills in occupational programs; (4) incorporating academic modules in expanded occupational courses; (5) multidisciplinary courses combining academic perspectives and occupational concerns; (6) tandem and cluster courses and learning communities; (7) colleges-within-colleges; and (8) remediation and English-as-a-Second-Language (ESL) programs with an occupational focus. Barriers to integration included disciplinary specialization, the status difference between occupational and academic instructors, lack of leadership for curriculum reform, and independent divisions in colleges. However, benefits were also cited, such as increasing student competencies and integrating the faculty. (Contains 69 references.) (KC)

National Center for Research in Vocational Education

University of California, Berkeley

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EXECUTIVE SUMMARY

Recently there has been a shift in favor of emphasizing more general or "academic" skills over the specialized or "vocational." Partly this has come from the business community, pressing for certain competencies it thinks necessary for a more productive workforce. Within occupational education, recent federal legislation requiring the integration of vocational and academic education has reinforced the trend. However, there has been little guidance about what such integration might be, especially for community colleges and technical institutes. To fill the gap, this monograph describes various approaches to curriculum integration at the postsecondary level and is based on a survey of practices in community colleges and technical institutes across the United States.

The results indicate a variety of approaches to integrating occupational and academic education:

- *Model 1: General education requirements*
  The most frequent form of integration is the requirement of general education courses for certain occupational students. In most institutions, students are required to take several such courses; typically, general education courses are not modified in any way to suit the interests of occupational students, requiring students themselves to integrate material and perspectives from the academic courses. A few institutions provide some guidance for their occupational students about which general education courses would be the most valuable, and one has developed general education objectives that are then incorporated into other courses (both vocational and academic).

- *Model 2: Applied academic courses*
  Another common approach to integration is the development of academic courses with applications in occupational areas, like technical writing, business math, or agricultural economics. Occasional debates about who teaches such courses reveal the underlying tension about the relative balance of occupational and academic elements. Often developed as a way of serving the needs of occupational students more precisely, applied academic courses are generally

taught to occupational students only and reinforce the segregation of occupational students from others.

- *Model 3: Cross-curricular efforts: Incorporating academic skills in occupational programs*

  The best-known cross-curricular effort is "writing across the curriculum," in which all instructors (including occupational faculty) are encouraged to incorporate more writing into their courses—either as a way of teaching writing or as a way of reinforcing other learning. Other similar efforts—communications across the curriculum, humanities across the technologies, and a reading across the curriculum program—have been developed at smaller numbers of institutions. While it is unclear how widely such initiatives are incorporated into occupational classes, they have the potential for incorporating more academic content into occupational programs.

- *Model 4: Incorporating academic modules in expanded occupational courses*

  Some occupational instructors have introduced modules based on academic disciplines—history or ethics, for example—into their occupational courses to broaden the perspectives of students. Such efforts are focused on specific courses and are more episodic and less sustained than are institution-wide efforts like Writing Across the Curriculum.

- *Model 5: Multidisciplinary courses combining academic perspectives and occupational concerns*

  A number of institutions have developed multidisciplinary courses, often with external funding, that take the perspectives and methods of academic disciplines and incorporate broad occupationally oriented issues. For example, some explore literature (both fiction and nonfiction) to explore themes about the role of work for individuals and society; several examine the history of technology and its effects on society; and others investigate the ethical issues surrounding work and technical change. Many of these courses are true hybrids, and almost all have been developed by occupational and academic faculty working together. Most such courses have drawn upon the humanities rather than the social sciences, perhaps because of support from the National Endowment for the Humanities. Unfortunately, past experiences suggest that reliance on special funding is

potentially dangerous because such courses may vanish once funding is withdrawn.

- *Model 6: Tandem and cluster courses and learning communities*

  Another approach has been to develop two or three (or more) complementary courses that students take simultaneously. This practice allows instructors to reinforce material from at least one other course, to present similar issues from different perspectives, to develop common examples and applications, to develop projects undertaken simultaneously in more than one course, and to rely on another course to teach necessary prerequisites; consequently, students have stronger personal relationships with other students, facilitating collaborative teaching and learning. While tandem and cluster courses need not involve vocational education, many examples include both occupational and academic courses and provide a structure which facilitates the integration of occupational and academic content.

- *Model 7: Colleges-within-colleges*

  Colleges-within-colleges are in many ways expanded clusters, in which students take all their courses together. Although this approach has the same potential for integration as do cluster courses and learning communities, it is also much less flexible because students must be committed to taking all their courses in a program together—often impossible, especially for older students with employment and family obligations. Colleges-within-a-college are quite rare: Within the institutions we interviewed, one college-within-a-college failed because of the inflexibility of scheduling required, while another is still in the planning stages.

- *Model 8: Remediation and English as a Second Language (ESL) programs with an occupational focus*

  Several colleges have developed remedial or English as a Second Language (ESL) courses to teach basic math and English, or ESL, simultaneously with introductory material in an occupational area. In theory, such approaches can provide greater motivation to students with occupational goals and may be more effective teaching strategies because they provide a context for instruction; indeed, several such programs have documented higher grades and lower dropout

rates in such courses. While this approach is different from the others because it concentrates on relatively basic skills, it presents a way of responding more effectively to the surge of postsecondary students requiring remediation or ESL.

These eight approaches differ not only in their methods and content, but also in their conception of integration and in their ambitions. Some make minor modifications in existing courses, while others (especially clusters and learning communities) restructure community colleges in novel ways. Some rely on students to make the links among occupational and academic content, while others make faculty responsible for integrating content. Some continue to stress academic content, using occupational material to contextualize such learning, while others are true hybrids of academic perspectives with occupational issues. Each of them has potential benefits for students, faculty, and the coherence of postsecondary institutions, though the differences among them should be clearly recognized.

While there are many innovative approaches to curriculum integration in community colleges and technical institutes, several are quite rare, and those who have developed novel approaches report a number of barriers to integration. These include pervasive disciplinary specialization, the status difference between occupational and academic instructors, the lack of leadership supporting curriculum reform, the lack of resources for release time and planning, and the development of the community college as an archipelago of independent divisions, each serving an independent mission. However, the examples of institutions that have embraced integration efforts indicate that these barriers can be overcome with sufficient commitment from administrators and faculty working together.

A final and crucial issue is whether integrating vocational and academic education is worth the time and effort necessary. There are several *a priori* reasons for thinking that integration will benefit postsecondary students. Several approaches are ways of developing more student-centered curricula, which are better suited to the needs and interests of occupational students and have advantages in motivating students. Most will increase the general and academic competencies of students, preparing students for occupations in a world of changing requirements. Some integration efforts also include material related to occupational alternatives, providing a vehicle for career exploration,

and others include opportunities to explore the political and moral issues that are widely cited as important components of education but often ignored.

Other benefits are indirect. Integration efforts provide natural ways for faculty to collaborate and, particularly, to break down the isolation between occupational and academic instructors. Some approaches—particularly tandem and cluster courses and learning communities—provide structures that facilitate more coherent programs, helping students avoid the "milling around" that is so common in community colleges. Finally, integration can help bridge the distinct islands of activity within the community college, providing a way of moving toward a true community of learners.

ACKNOWLEDGMENTS

Above all, we wish to thank the many instructors and deans whom we interviewed about their practices in community colleges and technical institutes. They were unfailingly generous with their time, with materials produced for courses and programs, and with their insights. Those who have been developing innovative approaches to teaching were especially informative: Their excitement and commitment were unmistakable, and their ideas provided the most important stimulus for this monograph. We regard this report as a distillation of these individuals' creativity, and any role it may play in furthering the integration of occupational and academic education at the postsecondary level should be attributed to these teachers and administrators.

While we interviewed too many individuals to thank individually, the following were especially helpful: Diana Metcalfe of the American Association of Community and Junior Colleges, who was a consistently reliable source of leads; Meryl Sussman and Roberta Matthews of LaGuardia Community College; Connie Pettingill, Cheryl Baraldi, and Gail Carberry of Springfield Technical Community College; Judy Sullivan of Southern Maine Technical College; and Susan Walling and David Massey of Bunker Hill Community College.

We also want to thank Liz Alpert of Hartnell College and the University of California at Santa Cruz, who carried out a round of interviews at an early stage of this research that formed the basis for our subsequent survey and interviews.

As always, the interpretations in this report are ours alone and do not represent the positions of either the National Center for Research in Vocational Education or its sponsor, the U.S. Department of Education.

INTRODUCTION

All during this century, the balance between the vocational and the academic content of education has been contentious. The battles over theoretical versus applied learning, over general education versus specialization, over "abstract" versus "concrete" approaches to teaching and learning, over broader "education" versus shorter-term "training," over "the head" versus "the hand" as the object of education—all these battles have reflected disagreements about the purposes of education as well as the balance of different elements within formal schooling. Well after the educational system has become the major form of access to most occupations, and schools and colleges have become vocational institutions in the most general sense, such debates continue to rage at virtually every level of the educational system. The current shifts surrounding academic requirements and the fate of vocational courses in high schools, the pressures for enhancing academic or transfer education over occupational education in community colleges, and the continuing debates over general education versus occupational (or disciplinary) specialization within four-year colleges are examples of a continuing and probably unresolvable discussion.

Recently, there has been a shift in favor of emphasizing more general or "academic" elements over the specialized or "vocational." Part of this has come from the educational reform movements of the 1980s, which attacked declining academic standards in high schools and the tendency toward over-specialization in colleges. In part, the pressure of the business community has been responsible. As the Committee for Economic Development (1985) declared, "Business, in general, is not interested in narrow vocationalism. It prefers a curriculum that stresses literacy and mathematical and problem-solving skills" (p. 15). The Commission on the Skills of the American Workforce portrayed the future starkly in the title of its widely-cited report as *America's Choice: High Skills or Low Wages!* (National Center on Education and the Economy, 1990), and went on to forecast the skills need for a "third industriai revolution" including "foundation skills" encompassing

> the demonstrated ability to read, write, compute, and perform at world-class levels in general school subjects (mathematics, physical and natural sciences, technology, history, geography, politics, economics and English). Students should also have exhibited a capacity to learn, think, work effectively alone and in groups and solve problems. (p. 69)

Even more recently, the Secretary's Commission on Achieving Necessary Skills (SCANS) (1991) of the Department of Labor outlined *What Work Requires of Schools*, complaining

that "we are failing to develop the full academic abilities of most students" (p. vi) and arguing that "tomorrow's career ladders require even the basic skills—the old three R's—to take on a new meaning." Among the five competencies and three "foundation skills" advocated as part of "high performance schools," the report illustrated the need for greater competence in the conventional academic capacities like reading, writing, mathematics, and computational skills (SCANS, 1991).

In searching for ways to nudge the educational system toward more general and academic competencies, the Congress has revised its support for more overtly occupational education in a potentially important way. The 1990 Amendments to the Carl D. Perkins Vocational Education Act, providing federal support for vocational education, include the following prescription: "Funds made available . . . shall be used to provide vocational education in programs that . . . integrate academic and vocational education in such programs through coherent sequences of courses so that students achieve both academic and occupational competencies" (Section 235[c][1][B]). One way to interpret this legislation, then, is as an attempt to undo the differentiation between vocational and academic education, and to promote a conception of occupationally-oriented education in which general and specific elements are more nearly balanced than has been the case.

Unfortunately, Congressional language provides no guidance about what integration means in practice—about how educational institutions should change, how teachers should modify their curricula, or about what different courses students should take. At the secondary level, efforts to integrate vocational and academic education have been underway for several years, and different conceptions of integration are relatively clear (Grubb, Davis, Lum, Plihal, & Morgaine, 1991).[1] However, at the *postsecondary* level it has been unclear just what integration might mean. The lack of clarity about integration within community colleges and technical institutes is especially unfortunate because, with declining enrollments in secondary vocational courses (Clune, White, & Patterson, 1989), the locus of occupationally specific instruction has shifted to the postsecondary level.

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[1] This report is the postsecondary analogue to the examination of approaches to integration in secondary schools in Grubb, Davis, Lum, Plihal, and Morgaine (1991). The National Center for Research in Vocational Education has sponsored a number of investigations of integration; for other reports, see Beck (1990, 1991); Beck, Copa, and Pease (1991); Copa and Tebbenhoff (1990); Little and Threatt (1992); Mitchell, Russell, and Benson (1990); Pepple (1991); Schmidt and Jennings (forthcoming); Schmidt (1991); Stasz, McArthur, Lewis, and Ramsey (1990).

The purpose of this monograph, therefore, is to explore what forms the integration of occupational and academic education might take within community colleges and technical institutes. To do so, we have relied principally on a telephone survey of community colleges and technical institutes, in which we asked instructional deans and faculty to describe their efforts to integrate vocational and academic education.[2] We supplemented the information from these telephone interviews, and the associated publications and materials sent by various occupational and academic instructors, with visits to four institutions that seem to be especially active in their efforts to integrate: Bunker Hill Community College, Boston; Southern Maine Vocational Technical College, Portland; Springfield Technical Community College, Springfield, Massachusetts; and LaGuardia Community College, Long Island City, New York. Finally, we searched the community college literature for descriptions of relevant programs, though this yielded little because the integration of vocational and academic education has not yet been a widespread concern.[3]

The results of these investigations reveal that there are many approaches to integration, which we describe in the first section, "Approaches to Integration." Given the different models, there is no consistent interpretation of integration, as we clarify in the second section, "The Different Conceptions and Purposes of Integration." For example, some approaches force the student to integrate material from vocational and academic courses that are otherwise independent of each other, while others place more responsibility on instructors to integrate material; some emphasize occupational applications as ways of

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2 Initially, we mailed letters to deans of instruction in a random sample of 295 community colleges and technical institutes that are members of the American Association of Community and Junior Colleges (AACJC). They were asked to return a postcard checking a box if they integrated academic and vocational education in any way, with space for a brief description of what they were doing and for the name and phone number of a contact person. Of 168 responses, 121 (72%) said that they integrated in some way. We then contacted by phone 45 campuses, concentrating on those with unusual or especially interesting descriptions, but not contacting every institution that mentioned the most common forms of integration (like general education requirements or applied academics courses). For each institution, we typically interviewed a dean of instruction and several faculty members. The telephone survey was not, of course, a random sample of postsecondary institutions (since the response rate to our initial inquiry was so low), nor can it be regarded as a census of integration efforts in any sense. However, it did enable us to uncover the major approaches to integration. We also think that the different approaches in our telephone survey roughly reflect their frequency in postsecondary institutions simply because there is such a substantial difference between the number of the most common practices—the reliance on general education requirements and the development of applied academics courses—and those we describe in models 3 through 8 below.

3 However, see the articles in the special issue of the *Journal of Studies in Technical Careers* (Volume XII, Number 3, Summer 1990), which is devoted to the role of liberal education in technical training; papers by Raisman (1992) and Sessions (1991/1992) in a special issue on liberal education of the *Community, Technical, and Junior College Journal*; and the publications of the Shared Vision Task Force, National Council of Occupational Education and Community College Humanities Association (1989, 1991). Almost all these articles present arguments for incorporating academic education (or liberal education, or general education) into occupational programs, but they tend not to describe the integration efforts of particular institutions.

teaching academic material in a "contextualized" way, while others bring new topics to occupational students. While they vary in their ambitions, each has something to offer students, faculty, and postsecondary institutions.

Many examples of integration are isolated efforts by individual instructors, or small groups of instructors, to develop novel approaches; there have been—with some notable exceptions—few efforts to integrate vocational and academic content systematically across several occupational areas or throughout an institution. As a result, many approaches to integration are comparatively rare. The reasons for this—the barriers to integration, described in the third section—are numerous; they also prove to be structural, rooted in the basic practices of community colleges and technical institutes. The implication is that certain approaches to integration are unlikely to be successful unless there is a concerted institutional commitment to changing long-established practices.

Given that integration is sometimes difficult to achieve, and that the argument for specialization at the postsecondary level is still strong, a legitimate question is whether integrating vocational and academic education is a good thing. Based on our interviews, however, a number of clear benefits to integration have emerged in those institutions that have tried it. A few institutions have collected evidence that integrated approaches increase retention and grades, and other instructors report improved progress of their students and better understanding of material. A cynic could correctly point out that there is no long-run evidence about the effects of integration on completion, subsequent employment, long-run earnings, or any other goal of postsecondary occupational programs. But there is almost never evidence of this sort about curricular innovations, and—given the origins of innovations at the classroom level—class-level measures of success are probably the most appropriate. Other institutional benefits—for example, greater collaboration among faculty—exist as well. In the final section, then, we examine more carefully the question of whether integrating vocational and academic education is worth doing, arguing that it has the potential to improve postsecondary occupational programs in many distinct ways. Indeed, the most powerful reasons for postsecondary institutions to move toward the integration of occupational and academic education—not the requirements of the Carl

Perkins Act,[4] or the external pressure of various commentators for enhanced "academic" skills.

APPROACHES TO INTEGRATION

Community colleges and technical institutes in the United States are enormously varied, as befits their status as local, community-serving institutions. They vary widely in the composition of their students, from those at middle-class suburban campuses to those at urban institutions dominated by low-income and minority students; and they vary substantially in their emphases on transfer-oriented, occupational, remedial, and avocational offerings. Therefore it is often difficult to describe these institutions, since practices vary so much with so little standardization from either state or federal policy. Consistent with this pattern, the responses to our telephone interviews revealed an enormous variety of practices that administrators and instructors considered integration. While initially bewildering, the responses began to fall into eight distinct approaches. There is substantial variation within each of these approaches; a particular model should not be interpreted as a blueprint, but rather as a general direction which can vary depending on specific fields of study, on the interests of instructors and students, and on the requirements of employment. Not surprisingly, the approaches vary in their frequency, with the first two—general education requirements and applied academic courses—by far the most common, and the others occurring in only a handful of institutions. They also vary substantially in their ambitions, since some affect only single courses while others attempt to reform entire programs of study.

At the outset, it became clear that one form of "integration" is nearly universal—but was mentioned by only a few individuals. The course requirements for certificate and Associate degree programs in occupational fields generally include a sequence of occupationally specific courses *and* related academic courses—for example, biology and chemistry for health occupations, mathematics for engineering technologies and other technical specialties, English courses concentrating on writing for many business occupations, and related social science courses for social work and police science

[4] In practice the requirements of the Perkins Act could be ignored because federal funds in postsecondary institutions are so small—roughly two to four percent of budgets for occupational education (Grubb & Stern, 1989).

programs.[5] The amount of such related academic content varies from field to field, of course, and is generally more substantial in two-year Associate programs than in shorter certificate programs, but it is still universally required.[6] Because of these related academic courses, a few individuals responded that the integration of academic content in occupational programs is not a problem, or that postsecondary programs are "naturally integrated."

However, most respondents did not point to such related academic coursework as evidence of integration. One reason, perhaps, is that, like general education requirements, such efforts require *students* to integrate material from courses that are otherwise independent of each other; the institution and the instructors do little to combine material from different disciplines, and there is no evidence that instructors help students to make connections among courses. Another limitation of this practice as an approach to integration is that it requires students to complete all the courses required within a program. However, the great majority of students in community colleges and technical institutes take only a few courses, rather than completing an entire program (e.g., Grubb, 1989). Particularly if such students enter with specific employment purposes, they are unlikely to complete the related academic courses and no integration of academic content can take place. It is heartening to see academic courses included in occupational programs of study, since they indicate that instructors have developed coherent programs of study—that is, sequences of logically related courses with the appropriate academic prerequisites. But such an approach does not necessarily imply that integration of occupationally oriented and academic content takes place in any other sense.

Model 1: General Education Requirements

The most frequent approach to integrating occupational and academic education is general education: Of the 121 institutions that reported some kind of integration, forty-nine referred to general education requirements. Such courses are overwhelmingly drawn from

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[5] In one interesting case, Vermont Technical Community College (Randolph Center, Vermont) began requiring the same academic courses as in engineering programs—English, math, physics, and computer sciences—in their Automotive Technology program under pressure from the Vermont Auto Dealers Association, who wanted better technically trained individuals. This particular program also includes several applied academics courses (described later), in technical math, technical communication, and "Management Practices for the Automotive Technician."

[6] For a similar conclusion based on transcripts of students in community colleges and technical institutes, see Grubb (1987).

academic subjects: Of community colleges and technical institutes with general education programs, ninety-six percent include courses in communications (both writing and speaking), ninety-four percent in the social sciences, eighty-six percent in the natural sciences, eighty-five percent in the arts and humanities, and sixty-seven percent in health, physical education, and family education (Hammons, 1979). Typically, general education requirements apply to students in Associate programs, but not to students in certificate programs or those enrolling for only a few courses.

The purposes of general education requirements in community colleges and technical institutes have a long and somewhat tortured history—just as they do in four-year colleges—with a variety of motives behind them (e.g., Cohen, 1988; Bartkovich, 1981). Within the institutions we examined, communications skills, critical thinking and problem-solving abilities, an understanding of civic responsibilities, and appreciation of the arts and humanities are common rationales for general education requirements. A few institutions include unconventional statements with loftier motives: Diablo Valley College (California) seeks "to help you make meaning from your encounters with your world . . . to handle the spirit of criticism and skepticism which pervades and threatens contemporary life; to help you offset the depersonalization and fragmentation of urbanization; . . . to help you find some security despite the rapid rate of change in the conditions of our lives." Cypress College (California) has designed its requirements "to introduce students to the variety of means through which people comprehend the modern world," and Yavapai College (Arizona) "commits students and faculty to seek a coherent center of values and understanding," "an alternative to the current fragmentation of knowledge and experience in education and in our culture."

The question for our purposes is whether general education requirements constitute a way of integrating academic content and concerns into occupational programs. In a few cases, particularly in technical institutes, a clear goal is to provide some context for occupational programs, or a deeper understanding of the forces affecting occupations. For example, Springfield Technical Community College (Massachusetts) cites "an understanding of the historical basis of our modern technological society" as one of its goals. Nashville Technical Institute (Tennessee) intends its requirements to prepare students to "use technology and science effectively and responsibly"; and it states that "assignments [in English courses] frequently allow students to make use of their job experience or technical background," suggesting an effort to link the "academic" training in writing and communication with occupational knowledge and concerns. However, such

references are clearly exceptions, and they have developed in technically oriented institutions, which have good reasons for orienting their general education requirements toward occupational issues. The overwhelming majority of institutions have established requirements that emphasize certain capacities considered important for all students, but without taking any special consideration of the interests of vocational students.

A somewhat tighter link between general education and occupational programs has developed in a few institutions which provide guidance about the specific general education courses that would be most useful to students in particular occupational areas. However, this kind of effort is comparatively rare; the vast majority of institutions simply offer students a menu of general education courses, with none linked to occupational concerns and little guidance about which to take.

The most thorough effort to link general education requirements with occupational goals among the institutions we interviewed was that of Pennsylvania College of Technology in Williamsport. That institution decided that the skills required for success in the workplace should determine its general education program. It then asked successful graduates from different occupational areas what capacities individuals need to be successful; using the DACUM (Developing a Curriculum) process,[7] they used these responses to develop core competencies. In turn, general education courses developed by instructors must incorporate these competencies. To be sure, the resulting competencies are not much different from those cited in most general education statements of purpose; they include "comprehensive interrelated skills" including problem identification and problem-solving; communications skill; mathematics; computer-related competencies; humanities, social sciences, and arts; science and technology; and competencies labeled "personal" and "career" (see Pennsylvania College of Technology, 1987). However, the process by which they were derived was substantially different, and the point of general education, in an institution where all students are occupational, is more clearly vocational.

With a very few exceptions, then, general education requirements incorporate academic courses into occupational programs, but they have not fostered the integration of academic competencies and occupational content since the courses remain independent. Like the inclusion of academic requirements in occupationally oriented Associate degree

[7] The DACUM process involves bringing practitioners together from a specific occupational area, asking them to describe typical tasks and duties, and having faculty use these job descriptions to determine the competencies students need to master.

programs, they require *students* on their own to make the links to occupational concerns or the requirements of employment, rather than providing any curriculum materials or instruction to help them make such connections. If community college students were adept at integrating different content areas, there might not be any problem with such an approach. However, there is good reason to think that community college students—whose prior academic records have often been weak, who may have been out of school for a considerable period of time, and who may be insecure about academic coursework in particular—are likely to need substantial help with such integration. For example, the non-traditional students in community colleges (including many occupational students) are more likely to be field-dependent, and therefore to have trouble applying a concept from one area to another (Cross, 1976, chap. 5).[8] Indeed, a few instructors remarked that occupational students resist taking academic and general education courses: One commented that they take general education courses only "grudgingly," and several said that occupational students often fail to see the relevance of general education to their occupational goals.

In a different sense, general education requirements may not be effective ways to integrate occupational and academic content. By and large, they apply only to students in Associate programs, not to those in shorter programs or those enrolled for a few courses. By one estimate, about half of community college students are in vocational programs that do not require general education (Cohen, 1988); and many will leave the institution before completing any such requirements. For that reason alone, we suspect that general education requirements reach only a minority of occupational students in community colleges and technical institutes.

We conclude, then, that general education is a promising but incomplete approach to integrating vocational and academic education. It can certainly bring into an occupational program the content and skills associated with academic disciplines, and it may be an antidote to complaints from employers that recent graduates lack communications skills, adequate reading abilities, or other fundamental competencies. But it places the burden for integration on students themselves, and may not reach the occupational students most in need of such abilities.

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[8] It is important to note, however, that students in even the best four-year colleges are likely to need guidance in integrating material from different courses. The movement for interdisciplinary courses within four-year colleges, the efforts to teach from case studies, and the movement to adopt capstone courses all reflect the difficulty all students have with fragmented courses.

Model 2: Applied Academic Courses

A second common approach to integration takes place in the majority of community colleges and technical institutes: the development of applied academics courses which take conventional academic subjects and apply them to occupational areas, usually broadly defined.[9] Of the 121 institutions that mentioned some kind of integration, sixty-seven specifically identified applied academics courses, though a perusal of course catalogues suggests that virtually every community college and technical institute has several such courses. Examples include Technical Writing, or Writing for the Workplace, or Written Business Communication; Applied Math or Technical Math, sometimes further specialized as in the Technical Math for Nurses course at San Bernadino Community College (California), or Applied Math for Recording Technology (Cedar Valley Community College, Lancaster, Texas); and Agricultural Economics or Business Economics. Some colleges offer a roster of occupation-specific courses. For example, Yavapai College (Prescott, Arizona) offers applied math courses for health sciences, for welding, for electronics, and for management, as well as Technical Math I and II; Cedar Valley College (Lancaster, Texas) offers applied math for nursing, veterinary technology, recording technology/music, business, and economics.

Applied academic courses generally adapt the content from conventional academic subjects, and use practical applications taken from those occupations. In many cases, these courses have been developed as a way to serve the needs of occupational students more precisely, sometimes because of the perception that standard academic courses in math or English are too general, too abstract, or too lacking in appropriate applications. Typically, such applied academics courses are taught to occupational students only, reinforcing the ability of instructors to mold the content to a particular occupational area. Most such courses are locally developed, though in Alabama centrally developed courses in Technical English and Technical Math are used for all non-degree occupational students; the state curricula occurred as a way of imposing some quality standards and consistency on local institutions.

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[9] These applied academics courses are locally developed; they are not the same as the Applied Academics courses—Applied Math, Applied Communications, and Principles of Technology—developed for high school students by the Council for Occupational Research and Development (CORD) and the Agency for Instructional Technology (AIT). However, the logic underlying the postsecondary applied academics courses and the CORD/AIT courses is roughly the same: to take a standard academic subject and incorporate more occupational examples and applications.

These hybrid courses may be taught either by academic instructors or by occupational instructors; rarely, because of fiscal limitations, are they team-taught. Occasional battles over who is to teach the course reveal the unavoidable conflict: Should an applied academics course stress the more abstract, theoretical, "academic" underpinnings of the subject, including discipline-based modes of thinking, or should it pay minimal attention to the academic content and instead stress occupational examples, "practical" information (including institutional details), and a further socialization into the values of an occupation? Often, academic instructors take the first approach while vocational instructors take the second. In one community college, a business math course was initially taught by business instructors. However, the math department thought the course inadequate and refused to assign the course a math department number. Finally, the business and math faculty collaborated in developing a course—taught by business faculty most of the time, and by math faculty when their teaching loads are light—worthy of being included among the math offerings. This particular episode reveals the inevitable tension between occupational and academic emphases, and suggests that collaboration is crucial to reaching some accommodation. The only troubling aspect of current practice in community colleges is that, since there is so little team teaching in community colleges,[10] there may not be sufficient opportunities for instructors from different disciplines to hammer out compromises that appropriately balance academic content with occupational applications.

Of course, there is a potential drawback to applied academics courses: They segregate occupational students from others, a form of tracking that could limit their ambitions. As a dean at Bunker Hill Community College (Boston) explained his opposition to such courses, "these [occupational] students need to have broader exposure. It's useful for them to sit in class with students studying different fields." As another example, an effort in one community college to establish an English course specifically for occupational students failed. The faculty found that "it isolated students and they ended up being too focused on their technical area"—a comment that implies that mixing with the transfer-oriented students is a valuable aspect of the general education requirement. In addition, the courses devised were largely remedial instruction in areas where students were weak; they perceived this as adult basic education, and "students didn't like that approach." In this case, the underlying problem seems to have been that the applied English class was remedial and therefore insulting to students, and it segregated them from

[10] With the exception of courses supported by special funding, such as the National Endowment for the Humanities, we found no examples of team teaching; and administrators uniformly reported that fiscal constraints make team teaching rare.

the rest of the students. Whether the benefits of making the content of applied academic courses occupationally related outweigh the costs of segregation from other students is difficult to answer in general, though the practice is so widespread that most institutions have implicitly decided that the benefits are substantial.[11]

Model 3: Cross-Curricular Efforts: Incorporating Academic Skills in Occupational Programs

Still another way to incorporate more academic skills into occupational programs has been to adopt cross-curriculum efforts in an entire institution. The best-known example is Writing Across the Curriculum (WAC), in which all instructors—both occupational and academic—are encouraged to incorporate more writing into their courses. Writing Across the Curriculum efforts have been implemented in several different ways: In Florida, the state has required WAC of all its community colleges; in other cases, like Wright State University, the institution has required that all instructors participate. In the majority of community colleges, however, much more informal methods are used to motivate faculty to participate, including recruitment and outreach by members of the WAC staff (usually from the English Department), seminars and staff development efforts to show instructors how to incorporate writing exercises into their courses, and availability of WAC staff to provide help to individual instructors. The best WAC efforts therefore provide instructors some resources to modify their course content, as well as the rationale and peer support to do so.

WAC is often viewed as a method of improving instruction by helping students think more deeply about their subject, to clarify and organize their thoughts, and to become more active learners (Watkins, 1990), an approach often labeled Writing to Learn. For example, the WAC coordinator at Cedar Valley College (Lancaster, Texas) stressed that the ability to write different kinds of papers is not as important (especially for occupational students) as is using writing in the service of improved teaching and learning. In particular, the head of the Air Conditioning Program uses writing extensively, though he notes that his students are "turned off" to writing and he therefore avoids mentioning

[11] While concerns about tracking are widespread in secondary schools, they are much more rare in community colleges except in the literature about "cooling out" stimulated by Clark (1960). We suspect that tracking mechanisms internal to community colleges are quite widespread, and that distinctions among "occupational," "transfer," and "developmental" students are central to such tracking. However, since the literature about "cooling out" tends to be hortatory rather than empirical, we have no way of knowing how widespread or how detrimental internal tracking mechanisms are.

writing when he incorporates it into class exercises. He has since moved to writing exercises as a way of clarifying what students have learned and as a way into critical thinking, since the diagnosis of equipment failures requires the kind of trouble-shooting and problem-solving often incorporated in critical thinking (Eishen, 1991). For example, early in the program he has students write on the role of air conditioning—presumably their chosen occupation—in their long-range plans. Later he has them write (both individually and as a team), as if they were instructors, about a method he has just demonstrated; and other exercises ask them to write about their solutions to ambiguous problems (i.e., a misdiagnosed air conditioning failure), what they would write to a customer, and what company policy they might establish.

Similarly, Prince George's Community College (Largo, Maryland) instituted a WAC Program with an emphasis on writing to learn. As an example of the emphasis on improving learning (rather than improving writing), writing exercises were introduced into business math classes that had previously experienced poor student success; they were intended to help students move between word problems and mathematical formulations, to identify applications in everyday life, and in other ways to focus on the mathematical content in non-standard ways. The instructor reported substantial increases in the passing rate among students completing the writing exercises (Stout & Magnotto, 1988). The humanities faculty at Mohawk Valley Community College (Utica, New York) developed a Learning Through Writing program as a way to teach writing in an informal way; the program has been used particularly in the Human Services Technology and Health programs.

Although Writing Across the Curriculum is by far the most common cross-curricular effort, there are a few others. Prince George's Community College initiated Communication Across the Curriculum, spearheaded by faculty in the speech department who felt they weren't successful in stimulating class discussion; they have developed materials to enable students and instructors to increase the amount and coherence of discussion—an attempt to shift to a pedagogy where students are more active and questioning.

In another variant, Nashville State Technical Institute has adopted what might be called Humanities Across the Technologies, an effort to incorporate some aspects of the humanities in every course to improve student outcomes in communications, the arts, math, and writing. This project includes Writing Across the Curriculum, designed to increase

both reading and writing related to historical perspectives, ethical issues, and aesthetics within various occupational programs. There are other components as well: A mechanical engineering technology course now includes components in the history, art, and ethics of the field and a unit on "solving problems related to balancing academics and beginning a technical career," while other technical courses include activities "designed to enhance [student] abilities in communication, critical thinking, and problem solving." A course in Mechanical Equipment provides a good example of how many different perspectives can be incorporated into a technical course: The instructor requires students to give oral presentations, with possible topics including whether the designer of the Tacoma Narrows Bridge (which collapsed in a high wind) should be criminally prosecuted, and whether the third little pig over-engineered his house. One paper requires students to clarify what steps technicians can do to "help preserve and/or protect the environment," and other assignments require them to read Petroski's *To Err is Human: The Role of Failure in Successful Design* and then write about the turning point in the development of Gothic structures, the ambivalence of William Wordsworth toward nineteenth century technology, and Galileo's error in calculating the yield stress of cantilever beams.

A final interesting effort has been Reading Across the Curriculum in Metropolitan Community College (Kansas City, Missouri). Instructors in all courses were encouraged to have their students read Kurt Vonnegut's *Galapagos*, with students in different programs emphasizing different aspects of the book. Occupational students could examine issues of technology and leadership, for example, and an electronics course used it to explore problems of new technologies. In addition, the book became the basis for various extracurricular activities: contests in songwriting, visual arts, writing, oral interpretation, and logo design (to be used on T-shirts and other items to support the reading project). At the end Vonnegut himself spoke with students and faculty in a teleconference. As a semester-long event rather than a continuous course or curriculum revision like WAC, the focus on *Galapagos* also provided what a good core curriculum would: It gave all students a common experience—a rare event in the fragmented community college—that they could discuss from different perspectives.

When community colleges and technical institutes adopt a cross-curriculum effort, it is difficult to know how extensively instructors modify their courses in response. The informal and voluntary nature of most WAC and other cross-curriculum programs—perhaps necessary for their acceptance within an institution—is also a potential weakness because the incentives for faculty to participate are slight. Not surprisingly, the

participation of instructors varies enormously: One director mentioned that "the old guard types say it's impossible," while others are more accepting. However, our impression—based on the comments of a very few deans, and impossible to substantiate[12]—is that occupational instructors participate in WAC and other cross-curriculum efforts less than academic instructors because they are less persuaded of the value of writing, because it takes time away from occupation-specific skills, because it requires skills that occupational faculty may not have, and because they may not be included in the networks of academic instructors. (One WAC coordinator reported that articulate English teachers sometimes "scare" occupational instructors who are told that their students need something they can't provide.) However, even if WAC is more widely used in academic courses, there are clearly exceptions. The director of occupational education at Three Rivers Community College (Poplar Bluff, Missouri) claimed that vocational faculty have adopted WAC more than the academic faculty because of insistence from their business advisory committees about the importance of communication for successful job performance. At Orange County Community College (California) the Writing Consultancy Project focuses specifically on eight technical and allied health occupations (Godwin, 1991; see also Killingsworth, 1988).

As a form of integrating certain "academic" skills into occupational programs, then, cross-curriculum efforts have substantial promise but also certain structural weaknesses. Because WAC and other cross-curriculum efforts provide resources—staff development, suggested exercises, and peer support—to help instructors modify their courses, they are likely to be more effective than simply the exhortation to incorporate more academic content from deans, college presidents, the business community, and national commissions. On the other hand, the effectiveness of such initiatives in getting instructors—especially occupational instructors—to change is unclear, and voluntary programs have especially weak incentives. Changing teaching methods and content is a difficult and slow process, in all institutions and at all times (Cuban, 1984), and something more may be necessary to cause change than simply the power of a good idea.

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[12] A national survey of WAC programs provided no evidence about its use by occupational versus academic faculty (Stout & Magnotto, 1991). In no WAC program that we interviewed was there any effort to determine the extent of course changes in response to WAC, or the numbers or types of instructors participating. Nor does there seem to be much emphasis within the national WAC "movement" to develop measures of effects. For example, a recent special issue of "New Directions in Community Colleges" about WAC (Stanley & Ambron, 1991) contained many articles on how to do it, but only one on measuring effects (Hughes-Wiener & Jensen-Cekalla, 1991).

Model 4: Incorporating Academic Modules in Expanded Occupational Courses

Another way to increase the "academic" content and skills taught within occupational programs has been to introduce units of material taken from academic disciplines into standard occupational courses. A few community colleges and technical institutes have done this quite intentionally. For example, the Introduction to Law Enforcement course at Southern Maine Vocational-Technical College recently added a component on the history of law enforcement; and instructors at Nashville State Technical Institute inserted modules on historical, ethical, and aesthetic perspectives into Industrial Engineering, Mechanical Engineering, and Business Technology courses. The inclusion of ethics—normally a topic within philosophy—in a variety of occupational programs is by now a standard recommendation. The course on Mechanical Equipment at Nashville State Technical Institute described above, with its inclusion of various topics drawn from history, aesthetics, and environmental concerns, is an excellent example of this approach.

In the cases where instructors have expanded their courses, they report doing so in order to bring broader perspectives to occupational students. Not surprisingly, then, the scope of such additions varies widely: A few examples (particularly the incorporation of ethics) look like quick efforts to respond to nagging social problems, while others seem more substantial.

Of course, Writing Across the Curriculum and other cross-curriculum efforts, to the extent they are adopted by occupational instructors, are also ways of incorporating more "academic" content into occupational courses. However, the two approaches differ in some important ways. WAC is typically broader in scope, applying (potentially) to all programs within a community college, and it tends to have some institutional support and to represent an on-going effort. The development of modules is generally limited to specific courses, and tends to result from collaboration of occupational and academic faculty around a specific goal. Once changes are made, the groups tend to disband or, in at least one case, to move on to revise other courses. But such efforts are more episodic and less sustained than are institution-wide efforts like Writing Across the Curriculum.

This approach and the previous model (cross-curriculum efforts) are essentially ways of taking existing occupational courses and stuffing more academic content into them, either with the help of academic faculty (in WAC and other cross-curricular efforts) or

simply with the efforts of occupational instructors. In contrast, the applied academic courses described in Model 2 are essentially efforts to take standard academic subjects and modify them to include more occupationally relevant examples and applications.[13] While the balance of occupation-specific and academic components varies across all these efforts, the starting point matters a great deal to this balance. Efforts to start afresh and to develop courses or programs that modify both occupational and academic components are much less common, but they can be seen in the next two approaches.

Model 5: Multidisciplinary Courses Combining Academic Perspectives and Occupational Concerns

A fascinating and quite different approach to integrating occupational and academic education has been the development of multidisciplinary courses, taking the perspectives and methods of particular academic disciplines but incorporating issues and concerns that are distinctly occupational. The resulting hybrids are often courses that could be included in general education programs, though—unlike most general education courses, which tend to be standard academic approaches—they have subjects thought to be of special interest to occupational students. Examples of this approach include the following:

- "Working in America" (Kirkwood Community College, Cedar Rapids, Iowa) is a literature course, where fiction and non-fiction concerned with work are used to examine attitudes toward work, to understand the "past, present, and future of working," to "develop [student] abilities to communicate about basic human experiences such as work," to "become more competent in the interpretation of stories and other symbolic expressions." "Culture and Technology," within the same institution, also includes a good deal of literature concerned with work, but also some reading about current ethical issues (like genetic engineering) and movies and music concerned with work. Similarly, "Science and Technology as Themes of Literature" (Northeast State Technical Community College, Blountville, Tennessee) examines various literary works, including science fiction, to explore themes surrounding technology like the hopes for technology, the sense of betrayal as technology fails to deliver on its promises, the problems of alienation in the

[13] This distinction—between academic courses modified with occupational applications, and vocational courses modified with more academic content—also distinguishes several approaches to integration at the high school level: Applied academic courses take the first of these approaches, while other efforts incorporate more academic content in vocational courses. See Models 1, 2, and 3 in Grubb, Davis, Lum, Plihal, and Morgaine (1991).

workplace, the loss of the self as machines have replaced people in production, the effects of industrialization on leisure, and ethical issues. A course titled "Changes and Choices: Experiencing Living in the Workplace, the Home, and the Broader Community" (Muscatine Community College, Iowa) uses short stories, novels, poetry, essays, and some history to "assist occupational program students in using the humanities to make everyday decisions, to take on the challenges of change, to make major decisions, and to decide to effect change."

- "History of Technology" (Yavapai College, Prescott, Arizona), "Society and Technical Change" (New Hampshire Vocational-Technical College, Manchester, New Hampshire), "Discoveries, Investigations, and Explorations" (Northeast State Technical Community College), and "Science, Technology, and Society" (Pennsylvania College of Technology, Williamsport) are all courses examining technical change in historical perspective, the effects on society, and the conflicts over technical change, allowing students to explore the current issues surrounding technological developments.

Another example is a course on "Technology in a Changing World," examining the origins, uses, and social influence of inventions and discovery. However, the course is taught entirely without reading, relying instead on videotapes. While it certainly develops topics that should be of interest to occupational students, it misses entirely the point of using multidisciplinary courses to get them engaged in activities—in this case, reading a variety of materials from different perspectives—that they would not normally see in their occupational courses.

- "Humanities and Technology," taught in various forms in several New York community colleges during the mid-1980s, examines technical change and its social effects from the vantage of several of the humanities including history, philosophy (both inquiry and ethics), and art in various forms.

- "Technology and Human Values" (Yavapai College) examines the ethical issues generated by advancing technologies, as well as the influence of technology on individual and social values. "Ethical Dilemmas in Modern Society" (Southern Maine Vocational Technical Institute, Portland) is a general ethics course, but within a technical college; one of its themes is the "intellectual flexibility and tolerance necessary for the workplace."

The common element in these courses is the application of academic subjects—history, literature, ethics and philosophy, the study of culture from sociology or anthropology—and their concepts and analytic methods to technological developments, to working and its consequences, or to other employment-related issues that are presumably more compelling for occupational students.[14] These courses can also serve as vehicles for introducing students to radically different ways of viewing the world. A business instructor teaching a course called "Wisdom for the Workplace"—using literature together with case studies from business to "teach students that the wisdom of great writers from the past is still pertinent to the solving of contemporary job-related problems"—described the process as follows:

> I have also discovered why my business-career students generally falter when faced with complex problems in their business or technical core courses, especially those that deal with human issues. The juxtaposition between the humanities—which always ask questions about life, happiness, and freedom—and the courses that fill their career programs (always focusing on the absorption of accepted processes or pragmatic applications) is so strong. [My course] is a wild mix that asks students to question first, and then to justify their opinions convincingly, rather than to simply accept. (Smith, 1990).

There are other obvious candidates for multidisciplinary courses that we have not yet discovered. These could include courses examining public policy and political issues related to technological change and employment issues (including unemployment, discrimination, the quality of work, and other unpleasant realities of capitalism); courses examining the sociology and the psychology of work[15] (including the psychology of occupational choice, for students unsure of their direction); and courses in business-government relations, to examine the ethical, political, and regulatory issues surrounding employment. Almost every area of the humanities and social sciences contains issues which are related to employment and which could form the basis for several courses.

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[14] Whether such employment-related issues are in fact more compelling for vocational students is an open question. While this link seems to make sense, in other contexts students are not necessarily preoccupied with employment-related issues. For example, in evaluating a workplace literacy program in Oakland, we discovered that some students—all employed as health care workers—did not want to use employment-related materials because they preferred a respite from work, and because their work was only a minor aspect of their identity. In this as in all other aspects of instruction, there is no substitute for discovering rather than assuming what most interests students.

[15] South Seattle Community College (Washington) does offer a course in "The Psychology of the Workplace," described by the division chair as "not really integrated" but still more responsive to the needs of occupational students than is the conventional psychology course.

Most of the existing multidisciplinary courses have come from the humanities rather than the social sciences, however. This may be due to the fact that these hybrid courses have often been developed with special funding, from the National Endowment for the Humanities and from the NEH-supported project on "Integrating the Humanities into Occupational Programs" (Shared Vision Task Force, National Council on Occupational Education and Community College Humanities Association, 1989, 1991); no parallel funding for hybrid courses related to social science disciplines has been available.

The reliance of multidisciplinary courses on special funding is testimony to the resources necessary to develop novel approaches. Every participant in multidisciplinary courses has stressed the need for staff development, since individuals are generally unfamiliar with the range of disciplines required; faculty must have release time to develop new materials, and many hybrid courses have required the collaboration of faculty from several disciplines, at least in the development stage. (Some but not all of them are team-taught as well, again increasing their costs.) However, there is a dangerous side to reliance on special funding: When the funding disappears, the courses may disappear too. One clear example arose in New York State, which supported interdisciplinary courses in nine community colleges through a grant from the National Endowment for the Humanities. The project, starting with planning grants in 1984-1985 and ending with a summary conference in 1987, brought together two-person teams from the humanities and occupational fields, and developed several versions of a course entitled "Humanities and Technology." However, funding for such efforts subsequently ended, and there appear to be no more than one or two such courses still being taught, (Fadale 1991) and these rely entirely on the initiative and interest of individual faculty without any institutional support. Given the power of the disciplines and of the conventional split between occupational and academic programs within community colleges, it is all too easy for novel and hybrid approaches to fade once special support is withdrawn. The challenge is to institutionalize such courses, to have them become part of the normal offerings of community colleges and technical institutes from "regular" rather than special funds, and accepted as legitimate by faculty, administrators, and students alike.

Despite the difficulty institutions have had institutionalizing these courses, they present promising vision for integrating occupational and academic education. They represent a fresh approach to integration, one which creates new courses rather than simply modifying existing courses in minor ways. The best of them have required the collaboration of both occupational and academic faculty, rather than being developed by

one side or the other. The difficulty institutions have had in institutionalizing them is distressing, to be sure, but the current round of courses is relatively new and, with the interest in broader forms of education and higher-order skills, may be able to establish themselves as permanent parts of the community college.

Model 6: Tandem and Cluster Courses and Learning Communities

Yet another approach has been to develop courses—including both occupational and academic courses—which students take simultaneously, with each course designed to complement the other. This kind of interaction among courses can happen at several different scales. In several institutions, two subjects have been linked, creating tandem courses. For example, Chemetketa Community College (Oregon) has developed a Human Services Practicum coupled with Writing 121. The practicum introduces students to various human services placements and requires extensive writing from students about positions they might like, in effect getting them to assess opportunities in human services; the writing course presents various styles of writing, and enables students to work more intensively on the papers they prepare for the practicum.

At a slightly larger scale, clusters of more than two courses can be related to one another. LaGuardia Community College (Long Island City, New York) has developed an umbrella called the Enterprise Center for cluster courses related to business. One cluster pairs introductory accounting with basic reading; it is essentially a remediation sequence with a clear focus on business uses of reading and arithmetic. The Introductory Business Cluster includes Introduction to Business, Composition I, and Introduction to Economics. The Advanced Business Cluster includes Principles of Management; Philosophy, Values, and Business Ethics; and Writing Through Literature. The advanced cluster has also articulated four themes—the entrepreneur versus individual rights, the individual within the organization, cultural and corporate values, and the social cost of business—intended to cut across the three courses in the cluster. The choice of themes reveals purposes related both to general education—providing critical perspectives from the humanities, for example—and to broad vocational purposes like introducing students to the personal and social tensions within business.

In addition, basic math is paired with a course called "Computer Topics"—again at a relatively basic level—while the pairing of "Introduction to Business" and "Introduction

to Computers" is designed "to explore the impact of computer technology on contemporary business." Other clusters at LaGuardia include the Animal Health Technology Cluster, including "Introduction to Animal Health," a chemistry course, and an English course, designed in part to clarify the need for good writing to students; and a pairing of ESL and keyboarding for students new to this country—what the instructors called a "sheltered pair" because it presumably shelters students from the more rigorous pacing of a standard class. Of course, clusters can be developed without a vocational component; for example, Chemetketa Community College (Oregon) offers a sequence in "Evolving American Cultures" which includes a course in American literature, one in U.S. history, and one called Understanding Movies.

In each pair or triple, students take all courses simultaneously. Instructors report that students within clusters are engaged in deeper ways than are most community college students. They have stronger personal relationships with other students, since they see them more frequently; they tend to work more collaboratively, and to develop study groups and other support mechanisms. Elsewhere the institution has tried to construct collaborative learning by pairing courses with formal study groups. (These groups are modeled on the research of Uri Treisman with minority students in calculus.) Students can refer to material from other classes, and benefit from having connections among classes clarified both by the structure of the courses and by instructors. As one student indicated in a flyer advertising the business cluster to all students, students in the clusters seemed to appreciate the connections between the courses and the collaborative environment that resulted.

For their part, instructors can be more confident about what material students have already learned, and can therefore build on earlier material in other classes. The faculty at LaGuardia College report that their regular meetings include discussion of assessment and teaching and learning methods, suggesting another mechanism where teaching can improve. They also claim that students in pairs and clusters are more motivated, and less likely to drop out; while there is only a little evidence,[16] the conclusion that students in clusters have closer ties to other students is consistent with the finding that dropout rates

[16] One ESL instructor reported that the pass rate in the ESL/keyboarding pair was ninety percent, compared to seventy percent in the non-paired ESL—but acknowledged that self-selection of highly-motivated students into the pair might be responsible. Those associated with the clusters in LaGuardia Community College contend that the pass rate is higher for cluster students than for noncluster students in the same English courses (85% versus 70%), and that students in the business cluster have retention rates from the first year to the second which are ten to twenty-four percentage points higher than noncluster students.

are lower among individuals whose social connections within postsecondary institutions are stronger.[17]

To be sure, there may be some drawbacks to clusters. Several instructors mentioned that they never had sufficient time for joint planning. While acknowledging the benefits of greater student interaction, several mentioned that students form cliques and that discipline problems may develop—"familiarity can become too familiar," in the words of one instructor with experience in several clusters. Several faculty members expressed the feeling that clusters were not worth the effort necessary to coordinate instructors and to cope with discipline problems, though one faculty member considering leaving a cluster still acknowledged the value of clusters: "When it works, it's incredible." Evidently, clusters represent substantial departures from conventional classroom practice, for instructors and students alike, and place novel demands on instructors; some may be unwilling to spend the time, and some may find themselves unprepared for the cooperation clusters require.

Of course, tandem courses and clusters can become larger groupings of courses, though such efforts are rare.[18] These approaches are sometimes referred to as learning communities (e.g., Hamberg, 1991; Gabelnick, MacGregor, Matthews, & Smith, 1990). Any number of disciplines can be linked within learning communities, of course, and many examples group conventional academic courses—economics and history, math and science, literature and art—rather than incorporating occupational fields. Whatever the specific disciplines, the most important aspects of self-conscious learning communities are the emphasis on interdisciplinary study, the development of institutional structures (like co-enrollment and team teaching) that overcome the fragmentation of conventional educational institutions, the integration of skills from various disciplines and content areas, and the development of more active approaches to teaching, with seminars, discussion groups, and projects more common than conventional lectures.

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[17] In Tinto's (1987) model, which dominates the empirical literature on persistence, academic integration (essentially, academic success) and social integration—the participation of students in the social life of the institution—are crucial to decisions about continuing rather than dropping out. Social integration is particularly difficult for students in community college because so many of them are part-time and have substantial non-educational demands on their time.

[18] The ambition of some programs in LaGuardia is to expand such groupings. As the director of the Enterprise Center has written, "Our long range goal is to develop several 'streams' of offerings which give students choices each semester of their first year at the college, regardless of the skill levels at which they start" (Sussman, 1991). While the Enterprise Center has started with business-oriented clusters, it is also working with faculty from other disciplines to develop clusters and "streams."

Model 7: Colleges-Within-Colleges

Finally, the potential exists for groups of related courses, instructors, and students to form a college-within-a college, with its own identity and culture. Like clusters and learning communities, such an organizational structure can provide an institution within which collaboration among instructors, and integration of all subject matter, is a logical and natural result of having a common purpose. A college-within-a-college can also have a clear focus, in place of the all-embracing purposes of the comprehensive community college which sometimes leads to diffuseness and chaos.[19]

However, such arrangements are quite rare in community colleges, as in the rest of postsecondary education.[20] The LaGuardia Community College Enterprise Center started out as a college-within-a college, where a group of students would stay together for two full years. However, community college students tend to require highly flexible schedules, particularly if they are older and have family and employment responsibilities; and the scheduling problems and inflexibility of the college-within-a college caused that attempt to fail and to be replaced by the more flexible clusters of the Enterprise Center.

One other example is the effort to develop a College of Design, Art, and Architecture as part of Santa Monica College (California). This college-within-a college is an arts-oriented college modeled after Black Mountain College and the Bauhaus that is both physically separate from the rest of the community college and philosophically distinct (see also "SMC," 1990). The aim is to provide a range of academic subjects as well as arts- and design-oriented courses, where the academic courses could incorporate readings, applications, and projects drawn from the arts curriculum. The academic courses would include English courses like "Language and Metaphor," science courses like "Patterns in Nature," social science courses like "Psychology of Perception," "Human Factors in Design," and "History of American Design," business courses emphasizing the business aspects of art and design-related occupations, a course in Italian and one in Italian Cooking taught in Italian (presumably to give the program the flavor of Art). There is also a distinct ambition to develop a true arts community—much as Black Mountain College was reputed to have been—in the manner of a learning community. Whether the college can realize this

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[19] The proposal to develop a college-within-a-college with a clear focus is similar to the "focus schools" analyzed by Hill, Foster, and Gendler (1990) at the high school level.

[20] The analogues at the high school level—schools-within-schools—are somewhat more common. Magnet schools often operate as school-within-schools, and the Academy model (described in Grubb, Davis, Lum, Plihal, & Morgaine, 1991; Stern, Raby, & Dayton, 1992) is another example that usually has a vocational focus.

vision is unclear, since it still seems to be in the planning stages. However, we know of no other efforts to develop colleges-within-community colleges with an occupational focus.[21]

The approaches of Models 6 and 7—tandem courses, cluster courses, learning communities, and colleges-within-colleges—have similar ambitions, though they include varying numbers of courses, instructors, and students. They all aim to provide a structure within which collaboration among instructors can flourish, in which two or more courses reinforce one another, in which instructors can presuppose knowledge and abilities gained in other courses, and in which common examples and applications can be developed.[22] In the best examples, they also serve to generate a community among students and a sense of purpose within community colleges and technical institutes. Their potential for integrating occupational and academic content is powerful, then, because they provide ways of removing the barriers among disciplines and for fostering collaboration where none might otherwise exist.

The two approaches differ principally in their flexibility: unless a college-within-a college were sufficiently large, it would require students to attend many courses in a fixed pattern. Tandem and cluster courses have many of the advantages of a college-within-a college without as much inflexibility: While students must commit themselves to all the courses of a cluster for a semester, they can alternate between clusters and conventional courses or to take a semester off from the cluster structure if need be.

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21 Interestingly enough, AB1725 in California, legislation that some community college advocates have hailed as a substantial advance, required the state Chancellor to study the feasibility of establishing, as pilot projects, " 'interdisciplinary colleges' within selected community colleges—with a special concern with the integration of vocational and academic study" (Section 60). Unfortunately, funds for the feasibility study have not been appropriated.

22 This approach is similar to the model of "alignment" at the secondary level, in which both vocational and academic content are modified; see Grubb, Davis, Lum, Plihal, and Morgaine (1991), Model 4. Clusters and learning communities at the postsecondary level are similar in many ways to Academies and other occupationally focused schools-within-schools, including the use of occupational clusters and career paths; a college-within-a-college would be similar to occupational high schools and magnet schools. There are, then, clear similarities between many of the forms of integration at the secondary and the postsecondary levels.

Model 8: Remediation and English as a Second Language (ESL) Programs with an Occupational Focus

A final approach to the integration of occupational and academic content is to develop remedial (or developmental) courses and English as a Second Language (ESL) programs with an occupational emphasis. Within the past ten or twenty years, the amount of remedial education in community colleges and technical institutes has expanded enormously, with estimates of the fraction of students needing remediation varying from twenty-five percent to seventy-eight percent (the latter in the Tennessee system, cited by Riggs, Davis, & Wilson, 1990). In regions of the country with substantial immigration, the demand for ESL has grown enormously, particularly in areas where community colleges are responsible for non-credit adult education. In most community colleges and technical institutes, remediation and ESL are freestanding courses, arranged in sequences leading to mastery of reading, writing, and simple mathematics but quite independent of the other course offerings of the institution (Grubb, Kalman, Castellano, Brown, & Bradby, 1991). However, there are reasons to think that this independence is detrimental to success in these courses. Many instructors report that students (especially occupational students) are bored with remedial courses and fail to see their relevance to occupational goals; motivation is low and dropout rates are high. Furthermore, the teaching in most remedial and ESL courses is decontextualized, providing a set of skills by textbooks and examples that are unconnected to the lives of students. In contrast, a long tradition within teaching reaching back to John Dewey and before—and a set of principles widely cited within adult education—has argued that teaching should be contextualized, using material and examples drawn from settings which have some intrinsic meaning to students.[23] For students who come to community colleges for vocational purposes, an obvious approach to contextualizing remediation and ESL, and clarifying their relevance to the goals of students, would be to teach basic academic skills or English while simultaneously preparing them for specific occupational areas.

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[23] The question of what it means to "contextualize" teaching involves a substantial and sometimes abstruse debate, reviewed in part in Grubb, Kalman, Castellano, Brown, and Bradby, 1991. One prominent approach relies on the notion of functional context literacy training developed by Sticht and his associates (e.g., Sticht, Armstrong, Caylor, & Hickey, 1987), though this proves to revise standard teaching practices in one way—in drawing curriculum materials from "functional contexts" like work—but not in others. In another school of thought, however, a context includes the social norms and expectations, the personal relationships, the purposes in reading and writing, and other aspects of the social setting in which reading and writing occur, not merely the origins of texts (e.g., Scribner & Cole, 1981; Heath, 1983; Erickson, 1988; Street, 1984). Therefore it becomes important to recognize that substantial differences exist in what a "contextualized" program might be. In practice, however, there appear to be very few efforts to developed contextualized remedial or ESL courses of any kind.

A few community colleges and technical institutes have developed developmental or ESL programs which teach basic academic skills (or English) while introducing students to the concepts, tasks, and job-specific skills required in an occupational area:[24]

- Springfield Technical Community College (Massachusetts) has developed a course called "Introduction to Business," aimed at students contemplating a career in business but needing some remediation. The course itself uses a business text and covers some topics from standard business courses (business practices, business-related vocabulary and concepts, familiarity with different business careers) but uses a variety of materials (including computers, music, and video) for students not yet ready for more advanced courses like accounting and management (Baraldi, 1990a, 1990b).

- A course called "Introduction to Technology" at Yakima Community College (Washington) provides remediation in math, reading, and writing in the context of an introduction to various technical occupational specialties, including jobs in agriculture, engineering, and auto/diesel mechanics. The proposal for the course states the problem as the separation of remediation from subsequent coursework:

  > Developmental students are physically remote from vocational/ technological programs and faculty [and] remain unaware of program opportunities available to them . . . This collaborative learning community will build bridges for faculty and students, and more clearly define a pathway from developmental education to vocational and technological programs.[25]

- The Basic Technology Program at Schenectady Community College (New York), designed for "students with limited math/science backgrounds or weak basic

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[24] In addition to the programs described in this section, the Two-Year College Development Center at the State University of New York, Albany, sponsored a project in the early 1980s to develop materials for faculty about the integration of basic skills into postsecondary occupational programs. The result was a series of monographs with titles like *Reading in Postsecondary Occupational Education*, *Writing in Postsecondary Occupational Education*, and *Basic Skills in Postsecondary Occupational Education*. However, like most projects supported by grant funds, this effort seems to have vanished once the funding (from federal vocational education funds) ended.

[25] The importance of this pathway cannot be overemphasized. Conventional practice in community colleges and technical institutes, as well as in JTPA and welfare-to-work programs, is to assess students and refer them to remediation if necessary—but only rarely to follow them and make sure they successfully enroll in remediation, complete, and progress back into occupational skill training (Grubb, Kalman, Castellano, Brown, & Bradby 1991). The "pathway" implicit in Introduction to Technology establishes connections at each of these junctures, and ought to improve rates of completing remediation and moving into job skills training.

skills,"[26] includes two courses titled "Introduction to Technologies" which describe technical careers, applied math (e.g., measurement and scales), some physical processes, and equipment used in technical positions. Supporting courses include a remedial math sequence, freshman English, and introductions to chemistry and computers.

- At Chemetketa Community College (Salem, Oregon) a program in drafting and study skills has been devised with the collaboration of a drafting instructor and an instructor from developmental education.

- A somewhat more complex program, with a sequence of remedial courses connected to occupational instruction, is the Health Career Community developed at Springfield Technical Institute, for students preparing for one of twelve health programs but needing remediation. A series of three courses focuses on reading skills with practical applications in medical settings (including a great deal of medical vocabulary); study skills (like note taking, outlining, and test-taking) using a specially selected text on health; life skills (time management, stress management, nutrition, and self-confidence), again using examples drawn from health; and familiarization with career opportunities in health, with an attempt to convey what is required in different occupations, a kind of career exploration. Simultaneously, students can take the conventional developmental courses in reading, math, and science. When they have passed the introductory courses, they can begin the regular courses of the health occupation they have chosen. The director claims higher retention rates than in the community college as a whole, which suggests substantial success.[27]

Of course, it is possible to develop developmental courses which use academic rather than occupational courses to make applications. Schoolcraft College (Livonia, Michigan) has developed "paired classes" in developmental reading and psychology, and found, in a relatively well-controlled study, that students enrolled in the pair earned higher grades and had lower dropout rates than did a control group of equivalent ability (Gudan,

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[26] Sadly enough, the program is aimed at unprepared high school graduates; as the program proposal states, "the Non-Regents Diploma and the General Equivalency Diploma have become the most suspect in terms of producing high school graduates who are unprepared for employment in modern industry."

[27] In community colleges and technical institutes everywhere, data on retention is difficult to come by and often suspect. However, in this example, the most relevant comparison would be to retention rates in the regular development program, which would normally be much lower than retention rates in a community college as a whole. Therefore the finding of retention rates higher than college-wide rates suggests that the Health Careers Community has a much higher retention than other developmental programs.

Clack, Tang, & Dixon, 1991). As a result of this success, the college is planning to extend such pairs to business and political science.

A similar approach has been taken in a very few ESL courses. At Bunker Hill Community College (Massachusetts), an ESL program for Allied Health, preparing students to become nursing assistants, lab assistants, and pharmacy technicians, and one for Electronics have been developed, based on the belief that "language training is most effective when taught in the context of skill training." The courses aim to improve the English-language reading and writing of students, but they include reading and vocabulary drawn from the related occupation, develop writing assignments that mimic those that will be used on the job, and introduce students to the careers available and the basic tasks and capacities required.[28] These courses are part of a practice sometimes labeled English for Speci Purposes (ESP), an offshoot of ESL. Similarly, an approach called technology-specific ESL has been developed at the Applied Technology Center operated by Everett and Edmonds Community Colleges (Washington). ESL instructors are first taught about electronics; then, in consultation with industry supervisors and managers from a number of local high-tech firms, they teach limited English-proficient employees of these firms "the reading, writing, and speaking skills necessary to participate in the problem-solving and collaboration required in high technology firms" and to pass the certification tests required by federal contracts. As yet another example of postsecondary Vocational English as Second Language (VESL), Black Hawk College (Moline, Illinois) has developed a machine tool curriculum for new Indochinese students, with vocational instructors and the Laotian and Vietnamese bilingual staff of the college collaborating.

In these cases, then, the integration of occupational content and academic instruction involves teaching basic skills (or English) within courses that draw reading, vocabulary, writing exercises, and other applications from a broad occupational area. Each also provides what might be termed career exploration—an introduction to the specific jobs within the occupation and to the concepts, practices, and demands in these positions. These courses, or the longer sequence of the Health Career Community in Springfield Technical Community College, prepare students to enter "regular" occupational programs, and so their vocational purpose is clear, in contrast to most remedial programs, which prepare students to pass basic skills tests but fail to link remediation to any future ambitions of students. The claims that this approach increases retention—consistent with the

[28] These courses appear to be similar to those in Vocational English as a Second Language (VESL) which can be found in some high schools.

complaints of instructors in conventional remedial programs that their students are unmotivated and fail to see the connection to their vocational goals—suggest real promise for this particular form of "contextualized" instruction. On the other hand, there appear to be relatively few efforts around the country to integrate remediation (or ESL) with occupational programs,[29] so—like many other approaches to integrating occupational and academic education—this is an innovation which has not been widely tried.

In one crucial way, the integration of remediation with occupational content is different from the seven other models we have described: The academic competencies included are quite basic, and the courses are aimed specifically at students needing remediation.[30] These are not efforts to achieve "higher order skills," or to educate the workers of the future more broadly, and they do not respond to the pressures on postsecondary institutions to increase the skill levels of students. But as a response to another pressing problem of community colleges—the surge of students who come unprepared for college-level work—they present another vision of combining occupational and academic instruction in a way that can make community colleges and technical institutes more effective in their diverse missions.

Evidently, the eight different models of integrating occupational and academic education vary in their frequency. The requirement of general education is virtually ubiquitous in community colleges and technical institutes, even though many occupational students may escape these requirements. Applied academics courses are also quite common: Of the 121 institutions that responded, sixty-seven had one or more applied academics courses. Writing Across the Curriculum is also a well-established innovation, even though its influence seems limited within many institutions. But each of the other approaches (including cross-curriculum efforts aside from Writing Across the Curriculum) exists, to our knowledge, in only a handful of postsecondary institutions.

Innovations have usually been the responsibility of small numbers of faculty, working independently without much institutional encouragement. Only a few community colleges have developed more than one or two isolated efforts at integration. For example,

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[29] In telephone surveys of remedial programs within twenty-three communities and a search for developmental programs linked to occupational training—the data underlying Grubb, Kalman, Castellano, Brown, and Bradby (1991)—we uncovered no examples within community colleges or technical institutes.

[30] In fact, there is a potential problem with vocationally oriented remedial and ESL programs, pointed out by some instructors: They segregate students from their transfer-oriented peers. Whether the benefits of a contextualized curriculum outweigh the potential disadvantages of such tracking is impossible to determine.

Yavapai Community College has a large number of applied academics courses, as well as several multidisciplinary courses like "Technology and Human Values" and "History of Technology." Chemetketa Community College (Salem, Oregon) has a number of integrated programs, some (the tandem courses in human services and writing, and the program in drafting and study skills) involving occupational areas while others (the American Culture cluster and a course in "Cultural and Racial Issues in the U.S." paired with "Introduction to Fiction") do not. Kirkwood Community College (Cedar Rapids, Iowa) has been one of the most successful participants in the Advancing the Humanities project sponsored by the AACJC and the National Endowment for the Humanities: Instructors at Kirkwood have already implemented courses in "Working in America" and "Culture and Technology," and are developing a third on "Living in the Information Age" (Sessions, 1991/1992). Most notably, LaGuardia Community College, with its large numbers of clusters and tandem courses, has developed an institutional vision which supports many integration efforts; integration across courses appears to be a routine and widely accepted practice there, not dependent on outside funding or the initiative of just a few faculty.

The existing practices in postsecondary institutions therefore reveal a wide variety of innovations, many practices with real potential for improving postsecondary vocational education, and a few institutions that have participated quite actively in integration. But with examples so rare, and institutionalization of integration efforts so uncommon, there is a long way to go before the integration of occupational and academic education becomes more than a glimmer.

THE DIFFERENT CONCEPTIONS AND PURPOSES OF INTEGRATION

The conception of integrating occupational and academic education has not yet been given much thought at the postsecondary level. Most of our respondents were unsure what we meant by integration; almost none of them had thought about curriculum integration, and their responses in citing their own institution's efforts revealed that there is no consistent understanding of integration. In contrast to the secondary schools, where there is substantial discussion of curriculum integration in general and of the integration of vocational and academic education in particular,[31] most postsecondary institutions have not

[31] For example, the conception of integration has been promoted by the Association for Supervision and Curriculum Development; see, for example, the special "Integrating the Curriculum" (1991) issue of

begun to think about what integration might be or why it might be valuable for their students.

The models of integration described in the previous section reveal a variety of practices, ranging from the incorporation of some additional writing in a conventional occupational course to substantial reorganizations of programs within clusters and learning communities. The underlying conceptions of integration also vary substantially among these models, and include the following:

- Students are presented both occupationally specific and academic content in separate courses, and they make the links among subjects themselves. The inclusion of academic prerequisites in certificate and Associate degree programs, and the presence of academic requirements in general education programs, are examples of placing the burden for integration on students.

- Occupational examples and settings are used to contextualize academic instruction—to clarify its relevance to future plans and its usefulness in employment, in order to motivate students—but the stress is still on skills and abilities usually considered academic like reading, writing, mathematics, science, and literary analysis. The remedial and ESL courses with an occupational focus (Model 8) are good examples emphasizing basic academic skills; applied academics courses are examples where skill levels may be somewhat higher. Whether such contextualization operates to narrow the academic component—to make it overly occupation-specific, or to "dumb down" the content taught to remedial or occupational students—or to expand the capacities which occupational or remedial students master is not always clear, and contributes to debates about this approach.

- Courses incorporate the skills and the content traditionally associated with academic subjects with the skills and applications conventionally included in occupational courses. Examples include some applied academics courses, cross-curriculum efforts like Writing Across the Curriculum, and expanded vocational courses incorporating more academic components. The balance of vocationally-oriented and academic components varies, of course; and no doubt classroom observations

Educational Leadership as well as Fogarty (1991). Many schools (including middle schools) are experimenting with integration of science and math, the traditional math courses, of history and literature, and of other obvious pairings. The conception of integrating vocational and academic education is by now widespread among secondary vocational educators, partly because of the Carl Perkins Amendments of 1990 requiring integration. In part, the lower level of consciousness in postsecondary institutions about integration reflects the smaller federal vocational funding at the postsecondary level.

over extended periods would reveal that instructors vary in the extent to which they clarify the connections between vocational and academic content, rather than leaving the student to make these connections. Nonetheless, in this conception of integration, vocational and academic content are brought in closer proximity under one instructor (or, rarely, a pair of instructors), facilitating a greater role for instructors in integrating material from different disciplines and increasing the chance that students can make these connections.

- In addition to learning occupation-specific skills, students learn about the variety of careers within a broad occupational area, their requirements, and the structure of the industries in which they are likely to be found. This kind of "career exploration" is part of many introductory courses in certificate and Associate programs, as well as the introductory courses in the remedial programs linked with occupational concerns of Model 8. These components are clearly aimed at giving students a broader conception of the alternatives available to them and a sense of the economic setting within which they will work.

This kind of introductory course is an example of another practice encouraged by the Perkins Amendments of 1990, which allows federal funds to be used for "programs which train adults and students for all aspects of the occupation" (Section 235). While the conception of "all aspects of the occupation" (also referred to as "all aspects of the industry") in the legislation is just as vague as the conception of integration, it can be interpreted as an effort to give students a broad view of the occupations and sectors they might enter so that they will be well-informed about the occupational choices they make and the avenues for mobility open to them. The career exploration modules that are part of introductory courses can be interpreted as one way of presenting "all aspects of the industry."

- Courses incorporate the broad perspectives and concerns from academic disciplines with occupational issues, broadly defined. The interdisciplinary or hybrid humanities courses described under Model 5 represent good examples of this conception of integration, as do some of the expanded vocational courses of Model 4. In this approach, there is less stress on skills and knowledge (reading, writing, knowledge of medical procedures, machining skills) and more on broader perspectives and ways of seeing the world—historical perspectives, or exploration of the human condition through literature, or the analytic mode common in economics or political science. In addition, such courses usually include broad

employment-related concerns, usually missing from standard academic courses *and* from standard vocational programs, that should be important to self-conscious, inquisitive, and politically-aware individuals who will spend a good of their lives in employment and whose purposes in postsecondary education are essentially vocational. The capacities taught in such an approach are not necessarily those touted as helping the United States establish its international competitiveness, but they may be crucial to helping students participate fully in the world of employment.

- Occupational and academic instructors collaborate in developing courses and programs, finding a variety of connections between their areas and clarifying the relationships for students (rather than leaving students to figure them out). Tandem courses and clusters, which are always developed by teams of instructors (despite complaints about not having enough time to work together), are the best examples of collaboration, and some applied academics courses and multidisciplinary courses have also been developed by pairs or teams of instructors. The collaboration of instructors shifts the burden of integration away from students, and allows many different kinds of connections to develop. Indeed, the approaches to integration which have the richest possibilities as ways of reshaping postsecondary occupational programs—the multidisciplinary courses of Model 5 and the clusters and learning communities of Model 6—all rely to some extent on collaboration, suggesting that this may be central to the most thorough forms of integration.[32]

- Postsecondary institutions restructure their practices to facilitate the collaboration of teachers and the ability of students to integrate material from different areas. The cluster courses, learning communities, and (potentially) colleges-within-colleges described in Models 6 and 7 are the best examples of such structures, operating at different scales but all moving away from the isolated course as the basic unit of postsecondary institutions.

Evidently, the ambitions underlying these different conceptions of integration vary. Some of them make minor modifications in existing practices, while others fundamentally reshape how community colleges and technical institutes operate. Some aspire to teach students high-level academic skills and various higher-order skills, while others concentrate

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32 At the secondary level, the collaboration of academic and vocational teachers is crucial in distinguishing the forms of integration that are relatively modest in their ambitions from those with the potential to reshape schools in substantial ways. See Grubb, Davis, Lum, Plihal, and Morgaine (1991).

on the most basic skills for students who come tc postsecondary education woefully underprepared. In our view, each of them has something positive to offer; compared to conventional practices, each has potential benefits for students, faculty, and the coherence of postsecondary institutions. From this vantage, it is inappropriate to label certain approaches to integration as exemplary and other as unacceptable. Rather, distinctly different approaches to curriculum integration exist with varying assumptions about what integration means, assumptions which ought to be explicit and carefully examined rather than covert.

IMPLEMENTING CHANGE: THE BARRIERS TO INTEGRATION

While it has been exciting to discover the many innovative practices in community colleges and technical institutes, the gloomy side has been the realization how rare many innovations are. The dominant approach cited as integration—general education—is hardly a novel idea, and other approaches to integration (aside from applied academics courses and Writing Across the Curriculum) can be found in only a few institutions. Even in those institutions where innovations exist, they are typically the inventions of a few highly motivated faculty members, acting as individuals without much institutional encouragement; their innovations have typically not been emulated by others even within their own institution. Some approaches to integration—particularly the multidisciplinary courses emphasizing occupational concerns—have been supported largely with outside funds, and have tended to disappear once external funding is withdrawn.

In cases of success with integration, a similar pattern of innovation seems to have emerged. Effective leadership and a genuine interest in reform among instructors—that is, both "top down" and "bottom up" strategies simultaneously—improve the chances for innovations to survive, as do the provision of institutional resources. At LaGuardia Community College, for example, one cause of the failure of the early college-within-a-college was that a "top-down" decision was not accepted by faculty members. However, when an administrator then used Perkins funds for staff development programs focused on active learning techniques, the participants developed the idea of pairs and clusters and then became the leaders in generating new ideas and applications. Similarly, the popularity of Reading Across the Curriculum in Metropolitan Community College was the result of faculty committees which developed ideas, selected the book, and generated a broader base of interest. This approach to change—administrative leadership coupled with the transferal

of responsibility to faculty, with institutional resources allocated to innovations as necessary—is relatively common in a variety of different areas.[33]

However, there are some particular barriers to integration of occupational and academic education cited over and over by the instructors and administrators who have developed novel approaches—most of them quite familiar, to be sure, but worth clarifying as indications of what changes need to be made for other institutions to reform. Most obviously, the disciplinary specialization which affects virtually all of education is a principle barrier to integration. Many instructors are wedded to their own disciplines, and some are uninterested and unprepared to make links to related fields. Innovators often report their colleagues unwilling to consider novel approaches, unwilling to leave the security of a traditional syllabus, content, and textbook, and sometimes unqualified to venture into new areas; administrators complain about the difficulty they have getting instructors to follow new visions. The unwillingness to try new approaches is expressed in different ways: Academic instructors often complain about pressures to "water down" the curriculum, occupational instructors express concern with teaching sufficient occupationally specific skills,[34] and everyone is worried about enough time to cover what they consider the most important topics rather than making room for someone else's subject—what we might label the "tyranny of coverage."[35] This problem is not peculiar to community colleges, of course: Efforts to develop interdisciplinary approaches in four-year colleges have routinely failed because of the power of the disciplines (reinforced by research interests), while efforts to integrate vocational and academic education in high schools have also foundered on these shoals.

The general problem of fragmentation among fields is especially powerful in community college because of the deep split and the status differential between academic education—with its link to the high-status transfer function and four-year colleges—and occupational education, often designated by the unfortunate label of "terminal" education and usually viewed as leading to lower-paying, lower status jobs than the baccalaureate. Within community colleges, the weaker position of vocational faculty—who are more likely to be part-time or temporary instructors, and are usually less active in the governance

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[33] For example, see the illustrations of innovation in a profile of Miami-Dade Community College, in Roueche and Baker (1987).

[34] This may be an especially difficult problem in occupational areas like health occupations where there are rigid requirements established by state licensing agencies. For example, one institution seeking to integrate humanities into all programs found resistance to adding another course, with the nursing program being the most recalcitrant.

[35] Our thanks to Judith Warren Little for pointing out this problem.

of the institution—also makes it difficult for them to relate to academic faculty as equals. Long after many community colleges have become predominantly vocational institutions,[36] their administration continues to be dominated by the academic side, and concerns about the transfer function seem to dominate those about the vocational mission. Even if there weren't a status differential between occupational and academic faculty, the fact that each group views the mission of the community college in such different terms makes collaboration more difficult. In one extreme case—a community college so divided into different camps that they do not consider themselves a single institution—the dean of occupational education declared, "we're a vocational school housed in a community college."

The conventional fragmentation of disciplines and the split between vocational and academic purposes is reinforced in several ways by institutional practices and policies. One is simply the organization of most community colleges into departments along conventional occupational and academic specialties. This means that routine communication among faculty—never especially good in any two- or four-year college—tends to occur along departmental lines rather than involving several disciplines. One might hope that curriculum integration would therefore be more common in institutions with unconventional organizational structures—for example, vocational and academic departments organized into one unit. However, we saw no evidence that this is true. In some community colleges, the cultural and status separation of occupational and academic instructors is reinforced by physical separation: The occupational departments, with greater needs for workshop space, are located in buildings separated from the classroom buildings used by academic instructors. State certification requirements for instructors also hamper cooperation in some cases: The requirement that only instructors certified in English or history teach courses with specified titles makes it difficult for a vocational instructor with interdisciplinary interests to teach (or team-teach) a hybrid course, and in some states applied academics courses must be taught by academically certified instructors.

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36 It is difficult to declare the community college predominantly vocational or academic because student intentions are so unclear and unstable, and it is difficult to infer anything from course-taking patterns. However, based on data from the 1990 National Postsecondary Student Aid Survey (NPSAS), seventeen percent of students enrolled in community colleges did not report themselves as either vocational or academic; this group might include "experimenters" undecided about their course of study as well as remedial and avocational students. Of the remaining students who did declare a field of study, sixty-one percent were in vocational fields and thirty-nine percent in academic fields. Of course, the relative emphasis on occupational and academic goals varies greatly among states: North Carolina limits enrollment of transfer students to fifteen percent, while states (like Minnesota) that have both community colleges and technical institutes have more transfer-oriented community colleges.

A more practical and often overwhelming barrier is simply the lack of resources for cooperation. Full-time instructors complain that they have no time to spend with their colleagues developing new and difficult courses; and part-time faculty, which include many vocational instructors, often don't spend enough time on campus for much collaboration to take place. The economics of community colleges and technical institutes, which are usually funded on the basis of attendance or enrollment, means that the costs per pupil compared to revenues are carefully calculated.[37] Team teaching and release time for developing new courses escalate costs dramatically, particularly for courses whose enrollments may be uncertain. We found, then, almost no team teaching, and little release time; most multidisciplinary courses have been developed with special funding, and instructors teaching tandem courses and clusters frequently complained about the limited time they had for coordination.

However, most community colleges and technical institutes can find the resources for initiatives that they deem compelling. For example, with the recent alarm over declining transfer rates, many have been able to fund transfer centers and honors programs. One reason for the lack of institutional support for curriculum integration, and curriculum innovation in general, is simply the lack of leadership. The administrators who set priorities in these institutions seem relatively indifferent to the teaching reforms we have discussed; in only one institution, LaGuardia Community College, is there an institutional culture that supports widespread collaboration, one that has developed partly from the leadership of a few individuals including the first president of the college and the administrator who first proposed tandem and cluster courses. Elsewhere, instructors instituting reforms operate largely on their own, with little recognition that whatever reforms they might develop would be spread to other programs, or that innovations they introduce with grant money would eventually be supported from regular funds. Indeed, the lack of institutional support seems to be a problem for various curriculum innovations. For example, many Writing Across the Curriculum programs we reviewed were initiated by highly-motivated faculty without institutional support, but their continuation and expansion has depended on institutional resources once enough interest has emerged. In many cases, however, institutional support fails to materialize and innovations die. Even

[37] In our experience, most community colleges know their break-even enrollments rather precisely—the enrollment required per course for tuition plus state aid to equal average instructional costs. Many of them operate as "profit" maximizers, eliminating courses with low enrollments or high costs and diverting resources to high-enrollment, low-cost courses—a move they can always justify as responding to student demand. Necessary as such decisions may be in the current tight fiscal situation, they undermine the possibilities for innovative teaching patterns.

though community colleges trumpet their commitment to teaching, many of them undertake little systematic inquiry into the quality of teaching and few efforts to improve instruction.

The final barrier to integrating vocational and academic education is simply a larger statement of those we have already noted. As the community college has developed, it has added new and different (and even contradictory) purposes. To the early "academic" emphasis on preparing students to transfer to four-year colleges, occupational education has come to be a critical mission, even dominant in some states; remedial or developmental programs have expanded enormously; community service courses of various kinds constitute important components; customized training and other firm-specific instruction come to play a crucial role, particularly in linking community colleges to the Holy Grail of economic development; some community colleges provide adult education in their states or regions, adding a variety of non-credit programs and new populations; and many have extensive responsibilities for serving particular groups like the disabled, JTPA clients, and welfare clients in the JOBS program. Most community colleges have responded to these responsibilities by adding new divisions,[38] and communication among the various divisions is sometimes quite poor.[39] As a result, we tend to view the community college as *an archipelago of independent islands*, each serving one mission but with limited communication among them. While there are obvious pedagogical reasons for linking several of the missions—occupational and academic instruction, conventional occupational programs with customized training, remediation with the occupational and academic programs students are preparing to enter—this seems to happen only rarely. The result is an institution which often operates less as a community of interest than as a collection of disparate missions.

But this obviously need not be the case. The example of LaGuardia Community College indicates that a college can establish an atmosphere where faculty regularly collaborate with one another in the development of integrated clusters and communities. The many local efforts at collaboration we have seen provide other visions of integration,

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[38] In an extreme case, one college has three math departments: one for applied math, one for remedial math, and one for transfer students. In part, this division is a holdover from the merger of a community college and a technical institute that took place twenty years ago.

[39] We know of no systematic reporting about the organizational independence of community college missions. However, in addition to the clear split between occupational and academic faculty we noted in the interviews for this report, we have previously identified a split between the remedial or developmental faculty and the rest of the institution (Grubb, Kalman, Castellano, Brown, & Bradby, 1991), and between customized training and the rest of the institution (Lynch, Palmer, & Grubb, 1991); the programs serving JTPA and welfare clients are sometimes distinct from regular courses (Grubb, Brown, Kaufman, & Lederer, 1990); and credit and non-credit courses are often organized in different divisions.

and some evidence of success. Specifically in the area of integrating occupational and academic education, the Perkins Act provides resources which must be dedicated to such integration efforts, as well as the imperative to do so with federal funds. More generally, the ideal of creating true communities within community colleges and technical institutes is one with widespread support. The Commission on the Future of the Community College (1988) titled its report *Building Communities*, and argued throughout for ways in which community colleges should be not only community-serving institutions but also internally-cohesive communities. There are, then, many reasons for integration and many ways of going about it, and the barriers to integration we have identified need not persist.

WHY TAKE THIS PATH? THE BENEFITS OF INTEGRATION

There remains a serious question about the wisdom of integrating occupational and academic education: Is this kind of reform likely to benefit students, given the need for specialization at the postsecondary level and the substantial job-specific requirements in certain fields? After all, one could argue that the high school should be the appropriate place to learn general and academic competencies, while postsecondary education should be reserved for specialization. Given the inevitable difficulties of integrating different elements of the curriculum, perhaps the notion of integrating occupational and academic education is one that ought to be confined to high school but abandoned at the postsecondary level.

However, there are several *a priori* reasons for thinking that integration will benefit postsecondary students.[40] At the most general level, several forms of integration are testimony to community colleges paying special attention to the needs and interests of occupational students. The applied academic curricula, the multidisciplinary courses of Model 5, and the tandem courses and clusters all provide examples where faculty have tried to mold content to the interests and needs of students with occupational goals rather than

[40] See also the articles cited in footnote 3 above. The most persuasive evidence might be information that postsecondary students in integrated programs are more likely to persist in postsecondary education, to achieve their goals, to find employment related to their training, to find their way into careers with subsequent opportunities for advancement, to earn more over the long run, or to find greater fulfillment in any of their adult roles. Some data, discussed in conjunction with Model 8, suggests that clusters increase retention, and many instructors have their own success stories to tell. Less directly, students who complete Associate programs (and women who complete certificates)—who have taken a balance of occupationally specific and academic courses—earn more than students who have taken a few courses in community colleges and technical institutes (Grubb, 1992). Unfortunately, as with many questions about outcomes, there is little direct evidence and it is necessary to rely on *a priori* arguments.

sending them to conventional academic courses that might not hold their attention. These are important steps toward developing student-centered curricula, an approach with the potential to enhance motivation and learning.

In terms of the skills that students learn, the dominant complaints from employers about their workers is not that their job-specific skills are deficient, but that they lack more fundamental competencies including the ability to read and communicate at appropriate levels and various higher-order capacities. This view emerges in part from national commission reports writing in grand generalities (see, for example, Committee for Economic Development, 1985; Carnevale, Gainer, & Meltzer, 1990; SCANS, 1991). In part, surveys of firms confirm the importance of skills other than technical skills: The Committee for Economic Development (1985) surveyed 438 large businesses and six thousand small ones, and found that language skills including communication, work habits, the ability to get along and to work with little supervision were more important for entry-level positions than were technical skills. The Washington State Commission on Vocational Education (1985) surveyed 700 Washington businesses about the competencies desired by employers of individuals from community colleges and technical institutes, and found that work habits, language and communications skills, math and science, and interpersonal skills were just as important as technical skills. An analysis of health occupations—one of the most technically-demanding areas within postsecondary occupational education—found that employers in the San Francisco area considered the technical skills of community college graduates to be adequate, but their communicative skills weak (Hudis et al., 1991). In several other occupational areas, employers seem to look for evidence of motivation, the ability to work in teams, independence, and problem-solving abilities instead of technical skills[41]—capacities which might be best taught with an appropriate mix of occupational and academic content, appropriately integrated so that students could see how general abilities are necessary in specific occupational settings.[42]

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41 This observation is based on NCRVE research in progress directed by Norton Grubb, in which researchers are interviewing employers and postsecondary education providers in four labor markets. A dominant finding is that most employers hiring for occupations which do not need a baccalaureate degree are not especially concerned with technical skills—which in many cases can be quickly learned—and instead put much more emphasis on experience. Community college credentials do provide individuals with greater access to occupations where they can gain experience and on-the-job training, and be promoted over time (Grubb, in press); but their mobility appears to be a function of their performance on the job rather than their formal education, and therefore may depend more on general competencies rather than narrowly technical skills.

42 There is no reason to think that academic courses as conventionally taught help students learn interpersonal skills or problem-solving abilities because the dominant form of teaching—the lecture method, a variant of an approach we call "skills and drills"—usually ignores interpersonal skills and teaches a sequence of small sub-skills rather than integrated capacities like problem-solving. Therefore a simple substitution of academic courses for occupational courses might not improve these capacities either. What

This argument is closely related to the position that students will be better-prepared for occupations over the long run, especially in a world of changing requirements and escalating skill demands, if they are broadly rather than narrowly educated. Indeed, this argument has frequently been made by those in community colleges and technical institutes to support the value of vocational education rather than short-term job training of the kind offered by the Job Training Partnership Act (JTPA) and many welfare-to-work programs. This position has recently been seconded by the Commission on the Future of the Community College (1988): "If technical education programs are too narrow, if work cannot be a broadening experience, then the students may achieve only short-term gains." The Commission then went on to recommend "exploring new ways to combine technical and general studies throughout the undergraduate experience," and declared that "Community college faculty should take the lead in closing the gap between the so-called 'liberal' and the 'useful' arts," particularly by developing "up-to-date programs that integrate the core curriculum and technical education" (p. 21).

A third and different rationale for integration is the motivational one. Many occupational instructors reported special difficulties in getting their students to take academic courses, including those required in the general education sequence; students complain of the irrelevance of these courses and tend to drop out, making it more difficult to obtain certificate or Associated degrees.[43] However, instructors in integrated approaches report higher levels of motivation, as students come to see the applicability of academic material. There is even some evidence of lower dropout rates, especially in the tandem and cluster courses of Model 6 and in the remedial programs of Model 7.

In addition, there is now a current of feeling—and even some research—suggesting that learning many capacities in context is a superior method of learning, compared to the conventional practice of teaching reading, writing, math, or science as abstract bodies of skills and facts disconnected from their applications. The widely cited recommendations of the Secretary's Commission on Achieving Necessary Skills (1991)—"that teachers and school must begin early to help students see the relationships between what they study and

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seems most appropriate is an integrated approach, as can happen in applied academics courses, expanded vocational courses, or tandem courses. The SCANS report resents an argument for such an approach to teaching in high schools, equally appropriate to postsecondary institutions.

[43] Although there is a convention within the community colleges that students enter to take a few occupational courses necessary for employment or promotion, the evidence suggests that only completion of certificates and Associate degrees improves employment and earnings (Grubb, in press). Since these results were developed from data on relatively young individuals, it is possible that older individuals returning to community colleges and technical institutes do benefit from a few courses, though we know of no evidence on this point.

its applications in real-world contexts," that "the most effective way of teaching skills is 'in context'" (p. 19)—should apply to community colleges and technical institutes as much as they do to the K-12 system. Indeed, one convention about teaching adults is that instructors ought to clarify the applications of their subjects (see, for example, the literature reviewed in Grubb et al., 1991, pp. 60-62)—a recommendation that is made easier when academic instructors have occupational colleagues to whom they can turn for examples, related issues and problems, and projects.

Indeed, there is even some evidence from our interviews that integrated programs change teaching methods, in precisely the ways recommended by the advocates of contextualized approaches. The shift to using issues and themes of greater interest to occupational students is one example; and some instructors whom we interviewed claimed that they have changed their teaching methods to make greater use of project and occupationally oriented problems, in which students are more active participants. Many integrated courses and curricula include statements of purpose indicating that they are moving away from the straightforward transmission of facts and figures, and towards a form of teaching in which students are more active in constructing meaning and interpreting issues of importance to them. For example, the cross-cutting themes used in LaGuardia's Advanced Business Cluster, the greater use of collaborative teaching methods in pairs and clusters, the introduction of novel content in the air conditioning program at Cedar Valley College, and the statement about general education at Diablo Valley College that such requirements will "help you make meaning from your encounters with the world" are all cases of more active teaching than is conventionally the case.

A somewhat different benefit is one related to career choice. Many programs have incorporated modules or units which can be considered career exploration, sometimes as part of an applied communications course, sometimes as part of an introductory course in remedial programs linked with occupational programs, sometimes in multidisciplinary courses or (rarely) associated psychology courses, and sometimes simply in initial courses like "Introduction to Business" or Introduction to Health Careers." These units are responsive to the observation that many community college students enter not knowing what they want, or what occupations might be appropriate for them. While the counseling and guidance staffs of community colleges provide some services for such individuals, integrating career information into courses is another and potentially more powerful approach, since it integrates career information with job-specific skills and contextualizes information about occupational options.

Another benefit to students of integration stresses the nonvocational purposes of education. While the moral and humanistic rationales for education often seem submerged in our utilitarian age, nonetheless a persistent stream of commentary has urged that occupational programs include these aspects too, lest they produce "technopeasants"[44] who are technically qualified but otherwise unable to participate in society in any but the most primitive ways. To cite the Commission on the Future of Community Colleges again,

> We also acknowledge that the utility of education and the dignity of vocation have important value, not just for those enrolled in general and transfer studies. Only by placing emphasis on both can all students help in the building of community. . . . Students in technical studies should be helped to discover the meaning of work. They should put their special skills in historical, social, and ethical perspective. Those in traditional arts and sciences programs should, in turn, understand that work is the means by which we validate formal education. (pp. 20-21)

Such a view lends particularly strong support to the multidisciplinary courses described under Model 5, as well as to more conventional uses of general education.

Several benefits of integration are relatively indirect. One of these is the collaboration among faculty that integration encourages. Many instructors we spoke with acknowledged that teaching is usually quite isolated, and they welcomed the contact with other faculty that tandem courses, clusters, and Writing Across the Curriculum fosters. As a dean responsible for a remedial learning community commented,

> It has brought instructors together in a new way. They have to co-plan the program. Assignments are structured so that they build upon one another. The content has been developed to correspond with other work being done. That builds a synergy effect. We get more accomplished and make better progress. The instructors love it. It pulls them away from the isolation they've experienced. They didn't all like it going into the planning, but all have ended up being real fans of the program.

Of course, collaboration has its problems too, since it usually requires more time and some accommodation to different points of view compared to conventional teaching. The fact that collaborative teaching requires faculty to go outside their fields of expertise also leads to some discomfort. But part of the problem is simply that instructors are not educated or encouraged to collaborate; institutions where collaboration became the norm would also be more supportive places to experiment with novel approaches to teaching. For those who

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[44] On the devastating image of the "technopeasant," see Hersh (1983) and Finn, Ravitch, and Fancher (1984), page 6. The latter volume is a general argument for the humanities in the high school, but many of its arguments apply equally well to higher education.

have been able to work well with colleagues in developing integrated curricula, there are substantial personal benefits as well as benefits to students.

Another advantage of integrating occupational and academic instruction is that it helps move beyond the conception of the course as a basic unit of postsecondary occupational education, and focuses more on a sequence of courses and related competencies. Within community colleges (as in high schools), there is a well-known pattern in which students take courses in what appears to be a relatively random pattern, rather than following a coherent sequence—a practice sometimes referred to as "milling around" (Grubb, 1989). Various institutions have taken steps to minimize such unfocused coursetaking, including elaborate student tracking systems to keep students on a course they have set for themselves (Roueche & Baker, 1987, chap. III; Palmer, 1990) and counseling systems (like California's matriculation initiative), solutions which elaborate services external to the classroom. Developing integrated courses, as in tandem and cluster courses, is a different tactic: It relies on instructors to develop coherence and forces students, through the device of enrolling in several courses simultaneously, to take more coherent programs. The expansion of clusters into learning communities also creates structures which should help students complete a program, since the learning community creates a network of peers and instructors with similar goals.

A final advantage of integrating occupational and academic education is also the loftiest: Integration can help bridge the distinct "islands" of activity within the community college as archipelago. The notion of pursuing integration wherever it is pedagogically appropriate is one way of preventing community colleges from being expedient collections of different purposes, with transfer, vocational, remedial, community service, and economic development missions coexisting but not interacting or reinforcing one another. There are, of course, many forms such bridges could take, but greater connections between occupational and academic components and between remedial and occupational segments would include a great majority of community college students.

Many benefits of integration are evidently indirect. They work not only by changing the curriculum and how it is taught, but also by improving collaboration among faculty and by changing the culture of an institution. The results of such changes take substantial time to accomplish, of course, but the benefits are substantial too. The results would be postsecondary institutions that are coherent learning communities motivating students and teaching them in the most effective ways, that provide a broad education for

occupational students, and that prepare flexible individuals able to change as employment and labor markets require.

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