

Targeting Clusters, Achieving Excellence

Figure 1
PRINCIPLES UNDERLYING CLUSTER CENTERS

A state system oriented to clusters should:

Be demand, not politically, driven

Curricula, programs, and services should be influenced by current and emerging needs of the cluster as articulated by its leaders and by best practices, not by political considerations.

Act collaboratively and connect externally

Work closely with organizations with overlapping or complementary missions, directing customers to other organizations where appropriate. Participate in national and international networks to stay abreast of innovations.

Serve as a catalyst for economic development

Assist existing firms to expand and compete and be a recruitment tool for new firms in the cluster reacting swiftly to changing market demands, even if it challenges traditional organizational and decision-making structures.

Stay focused on social and economic missions

Connect work-based competencies with general or academic competencies, using cluster-based contexts to improve the teaching of theory. Centers should target populations that have not historically held skilled positions in the industry.

The partnerships that involve community colleges and economic development have never been stronger than they are today. But colleges' strategies are changing as they come to better understand the competitive advantages of their economies. These advantages are most often associated with concentrations of certain groups of industries, or "clusters." Some industry clusters are obvious, like oil and gas in Texas, furniture in North Carolina, or software in Seattle. Others are less conspicuous, like houseboats in south central Kentucky, biotechnology in Iowa, or metalworking in western Minnesota. Nearly everywhere in the world businesses with similar or complementary interests and needs exhibit a tendency to cluster. They prefer to be near one another because it gives them advantages. They get better access to suppliers, specialized services, expertise, and knowledge, and, perhaps most importantly, skilled labor.

Studying and working with clusters around the world, we have learned that clustering is first and foremost influenced by the skills of the labor force—pools of experienced and productive labor and the availability of customized and specialized education and training that produces and upgrades skills and knowledge. The key to the success of almost every cluster is the presence of a labor force familiar with the operations of its businesses and able to apply its skills to a particular work environment. Community colleges, we argue, can be, and in some places already are, the linchpins for successful clusters.

Concentrating on clusters also gives a college a chance to stand out. Not every college can provide high quality education, training, and services to all industries; only by specializing can institutions and systems assemble the expertise and resources to achieve excellence. Some have discovered the value of becoming a particular cluster's

center of excellence, and have developed the specialized program expertise needed by certain groups of firms. Brazosport in Texas, Catawba Valley in North Carolina, Bellevue in Washington, Somerset in Kentucky, and Alexandria in Minnesota are community colleges that have developed programs, centers, and expertise for their respective industry clusters.

Setting Out the Assumptions

A cluster-oriented community college system is based on certain assumptions. First, excellence requires continual innovation, specialized resources and expertise, knowledge of trends and benchmark practices, and close links to industry. Second, only by specializing can institutions marshal expertise and resources to achieve excellence. Third, all learners must have the opportunity to pursue education in any cluster to the extent of their abilities and aspirations.

The following model of a cluster-based workforce delivery system is based on (1) college practices observed and studied in the U.S. and elsewhere in the world, (2) direct experience with cluster building strategies, and (3) emerging theories and innovations.

Addressing Common Concerns

First, let's address a few of the questions that inevitably arise when suggesting new approaches that imply not only a different way of thinking about an economy but also different criteria for allocating resources.

Shouldn't colleges serve all their students and all their industries?

Specialization is a relative, not absolute, concept. Colleges and systems already make choices among programs offered, and an exceptionally high existing or potential demand is a justification for concentrating resources in a specific region. As long as students have options and the means to participate in a broad range of programs—including some outside of their geographical areas—the state meets its responsibility.

Aren't companies deterred from locating in places with too many other companies competing for their labor markets?

Specialized labor markets, except in the most mature and low-skill clusters, improve employers' labor pools and thus make locations more, not less, desirable, despite competition.

Doesn't specialization unfairly favor some colleges over others?

Since there are costs associated with centers, funding agencies have to make choices. But they can achieve fairness by using clear and transparent criteria and allowing all colleges to develop expertise for a local dominant cluster. The goal of a cluster strategy is not to have colleges compete with each other but to determine in which program areas greater emphasis would enhance communities' competitiveness.

How do colleges that do not become lead colleges for a cluster benefit?

Cluster centers are intended to benefit the state or a region, not only the host college. One of the responsibilities of

being awarded resources for a center is to see to it that all colleges have full and immediate access to the center's expertise, information, and innovations.

Aren't clusters just sectors in new clothing?

Sectors define themselves by the product or service of a company. Clusters can be based on common dependencies such as core technologies, supply chains, natural resources, or skills. Clusters, unlike sectors, have geographic boundaries set by the distances that people (and by extension companies) will travel to work, to access a service, or to interact with peers.

What if a region has no clusters?

One would be hard pressed to find a place in the U.S. without some form of prominent economic activity in its region. Clusters are systems, and the interdependencies and collective interests within an economy offer a logical way to organize and deliver services. Even in places with weak systemic relationships,

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treating the economy as a system yields more benefits than simply working with individuals and single employers.

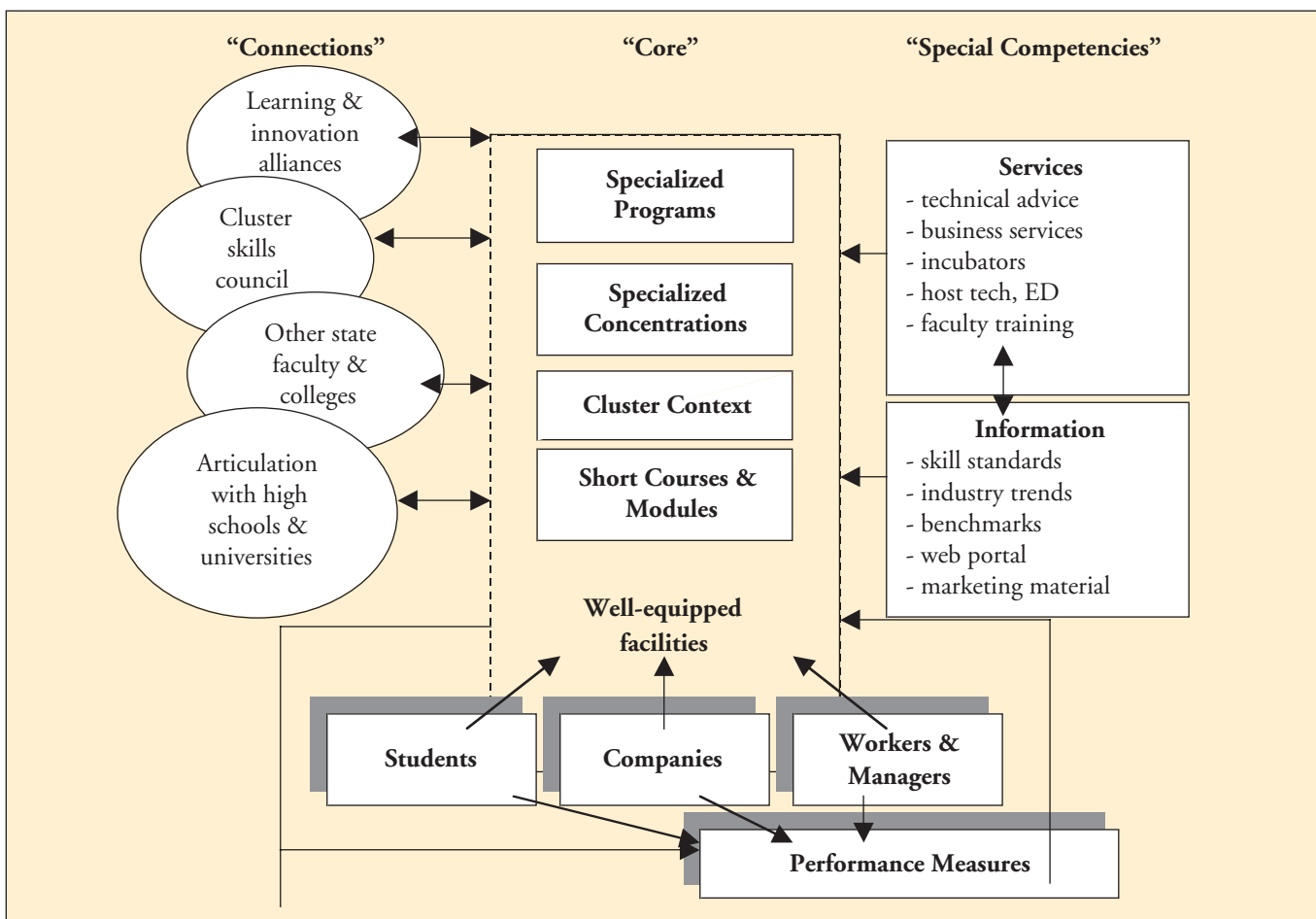
Building a Cluster-Based System

Just how and where a college ought to concentrate its resources and expertise depends largely on the needs of the cluster and the community it serves and the availability of other services. In some instances colleges become the lead institution for curricula design, dissemination, and delivery but do little more. In others they may take on a wide array of activities that complement or supplement their educational offerings, which may include incubators, quality testing labs, or technical assistance offices. The additional services enhance a college's value to a cluster but require commensurately more resources. Here we describe cluster-specific services effective at one or more community colleges and give models for cluster centers.

Packaging Education and Training Around Clusters

Clusters influence course curricula on three levels: the design of cluster-oriented

Figure 2
CLUSTER CENTER DIAGRAM





Contextualized education also raises school retention and achievement by making education more relevant to a community's economy and a student's life.

programs of study, cluster-specific courses available to students in non-core technical programs, and cluster-based contexts applied to general studies programs. Importantly, skills based on industry clusters are different from skills based on occupational clusters. Occupational clusters are skill sets common to a variety of jobs that may cross many different industries. Preparing for work in industry clusters assumes a common context that cuts across many different occupations.

- *Develop and improve programs of study*

Cluster centers assume lead (but not exclusive) responsibility for reviewing curricula content in light of employer and student feedback, modifying and expanding curricula, and developing new courses as needed. This function includes short courses to upgrade the skills of incumbent workers. They should as much as possible link to credit in order to encourage existing workers to pursue further education and credentials that increase their value in the workplace.

- *Create concentrations*

Many jobs in a core cluster company are not specific to the cluster itself. Industrial and facilities maintenance, for example, are needed by all manufacturing clusters but require special skills for some industries, such as working in a sterile environment or taking certain health precautions. Demand for these skills does not justify special programs but the jobs require cluster knowledge that can be provided by an optional capstone course or courses that could be recognized as a concentration or minor in a degree program.

- *Contextualize learning*

The context in which learning occurs matters. Educators classify their programs by occupation, but workplace skills also are defined by the context in which they are applied. These vary among industries. Network administrators working in a division of a large multi-national corporation, a government agency, and a small service company all have different skill requirements and business cultures. By designing curricula around the workplace and business of firms in a local cluster, learners appreciate the value of the cluster and understand more about their regional environment. Contextualized education also raises school retention and achievement by making education more relevant to a community's economy and a student's life.

- *Create management short courses*

Management education, especially for small- and mid-sized businesses, is an

important function of cluster centers. Content taught in the right context is as important to managers as to new entrants. The more these courses are tailored to a particular industry environment, the more valuable they become.

- *Develop and apply skill standards*

The voluntary National Skill Standards that Congress supported have proven elusive. Some states (e.g., Washington and Illinois) and professional associations developed their own standards. Indeed, one of the problems is that there are too many different sets of standards and too little attempt to resolve them at the local cluster level. A center can track existing standards and work with the cluster skills council to agree on standards that will lend more credibility to credentials.

- *Offer up-to-date facilities and equipment*

High quality and relevant cluster specific programs require the most advanced equipment used by the lead firms of the cluster. Colleges providing modern labs and simulated work environments generally beg and borrow from local employers and equipment vendors. A strong argument for specialization is that state systems achieve economies of scale and make costly equipment available to more colleges through capstone programs or unit operations labs, made available to non-local students, and by developing mobile facilities.

Serving as a Resource Center for the Cluster

The cluster center is a comprehensive resource for firms, providing services that affect skill needs and development by increasing or altering skill requirements, employment levels, or the organization of work.

Hosiery Technology Center

North Carolina produces about 60 percent of the nation's hosiery, and most of this comes from the area in and around the city of Hickory. Catawba Valley Community College's Hosiery Technology Center is a hub of training and information for this cluster. Created in 1989, the staff creates curricula and trains workers and managers, and, perhaps even more importantly, brings companies together on technology and business trends affecting this vulnerable industry. For example, the center offers testing services at a lower cost than any one firm could provide, and the center coordinates with the North Carolina State University on hosiery related research and development needs (e.g., color quality standards). The center has also taken a lead in easing the transition of the hosiery workforce to largely Latino and other immigrant populations by creating English as a Second Language training that is taught in the context of the hosiery industry.

- *Organize and facilitate cluster skills councils*

It is vitally important that a center be well connected to organizations designated by the state or region to represent the cluster. Most of these organizations turn quickly to education and training and create skills committees. The Northeast Oklahoma Manufacturers Council is an example of a council created by a college that ultimately became a statewide strategy. Where councils are already formed, the college ought to link itself to the organization and, where they are not, the college should organize the committee.

- *Manage business incubators*

Many community colleges run business incubators as an economic development strategy, as opportunities for graduates or faculty, and as a potential co-op experience for students. Some incubators are generic but many focus on specific clusters, such as biotechnology at Asheville-Buncombe Community College in North Carolina, metals and information technology at Hagerstown Community College in Maryland, and the Arts at LaGuardia Community College in New York.

- *Host technology and business development offices*

A community college offers a convenient and easily accessible site for co-locating complementary services for the cluster, which makes it easy to coordinate activities and share information on a day-to-day basis. Some university extension services place engineers at colleges to connect training and modernization needs of small and mid-sized enterprises. Okaloosa-Walton Community College in Florida and Hagerstown Community College in Maryland have co-located economic development offices.



The college can sponsor faculty workshops and even arrange faculty exchanges and study tours to enhance effectiveness.

- *Train faculty from other colleges*

Centers should help prepare and upgrade the skills of faculty at all colleges in the state, particularly when there are changes in curriculum content or methods, or new information from industry that affects program delivery. The college can sponsor faculty workshops and even arrange faculty exchanges and study tours to enhance effectiveness.

Supplying Information, Spurring Innovation

Cluster centers ought to house information relating to the status of the cluster, such as the state of its technology, current and projected employment opportunities, training programs, contacts, and interesting and innovative practices in other locations. Some of this information will reside in the head of experienced faculty, but it should also be systematically collected and made available electronically to other institutions and employers.

- *Benchmark programs*

Benchmarking is vital to learning. A center ought to track the activities of

other colleges that work with similar clusters, organize study tours to observe others like them, attend major industry conferences, and generally stay abreast of changes and innovations—and share all new knowledge across the state.

- *Advise about new technologies*

Maintaining close connections with equipment and software vendors enables a center to advise other colleges on equipment capabilities and applications and help them make wise investment decisions. The center can also be a state's demonstration center, where other colleges and businesses can come to see and learn about the latest technologies.

- *Serve as education and training portal for industry*

Companies are bombarded with information about education and training opportunities and with job applicants. With listservs, mass faxes, mailings, ads, personal telephone calls, and visits, companies have more information than they can sort through. Cluster workforce portals are gateways and sorting devices that, if properly designed, can tell firms which trainers understand their businesses and best fit their needs.

- *Collect industry trends and projections*

Plans for programs and new investments ought to stem from the best available information about anticipated cluster growth and projected employment based on replacements, expansions, and new firms. The center can play a role in collecting this information, particularly for clusters easily defined by standard industry classifications.

- *Develop and distribute marketing materials*

Community colleges have scarce, if any, resources for marketing to students or employers. As a result, some of their best

North Carolina's Cluster Strategy for Biotechnology

North Carolina is pursuing a cluster approach to meet the workforce needs of the state's fast growing biotechnology cluster. The North Carolina Community College System is planning to create an Office of Biotechnology at the state system office that directs BioNetwork, an alliance comprising five to-be-created biotech cluster centers located at community colleges across the state as well as faculty from other colleges involved in the preparation of workers for the cluster. Each center will focus on a specific subindustry (e.g., agriculture-related biotech) or activity (e.g., creating skills upgrading curricula), and all resources created will be used throughout the system, aided by a mobile biotech lab. The plan also calls for competitively distributed innovation and facilities expansion funds to build colleges' capacities for the industry.

programs are not well known by individuals or companies. Cluster centers should be responsible for designing and producing marketing brochures and advertisements for programs directly relevant to the cluster. These materials should be used by all community colleges in the state.

Tracking Needs and Outcomes


It is important for colleges to demonstrate the value of their programs and services, justifying extraordinary investments. To do this, they must measure outcomes relating to individuals, companies, and the economy. The last two, in particular, are quite difficult because the community college is only one of a large number of factors that affect both. Yet a center should be able to measure impact, even if only in rough estimates.

- *Conduct cluster needs assessments*

Curricula are nearly always designed on the basis of industry skill needs, whether through a DACUM process or with the help of an advisory committee. Further, colleges plan courses on the basis of employment needs. Assigning responsibility for the design of the instruments, sampling techniques, and analysis of data to a cluster center minimizes demands on companies and ensures comparability across the state.

- *Measure performance*

Accountability is perhaps the most challenging task for the college and will most likely require working with subcontractors or consultants. The college ought to develop the tools and data collection mechanisms that are most appropriate for a particular cluster for capturing as accurately as possible (1) the quality of the programs and services and (2) the added value of the center's programs and serv-



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ices to learners, companies, and local economies. Centers must work with cluster associations to make sure the measures reflect the goals and needs of the cluster.

Forging Broad-Based Linkages

One of the most important functions of centers is establishing connections and facilitating collaboration—with companies and associations, other levels of education and colleges, community-based organizations, and other regions of the U.S. and world.

- *Organize and facilitate faculty networks*

Community college faculty members have scarce resources or release time to meet with peers from other institutions in their own state, let alone from other states. Centers can create and facilitate opportunities for faculty professional development and sharing within their fields.

- *Collaborate with secondary school systems to ensure well-prepared students, full knowledge of career options and paths, and improve the transition.*

Particularly in clusters facing skill shortages, cluster centers should take the lead in building relationships such as industry visits for students and encouraging dual enrollments or developing specific articulated tracks between high school and college. High school counseling systems have too few resources to understand various industries well enough to advise students about career paths.

- *Interface with cluster organizations*

Most states embarking on cluster-based economic development begin by forming cluster associations. It is important that the center represent the region or state in any such organization that is designated, or acts by default, to represent or speak for the cluster. This relationship is key to the success of many other activities that require industry cooperation.

- *Establish internships and externships in cluster*

Centers should build internship programs for students and externship programs for faculty, working through cluster organizations. The former give students hands-on experience, allow firms to know students, and connect them to employment opportunities, which is particularly important for non-traditional students. Externships provide faculty with exposure to the daily environment in which their students will work.

- *Work with WIA Boards*

Under federal WIA legislation, local boards have powers to determine what their foundation and technical local skill needs are and communicate them to the various providers and vendors. In most cases, this means an examination of the central cluster firms in the community to determine what these skills are and how firms will hire individuals for them.

Clusters as an Approach to Reduce Program Duplication

Washington's State Board for Community and Technical Colleges began an effort in 2001 to be more responsive to employers and decided to adopt a cluster framework. The rationale is that not all colleges can be good at all things and that there is a tendency to have too many expensive programs with too few students. The State Board conducted research on existing clusters in the state and is now bringing together state resources (e.g., WIA funds) to create, based on local clusters, single points of contact for industries and to build better, deeper programs at fewer numbers of colleges. Lessons learned so far include the importance of focusing on local knowledge to identify clusters over merely analyzing data and that it's difficult to overcome the ingrained notion that every community college must serve every aspect of its community.

Local WIA boards should use skill clusters to meet the needs of their local service area, and community colleges should facilitate this.

- *Participate in learning and innovation alliances*

States' efforts to build workforce programs, skill standards, or curricula benefit from the ideas and experiences of similar centers or institutions in other states or nations. Innovation and learning are interactive activities, and opportunities for staff and faculty to exchange ideas lead to program improvement. Support for such alliances, by acknowledging the value of learning, providing release time, and allowing travel, also creates potential learning and benchmarking opportunities in the cluster.

Expand Outreach and Access

Outreach, strategically planned and proactive, is a vital aspect of any center's work plan, making its expertise and resources available throughout the state and to all segments of the population.

- *Engage community-based organizations*

A number of successful, often foundation-supported, sector-based workforce development intervention strategies have assumed responsibility of preparing low income and unemployed people for employment and career advancement.

In any economy, whether skill based or knowledge based, people get ahead because of whom they know as much as what they know. While sectors and clusters are not exactly the same, they overlap and many sector programs have worked successfully with groups of industries in geographic regions that act like clusters.

- *Develop local career pathways*

Firms within a cluster, particularly if expanding, create new positions and careers for individuals who join them. These careers become important for educational institutions to learn and master so that young people in the community understand what it takes to follow various career pathways. The use of cluster-driven local career pathways becomes an important part of a local career technical system. One other



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important step for educational authorities is to take the pathways and determine how these fit within other pathways offered to students so that "crosswalks" are possible and adults—often displaced workers from another industry—can build on their existing skills and find work within a growing cluster.

- *Build capabilities for any time anywhere delivery*

Centers can develop specialized Web-based courses that enable more people to acquire some of the knowledge and skills needed by clusters. Experiences with asynchronous learning networks show that Web-based education that includes team activities and learner-to-learner and learner-to-instructor interaction are most effective.

Finding the Funding

The special expertise, connections, and related services necessary to make significant contributions to a cluster's competitiveness have associated costs that exceed conventional community college funding formulas. Colleges that have been most successful at focusing on a cluster typically cobble together revenues from a variety of sources. Self sufficiency is not a reasonable expectation for activities aimed at innovation and improvement of programs or services that address special needs of particular underserved populations, or whose value accrues to an entire industry, not a single client company, or that boost a region's competitive advantage to encourage future growth. While there ought to be some industry contribution, the

extraordinary costs of excellence requires continuing supplementation.

Centers able to sustain their special focus often supplement enrollment-generated income with additional funds from:

- State and local economic development agencies
- U.S. and state Departments of Labor
- Special state training funds
- National Science Foundation, FIPSE, Appalachian Regional Commission, U.S. Department of Commerce, and other federal agencies
- Private foundations
- Congressional or legislative earmarks
- Industry and vendor donations (mainly equipment)

Endnote: This model was developed in collaboration and advice from the state community college system offices of Colorado, Kentucky, Michigan, Minnesota, New Hampshire, North Carolina, Virginia, Washington, and Wisconsin.

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