GAINING COMPETITIVE ADVANTAGE

THE NEED FOR CUSTOMER-DRIVEN HIGHER EDUCATION

A Business Perspective

Principal Participants:

Oregon Business Council
Associated Oregon Industries
Portland Metropolitan Chamber of Commerce
Oregon Council, American Electronics Association

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Contents

Introduction

The Time Is Right To Review Higher Education

A movement is gathering force in Oregon to reassess the collective role, structure, and performance of the state's higher education providers. This includes all undergraduate and graduate programs in Oregon, particularly those that are publicly funded: four-year schools in the Oregon State System of Higher Education and the community colleges.

Higher education faces pressures and problems that cannot be ignored any longer. At a time of rapid growth in population and social problems, Oregon depends on higher education to transmit the shared values and knowledge that shape capable individuals and cohesive communities. Oregon's knowledge-based economy is growing. It depends on a work force that requires more exacting preparatory and continuing education than ever before. The "echo" cohort of the Baby Boom is entering its adult years. Access to advanced education and training will be critical to the life prospects of these individuals and to the success of the Oregon economy. There is widely held concern whether higher education is adequately meeting these demands. And even as these demands grow, public dollars for higher education are shrinking.

Public officials are focused on this issue, and they are ready to weigh the options. The State Board of Higher Education and the Chancellor have begun a system review. The Governor is open to recommendations. The Senate and House education committees are conducting interim hearings on higher education, and they expect to set an agenda for this issue in the coming session of the Legislature.

Business has a long-term interest in the broader purposes of higher education. These include shaping within individuals an understanding of human experience, a shared sense of community, constructive values, intellectual curiosity, critical thinking skills, and the ability to communicate and work with other people. While these are the attributes of well-rounded individuals, they are also the hallmarks of employees who make businesses more competitive and successful.

A Business Perspective

Oregon's business community has a vital stake in this issue both directly and indirectly. At the most direct level, business relies on higher education as a source of skilled employees. Business needs continuing education services in order to stay competitive. Business depends on higher education as part of Oregon's quality of life — as a factor that attracts and retains talented individuals. Less directly but more fundamentally, business has a long-term interest in the broader purposes of higher education. These include shaping within individuals an understanding of human experience, a shared sense of community, constructive values, intellectual curiosity, critical thinking skills, and the ability to communicate and work with other people. While these are the attributes of well-rounded individuals, they are also the hallmarks of employees who make businesses

more competitive and successful. In this respect, the business perspective on higher education is not narrow or exclusive. What business wants from higher education for its workers are the same things that individuals want from higher education for themselves, their families, and their communities.

Because so much is at stake, the business community has come together and begun its own review of higher education. This effort was initiated in 1995 when Associated Oregon Industries, the Oregon Business Council, and the Portland Metropolitan Chamber of Commerce agreed to work together to develop a unified position on Oregon higher education. Since then, the Oregon chapter of the American Electronics Association, the Software Association of Oregon, and the Oregon Metals Industry Council have joined the undertaking. All of these groups are expected to endorse this report and commend it to Oregon policy makers before the end of this month.

Because so much is at stake, the business community has come together to develop a unified position on Oregon higher education.

Among its own member companies and among members of the American Electronics Association the Oregon Business Council has conducted extensive focus group surveys of work force skill needs and other requirements of higher education. Associated Oregon Industries has formed a task force to study the issue. Survey data has also been examined from a series of focus groups at large commissioned by the Oregon State System of Higher Education. This report contains the findings and recommendations that grow from business community research and deliberations. It is important to note that the recommendations in this report focus on *what* the business community requires of higher education but these recommendations are not prescriptive. They do not suggest *how* higher education should accomplish those objectives.

Business hopes this report will prompt Oregon's policy makers to look at higher education from the perspective of the marketplace. Hard questions need to be asked. Who are the customers? How do changing demographics influence higher education needs? What are the new demands created by an information-based economy? How appropriate are programs, quality, cost, and access? Who should pay? And finally, do the institutions in question need fine tuning or fundamental overhaul? The answers will be important in shaping Oregon's future.

Report Summary

Higher Education Must Become Customer Driven

In today's intensely competitive economy, Oregon's business community depends more than ever on a capable, well-educated work force. Individuals preparing to enter that work force and workers already in it need higher, more relevant technical knowledge and intellectual skills than ever before.

Yet just when Oregon needs its higher education systems to meet these competitive requirements, those systems are, with isolated exceptions, insufficiently responsive. Too many students have little assurance that what they learn in school will enable them to secure a good job or perform effectively once employed. Too many employers have no confidence that a degree represents the skills, knowledge, and work habits they expect from each employee in order to remain competitive. Lifelong learning and continuing education are growing in importance yet higher education is meeting only a small share of the demand. In the courses they do offer to working adults, schools are often inflexible about when and where those courses are held.

Just when Oregon needs its higher education systems to meet the requirements of a competitive economy, those systems are, with isolated exceptions, insufficiently responsive.

Oregon's publicly funded colleges and universities are perceived to be more out of touch with their markets than community and private colleges, but the two-year and private institutions are also failing to meet important needs. The result is a damaging accretion of missed opportunities. Increasing numbers of degreed students are taking low-level entry jobs. Many employers are avoiding new graduates to hire people with experience, or they are recruiting out-of-state talent they can't find in Oregon. Companies that can't get what they need in continuing education are developing in-house programs or hiring private, proprietary trainers. Through distance learning, some companies and employees are bypassing Oregon schools to get what they need at colleges and universities out of state.

From a positive perspective, these problems represent great opportunity for higher education in Oregon. The business community believes that higher education, in order to grasp these opportunities, must meet these requirements:

- First and foremost, become thoroughly customer driven — in both philosophy and organizational behavior. Stay closer to customers, listen and respond to what they want, anticipate and propose services, continuously evaluate and improve service delivery, and build and maintain long-term relationships.
- Adopt quality standards so that employers and graduates themselves have assurance that a degree represents a high, competitive level of knowledge and skills.

- Assure greater access to and utilization of the higher education system by qualified Oregonians.
- Offer more practicum experience to students, and possibly faculty members, too, to make course work more relevant to real work and to give more new graduates the practical experience that employers prefer.
- Expand the availability of customized continuing education.
- Increase the volume of training needed to meet the large and growing demand for technicians in a variety of Oregon industries.
- Make programmatic improvements to accommodate the particular work force needs of Oregon's high technology industry, as well as other industries.

Meeting these requirements will call for changes in mind set, operation, and curriculum content in higher education. It may require changes in institutional structure.

The business community itself has gone through wrenching changes in recent years as competition has increased and as markets have contracted, shifted, or exploded. It understands the ordeal of reassessment, adjustment, and restructuring. It does not underestimate what it is asking of higher education. Business wants higher education to succeed in serving its markets, and, in fact, depends on that success. Business is ready and willing to help.

Findings

Higher Education in Oregon Isn't Keeping Up With State Needs

In the winter and spring of 1996, Oregon Business Council staff and consultants conducted focus group sessions with human resource personnel and line managers in more than 30 diverse Oregon businesses representing both large and small employers (see Appendix A). These groups were asked to describe the nature of their business, the competitive environment, the importance and nature of their work force, and how they are doing in meeting their work force needs. The groups were asked about the role played by Oregon's K-12 and higher education systems in meeting their human resource requirements and how these systems might better address their competitive needs.

In a number of instances managers said they look to Oregon institutions as a source of new employees and they praised the particular preparatory and continuing education programs offered by particular Oregon schools. But this was not the predominant view. Virtually none were willing to chance hiring a new high school graduate, and most would not chance hiring a community college or four-year graduate without work experience.

Time and again, managers described degreed job candidates with fundamental deficiencies in basic skills (particularly writing and oral communication), social skills, and work ethic. They described graduates with outdated or unrealistic knowledge in the specialties for which they were recently trained.

Time and again, managers described degreed job candidates (both those they hired and didn't hire) with fundamental deficiencies in basic skills (particularly writing and oral communication), social skills, and work ethic. They described graduates with outdated or unrealistic knowledge in the specialties for which they were recently trained. They described continuing education upgrade or degree programs that are out of touch with fields of knowledge or unwilling to accommodate the schedules of working adults. The more knowledge intensive the business, the more critical were these managers of higher education. Community and private colleges were more frequently cited for their responsiveness to market needs, but they, too, are perceived to be out of touch. For example, the economy is developing thousands of openings for technicians who could be trained by community colleges. Businesses that need these technicians say the schools are not on top of this opportunity.

Even as it was conducting these focus groups, OBC was aware that some institutions, for example, Portland State University and the Oregon Graduate Institute, have recently adopted more customer-oriented practices. Unfortunately, these practices have not been in place long enough or at a scale sufficiently large to create the kind of broad market awareness that would influence the overall tone of focus group comments. With important exceptions, focus group participants generally perceive a higher education system in Oregon that is not sufficiently in tune with their needs.

This is what the focus groups reveal:

1. The business environment is intensely competitive and is becoming more competitive all the time. This theme was expressed in one way or another in virtually all of the focus group sessions. Participants often referred to competing for market share, but many mentioned they are competing to maintain margins, contain costs, or recruit and retain skilled workers.

2. The workplace is changing across all business sectors. Because of competitive pressures and changing technologies, the nature of tasks is changing. Companies are asking their people to know more, do more, work together better, pursue quality more than ever before, and become more customer focused.

3. Work force quality is key to competitive success. Time and again, participants used terms such as "critical" to describe the importance of work force quality.

4. Degrees of new graduates have lost value as a job qualification. Focus group participants say new high school graduates lack sufficient skills and work ethic to chance hiring. Many have the same view of new two-year and four-year college graduates. In specialties such as engineering and accounting, some businesses hire new college graduates for professional positions. Most new college graduates must take lower level entry positions. There are, however, some notable exceptions. Several of Oregon's largest employers court and hire top college graduates, especially in engineering, but in other fields as well. While they recruit from Oregon schools, almost all of these employers recruit in other states because schools here do not provide the volume or quality of skilled workers they need. For these employers the marketplace for college graduates is national rather than local or statewide.

5. The labor pool, especially for skilled positions, is tightening. All business sectors in Oregon are having trouble finding qualified applicants in particular categories, especially for professional and technical positions. There are shortages in everything from maintenance and production technicians to physical therapists to software engineers to management information specialists. In some cases, these shortages are already impeding business performance and growth, and employers expect this problem to worsen. For more and more positions, employers are looking outside Oregon to find qualified workers. In some cases they are considering relocation or expansion outside Oregon where skilled labor is more readily available.

6. As demand for skilled workers grows beyond local supply, many employers are willing to consider hiring new graduates, but they would like these graduates to have higher levels of knowledge and some form of work experience. Employers are interested in internships as a way to meet their work force needs. Focus group participants expressed two principal perceptions underlying their reluctance to seek out new Oregon graduates to fill responsible positions. First, students have not had to meet high enough standards in their basic problem solving, writing, and math skills. Second, too many students lack sufficient work ethic and

fundamental social and teamwork skills. Employers say higher education can address many of these deficiencies if it works more closely with business. They say a greater number of students can develop better technical knowledge, performance standards, work habits, and teamwork skills if they have internship experience while still in school. The health field has long used this model in educating medical professionals.

7. Continuing education is important and becoming more important, but four-year colleges are not providing enough of what businesses need in continuing education services. Community colleges get better marks. Employers see continuing education as the key to helping their employees acquire new knowledge and skills necessary to keep up with job requirements, to gain advancement, and to meet the competitive needs of their companies. However, many focus group participants say that Oregon four-year schools are not addressing their needs, in many cases forcing them to rely on in-house training, proprietary vendors, and training offered by industry associations. Community colleges are regarded as more responsive, but even they come in for some criticism. A large number of companies that participated in the focus group research offer tuition reimbursement to their employees, and the employees take advantage of that benefit at local two- and four-year schools.

8. From the business perspective, the most fundamental problem with preparatory and continuing education provided by Oregon's higher education institutions is a lack of customer focus and adaptability to customer needs. Time and again focus group participants said that higher education either fails to offer specific field-of-study curriculum that business needs, or it offers curriculum that is out of date or ill-fitted to current business needs. With some notable exceptions participants said that schools are out of touch with the business world and have no market outreach capability or orientation. In the case of employees who take continuing education courses or pursue advanced degrees while still working full time, participants frequently complained that schools are inflexible. In particular, they said, the schools are not willing to send faculty members to employee work sites or to offer classes that accommodate the schedules of working students.

9. An improved education and training system is critical to the competitive capability of Oregon businesses. The observations of focus group participants suggest that Oregon employers are eager for improvement in education resources. They believe such improvement would help them strengthen their work force quality and make them more competitive. And they are willing to work with higher education toward these ends, whether that involves employing student interns or better defining their work force skill and education needs.

A Case in Point: Oregon Schools Are Not Keeping Up With the Needs of High Tech Manufacturing

The findings above apply to Oregon businesses in general, but there are specific industries with unique demands for well-educated employees. High technology's view of higher education is offered here as an example because it is Oregon's largest manufacturing employer, it is growing rapidly, and it depends on a well-educated work force. The kind of analysis presented below, from focus group sessions with members of the American Electronics Association, can and should be generated from focus group sessions with other individual sectors.

1. Oregon high tech is booming. Oregon's high technology industry is growing much more rapidly than is the industry nationwide. It is now Oregon's largest manufacturing employer. More than half of the high technology work force in Oregon holds a bachelor's degree or above (more than twice the state average). More than half of the high technology work force is employed in management, professional, and engineering positions.

2. Oregon has attracted a strong pool of electrical engineers and computer scientists, mostly from out-of-state. Oregon companies employ a huge base of electrical engineering, computer science, and software talent, including many individuals doing leading edge work. The vast majority of new hires in companies are experienced employees, not fresh college or university recruits. A few large companies hire employees directly from colleges and train them, but even at these companies most new people do not come directly out of school. Of the new hires from school, a majority of engineers are from out of state. Smaller firms hire from other companies, both in Oregon and outside. While direct data is hard to come by, it is clear that a very large portion of Oregon's high technology talent is educated outside the state.

3. Shortages of qualified professionals, especially in engineering and computer sciences, are constraining operations, growth, and ability to pursue opportunities among a number of businesses. While the shortages are most acute in engineering and computer sciences, the industry also needs qualified professionals in general business fields such as finance, marketing, and sales. Oregon's high tech industry needs more and better professional talent to fuel its growth and address competitive market pressures. Unable to find the capabilities they need in new graduates, especially from Oregon schools, many businesses secure talent by raiding other local companies and recruiting out of state. However, the shortage of talent is growing as the industry grows. Raiding provides only temporary, isolated fixes. As increased housing costs, congestion, and school funding problems diminish Oregon's appeal, out-of-state recruiting is becoming more difficult. Many companies are already feeling the pinch.

4. Technician level skill shortages also present a looming bottleneck to industry competitiveness and growth. Oregon is growing thousands of technician jobs in the semiconductor industry, alone. The capacity to fill those jobs is not yet in place. In addition, many other technician jobs across a variety of companies are going unfilled, stifling growth.

5. Continuing education is critical to the high technology industry. High technology businesses need extensive continuing education services in engineering and related disciplines to keep employees current with industry developments and to help attract employees. While they see some improvements, many participants believe Oregon is far behind other regions such as Silicon Valley. In particular, strong graduate education in computer science and electrical engineering is frequently cited as critical for solidifying Oregon's high technology position, and for expanding its highest value, highest income work. The industry buys most of its continuing education services from proprietary sources. Community colleges and four-year schools supply some services through tuition reimbursement programs. The industry frequently taps out-of-state programs as well, through distance learning and through expensive proprietary seminars or executive programs at nationally recognized universities.

Recommendations

Business Requirements Present Opportunities for Higher Education

While higher education's shortcomings seem clear, so are its opportunities to do a better job, build markets, and become more valuable to Oregonians. The recommendations summarized here suggest a framework for seizing those opportunities. Each recommendation is discussed more fully in the pages that follow.

The recommendations are divided into two broad categories, those that are generalizable across all industrial sectors, and those that are specific to particular industries. To date, we have specific requirements for only one sector, high technology, but we anticipate adding other industry-specific requirements as they emerge.

While all of these requirements represent often-repeated views of focus group participants, we do not claim that they are complete. As education becomes more customer-driven, undoubtedly other critical needs will be identified, and the requirements below will be refined. We *are* certain that aggressive pursuit of these requirements would make an extraordinary difference to Oregon's economy and standard of living over the next decade.

While laying out these business requirements of higher education, we should stress that we are not being prescriptive about how to achieve them. There are a variety of strategies and tools available. The business community is eager to work with Oregon's higher education leaders as they decide which are most appropriate.

Recommendation Summary

General Requirements

1. A customer-driven mode of operation. This is the overriding recommendation of this report. Higher education must have a relentless customer focus. It must stay closer to customers, listen to what they have to say and respond to what they want, anticipate and propose services, continuously evaluate and improve service delivery, and build and maintain long-term relationships.

2. Quality assurance. An undergraduate degree from an institution must assure that the student meets high, definable standards of knowledge and skills.

3. Improved system access and utilization. Oregon should strive to make higher education accessible to all qualified Oregonians regardless of their financial condition or geographic location.

4. Practicum experience. Internship programs are a key way to give students experience that businesses want in hiring new graduates. They also encourage businesses to become aware of the formal education curriculum. Internships and other experiences with businesses provide faculty members a way to stay abreast of applications in their disciplines.

5. Customized continuing education. Continuing education is as vital to business success in Oregon as preparatory education. Oregon institutions have an opportunity to meet a vital market need in supplying customized continuing education in business, management, and engineering.

6. Increased training of technicians. There is a large and growing demand for well-trained technicians in a wide variety of industrial sectors. Oregon institutions have an obligation to meet this demand.

High Technology Sector Requirements

7. Stronger high technology undergraduate education. Oregon needs more and better educated electrical engineering and computer science graduates. Production of such talent by Oregon schools falls short of demand, forcing companies to look out of state for skilled personnel they need.

8. Advanced education in proximity to the high technology industry. Oregon's high technology industry needs a top-ranked electrical engineering and computer science program where the industry has critical mass, in the Portland area.

Full Recommendations

General Requirements

1. The overriding principle: Become customer-driven and adaptable to changing market needs. If higher education is to be relevant and responsive to the Oregon economy and its job aspirants, businesses, and workers, it must do what businesses must do to be successful: stay close to and meet the needs of the market, continuously improve products and services, and build and maintain long-term relationships with customers. Of all the findings from the focus groups, this is by far the most important and far reaching. As Oregon's economy undergoes a profound transformation, companies will need higher education services that constantly adapt to changing needs and that anticipate such needs. Such services simply are not provided today. Community colleges and private four-year colleges receive higher marks for responsiveness than public higher education, but all come in for criticism that they don't reach out to the market, won't take classes to the customer site, don't offer flexible hours, don't understand the business environment, haven't kept up with real-world developments in the courses they do offer, and don't bother to consult or tap as a resource industry figures who are acknowledged experts in their field. Many focus group participants told their companies' stories about the need or struggle to become more customer oriented, and acknowledged how difficult that is to accomplish. While pointing out that there are strengths in Oregon's higher education institutions, participants again and again said that unless higher education comes to the realization that it must be market oriented, none of its efforts to serve job aspirants, businesses, and employees will be successful.

The Chancellor's higher education task force has found that "there are few examples in the Oregon System of Higher Education or in the individual institutions where evaluation is done on overall program quality, responsiveness to needs, and timeliness of offering, both in terms of development as well as when courses are offered." Until measures are established — and

programs respond to the data — it is difficult to imagine how any other recommendations concerning higher education can be successfully designed or implemented.

How we will measure progress

Benchmarks	Now	Future
Percentage of schools and programs that have identified customers and their needs and that have measures of customer satisfaction in place	[data not available]	All public institutions; hopefully, many private as well
Percentage of students who are satisfied with their higher education experience during schooling and 1, 5, and 10 years after graduation	[data not available]	High percentage satisfied
Employers, by major employer category, who express satisfaction with quality of graduates from Oregon schools	[data not available]	High percentage satisfied

2. Assure that all graduates meet high, definable standards of knowledge and skills. Focus group participants repeatedly expressed concerns about the knowledge and capabilities of graduates. Employers say they want people who are hard working and dependable, who write and speak well, who are skilled in math and problem solving, who are creative and flexible, eager to learn, and able to work in teams. At the same time, they say too many graduates do not have these capabilities. As a result, while some employers seek very talented or specialized new graduates to hire for responsible entry positions, most prefer experienced candidates. Many employers report placing college graduates in low-wage entry jobs and promoting them only after they prove themselves.

Oregon has embarked on a far-reaching effort to establish certificates of mastery for high school students and competency-based entry standards for higher education. This effort is designed to move K-12 education to a standards-based system where students must demonstrate specific knowledge and proficiencies. This framework needs to be extended into higher education so employers have greater assurance that a college graduate applying for a job with them is likely to meet high standards for field-specific knowledge and high standards of proficiency in research, reasoning, problem solving, math, writing, oral communication, and teamwork. This implies that students will have been exposed to if not encouraged to adopt certain values associated with higher learning: an interest in human experience, intellectual curiosity, critical thinking skills, a respect for traditions and methods of scholarship, and a willingness to pursue knowledge for its own sake. This would make it far easier for graduates to find promising work early in their careers (especially if these standards are tied to internships: see below).

The state system is working on the Oregon Assessment System to measure progress at midpoint and at graduation. This fledgling effort needs to be accelerated, possibly in partnership with community and private colleges.

How we will measure progress
The assessment system, conceptually, would be structured something like this:

Assessment	Approximate Grade Level	Possible Skills Assessed
Certificate of Initial Mastery	10th Grade	Fundamental academic skills
Certificate of Advanced Mastery	12th Grade	Advanced academic skills Workplace readiness skills
Proficiency-based admission standards	12th Grade	Advanced academic skills for higher education
Higher education graduation standards	16th Grade	Highly advanced academic knowledge and high-level skills in critical thinking, analysis, and synthesis

3. Improve access to and utilization of Oregon institutions. Oregon should strive to provide access to higher education to all qualified Oregonians regardless of their financial condition and geographic location.

Every qualified Oregonian should be able to attend college. Those who meet the high academic standards necessary to participate in college deserve the opportunity, and they will contribute much to the state. As workplaces demand higher levels of skills and knowledge, we cannot afford to leave behind those with the qualifications and desire to pursue higher levels of education. By better educating Oregonians to connect with well paying jobs, we improve the standard of living for people already here and reduce the pressure of in-migration caused in part when employers are forced tor recruit talent from out of state.

Improving access to higher education does not necessarily suggest that Oregon needs more people to attend four-year schools, however. When stronger academic standards are in place for high school as well as college, many individuals may find they can be successful without a college degree. Indeed, because most employers place no value on a high school diploma and many have devalued the college degree as well, many college graduates today are filling openings that historically would not have required a college education. If high standards are set for each level of education, degrees will gain in value and enable Oregonians to achieve better jobs sooner. In this context, Oregon may not need more college degree holders. Whether it does or not will become clearer when the system of standards is in place.

There is good reason to expect growth in demand for higher education. As the children of the baby boom generation reach adulthood, there will be growth in the college age cohort. At the same time, more adult learners can be expected to seek additional education. This will require a careful review of higher education delivery systems with an eye toward reducing costs and increasing utilization. For example, initiatives to grant degrees in three years (tied to strong academic standards), and efforts to improve degree requirement uniformity and degree transfer should be explored. We also will need to look carefully at education technology.

Higher education in Oregon must also be accessible in all parts of the state. In rural communities, access to associate, bachelors and graduate degree programs can greatly

enhance community and business development by attracting businesses and upgrading skills of employees. Already, Oregon is making progress in distance learning technology. Oregon should continue to build these kinds of delivery systems statewide.

How we will measure progress

Benchmarks	Now	Future
Percentage of qualified applicants who can afford to attend college	[not available; affordability needs to be defined]	100%
Average cost/student of an associate degree in Oregon	[not available; measure to be determined]	
Average cost/student of a four-year degree in Oregon	[not available; measure to be determined]	
Percentage of Oregonians with access to associate, bachelor's, and graduate degree programs within a 30-minute commute from home	[not available]	

4. Provide practicum experience to both students and faculty members. Employers by and large are very reluctant to hire graduates right out of school, because of the perceived costs of training new graduates to be productive. Lack of experience (in both specific job requirements and workplace skills) is often cited as the obstacle. While recognizing the importance of a good grounding in fundamental academic skills, many believe that students would benefit greatly from career exploration and internships, and that such experience would make them much more employable. High technology employers frequently praised OSU's MECOP program (an internship program for academically talented engineers) as an exemplary model that leads to direct job offers. In nearly all sectors, the need for better connections to school was highlighted as a critical component for linking higher education with employment, and many employers expressed strong willingness to step up participation in such programs. A number of employers believe that faculty members, too, would be better able to stay abreast of specialty fields and business in general if they participated in business internships, worked part time or occasionally in industry, or consulted or volunteered with businesses.

How will we measure progress

Benchmarks	Now	Future
Number of job shadows and career explorations per higher education student	[data not available, but apparently small]	four or more
Percentage of higher education students with formal career-related internships	[data not available, but apparently small]	high
Number of job shadows/employee among Oregon employers	[data not available, but very small]	high
Number of student internships/employee among Oregon employers	[data not available, but very small]	high
Number of faculty involvements with employers to stay current on market needs	[measures to be developed]	high

5. A larger menu of customized continuing education. As companies transform their workplaces to meet customer needs, demand for continuing education is burgeoning. Many companies realize that continuing education for employees is essential to their success, and many are rethinking their continuing education policies. While most companies encourage and support employees pursuing degrees, employers are becoming more interested in shorter instructional programs designed to certify employees in specific job skill requirements. This kind of continuing education, characterized as "just in time, just enough," breaks learning into smaller, more manageable instruction that is directly tied to job requirements and that suits rapidly evolving technology and workplace practices.

Continuing education includes undergraduate and graduate degree programs; training in workplace practices that meet legal requirements; upgrading specific knowledge and skills among managers, engineers, and scientists; and training to accommodate such corporate initiatives as continuous quality improvement. The providers are equally numerous, with proprietary, out-of-state university, and in-state private and public schools vying for customers. While there is considerable competition, many needs remain unmet, and opportunities abound for nimble providers.

Oregon companies and their employees need access to education and training services that keep abreast of evolving knowledge, that offer different delivery mechanisms, and that conform to schedules, locations, and formats that suit their needs. Oregon may also need learning 'brokers' to help companies and employees navigate through a rich menu of offerings. It is unlikely that any one institution can or should dominate this market.

How we will measure progress

Benchmarks	Now	Future
Employer and employee satisfaction with access to continuing education by key industry segments and geography	[not available; measures need to be defined]	Satisfied
Employee satisfaction with continuing education and training services by segment and geography	[not available; measures need to be defined]	Satisfied

6. Technician training to meet growing demand. The Oregon economy is creating a huge number of family wage jobs that require a good fundamental education plus specialized technical skills. The semiconductor industry alone is expected to create 8,000 jobs over the next few years, primarily in the technician and operator classifications. The metals industry expects to fill another 6,500. Beyond these large aggregations of jobs, there are many other examples of shortages in sectors ranging from computer technicians (we found shortages in nearly every company) to mechanics (we found shortages from Pendleton to Beaverton). The community college system is the primary source of technician training in Oregon and generally gets good marks. Yet the technician shortage remains acute, and much more effort will be needed to increase the output of graduates and to continuously improve curriculum to meet employer and student needs.

Unless we act fast, a large number of Oregon family-wage jobs will go to out-of-state people, and ultimately the growth of high-wage positions in Oregon will stall.

How we will measure progress

Benchmarks	Now	Future
Percentage of technical positions filled by in-state recruits	[data not available, but apparently low in some categories]	High
Number of key industry sectors reporting growth impeded by lack of technical workers	[data not available, but apparently high in some industries]	Low
Employer rating of quality and responsiveness of technical education and training	[data not available but apparently mixed]	High
Student satisfaction with training program one year after completion	[data not available]	High

High Technology Requirements

7. Stronger high technology undergraduate education. According to the Oregon Employment Department, the job demand in Oregon for computer scientists and electrical engineers will grow rapidly in the coming decades. Yet, relatively few higher education students are exploring these career fields. (In 1993-94, OSSHE reports, state schools awarded 159 undergraduate degrees in computer/information science and 103 degrees in electrical engineering.)

The undergraduate programs Oregon does have are small and ranked far below what one would expect with the size of the state's high technology industry. Oregon schools produce few of the total industry professionals here. The industry imports most of the talent it needs to make up for local shortages.

Some analysts question whether Oregon can continue to meet its work force needs primarily by importing skilled employees. This demand-supply mismatch threatens our ability to sustain and grow at least the highest-wage part of the high-tech work force.

How we will measure progress

Benchmarks	Now	Future
Ratio of graduates from Oregon institutions to engineering and computer sciences jobs created in Oregon	Much less than one	One or above
Employer satisfaction with engineers and computer scientists from Oregon schools	[data not available]	Satisfied
Engineering and computer science student satisfaction with programs during school and 1, 5, and 10 years after graduation	[data not available]	Satisfied

8. Advanced education in proximity to the high technology industry. The high technology industry continues to argue for a first-rate computer science and electrical engineering advanced degree program in the Portland area. Such a program would serve at least three critical purposes. First, it would provide continuing education for existing employees, both degree and non-degree. Second, it would serve as a magnet for attracting out-of-state talent here to help fuel the industry's continued growth and competitive strength. Third, it would provide from Oregon's existing population a larger supply of talent, connected with internships to make new graduates readily employable.

To serve all three of these functions, such a program would need to be highly ranked and in the Portland metropolitan area.

How we will measure progress

Benchmarks	Now	Future
Ranking of Oregon's schools of electrical engineering in the Portland area	[ranking system needs to be chosen]	Top 10
Number of masters or Ph.D. degree electrical engineers and computer scientists graduating in the Portland area	[data needs to be gathered, but apparently few]	Many more

Potential Steps Ahead

Ideas for Change

The first step in developing higher education policy for Oregon is to define what we need in the way of services. This section suggests the kind of discussion we envision *after* we reach accord on needs. What we present here are ideas, not prescriptions. Many of these ideas were developed by the Associated Oregon Industries task force on higher education. We expect other ideas to emerge as the discussion evolves on how to meet Oregon's higher education needs.

Access

To achieve wider geographic and individual access to higher education in a time of scarce public resources, Oregon will need to explore a range of options, including:

- A three-year bachelor's degree for prepared and qualified students
- Increased utilization of distance technology
- More convenient credit transfer from community colleges to four-year schools
- Increased financial aid for academically qualified but financially needy students to increase their access to both public and private institutions
- Increasing opportunities for life experiences (e.g., employment experiences) to be used for credit that applies to degrees.

Quality Assurance in Teaching

Faculty members must stay current in their fields, continue to teach energetically and well, and develop a market perspective through outwardly focused experiences. Faculty members might be required to participate in performance assessments based on measurable criteria. They might be encouraged to do outside work, to consult, or to volunteer within their field of expertise in order to bring fresher, more relevant knowledge to the classroom. The tenure system should be examined as a potential impediment to better teaching performance.

Continuing Education

Traditionally, higher education has treated continuing education as an afterthought. Today, it is a fundamentally important service. Higher education should explore ways that it can more effectively offer four-year, graduate and non-degree services in a wide variety of settings. Impediments may include the financing structure for continuing education, which forces many services to pay their own way, and provides little or no dollars for program development. In addition, policy makers should look at incentives for involving more full-time faculty members in continuing education.

Oregon should also look at alternative means of delivering continuing education. Exploration of a "virtual university" has begun through the Western Governors Association. Under this model, Oregonians could access course work worldwide through electronic classrooms. Through education brokers, Oregonians might identify customized course work to meet specific needs.

Decentralization to the Campus Level

In order to create stronger incentives for customer service, higher education systems should consider decentralizing governance to the campus level, as well as funding based on student choice of campus. In suggesting exploration of this concept, we recognize that it may be in conflict with specialization of individual campus missions (see below). Nonetheless, decentralization should be considered for its potential to reduce overhead and increase incentives for customer-driven education services.

Centers of Excellence

In order to avoid unnecessary duplication, the state should explore creating centers of excellence. Individual colleges would specialize, to avoid costly duplication.

Appendix A

Focus Group Research

Purpose
Determine the kind of education system that would give Oregon businesses a significant competitive advantage.

Sequence of Discussion Topics
- Nature of the business and its competitors
- Keys to the company's competitive success
- The important of work force quality to company success
- Profile of current company work force
- Skill categories hard to fill
- Extent of hiring recent graduates
- Training and continuing education
- Needs from higher education
- Needs from K-12 education
- Vision for Oregon's education and training system and importance of achieving it

Participating Companies
- OBC member companies
- High technology companies in American Electronics Association

Time Period
- Winter and spring, 1996

Focus Group Process
- Two-hour session on-site at each company
- Participation by six to ten company representatives, including at least two line managers, key human resource managers, and a cross section of other managers
- Questionnaire completed in advance by participants and results tabulated for the discussion

Sessions Completed to Date
- 10 high technology companies
- 4 utilities
- 3 health care
- 3 retail sales
- 2 financial services
- 1 forest products
- 5 manufacturing
- 1 professional services
- 1 agribusiness