

University of Massachusetts Boston

ScholarWorks at UMass Boston

New England Resource Center for Higher
Education Publications

New England Resource Center for Higher
Education (NERCHE)

Spring 1994

“Knowledge Utilization” Universities: A Paradigm for Applying Academic Expertise to Social and Environmental Problems

Abraham B. Bernstein
University of Massachusetts Boston

Follow this and additional works at: https://scholarworks.umb.edu/nerche_pubs



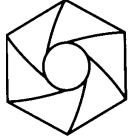
Part of the [Educational Assessment, Evaluation, and Research Commons](#), and the [Higher Education Administration Commons](#)

Recommended Citation

Bernstein, Abraham B., "“Knowledge Utilization” Universities: A Paradigm for Applying Academic Expertise to Social and Environmental Problems" (1994). *New England Resource Center for Higher Education Publications*. 3.

https://scholarworks.umb.edu/nerche_pubs/3

This Occasional Paper is brought to you for free and open access by the New England Resource Center for Higher Education (NERCHE) at ScholarWorks at UMass Boston. It has been accepted for inclusion in New England Resource Center for Higher Education Publications by an authorized administrator of ScholarWorks at UMass Boston. For more information, please contact scholarworks@umb.edu.



New England Resource Center *for* Higher Education

Working Paper # 3

“Knowledge Utilization” Universities: A Paradigm
for Applying Academic Expertise to Social
and Environmental Problems

Abraham B. Bernstein

Spring 1994

**University of Massachusetts Boston
Graduate College of Education
W/2/143-06
Boston, Massachusetts 02125-3393
Phone: (617) 287-7740
Fax: (617) 287-7747**

“Knowledge Utilization” Universities: A Paradigm for Applying Academic Expertise to Social and Environmental Problems

email: nerche@umb.edu

Abstract

Promoting the utilization of knowledge is an important mission for institutions of higher education. The "knowledge utilization" university should stand alongside the research university, the professional school, the liberal arts college, and the community college as one of the five archetypes of higher education institutions.

Environmental problems typify a class of social problems that require the utilization of existing knowledge in a trans-disciplinary manner just as much as they require the creation of new knowledge through research. These problems are characterized by their multiple dimensions-- they have scientific, technical, social, political, economic, and ethical aspects, all of which must be taken into account in an integrated way when seeking solutions. "Knowledge utilization" universities can contribute to solving environmental problems in three ways: by offering interdisciplinary degree programs that address environmental issues; by offering on- and off-campus programs that promote environmental literacy; and by involving their faculties in technical assistance and consulting activities with community organizations.

To accomplish this, these institutions must develop organizational cultures that support the mission of promoting knowledge utilization. Cultures that were developed to encourage research or teaching are not likely to be effective in encouraging the activities that promote knowledge utilization.

Introduction

In commenting on the ways universities are changing to meet the changing needs of society, Ernest Lynton has pointed out that activities that promote the utilization of knowledge are as essential, as challenging, and as appropriate to academic institutions as activities promoting the creation of knowledge (Lynton 1991). He noted that while our higher education system has established a superb system for creating new knowledge, we have done a less than adequate job of ensuring that new knowledge is made available and utilized wherever it is needed--- i.e., of getting new knowledge to potential users in appropriately aggregated, integrated, interpreted, and adaptable form. He suggested that urban comprehensive universities, which he called "metropolitan universities," are well suited to this task, and proposed that "just as the defining mission of research universities is to contribute to the creation of knowledge, that of the comprehensive institutions . . . or metropolitan universities, is to enhance the utilization of knowledge" (Lynton 1993).

Building on these ideas this paper proposes a new generic model for colleges and universities that can stand along with the research university, the professional school, the liberal arts college, and the community college as one of five "archetypes" of higher education institutions. This new model--the "knowledge utilization" university--was suggested by Lynton's "metropolitan universities," but is not restricted to urban and suburban institutions. It is also applicable to small rural colleges and universities, both public and private, that are attuned to the needs of their regions, and to large, multi-purpose universities whose missions embrace the functions of knowledge creation, knowledge transmission, and knowledge utilization.

This paper describes the characteristics of a "knowledge utilization" university. It then illustrates the role that such universities can play in helping their communities address a broad array of social and environmental issues. Finally, it identifies some of the organizational challenges that these universities must address if they are to take their place as one of the fundamental types of higher education institution.

Institutional Archetypes in American Higher Education

For many years there were three archetypal models for colleges and universities-- the research university, the professional school, and the liberal arts college. Research universities were typically large institutions in which conducting original research was valued and rewarded more than anything else. Faculty were drawn to careers in these institutions because of the opportunity to do research of their own choosing. They were required to have doctoral degrees in research fields. They spent relatively little time teaching undergraduates, but devoted the majority of their efforts to research and to teaching graduate students who were themselves

preparing for careers as researchers. These universities were the most prestigious of higher education institutions and paid the highest salaries.

Professional schools prepared students for careers in such fields as business, law, medicine, engineering, teaching, theology, the fine arts, music, design, and architecture. They offered practitioner-oriented education and training with a strong focus on practical experience in the clinic or the studio. They made extensive use of part-time faculty who were primarily practitioners in their fields. Their focus was on depth rather than breadth. People chose to teach in these institutions out of a sense of calling or to complement their professional practices by spending time with students who could be thought of as apprentices. The academic requirements of the faculty varied from field to field; the most common trait was dedication to a particular field of practice. The prestige and pay varied too, from field to field. It was highest in fields whose practitioners had high incomes, such as business and engineering, and relatively low in fields like teaching and the arts.

Liberal arts colleges were typically small institutions that were primarily devoted to teaching undergraduates, with a major emphasis on the arts and sciences rather than on career preparation. People sought faculty careers at these institutions because they wanted to teach young people and to work in a scholarly, academic environment. Faculty were required to have doctoral degrees in the arts and sciences. They spent the majority of their time teaching, with the remainder devoted to scholarly activities such as conducting research and writing books and articles that synthesized the results of research performed by others. While faculty at liberal arts colleges were expected to be active scholars, these institutions did not have the library holdings or the laboratory facilities to support the kinds of scholarship that research universities could undertake. The more selective liberal arts colleges were quite prestigious and paid their faculty well, but they were not usually as prestigious and did not usually pay as well as research universities.

In recent years a fourth archetype emerged--the community college. This is typically a medium-sized institution that (i) provides the first two years of undergraduate education for students who will later transfer to four-year institutions to complete their bachelor's degrees; (ii) provides two-year vocational and technical programs leading to associate's degrees for students who will not go on to pursue bachelor's degrees; and (iii) provides a variety of community outreach programs. Community colleges are primarily teaching institutions in which the teaching must often be geared to students whose academic skills are limited. They do not require their faculty to have doctoral degrees. Faculty have heavy teaching loads and are neither expected nor given the time or resources to engage in research or other scholarly activities. People seek faculty careers in these institutions because they want to take on the challenge of teaching students who have not had much opportunity to develop their academic skills and who would not otherwise have access to higher education, and also because they themselves want to go into teaching without having to acquire a doctor's degree. These institutions are less prestigious than research universities and selective liberal arts colleges and their

salary levels are typically lower, although not as low as salaries at some of the less prestigious universities and the less selective liberal arts colleges .

However, there are many higher education institutions that do not fit any of these models. There are at least three well recognized types. First, there are private two year colleges, many of them very small, that specialize in career preparation or in preparing students for transfer to a four-year college, but that limit their offerings to a much smaller number of fields than the typical community college. Second, there are many small colleges that are primarily teaching institutions but that are not true liberal arts colleges because a substantial portion of their offerings are in professional or occupational disciplines such as business, nursing, and education rather than in the traditional arts and sciences. Some of these institutions offer graduate programs as well, with an emphasis on terminal, practitioner-oriented master's programs rather than on research-oriented doctoral programs. Finally, there are large multi-purpose universities that offer-- under one institutional roof-- the full array of higher education activities. They offer associate degrees; baccalaureate degrees in the arts and sciences and in professions such as engineering, education, forestry, and business; master's degrees in the arts and sciences and in the professions; and doctoral degrees. They also conduct basic and applied research, operate extension services and continuing education programs, and interact extensively with their communities. These institutions, which are typified by large state universities, especially land grant universities and "flagship" state universities, are usually classed as research universities. This can be misleading, as their missions encompass much more than research.

Even though these institutions do not fit any of the archetypes particularly well, they use them-- for want of anything more suitable-- as models in designing their organizational systems. As a consequence, many of them are trying to use organizational models that were developed to support specific kinds of activities-- such as research or liberal arts teaching-- in contexts that emphasize different kinds of activities for which those models are not well suited.

Metropolitan Universities

There is a class of institutions that are neither research universities, liberal arts colleges, two-year colleges, professional schools, or large, multi-purpose universities. These institutions, which are often located in urban areas, offer both liberal arts and professional and occupational programs at both the undergraduate and graduate level. They place more of an emphasis on career preparation than do liberal arts colleges, and their graduate offerings are primarily practitioner-oriented master's degrees, not the research-oriented doctoral degrees that are the central focus of research universities. These institutions were called "comprehensive universities and colleges" in the Carnegie Foundation's 1987 classification; the current Carnegie classification calls them "master's universities and colleges."

Many of these institutions arose and prospered because they were located close to a target population that would not otherwise have had access to higher education. They appealed largely to traditional-aged students who could not afford to live away from home, to traditional-aged students who could only attend college part-time and had to work in order to afford even that, and to older adults who were working and had families. Their primary institutional goals were usually to provide access to higher education and to promote upward socioeconomic mobility (Jencks and Riesman 1968, Finnegan 1991). These institutions were sometimes called "commuter colleges" in recognition of the demographic niche that they filled. Although this designation characterized their student bodies it did not suggest a specific institutional mission such as professional training, preparation for graduate school, or research.

In fact, it has often been unclear what these institutions' educational niche is, what kinds of activities are central to their mission, and what kinds of faculties they should attract and nurture. Because they have had no clear model to emulate, they have taken their organizational models from the ranks of research universities, liberal arts colleges, and professional schools, none of which really suits them. In the words of Ernest Lynton and Sandra Elman, "by believing themselves to be what they are not, these institutions fall short of being what they could be" (Lynton and Elman 1987). There has been a recent attempt to give institutions of this sort, especially those situated in urban areas, a more unique identity as "metropolitan universities," with missions that center in their interaction and partnership with their communities and the application of academic knowledge and skills to community issues (Lynton 1993).

Faculty Culture and Institutional Mission

Regardless of institutional type, what makes a college or university effective is the quality of its faculty and the harmony between its organizational culture and its mission. It is important that there be consistency between what the faculty sees as its primary role and what the institution sees as its primary function. If faculty are given incentives, support, and rewards for activities that are traditional in one kind of institution but that do not contribute to the mission of their particular institution, there will be internal conflict and confusion, low morale, and an unsatisfactory level of quality or accomplishment.

The nature of the faculty is perhaps the most central characteristic of any college or university. All faculty members are expected to be experts in their fields, but this expertise has two dimensions-- one focusing on content and one focusing on process. All professors are expected to be thoroughly grounded in the content of their fields and, through their own continuing education, to remain current in that field as it grows and changes. Their process expertise, however, can take several different forms. It may be expertise in creating new knowledge through research, technological innovation, or artistic creativity. It may be expertise in transmitting knowledge and understanding to others, through teaching, writing, public speaking,

and artistic performance. It may be expertise in utilizing knowledge by applying it to societal problems through applied research, community service, and professional practice. This trio of types of expertise is not new; something very similar to it was described more than twenty-five years ago (Hainer 1968).

To some degree, these three processes-- knowledge creation, knowledge transmission, and knowledge utilization-- take place in all colleges and universities. Some faculty members engage in all three; some in only one or two. A faculty member's primary emphasis may remain the same throughout his or her career or it may change over time. Nevertheless, the value placed on these different kinds of expertise varies from institution to institution, depending on what the institution sees as its primary mission. Consequently, one way to characterize an institution is by the primary process expertise that it values among its faculty. For example, although it may be an oversimplification, it is useful to think of knowledge creation as the expertise that is most valued at research universities and knowledge transmission as the expertise that is most valued at liberal arts colleges.

The third kind of expertise-- knowledge utilization-- is not the primary focus at any one type of institution. Many colleges and universities have embraced the concept of knowledge utilization, usually under the rubric of professional and community service, out of a realization that their faculty's expertise ought to be put to use in the service of society if that can be done without detracting from the primary mission of teaching or research. This has perhaps been most true at public institutions, since legislators like to see direct benefits from the dollars they appropriate to higher education. Knowledge utilization has long been the mission of such activities as the agricultural extension services at land grant universities. But it has not been an activity for which faculty are rewarded or for which incentives are provided, and faculty have typically given it minimal attention. Thus the application of faculty expertise to applied problems has been, so far, a mission without an institutional champion.

Ernest Lynton has proposed linking this mission with the institutions-- primarily urban and suburban comprehensive universities-- that are beginning to be identified as "metropolitan universities" and which, until now, could be thought of as institutions lacking a cause, other than access, to champion. He suggested that just as the role of the research university is to promote the creation of knowledge, the role of the metropolitan university is to promote the utilization of knowledge (Lynton 1991).

If it is to take on this mission, the metropolitan university must organize itself quite differently from the research university. While the research university accomplishes its purpose by turning inward to its faculty expertise, by concentrating on incremental additions to the body of knowledge, and by compartmentalizing knowledge into highly specialized segments, the metropolitan university must accomplish its purpose by turning outward to the community, addressing "messy" real-world problems, and adopting a multidisciplinary or interdisciplinary approach that requires the integration of knowledge from different specialized fields. This

requires a different kind of faculty; a different approach to organization, administration, and funding; and different incentives and rewards than are appropriate in research universities.

"Knowledge Utilization" Universities and Societal Problems

Knowledge utilization should not be solely the province of urban institutions. It is, and should be, engaged in by institutions of many different kinds and sizes in urban, suburban, and rural locales. In some cases it will be the institution's primary mission; in others it will be one of several missions. I will call any college or university that recognizes the promotion of knowledge utilization as one of its major purposes-- and that develops administrative and funding mechanisms, a faculty culture, and organizational procedures to support that mission--a "knowledge utilization" university.

The examples usually given of the ways such institutions can interact with their communities are in education (e.g., working closely with local elementary and secondary schools), business (working with local commercial entities to promote workforce skills and entrepreneurship), and government (working with community agencies to create solutions to local problems). I will suggest another kind of role that "knowledge utilization" universities can play with respect to the environmental concerns that face our society today.

I will focus on environmental concerns because they represent a class of social problems that are more multidimensional than education and business, and involve a more diffuse range of constituencies. Environmental problems have scientific, technical, social, cultural, economic, political, and ethical dimensions. So do problems such as natural disasters, health care, crime, and poverty. Environmental problems are intimately connected with natural resource extraction, energy generation, urbanization, industrialization, food production, and transportation. In a similar way, crime is intimately associated with poverty, health care, education, and substance abuse. Health care is intimately associated with population growth, education, food production, and recreation. And so forth.

Environmental problems occur on all scales and in all locales--local and global, urban and rural. At the local level, they include air and water pollution, waste disposal, transportation of hazardous materials, and cleanup of contaminated sites. In urban areas, they include lead paint in residences, automobile emissions, and provisions for parks and recreation. In rural areas they include misuse of fertilizers and pesticides, loss of wildlife habitat, and soil contamination. Coastal regions are concerned with oil spills, beach erosion, overfishing, and loss of coastal wetlands. Mountainous regions are affected by acid rain and deforestation. On the global scale, there is concern with greenhouse warming, stratospheric ozone depletion, and loss of biodiversity. It is important to work simultaneously on all these scales, as they are interconnected. The same is true of such issues as health, crime, and poverty.

All of these issues require traditional research and teaching as well as an integrative approach to real-world problem solving. The necessary research and teaching can be carried out by other kinds of institutions. But there is a special role that "knowledge utilization" institutions can play in addressing complex real-world problems, and environmental issues illustrate this well.

Addressing Environmental Issues

During the past three decades, since the publication of Rachel Carson's Silent Spring in 1962, environmental issues have become a staple in our scientific, political, and educational agendas. It has become increasingly apparent that we face many environmental problems for which our scientific understanding is incomplete and subject to debate and for which the feasibility and costs of technological solutions are uncertain. Yet it has also become apparent that the consequences of inaction while we wait for better understanding may be disastrous.

Strategies for dealing with these problems must be based on a mix of technical, social, ethical, and international considerations. Regional and global problems-- such as acid rain, stratospheric ozone depletion, greenhouse warming, natural resource depletion, loss of biodiversity, and hazardous waste disposal-- are especially complex. We must understand the science on both a local and a planetary scale. We must deal with cultural, political, economic, and technological differences between nations and between communities within our own nation. We must develop ways of fostering international and domestic cooperation among government, industry, and the public with regard to economic development and environmental protection. Even when dealing with strictly local problems, we must create mechanisms for integrating the results of disciplinary and interdisciplinary research, communicating those results to the scientific and political communities, and promoting the practical application of our knowledge in ways that are economically productive and responsive to social needs.

There are a number of distinct steps we must take to accomplish these tasks. We must conduct research to better understand environmental issues from a scientific, economic, and social viewpoint. We must train technical experts in ecology, air and water chemistry, environmental engineering, and environmental economics to design and carry out procedures for controlling air and water pollution, preventing environmental health hazards, and cleaning up contaminated sites. We must develop an environmentally literate citizenry-- and, in fact, a whole new generation of scientists, engineers, technical analysts, economists, business managers, social activists, and political leaders--who have an understanding of environmental issues and a range of multidisciplinary problem-solving skills. And we must educate a cadre of broadly trained environmental managers to organize activities such as resource extraction, ecosystem protection, water supply, energy generation, and waste disposal-- activities that require the participation of specialists in many different disciplines.

Research institutions have a crucial role to play in improving our knowledge and understanding of environmental systems. But they are not well suited to taking an interdisciplinary, integrative approach to the management of environmental systems that takes into account the full range of technical, political, social, and ethical considerations. Although achieving a basic understanding of the behavior of environmental systems is a research activity rooted in specific disciplines, applying that understanding to the solution of real-world problems must be interdisciplinary and integrative because real problems do not respect disciplinary boundaries.

Sometimes a research university does try to take a broadly integrative, interdisciplinary approach to environmental issues. However, it runs the risk that it will then be perceived as failing to meet the needs of its traditional constituencies. This seems to have happened when the College of Natural Resources of the University of California at Berkeley restructured itself to bring ecological perspectives to bear on agriculture and natural resource issues (Barinaga 1994). By using its resources to look at the "big picture," it failed to meet the needs of those concerned with the day to day issues of agricultural production, which were the rationale for its funding.

Teaching institutions play a major role in giving future environmental professionals their basic education in science, engineering, and economics and in giving all students the education that will help them become environmentally literate citizens. But if their faculties do not include practitioners as well as scholars, and if they are not intimately connected with real-world institutions and real-world problem solving, they may be better suited to educating their students than to helping their communities solve their problems.

Colleges and universities whose missions emphasize knowledge utilization may, however, be able to make substantial contributions in this regard. This is especially likely if their faculty are encouraged to engage in real-world consulting as well as in the more traditional kinds of scholarly activity. Three examples are offered here that illustrate some potential roles for "knowledge utilization" universities: (i) interdisciplinary degree-granting programs that prepare students for careers as environmental managers; (ii) on- and off-campus educational activities whose aim is the development of an environmentally literate citizenry; and (iii) technical assistance and consulting activities in which university faculty work with community groups on environmental issues that require the integration of scientific, social, political, and ethical concerns.

Interdisciplinary Degree Programs in Environmental Management

Colleges and universities have for many years offered undergraduate and graduate degrees in the basic environmental sciences--biology, chemistry, and geology--and in professional and applied fields such as forestry, fisheries, natural resource management, environmental engineering, and environmental planning. As

“Knowledge Utilization” Universities: A Paradigm for Applying Academic Expertise to Social and Environmental Problems

interest in environmental issues among college students has grown, there has been a proliferation of new programs that are more interdisciplinary, usually under names such as environmental science and environmental studies.

In contrast to professional programs such as forestry and environmental engineering, environmental science and environmental studies are "liberal arts" or "arts and sciences" programs. Environmental science is usually a "hard science" program built on biology, chemistry, and geology, with an emphasis on such specialties as ecology, toxicology, and hydrogeology. It concentrates on the scientific aspects of environmental problems rather than on the context in which those problems arise. Environmental studies is usually an "arts and humanities" program centered on a "soft" approach to science and on a historical, social, political, economic, philosophical, and literary approach to environmental issues. It typically emphasizes the policy aspects and the social and historical context of environmental problems, but does not delve into the technical details.

However, the most rapidly growing employment opportunities in the environmental arena are in enforcing compliance with environmental regulations, managing wastes, and cleaning up contaminated sites. These activities involve the application of scientific and engineering knowledge in a context that includes economics, politics, management, and organizational behavior. Academic programs in environmental science and engineering can meet the demand for technical specialists, but they are not designed to produce graduates capable of organizing and managing the activities involved in site remediation, regulatory compliance, and other environmental protection activities.

"Knowledge utilization" universities could meet this need by offering degrees in a new field that might be called "environmental management." It would focus on the use of scientific knowledge to solve environmental problems that have technical, social, economic, and political dimensions. It would be a broadly interdisciplinary, practitioner-oriented degree incorporating concepts and skills from the physical and social sciences, the humanities, and such applied fields as management, policy analysis, communication, and computer science.

An environmental management degree would prepare students to work in such areas as regulatory compliance, environmental cleanup, and resource and ecosystem management. These are the major areas of job growth. They require a solid background in chemistry, biology, and geology with an emphasis on laboratory and field techniques; some mastery of mathematics, statistics, and data processing; computer skills; and a quantitative, technical understanding of economics and engineering.

It could also prepare students for careers in community planning, environmental policy, economic development, and environmental advocacy and activism, although the job market in these areas is not as strong. Jobs in these areas require an understanding of community dynamics and governmental

processes as well as economics, science, and law. Community planning tends to be dominated by economic and demographic, rather than environmental, considerations. Environmental policy is greatly influenced by the work of activist organizations that rely extensively on volunteers and unpaid interns. Policy positions with government agencies and legislative bodies are relatively rare and are likely to require some graduate education in science, policy, or law. Programs that prepare students to enter these fields should emphasize skills applicable to the non-environmental as well as the environmental aspects of community planning and public policy-- especially skills in policy analysis, conflict resolution, and communication skills such as writing, editing, and public speaking.

Environmental managers often find themselves in adversarial situations and in ethical quandaries. Their data may be used in court proceedings and they themselves may be called upon to testify as expert witnesses. They may play roles in the development of new laws and regulations, new business strategies, new political movements, and the development of new technologies. They may be caught up in conflicts among special interest groups representing a multitude of viewpoints. For these reasons, environmental managers need more than technical knowledge and skills. They must be competent in management, strategic planning, and communication and they must understand the social, political, economic, legal, international, and ethical ramifications of their work.

If they are to teach their students these skills, the faculty of an environmental management program should have experience in government, industry, and the non-profit sector as well as in the academic world. They should be encouraged to engage in consulting and other activities that require them to interact with entities outside the university and to develop and maintain their skills in "real-world" problem solving, as well as in more traditional kinds of scholarly activity. This faculty culture clearly meshes with the culture of a "knowledge utilization" university.

Some colleges and universities have already begun to offer programs of this kind. The new program in environmental management at Lake Erie College and the new program in environmental science and policy at the University of Southern Maine are typical examples.

Developing an Environmentally Literate Citizenry

If we are to establish effective public and private policies concerning resource conservation, protection of endangered species and ecosystems, and avoidance of activities that degrade the natural environment and create public health hazards, we will need an environmentally sensitive citizenry, environmentally aware communities, and environmentally literate business and civic leaders.

An environmentally literate person is not necessarily an environmentalist. Many of those who promote levels of resource extraction and pollution that environmentalists consider dangerous are quite environmentally literate. It is important to distinguish between informed differences of opinion that are rooted in

“Knowledge Utilization” Universities: A Paradigm for Applying Academic Expertise to Social and Environmental Problems

environmental literacy and blind, uninformed disregard of environmental considerations. In a democracy, what is important is that people be informed and that they think rationally and analytically about environmental issues-- not what conclusions they reach. In our pluralistic society people will always reach different conclusions, but if their thinking is based on knowledge rather than ignorance, society as a whole can accommodate these differences and achieve a balance among various points of view.

“Knowledge utilization” universities can contribute to the development of an environmentally literate citizenry in two ways. One way is internal. “Knowledge utilization” universities can give all their students-- not only those preparing for careers as environmental professionals-- a substantive, scientifically based understanding of the way we interact with our physical environment and of the means available for solving environmental problems. They can prepare their students to be “educated consumers” of environmental information derived from scientific, technological, social, political, and economic expertise. They can reach out not only to science and engineering students, but also to those non-science students who will become our future political and business leaders, writers, educators, journalists, artists, and ordinary citizens.

The other way is external. “Knowledge utilization” universities can foster awareness, throughout the government and business communities and among the general public, of the complexity of environmental problems, the interconnections among problems and solutions, and the difficulty of making policy decisions concerning newly discovered problems when the facts are uncertain and new research results are continually emerging. They can do this through outreach programs developed in cooperation with local schools, museums, businesses, and citizens' groups and through continuing education, extension programs, and other activities directed externally, toward their communities, rather than internally, toward their students.

Continuing education programs are often designed to be self-supporting. They tend to be “market driven” and to emphasize programs that meet demands from clients who can pay. For example, courses in waste management and regulatory compliance may appeal to local industries that have the resources to pay for their employees' participation. However, it is important not to neglect other sectors of the community, particularly “grass roots” citizens' organizations whose limited financial resources do not permit them to send people to courses at the tuition rates that industry can afford. If the “knowledge utilization” university is to truly serve its community it should offer educational outreach services in an even-handed manner, favoring neither economic development nor citizen activism, but promoting the development of an educated citizenry with equal access to the political and economic mechanisms needed to achieve environmental justice.

For such outreach programs to be effective, the faculty and other experts who participate in them must not be “ivory tower” academics but experts in their

fields who are familiar with and committed to the way real problems are identified and solved in a complex and political society that is convoluted and "messy" in comparison with the relatively rational, more intellectual and orderly world of research. At the same time, they must be committed to the importance of rigorously evaluating new research results and applying solidly based expertise, rather than "gut impulses," to the solution of real problems in a rapidly changing technical, economic, and social context. There is a very different faculty model than the one we are accustomed to seeing in research institutions and in teaching colleges.

Technical Assistance and Consulting Activities

Our communities need mechanisms for political and social decision making that will enable them to do a better job of balancing the competing demands of economic development, environmental preservation, and the protection of human health. They must learn how to promote fairness and equity in distributing the benefits and costs of new technologies and of resource extraction and utilization.

"Knowledge utilization" universities can do much to promote sound environmental decision making. Environmental decisions are made at a variety of levels throughout the private and public sectors. These range from small businesses, "grass roots" citizens' organizations, and local governments to large corporations, legislative bodies, government agencies, major environmental organizations, and international organizations, both governmental and non-governmental. "Knowledge utilization" universities can work with government, industry, and public interest organizations in two ways. First, faculty members with appropriate expertise can help these organizations with specific problems. Second, interdisciplinary faculty teams can work with these organizations to develop mechanisms they can use to incorporate into their decision-making processes information from the scientific community about problems for which our understanding is uncertain and rapidly changing. Similarly, they can work with representatives of the scientific community to develop mechanisms that scientists can use in offering guidance to government, industry, and the public about problems on which there is not yet a consensus and for which the stream of new research results continually produces surprises. And they can work with community groups to develop mechanisms through which the public can have a say in decisions concerning the adoption of new technologies that may pose a risk to health or to the environment.

For example, mechanisms are used in Europe that enable ordinary people to play a role in decisions about the introduction of new technologies that may have adverse environmental impacts (Sclove 1994). In Denmark, for example, citizens operate in a sort of "grand jury" format to hear proposals, question experts, and make recommendations concerning the adoption of new technologies. These are supported by a network of university-based "science shops" that respond to the concerns of citizens, trade unions, and community organizations. These "science shops" are operated by a combination of paid staff, student interns, and faculty

volunteers. They have helped factory workers assess the consequences of new production technologies and they have helped citizens' organizations trace sources of industrial pollution. Such community-based inputs into decision making broadens and decentralizes the process and provides additional sources of insight and creativity from those whose lives are most directly influenced by the adoption of new technologies. "Knowledge utilization" universities can experiment with approaches like these in meeting the needs of their communities.

Environmental degradation is not always a result of new technologies that turn out to have unanticipated effects. It also occurs as a result of greed, corruption, institutionalized bullying, and activities that take advantage of those who have little political power to resist. In 1992, the Highlander Research and Education Center published a report documenting many cases of environmental degradation within the United States (Highlander Research and Education Center undated, circa 1992). The cases described in that report do not focus on problems such as stratospheric ozone depletion, global warming, loss of biodiversity, species extinctions, and maintenance of wilderness areas, but on situations in which the health and livelihoods of individual people have been placed in jeopardy by actions such as improper waste disposal, strip mining, groundwater contamination, and inappropriate use of pesticides.

The cases in the Highlander report come from all regions of our country, from urban areas and rural areas, from places that are economically prosperous and from places that are economically depressed. However, most of the communities that suffer this kind of environmental degradation are poor, undereducated, politically powerless, heavily populated by racial and ethnic minorities, unable to afford expensive technical and legal counsel, and economically dependent on a single industry-- modern versions of the old "company towns." In these communities, environmental issues are not dealt with in a "civilized" manner through impartial public hearings, legislation, court proceedings, and site remediation, but through the use of terrorist tactics of harassment and violence. These tactics include intimidating lawsuits, shootings, beatings, firebombing, blackballing, and economic blackmail-- the threat to pull an essential industry out of a town-- against whole communities.

These stories are reminiscent of the conflicts between management and labor unions in the early part of this century and the civil rights struggles of the 1960s. In fact, the Highlander report notes that the individuals and organizations that have mobilized to resist this kind of environmental degradation do not generally think of themselves as "environmentalists." They associate that term with the big environmental organizations such as the Sierra Club, the National Wildlife Federation, the Natural Resources Defense Council, and the Nature Conservancy, which have been shaped and led primarily by affluent, educated, white male Americans and which have dealt primarily with ecological, aesthetic, and recreational issues. Rather, they think of themselves as activists concerned with the

social justice aspects of local environmental issues-- issues that affect individual people in a very cruel and direct way.

"Knowledge utilization" universities can contribute to the design of institutional and community mechanisms that promote fairness and equity in two ways. They can work with business and community organizations to avoid problems before they arise by promoting a collaborative, rather than an adversarial, approach to resolving the joint need for economic viability, environmental protection, and public health. They can also develop educational programs that ensure that their students-- and their communities-- learn about the political, economic, and "social justice" aspects of environmental issues as well as about their scientific, technical, historical, literary, and aesthetic aspects. They must avoid letting a very legitimate concern with global issues and high technology keep them from addressing the plethora of local issues crying for "low-tech" solutions. They must address the broad spectrum of environmental issues, not just the ones that are "in vogue" at the moment or that are the targets of major funding programs.

As universities, their role is not simply to engage in this way in their communities problems, but also to see to it that these activities and their outcomes are documented and assessed and that the results are shared with other universities and other communities. In this way the experience gained in each community can be analyzed and evaluated and can become part of the growing body of knowledge about ways of solving environmental problems.

Knowledge utilization" universities can promote effective communication between scientific and technical experts and government officials, business leaders, and the public in two ways. First, they can promote development of the professional field of environmental communication. This is not the same as environmental education, which focuses on formal programs in schools and also on informal, public education in nature centers, museums, and zoos. Nor is it the same as environmental journalism, which focuses on the mass media-- although it is closely related. Environmental communication involves the development of a pool of broadly educated environmental professionals who can serve as "information brokers" between scientists, technical experts, politicians, the news media, the general public, and special interest groups representing a broad variety of constituencies.

Second, they can provide forums where researchers and practitioners from a variety of organizations and disciplines can interact and exchange views. They can also promote publications and workshops that span constituencies and disciplines. An example of the latter is the book, Environmental Decision Making: A Multidisciplinary Perspective (Cheshire and Carlisle 1991). This book was jointly produced by two interdisciplinary activities at Tufts University the Center for the Study of Decision Making and the Center for Environmental Management. It contains contributions from fifteen individuals representing twelve disciplines that included philosophy, public policy, psychology, geography, engineering, public

health, and regional planning. It differs from most anthologies in that the contributing authors met in an informal seminar, over a period of a year, to design the book, and each chapter was reviewed and discussed by the group as a whole.

Contributions of this sort are of great value. They are not easy to achieve, but they are worth attempting because of their potential importance in developing the resources we need if we are to successfully address the environmental challenges that face us and that will continue to face us during the coming decades.

Meeting the Organizational Challenge

"Knowledge utilization" universities must frame their missions in ways that reflect the interdisciplinary and applied nature of their goals. They must find ways to transcend traditional discipline-centered scholarship in favor of an integrated approach to sociotechnological problems. But interdisciplinary activities are the exception, rather than the norm, in the academic world. Therefore, "knowledge utilization" universities must find ways to overcome the barriers to interdisciplinary activity that now exist in many universities and funding agencies. These barriers include (i) the absence of clear career rewards for interdisciplinary work; (ii) the prevalence of discipline-centered funding mechanisms for research and other scholarly activities; and (iii) the absence of a well-defined network of professional organizations to promote interactions among all the disciplines that have roles to play in solving environmental problems.

If "knowledge utilization" universities are to accomplish this, it is important that they encourage, support, and reward their faculties for engaging in the kind of interdisciplinary "networking" activities described above. They must develop institutional mechanisms for administering and funding these activities that differ from those which encourage research and teaching. There are a variety of ways to accomplish this. Some institutions that include knowledge utilization among their missions have established environmental outreach centers. These centers operate under a variety of names but with similar functions. Examples include the Center for Environmental Education and Training at the University of Kansas, the Olympic Natural Resources Center at the University of Washington, the Center for Energy and Environmental Education at the University of Northern Iowa, the Wolfe's Neck Program on Environment and Society at the University of Southern Maine, and the Center for Environmental Management at Tufts University. Centers like these provide an opportunity for university faculty to interact with members of the general public as well as with special interest groups and constituencies drawn from the business, education, and civic communities. They thus provide a vehicle for using the expertise of the faculty to contribute to these broader social goals.

Faculty culture is as important as organization. The faculty of "knowledge utilization" universities must have temperaments that are more suited to "messy" problem solving in the real world than to either the theorizing and hypothesis testing of the research university or the traditional "ivory tower" intellectualism of the liberal arts college. Temperament and motivation are not enough. Faculty must be

encouraged, supported, and rewarded for interacting with a variety of academic and non-academic constituencies that are both internal and external to the university. They must have incentives for developing skill in “real world” problem solving, and for applying their expertise to the problems of their communities. It is the presence of an appropriate system of incentives and rewards that will enable “knowledge utilization” universities to attract the kind of faculty members they need, and it is the acquisition of this kind of faculty that will distinguish the structure and culture of the “knowledge utilization” university from those of the research university and the liberal arts college.

It may prove more useful to organize “knowledge utilization” universities in interdisciplinary centers with problematic themes than to follow the traditional path of organization by discipline in departments, schools, and colleges. It may be necessary to create new kinds of faculty appointments that enable faculty members to spend more of their time with off-campus constituencies-- in business, government, and the non-profit sector-- regardless of those organizations' ability to pay for the faculty members' time. For example, there might be three different kinds of units to which a faculty member could be appointed-- a teaching department, a research and application center, and an off-campus unit. Faculty might hold appointments in one, two, or all three of these units, and the mix might change with time.

The faculty of a “knowledge utilization” university must be held to high standards of quality, as in any university. However, traditional evaluative approaches, such as the use of peer review, will not work here-- at least, not in the same way as in the research world. It may be more useful to look for models in professional and clinical fields such as medicine, law, and social work, than in the arts and sciences. It may be necessary to design new kinds of professional development opportunities, and new approaches to sabbaticals and to continuing professional education, that encourage faculty to continually increase their expertise in real-world problem solving. It may even be useful to create a new definition of academic freedom and a new approach to tenure.

For example, academic freedom might extend not only to what is done in the research laboratory and the classroom, but to what is done in the community as well. Tenure decisions might be based not only on what has traditionally been considered to be scholarship-- conducting research that is published in peer-reviewed journals, writing books, teaching, and giving service to one's discipline-- but on off-campus activities such as participating in community outreach efforts and interacting with businesses, schools, government agencies, and non-profit organizations. To accomplish this, the “peers” who provide review will have to be drawn not only from the faculty member's university and discipline, but from outside organizations and other disciplines as well.

These innovations may be reflected in teaching as well. It may prove beneficial to offer more interdisciplinary degrees and to arrange courses according

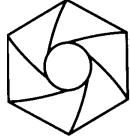
“Knowledge Utilization” Universities: A Paradigm for Applying Academic Expertise to Social and Environmental Problems

to problematic themes rather than traditional academic subjects. Internships and other forms of service learning may play a bigger role than they do now in many teaching programs. Collaborative teaching and learning may become more important, as students learn to do the kind of teamwork that real-world problem solving requires-- from faculty members who are practicing professionals as well as teachers and researchers, and who are themselves engaged in interdisciplinary, collaborative activities. A recent article (Djerassi 1994) points out that "More than half of our . . . students . . . pursue careers in industry" and asks "Could a professor with active participation in the extremely complicated, multidisciplinary approach to practical realization of laboratory discoveries not be a better mentor (than one who is purely an academic)?" In terms of service to society, "Could an academic, serving in some part-time directorial or managerial position in industry, not offer a perspective rare in conventional business?"

Such a major change will not be easy to design or implement, and should not be undertaken hastily or abruptly. A few incremental experiments at a number of institutions may provide the experience we need to design such changes more broadly. Ultimately, a whole new culture of knowledge utilization may emerge. This can give "knowledge utilization" universities as distinctive a character of their own as research universities and liberal arts colleges. Some of the innovations that arise in "knowledge utilization" universities may turn out to be applicable to research institutions and liberal arts colleges as well. It may even be that "knowledge utilization" universities will play a leading role in shaping new approaches to higher education suited to the needs of the twenty-first century.

References

- Barinaga, Marcia. "A Bold New Program at Berkeley Runs Into Trouble," Science, 263, March 11, 1994, 1367-1368.
- Chechile, Richard A. and Susan Carlisle, eds. Environmental Decision Making: A Multidisciplinary Perspective. New York: Van Nostrand Reinhold, 1991.
- Djerassi, Carl. "Basic Research: The Gray Zone," Science, 261, August 20, 1993, 972-973
- Finnegan, Dorothy E. "Opportunity Knocked: The Origins of Contemporary Comprehensive Colleges and Universities," Boston: Working Paper No. 6, New England Resource Center for Higher Education, University of Massachusetts at Boston, 1991.
- Hainer, Raymond M. "Rationalism, Pragmatism, and Existentialism: Perceived but Undiscovered Multicultural Problems." In The Research. Society, edited by E. Glatt and M W. Shelly, New York: Gordon and Breach, 1968, 7-50.
- Highlander Research and Education Center, Environment and Development in the USA A Grassroots Report for UNCED. New Market, Tenn.: Highlander Research and Education Center, undated (circa 1992).
- Jencks, Christopher and David Riesman. The Academic Revolution. New York: Doubleday, 1968.
- Lynton, Ernest A. "The Mission of Metropolitan Universities in the Utilization of Knowledge: A Policy Analysis," Boston: Working Paper No. 8, New England Resource Center for Higher Education, University of Massachusetts at Boston, 1991.
- Lynton, Ernest A. "Metropolitan Universities: Partners With Community and Commerce," The Maine Scholar, 6, Autumn 1993, 93-103.
- Lynton, Ernest A. and Sandra E. Elman. New Priorities for the University. San Francisco: Jossey-Bass, 1987.
- Sclove, Richard E. "Democratizing Technology," The Chronicle of Higher Education, January 12, 1994, B1-B2.



New England Resource Center *for* Higher Education

About The New England Resource Center for Higher Education

The New England Resource Center for Higher Education (NERCHE), founded in 1988, is dedicated to improving colleges and universities as workplaces, communities, and organizations. NERCHE addresses this issue through think tanks, research, consulting, professional development, and publications.