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ABSTRACT
                Issues and problems associated with university
involvement in public sector activities and the knowledge transfer
process are examined. After a brief statement of the state-of-the-art
in knowledge transfer, attention is directed to one of the basic
issues presented in the literature: the appropriateness and
inappropriateness of university involvement in public service. An
opinion favoring a more responsive stance on the part of universities
was interpreted from the literature. The academic community and
nonacademicians have suggested that the university is a source of
knowledge needed for decision-making in various kinds of action
programs. Consideration is given to types of knowledge, since there
are conceptual variations regarding the product(s) that universities
have to offer to the public. Various knowledge transfer models are
compared, and a composite knowledge transfer model that utilizes
concepts from these models is examined. The basic thrust of the
composite model is the concept of university-user partnership as
proposed by Moe (1977). Two basic functions of the model are a
clearinghouse function within the university and a linking function.
Both of the basic functions of the model can be made operational
through a relatively small organizational structure (e.g., the
community services office). To facilitate the operation of this
office, a needs assessment methodology is offered--the Social Mapping
Matrix Assessment (SMMA), which can be used for inventory purposes to
identify on-campus resources, such as institutes, and the types of
services they can provide. A second use is a type of catalog for use
by university sub-units and clients. Steps that would bring this
model to an action stage are briefly considered. (SW)
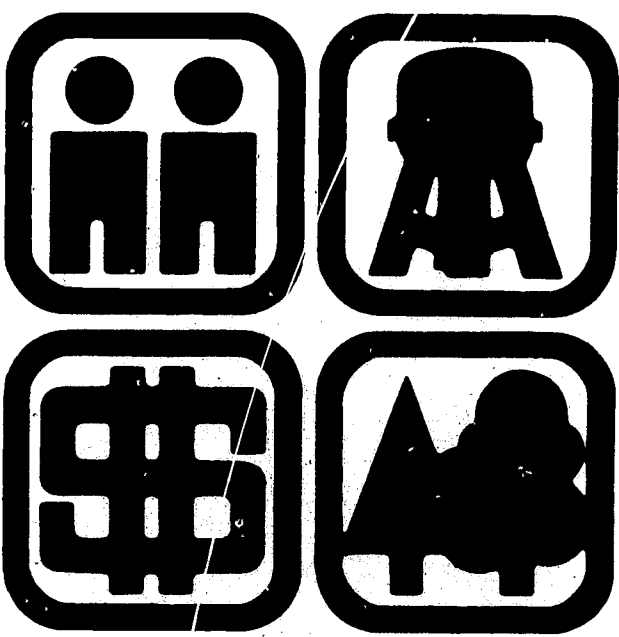
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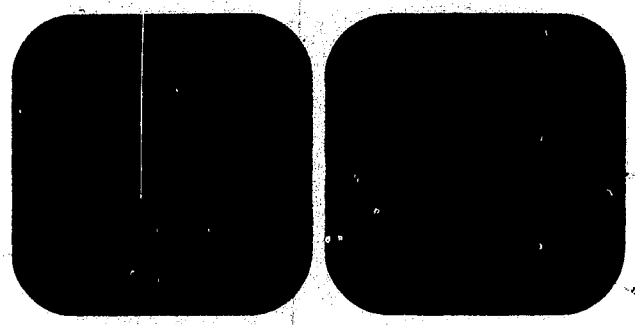
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This publication represents the research time and resources of Dr. Frank M. Howell, Dr. Carlton R. Sollie and their associates working as members of the Southern Rural Development Center Functional Network on Providing Operational Research for Community Decision Makers. Dr. Sollie, a rural sociologist at Mississippi State University, has served as Center Associate for this network since May 15, 1979. The ultimate objective of the network is to provide materials useful to educators, researchers, action agencies and lay citizens' groups in relation to the subject of university participation in public affairs.

This network is only one of many networks established by the SRDC to inventory the current state of knowledge in high-priority areas of rural development. These networks and individual research projects of the Southern Center are designed to provide information and assistance to extension and research staffs throughout the South as they respond to rural development needs in local communities.

As one of four regional rural development centers in the nation, the SRDC focuses specifically on the rural problems of the Southern region and receives funding through the USDA--Extension Service and Cooperative Research.

The Southern Center is jointly sponsored by Mississippi State and Alcorn State University and provides support staff for capacity building and innovative programming for the experiment stations and extension services of 28 land-grant universities in 13 Southern states and Puerto Rico.

William W. Linder
Director
Southern Rural Development Center

UNIVERSITY KNOWLEDGE/TECHNOLOGY TRANSFER AND PUBLIC DECISION-MAKING
REVIEW, SYNTHESIS, AND ALTERNATIVE MODELS

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TABLE OF CONTENTS

FOREWORD

This report is the culmination of an extensive, but not exhaustive,
review of a large and varied body of literature. It is the second of
two reports focusing on a subject that is becoming a matter of growing
interest in academic and other circles. The subject is university parti-
cipation in public affairs, and it is treated in the literature from a
variety of perspectives. Different viewpoints are expressed about the
appropriateness of university involvement in various kinds of public sector
activities, and much has been written about strategies and techniques
for involvement.

Involvement of universities in public service activities is not of
recent origin; land grant universities in particular have a long history
of responding to various needs in the field of agriculture through "mission-
oriented" research and knowledge dissemination through the Cooperative
Extension Service. Growth of interest in public service activities, how-
ever, is occurring in other components of university structure. Stimu-
lating this growth are pressures both internal and external to the university,
pressures in the form of increasing expectations by the public and in
the form of interest of academicians in being more responsive to societal
needs and problems for which their capabilities in research, teaching,
and service are relevant.

The first report in this series is an annotated bibliography, the
product of a Southern Rural Development Center Functional Network, entitled
"University Knowledge/Technology Transfer and Public Decision-Making."
As the title implies, much of what appears in the literature about university
involvement in public service pertains to the transfer of knowledge from

universities to various user publics, including local governments, public and private agencies, organizations and other groups as well as individuals. There seems to be a voracious appetite for knowledge and a very strong interest in the application of scientific knowledge to various types of problems. This interest is expressed by people in and outside of academe, from university presidents to individual farmers with relatively small operations.

The purpose of this report is to provide an overview of issues and problems associated with university involvement in public sector activities and the knowledge transfer process. Chapter 1 begins with a brief statement of the state-of-the-art in knowledge transfer and continues with an identification and discussion of one of the basic issues as it is presented in the literature, i.e., the appropriateness and inappropriateness of university involvement in public service. The subject of Chapter 2 is types of knowledge. The need for examination of this component of the knowledge transfer process is based on the fact that there are conceptual variations regarding the product(s) that universities have to offer to the public. Chapter 3 describes various knowledge transfer models, pointing out similarities, differences, and problems. In Chapter 4 we present a composite knowledge transfer model which utilizes concepts from models described in Chapter 3. Offered in Chapter 5 is the Social Mapping Matrix, developed by the authors using their home university as a base. The Matrix is a tool, adaptable to different models and to different universities. The report concludes with a general summary and some suggested operational steps.

CHAPTER 1

KNOWLEDGE TRANSFER: THE STATE OF THE ART

Introduction

Knowledge transfer as a process can range in complexity from a simple

factual statement made by one person (who knows the fact) to another person

(who does not know it) all the way to the complex system of formal education.

With such a broad range, any literal attempt to describe the state of

the art of knowledge transfer would be a task of gargantuan proportions.

Not only is the range of immense proportions, but knowledge is also of

different types. Machlup (1963: 21-22) uses five broad categories in

his discussion: (1) practical, (2) intellectual, (3) small-talk and pastime,

(4) spiritual, and (5) unwanted. Another classification by Machlup (1962:

17), on the other hand, lists (1) scientific and historical, (2) general-

abstract and particular-concrete, and (3) analytical and empirical. Machlup's

are but two of many classifications. Ruesch (1975) differentiates between

knowledge in action and knowledge in general, while other writers discuss

basic knowledge and applied knowledge.

In addition to the problem of classifying knowledge, methods of trans-

ferring knowledge are many and varied, also ranging in complexity from

a single spoken work to technical manuals prepared for a very limited

and highly trained audience, for instance, space exploration technicians

and theorists, to the widely disseminated versions of Einstein's theory

of relativity.

Much is said to be known about knowledge transfer.[1] The state-of-the-

art of knowledge transfer, however, insofar as it is documented in the

literature, can best be described as mixed. Different writers emphasize

different aspects of the process, and there is no clearly articulated
or widely accepted set of concepts.

Given the scope and complexity of the subject, preparation of a com-
prehensive state-of-the-art report looms as a formidable undertaking.
If certain restrictions are imposed on the undertaking, however, the task
becomes more manageable. That is, adoption of a less comprehensive per-
spective recasts the undertaking into a conceptual framework that allows
for preparation of a more focused report. That is the approach used here;
the perspective is one that restricts attention to a single, but primary,
source of knowledge--institutions of higher learning. The perspective
is further restricted by excluding knowledge transfer as it occurs in
classrooms on campus and by focusing attention on the public service role
of those institutions.

Operating from this restricted perspectives does not result in a
truly comprehensive state-of-the art report, but it does have advantages.
First, it allows a detailed examination of an important part of the knowledge
transfer process in American society. Second, it has the advantage of
timeliness with respect to a growing movement and commitment in higher
education.

Universities and Public Service: For and Against Involvement

Involvement of universities in public service activities of various

kinds is becoming more and more a matter of both interest and action.

The literature is rich with two main types of material pertaining to this

topic. One type is dialectical, dealing with the role of institutions

of higher learning with respect to societal needs and problems - i.e.,

the question of whether these institutions should devote more of their

resources to a public service function. The traditional view of this

role, the so-called "ivory tower," is being subjected to pressures that

are pushing these institutions toward more direct participation in various

kinds of activities of a public service nature. Illustrative of the dialec-

tical material in the literature are views expressed by:

Commager (1965: 79)

> The university is, next to government itself, the chief servant
> of society, the chief instrument of social change. It occupies some-
> thing of a symbolic role of both the church and the state in the
> Old World, but it fills a role which neither church nor state can
> effectively fill; it is the source, the inspiration, the powerhouse,
> and the clearinghouse of new ideas.

Perkins (1966: 7)

> Knowledge acquired must be transmitted, or it dies. Knowledge
> acquired and transmitted must be used, or it becomes sterile and
> inert.

Birenbaum (1969: 71)

> . . . Traditional notions about scholarly detachment, the meaning
> of "objectivity," the necessity for a disconnection between academic
> thought and social action, old ideas about how the human learns,
> the retreat from the streets of the city into the superblock campuses,
> the ways talent may or should be used--all of these and more deserve
> an intensive, fresh look . . . The university can no longer avoid
> the risks of taking positions on the conduct and goals which it has
> chosen to wheel and deal. Indeed it has no choice about this. So
> long as it chooses to wheel and deal in the maintenance and extension
> of its own power, it takes risks--whether it consciously supports
> and approves the status quo or not. The twilight of an older academic
> era cannot be conjured away. The sun has set. No critiques of the

American university can go far in the absence of a confrontation
with the society in which the academic institution is a power partner.

Mayhew (1968: 3)

When an institution is unresponsive to the fundamental demands
and needs of its society, it loses its vitality and becomes irrelevant.

Nash (1973: 143)

There really is no debate about whether institutions of higher
education should be involved in the urban crisis--all the prominent
people who have discussed the subject agree that they should be.

Perkins (1973: 255)

Consultation and public service activities of the university
are now part of the increased interdependence of our institutions
that provides much of the dynamic energy that our intellectual growth
brings to our society. Teachers who are involved in research or
public service are needed to understand, explain, and help manage
an increasingly complex society.

McComas (1980)

There will be greater involvement in public service activities.
Comprehensive universities in general and land-grant universities
in particular will become increasingly involved in community planning,
the improvement of governmental units and planning, energy efforts,
environmental problems, economic development, and continuing education
in a broad range of areas. To his credit, our Governor appears
to have a broader vision of what our universities can contribute
to the state in a variety of public service areas. I hope that
we can make a pronounced contribution to the state and at the same
time develop a new appreciation of an additional support for higher
education.

On the other side of this question the position reflected by the

annual faculty conference of the University of California in 1964 as reported

by Long (1977: 78). The conference went on record as resisting "pressures

to commit its resources to special public service activities." Further,

suggestions were made that some of the existing public service activities

such as agricultural extension and applied research facilities at Los

Alamos and Livermore be separated from the university. Arguments favoring

elimination of public service activities from "the spectrum of university

activities are based on academic and ideological values" (Perkins, 1973:

253). Inability to defend its neutral stance vis-a-vis social structures

and processes while serving some public service is one of the key arguments

against public service. There is, also, some doubt in the minds of anti-

involvement proponents about the benefits of public service, especially

to students and faculty not directly involved in providing the services.

Long (1977: 77) summaries the arguments:

> Now, many people both inside as well as outside the university
> have come to think of it largely as a staging ground for a multi-
> plicity of activities more or less educational: as an _instrument_
> for action rather than as an _institutional organism_ with its own
> integrity.

> At the same time, a number of professors concerned about class-
> room instruction and their own research find that this extension
> of the service idea goes against their grain. Some are simply reluc-
> tant or disinterested in responding to new clientele; others are
> actively hostile to university commitments to action beyond experimental
> research. With so much knowledge, as many needs and problems re-
> quiring knowledge, and so many demand for service, how much is too
> much? How much is too little? What kind of service is appropriate?
> Who should decide—and by what criteria?

> As a result, the current era may be a critical transitional
> period in the long-term evolution of the public service mission of
> American universities. The tension between institutions and their
> sponsors is increasing. Community groups and government leaders,
> on the one hand, hold broad expectations of the role universities
> should play in serving the public, while the universities, on the
> other hand, often have more limited vision of their responsibilities.
> These differences require resolution.

According to Moe (1978), American colleges and universities are caught

in the confluence of two sets of forces, internal and external, both exerting

pressures to become involved. The major internal force is described as

"the basic design of our publicly-supported colleges and universities

with their functions grounded in the function of knowledge itself, i.e.,

acquisition and discovery of knowledge in research, transmission of know-

lege in teaching, and application and utilization of knowledge in public

service-extension" (p. 24).

Important as an external force is the growing notion that institutions
of higher learning should respond to the demands and needs of society
for help in the alleviation or solution of various kinds of problems.
These demands on the resources of colleges and universities, particularly
researchers, are partially seen in requests from various decision-makers
for help in problem definition, development planning, program implementa-
tion, identification and assessment of alternative courses of action,
and in evaluation of programs and projects.

Counteracting these forces are various conditions and circumstances;
some identified by Moe (1978: 24-25) are as follows:

    o lack of a system which effectively links users (of knowledge)
       and researchers, including a clear definition of who the
       users are;

    o mutual suspicion and distrust between researchers and decision
       makers on policy program;

    o researchers designing research projects without direct con-
       tacts with potential users, and frequently with little infor-
       mation on their views of what the problems are;

    o users not aware of what research is available, and not having
       had a voice in the formulation of the problems researched;

    o difficulties researchers face in accepting the fact that
       from a user point of view partial information available at
       the time of action or decision is better than complete in-
       formation after that time;

    o lack of appropriate, periodic research information releases
       and publications for users;

    o failure of researchers and research units in universities
       to follow up significant relationships and exchanges that
       are initiated with users;

    o failure to provide technical and educational assistance to
       users for interpretation of findings and for adapting them
       for research which has not been made a built-in, continuing
       part of the program development and evaluation processes;
       and

    o lack of a broad-based public education program which builds
       public literacy about social policy issues, policy alterna-
       tives, and improvement of programs and services.

Although the issue is not settled, it is apparent that increasing
pressures and expectations are indeed pushing universities toward increased
levels of involvement in public service activities of various kinds.
The basic question is now one of strategy, the manner and style of involve-
ment that would be most effective for any given university whether the
interest of the university is in rural or urban crises, educational services,
community development, energy conservation efforts, environmental problems,
or continuing education.

One suggestion, recommended as a partial and long-range answer to
the question, is the creation of a new discipline, the "science of know-
ledge utilization." Institutionalization of this new science, according
to Havelock (1971: 1-2) will require "organizational bases, university-
linked centers, research and teaching faculties and departments focusing
on the study of utilization." Associated with these requirements would
be the development of a crops of dissemination and utilization consult-
ants and change agents and the creation and maintenance of communication
channels. The time required for this kind of response to the question
argues strongly against it as the only effort by the university to expand
and strengthen its public service mission. Alternative models that can
be more rapidly operationalized must be designed if the university is
to achieve a response-to-needs capability that allows it to become "the
chief servant of society" not only with respect to the production of know-
ledge but also with respect to the transfer of usable knowledge and the
delivery of services to those who need them for various purposes, including
problem-solving and development planning.

A major question facing those universities interested in enhancing
their service role is one of definition, i.e., what activities can be

designated as legitimate parts of the public service role? Durward Long,

Vice President for Academic Affairs at the University of Hawaii and formerly

Vice President for extended academic and public service programs for the

University of California system, has offered the following categories

of public service activities (1977: 82):

- o Dissemination of <u>knowledge</u> beyond the campus.

- o Delivery of instructional <u>programs</u> beyond the campus.

- o Applied <u>research</u> for immediate public problems.

- o Sharing of resources, including facilities and instructional
  and other learning resources and personnel.

- o The development of public policy issues and alternatives.

- o Public participation in cultural, esthetic, and other uni-
  versity activities.

- o Community development and community problem solving.

This list encompasses a broad array of different types of activities,

at least some of which probably can be found at most universities.

The transfer of knowledge as one component of the service role of

universities has been the subject of much research.[2] The literature is

rich with material pertaining to this subject, but little attention has

been given to the question of how a university can organize itself to

expand, facilitate, and enhance its function as a resource system. Havelock

states that "special sub-systems in contemporary society specialize in

the production, certification, and storage of knowledge. . ." (1971:

3-10). These sub-systems usually take the form of university is a bastion

for new ideas, it is also a prison consisting of imbedded norms and values

designed and maintained to protect systematically the purity of "basic"

science. Of course, there are exceptions, and the agricultural-agribusiness-rural life component of land grant institutions is a shining example of these exceptions. It is probably accurate to say that most universities are engaged in the transfer of knowledge and the performance of service roles of various kinds. It probably is equally accurate, however, to say that the optimum utilization of the university as a coherent and effective resource system for society has yet to be realized.

Knowledge, as stated earlier, is of different types. Universities are complexly organized and capable of producing, collating, storing, and transferring knowledge of different types in different ways. Knowledge producing institutions under some pressure and with some commitment to increase contributions to the public sector through knowledge transfer need to be aware of conceptual problems associated with their product: knowledge. The following chapter summarizes some of the material in the literature about types of knowledge.

NOTES

1. Machlup's treatment of knowledge production and distribution in the United States is one of the most comprehensive in the field.

2. Rural sociologists are leaders in the study of diffusion and adoption of new ideas and recommended practices and technologies. See Everett M. Rodgers, <u>Diffusion of Innovations</u>. New York: The Free Press of Glencoe, 1962.

CHAPTER 2

TYPES OF KNOWLEDGE

An overview of the knowledge transfer process as it is described
in the literature reveals some variance in terminology. In their compari-
son of social and organizational change models Sashkin, Morris, and Horst
(1973) identify the product being transferred as information; but little
attention is given to the type of information that, in their terms, "flows"
through various channels to an ultimate user of consumer. In Havelock's
(1971: 8-1) extensive work, the question is asked: "What knowledge?
What range of phenomena deserve the label 'knowledge' or 'scientific know-
ledge' or 'innovation'?" The term adopted by Havelock to define the pro-
duct is message, suggesting an emphasis on communication. Ruesch (1975:
289) writes of knowledge in action as a "living model, located inside
the organism, that enables the individual to plan action and to steer
movements while he carries them out."

When production of knowledge is viewed from the standpoint of those
who produce it, it is possible to identify several different types. Znaniecki
(1940) focused on different roles of "the man of knowledge" and concluded
that many types and forms of knowledge may be produced through specialization
of roles, even within a given field of knowledge production. Included
in his list of roles of "the man of knowledge" are inductive theorists,
discovers of facts, popularizes, historians of knowledge, fighters for
truth, contributors, systematizers, discoverer of truth, sages, techno-
logical experts, and technological leaders. In a somewhat similar view,
Paisely (1969: 15-22; 1968: 3-6) asserted that the types of knowledge
produced differ with respect to the system in which the scientist functions
as a producer of knowledge. Influencing the type of knowledge he produces

are his culture, his political system, legal/economic system, formal information system (libraries, journals), professional membership groups, formal work organization, his reference group(s), work associates, and his own cognitive structure. Not mentioned by Paisley is the role played by the scientist's general values and his normative orientations within his discipline.

Machlup (1962: 15), in one of the most comprehensive works on knowledge production and utilization, states that "classifications are said to make little sense unless it is stated what purpose they are to serve." He then proposes his own classification scheme consisting of five classes or types:

o Practical: knowledge that is useful to man in his work, his decision, and his actions.

o Intellectual knowledge: that which satisfies intellectual curiosity.

o Small-talk and pastime knowledge: That which satisfies nonintellectual curiosity or desire for light entertainment and emotional stimulation.

o Spiritual knowledge: related to religious knowledge of God.

o Unwanted knowledge: outside his interest, usually accidentally acquired, aimlessly retained.

Taking the position that "most information is used as a means to some decision-making," Downs (1957: 215) classified all information as production information, consumption information, or political information, or any combination of these, depending on how it is used.[1] Although he differentiates between contextual knowledge and information,[2] he treats them as one type with reference to decision-making. Rational decisions, according to Downs, can only be made when the decision-maker knows three things: what his goals are, alternative ways available or open to him to

achieve goals, and probable consequences of alternatives.

Classification of research, a knowledge producing process, as either basic or applied is a convention of long-standing and one that is relevant to this report. Writing from the perspective of message content, information flow from one system to another, Havelock (1971: 2-38) offers the following definitions:

o   Basic Research Output

Basic research generates "basic" knowledge in the form of
theories, laws, and classifications which underly the masses
of empirical phenomena of our world. But the basic researchers
do more than provided these general principles: they also give
us the empirical data on which these principles are based and
the methods by which such data are collected.

o   Applied Research and Development Output

Applied research gives us the same types of information,
theories, data, and methods, but in a form which is classified
to correspond to broad areas of human and social need (e.g.,
health, welfare, education). From applied research and develop-
ment we also get prototypes of new products and services, working
models and "inventions", which the practitioner can adopt and
adapt to his own special circumstances.

Distinctions between basic and applied research output are not as clear-cut as they might seem to be. Havelock (1971: 8-2) stated that he and his co-workers ". . . found it very difficult to draw the line between information which is and is not scientific." It is also noted that when knowledge "moves from the hands of the scientist – creator to the hands of the various others who 'use' it, it seems to go through a kind of metamorphosis; the form change." Havelock (1971: 8-2) states further:

Thus, what may have been a basic law to a physicist becomes
an operational guideline to an engineer; and what was a theory of
personality to the academic psychologists becomes a theory of psycho-
therapy in the clinic. Theories become models and models become
products.

In his Editor's Introduction, Rich (1979: 327-337) states that the
use of knowledge is affected by two main factors, the type of information
produced (e.g., social indicators, consultant reports, surveys, program
evaluation) and the sector/policy areas in which the information is being
applied.

Lying somewhere between basic and practice knowledge is knowledge
that has characteristics of both; it is knowledge resulting from "applied
research and development," described by Havelock as "knowledge in evolu-
tion" (1971: 8-11). It is knowledge that is "on its way" to becoming
usable. "On its way" is depicted by Havelock as an information or know-
ledge flow beginning with (1) basic knowledge types which are transformed
into (2) applied research and development types which are transformed
into (3) practical knowledge types which are finally transformed into
(4) user message types.

What happens to knowledge - the "message" - as it flows from producer
to user depends upon several factors. Machlup (1962: 32-33) identifies
six types of knowledge communicators and explains how messages can be
modified.

> A transporter will deliver exactly what he has received, without
> changing it in the least; for example, the messenger carrying a written
> communication.

> An original creator, although drawing on a rich store of infor-
> mation received in messages of all sorts, adds so much of his own
> inventive genius and creative imagination, that only relatively weak
> and indirect connections can be found between what he has received
> from others and what he communicates.

> An analyzer uses so much of his own judgement and intuition
> in addition to accepted procedures, that the message which he commu-
> nicates bears little or no resemblance to the messages received.

> A transformer changes the form of the message received, but
> is not supposed to change its contents; for example, the stenographer
> receiving a message in sound, changing what she hears to penciled
> shorthand notes and then to a typed letter, which she dispatches.

A <u>processor</u> changes both form and contents of what he has received, but only by routine procedures which subject different pieces of knowledge received to certain operations, such as combinations, computations, or other kinds of rearrangements, leading to definite results, independent of the processor's tastes, moods, or intuition, dependent solely on conventions concerning such processing rules; for example, the accountant receiving separate debit and credit advices, which he combines in definite ways to prepare balance sheets and income statements.

An <u>interpreter</u> changes form and contents of the messages received, but has to use imagination to create in the new form effects equivalent to those he feels were intended by the original message; for example, the translator of a subtle speech or sensitive poetry in a foreign language.

These knowledge communicator types may also be viewed as social roles of those who deal with knowledge. As treated in the literature, roles of "knowledge dealers" include facilitator, encourager, organizer, evaluator, and others. Typically, these specific roles are identified as functions of the more general role of change agent.

Some will argue that all knowledge is useful, and the argument is difficult if not impossible to refute. The ultimate criterion of usefulness, however, as viewed from the perspective of this report is acceptance and application or use by clients.

Knowledge may be transferred from universities to users in various forms. A consultant may carry it "in his head" to a user. A researcher may collect, analyze and interpret data, and report his results in person or in writing. A data bank technician may extract computerized information and forward it to a client. Publications of various kinds may be distributed through institutionalized channels. Workshops, seminars, short courses and institutes may be scheduled both on and off campus. Television, radio, and other media may be used. In all cases knowledge is the commodity that is being transferred.

Systematic ways for transferring knowledge as they are described in the literature are discussed in the following chapter. These systematic ways are defined as knowledge transfer models.

NOTES

1. Downs excludes "entertainment" information from types of knowledge needed by decision-makers.

2. Contextual knowledge is that which "illuminates the basic causal structure of some field of operations," while information "provides current data on variables in the field."

CHAPTER 3

KNOWLEDGE TRANSFER: MODELS

The second main type of material in the literature is found under

different labels--planned change, knowledge transfer, diffusion, dissemi-

nation, communication, linkage, applied research, public service, and

others.   Much of this material deals with techniques, procedures and models--

ways of transferring information that would be useful to universities

interested in providing various kinds of help and in promoting the use

of research findings as decision-making input as well as the use of research

as a tool for problem definition, program planning, and evaluation.

Also included in this body of literature are numerous examples and

case studies of university involvement in many different kinds of public

service activities.   Among the case studies are those reported by Nash

(1973: 26). About the University of Chicago, Nash writes:

> The university has become involved in a number of programs in
> the Woodlawn area . . . Key ingredients in this story have been prag-
> matic, forceful leadership both at the Universtiy of Chicago and
> in the Woodlawn organization.

Other institutions of higher learning about which Nash wrote are Southern

Illinois University, University of California at Los Angeles, Morgan State

and Our Lady of the Lake. Also included in his collection of case studies

were chapters about Northeastern University, Columbia, and Wayne State

University contributed by other writers.

One entire issue of Rural Development Research and Evaluation was

devoted to university responses to community needs (Volume 3, No. 3, Fall

1979). A special issue of The American Behavioral Scientist (Volume 22,

No. 3, January-February, 1979) was published in recognition of "the im-

portance of examining all aspects of knowledge development--creation,

diffusion, utilization" (p.327).

Glaser (1978: 50) writes in general terms about ways of moving mountains toward the Mohammeds who do not seem motivated to go and explore them. In this report he summarizes "some strategies and techniques for facilitating knowledge transfer and planned change" (p. 48). He likens the transfer of research findings to users to a "good marriage," implying effective reciprocal relationships between knowledge producers and knowledge users.

LINKAGES

Perhaps the most useful concept in examinations of knowledge transfer is the term "linkage." It is as Havelock (1971: 7-1) states:

> Any detailed consideration of the dissemination and utilization of knowledge must sooner or later focus on the question of linking roles. Who sees to it that knowledge gets to the user? Who is charged with the responsibility of retrieving basic or applied knowledge, deriving practical implications from it, and distributing it to people who need it and can use it?

Implied in Havelock's question is the existence of a gap between the producer of knowledge and the user of knowledge; it is identified by Havelock as "the knowledge gap," a sort of "no-man's land" where neither the scientist as producer nor the client as user feels comfortable. The uneasiness felt by producers and users in this no-man's land is based on the fact that the two social systems differ in terms of values, languages, rules, norms, communication patterns, perceptions, and expectations.[1]

To overcome the knowledge transfer obstacles found in the knowledge gap, it has been suggested that the two systems--producer and user--should be "linked." Aveni (1978: 185), writing of organizational linkages and resource mobilization, asserts that "the concept of linkage can also be extended to ties between organizations and groups and individuals in the society." With respect to knowledge transfer from colleges and universities to client systems, the rise of linkages has a history of success reaching as far back as the creation of the Cooperative Extension Service in 1914.

More recently, the linkage concept was expanded to produce new occupational roles as a means of extending educational benefits to larger number of clients; this role is defined variously as paraprofessional or Extension Aide.

A detailed treatment of the concept of linkage in Eaton (1972: 23-24) identifies and describes four types of linkages:

    o   Enabling linkages: with organizations and social groups
        which control the allocation of authority and resources need-
        ed by the institution to function.

    o   Functional linkages: with those organizations performing
        functions and services which are complementary in a produc-
        tion sense, which supply the inputs and which use the out-
        puts of the institution.

    o   Normative linkages: with institutions which incorporate norms
        and values (positive or negative) which are relevant to the
        doctrine and program of the institution.

    o   Diffused linkages: with elements in the society which cannot
        clearly be identified by membership in formal organization.

In his review of the literature, Havelock (1971: 7-4, 4a) found nine different "knowledge linking roles."

    o   Conveyor: to transfer knowledge from producers (scientists,
        experts, scholars, manufacturers) to users (receivers, clients,
        consumers).

    o   Consultant: to assist users in identification of problems
        and resources, to assist in linkage to appropriate resources;
        to assist in adaption to use: facilitator, objective ob-
        server, process analyst.

    o   Trainer: to transfer by instilling in the user an under-
        standing of an entire area of knowledge or practice.

    o   Leader: to effect linkage through power or influence in
        one's own group, to transfer by example or direction.

    o   Innovator: to transfer by initiating diffusion in the user
        system.

o <u>Defender</u>: To sensitize the user to the pitfalls of innova-
tions, to mobilize public opinion, public selectivity, and
public demand for adequate applicatons of scientific know-
ledge.

o <u>Knowledge-builders</u> as Linkers: to transfer through gate-
keeping for the knowledge storehouse and through defining
the goal of knowledge utilization.

o <u>Practitioner</u> as Linker: to transfer to clients and consum-
ers through practices and services which incorporate the
latest scientific knowledge.

o <u>The User</u> as Linker: to link by taking initiative on one's
own behalf to seek out scientific knowledge and derive use-
ful learnings there from.

Another typology is found in Sashkin, Morris, and Horst (1973: 520)
consisting of three types: input-linking, throughput-linking, and output-
linking. Change agents are viewed as being involved in all three types,
playing the roles of consultant, trainer, and researcher. As a consultant,
the change agent may link external information sources to a client system,
diagnose client system needs, or recommend uses for knowledge. These
are input-linking activities. Throughput-linking involves the change
agent in training activities to help clients in various ways with respect
to knowledge use. As a researcher, the change agent is involved in output-
linking. Included are such activities as helping clients evaluate effects
of knowledge use and evaluating the process of change. New information
resulting from input- and throughput-linking activities is translated
into general knowledge for knowledge banks, thus making it available to
others.

It is apparent that such linkages are important. They are, as Aveni
(1978: 186) states, "central to resource mobilization." For an organi-
zation such as a university to perform its public service role in a con-
tinuing and effective manner, linkages are necessary. They bridge the

27

so-called "knowledge gap" (Havelock, 1971: 7-1) by inserting intermediaries

who are specialists in the linking process between the university as a

knowledge stczchouse and knowledge-producing organization and various

client systems.

MODELS

Knowledge transfer models, as they are described in the literature,

emphasize different aspects of the knowledge production and utilization

process (Sashkin, Morris and Horst, 1973). In their discussion of "phase

models of diffusion and change," Havelock and his colleagues identify

three "schools of thought" which are described in detail. The social

interaction school of thought or perspective focuses on the receiver of

'knowledge, his perception and response to knowledge coming to him from

a source outside himself. Application of knowledge, as viewed by contri-

butors to the social interaction perspective, is primarily a function

of interaction among individuals for whom an indentifiable product or

recommended practice is relevant. Adoption (use) of the product or prac-

tice is seen as the fifth phase of the process that begins with awareness,

and much of what is in the literature focuses on those phases (Lionberger,

1960; Rodgers; 1962; Wilkening, 1953; Beal, Rodgers and Bohlen, 1957).

Detailed treatment of this process by these writers does not preclude

an interest in structures and mechanisms through which the innovations

are transmitted, but, as Havelock states, "S-I researchers assume the

existence of a diffusable 'innovation' as a precondition for any analysis

of the diffusion process."

The second school of thought analyzed by Havelock and associates

is labeled "the research, development, and diffusion perspective." It

is best exemplified in the field of agriculture where it has been suc-
cessfully applied for more than a half century by land grant institutions,
i.e., Agricultural Experiment Station research and Cooperative Extension
Service. It is a more comprehensive model than the social interaction
model, partly because it covers a wider range of roles, relationships
and activities. Analysis of the production and diffusion process begins
at an earlier time with research. Theorists who function in this school
of thought place heavy emphasis on the planning of change on a large scale.
There is, however, an assumption on the part of these theorists that "users
are passive consumers; if the new knowledge or innovation is presented
over the 'right' channel of communication, in an appropriate way, at the
proper time, the user will accept it" (Sashkin, Morris, and Horst, 1973:
511). This assumption results in an inadequate treatment of what the
social interaction theorists emphasize, the role and function of the know-
ledge user. The model has also been described as "over-rational, over-ideal-
ized (and) excessively research oriented" (Havelock, 1969: 11-17).

Another form of knowledge transfer is that in which a user of know-
ledge, faced with a problem or need, utilizes resources outside himself
to solve the problem or meet the need. This knowledge transfer model
is defined as the "problem-solver perspective." The transfer of knowledge
may be initiated by the user or by outside resources, usually referred
to as "change agents." Unlike the social interaction and the research,
development, and diffusion models which include users of knowledge as
"target systems," the problem-solver model treats users as "client systems."
This is an important difference because relationships between producers
and users as clients implies a collaborative arrangement. The problem-sol-
ver model has a strong user orientation, but the use of knowledge is only

a part of the problem-solving process.

Typical of problem-solver model is the process of planned change described in detail by Lippit, Watson, and Westley (1958). Their analysis of the knowledge utilization process includes seven phases beginning with the development of a need for change and concluding with termination of the change. The role of scientific knowledge in the problem-solving model may be of several different types, including theory, research findings, or methodology; but use of such knowledge is not always a necessary part of the planned change process. This is seen as a weakness of the model with respect to utilization of outside resources. In addition, there is "excessive strain on the user" (Havelock, 1972: 11-14), a criticism that is based on suspicion that the average user lacks sufficient creativity in problem-solving.

Whereas the problem-solver model emphasizes the solution of specific problems and creating specific changes, the action research model, although derived from the work of Lewin (1947a, 1947b, 1948) (as is the planned change model of Lippit, Watson, and Westley) is primarily a process model. That is, it focuses on the development of ability within the client system to diagnose problems, plans, and implement changes. The model consists of two research phases and one action phase. The first research phase includes data gathering, analysis and diagnosis followed by the action phase-planning and implementation of an action project or program. The final phase is evaluation (research) of the results of the action program to provide information for further diagnosis and action. This three-phase process is seen as a continuous cycle, providing a general model for problem solving and change within the system. Linkage with outside systems, particularly knowledge-producing systems, is seen as a part of the structure

of the model and is based upon a concern for "research knowledge that
can be added to the general fund of behavioral science knowledge and then
be put into practice by other applied behavioral scientists in new situa-
tions" (Sashkin, Morris, and Hurst, 1973: 516).

Similar to the action research model in some respects is the insti-
tution building model, developed by a group of scholars concerned with
the training of development specialists to work in developing countries
(Eaton, 1972). The model is described as "a generic model of induced
change . . ." (Siffin, 1972: 43). The emphasis of the model is not on
knowledge production, transfer, or utilization specifically; instead,
it focuses on the building of viable and effective organizations which
can serve as vehicles for promoting the adoption of innovations and the
use of new knowledge. In this sense, institution building is appropriate
for any form of "non-coercive social innovation in any sector of society
in any culture at any time" (Esman, 1972: 21). While the action research
focus is on existing systems, the institution building focus is on creating
new institutional structures or reconstituting existing structures as
a strategy of directed social change. Shortcomings of the model are des-
cribed by Siffin (1972: 51-52):

> o It is a static model . . . in the sense that it identifies
>   a set of topical areas without (a) saying how they are inter-
>   related, or (b) saying what to do about the respective cate-
>   gories.
>
> o It is an a priori model, i.e., not dervied from or built
>   upon a large number of cases or experiences, but upon a syn-
>   thesis or lessons learned from pragmatic experience and socio-
>   logical concepts.
>
> o It is, in one sense, a conservative model, i.e., it does
>   not promise success in dealing with any of a broad class
>   of situations even though it does claim to offer a valid
>   and useful view of those situations.

Viewed from a sociological perspective, the institution building model is a tempting device. Directing attention as it does to the institutionalization of a process involving induced change, it offers producers, transmitters, and users of knowledge an efficient means for each to expedite achievement of his goals through the establishment of more or less permanent reciprocal relationships. This is similar to what happens in Phase 6 of the Lippit, Watson, and Westley model (1958); that is, "procedural change may become institutionalized because it is supported by structural change" (p.141). It can be utilized with respect to client system capacity building (in this sense it is similar to the action research model) and for "quick and useful" studies of issues and problems faced by decision-makers, i.e., "brush fires," to use the Rodgers and Linder (1980: 3) terminology.

Pointing out that "universities have the resources to tackle a multitude of local problems, to propose alternative courses of action, to develop solutions, and to improve the management capabilities of local governments," Rodgers and Linder (1980: 4) then present three examples of "university/local collaboration," or institution building.

Pennsylvania State University's Title V efforts emphasize capacity building in local communities for working in rural development. Interaction between local community people and Penn State researchers results in application of a problem-solving process designed by local people themselves. Functioning as a linkage between local community residents and university researchers is a Community Development Specialist who plays a number of roles including "educator, meeting organizer, motivator, expert, researcher, objective third party, and a consultant with access to technical information" (Rodgers and Linder, 1980: 8). Structurally, the Title V program is

organized with joint staff appointments with the Departments of Rural

Sociology and Agricultural Economics and the Cooperative Extension Service.

Innovative and in an experimental stage is the Community Technology

Initiatives Program (CTIP). It is national in scope and focuses on

"strenthening local government capabilities" through a "technology transfer

system which will bring current information to bear of local problems"

(Rodgers and Linder, 1980: 9). The innovative element of this model

is the circuit riding technology agent; in effect, he performs a linking

role between local governments and "broad based resources of the Federal

government, industry, universities, and other units of government in the

United States" (Rodgers and Linder, 1980: 9).

Another model that focuses on local governments as client systems

is represented by the Center for Government Technology located at Missis-

sippi State University and operated as a component of the Cooperative

Extension Service (Rodgers and Linder, 1980). The program activities

in the Center include:

> Training for Mississippi city clerks, assessors, and tax col-
> lectors; seminars on local government financial management, county
> records management, road maintenance, computer procurement, and per-
> sonnel administration; workshop for members and trustees of school
> boards, school attorneys, superintendents of schools, mayors, and
> newly elected supervisors; and training seminars on jail operations
> and guidelines for handling inmates (p. 9).

As a component of the Cooperative Extension Service, the Center is capable

of prompt response to lcoal requests for assistance. Functional issue

area specialists and generalists trained to provide technical assistance

work cooperatively in the Center's programs.

The interventionist model (Argyris, 1970) concentrates on internal

changes in an organization. Not knowledge transfer from one system to

another, but knowledge flow within a system is the focus of this model.
In this sense, the interventionist model is similar to other models that
emphasize increasing client system capabilities to generate and use problem-
relevant data. The goal of the interventionist is not to "implement specific
'content' decisions or changes," but "to alter the basic processes of
information flow and data use within the client system" (Sashkin, Morris
and Horst, 1973: 514).

The final model to be discussed is significantly different in one
important aspect from other models.[2] It utilizes the so-called team approach,
the team consisting of representatives of various disciplines who colla-
borate in a highly intensified effort in cooperation with and in response
to requests for help from local decision-makers. It is not solely the
team approach that makes the model unique, but the fact that the client
system is involved in a partnership type of operation for overall planning
and implementation of a research/action project. It also demonstrates
how university resources--professional expertise--can be organized for
a public service activity.

S.T.A.T. (Small Town Action Team) is the name adopted for the inter-
disciplinary team. Working with the community, the team's purpose is
to stimulate thought, focus attention, create an awareness of issues and
opportunities, and make recommendations for action. The model calls for
a very intensive work session typically lasting from a Friday through
a Monday, although the process varies as widely as the communities it
serves. Essentially, the process follows a series of steps consisting
of:

> o   Introduction of team members to community leaders at an
>   informal meeting.

o Physical overview of the community by air, bus, foot, boat.

o Meetings with community leader's and resource people.

o Meetings with citizen groups.

o Preparation of reports, including drawings and words.

o Production of reports.

o Press conference.

o Final presentation.

o Report distribution.

o Follow-up planning.

Representing sociology on S.T.A.T., the senior author of this report was associated with representatives of architecture, landscape architecture, urban planning, political science, and economics. S.T.A.T. was sponsored by the local Chamber of Commerce whose president was an architect. The Chamber, along with other Civic organizations, provided room and board for S.T.A.T. members, all of whom worked without remuneration. With the exception of the economists, all S.T.A.T. members were from university departments.

Initiation of the S.T.A.T. effort was by architects, and there was a relatively heavy physical design emphasis. However, the team's report and final presentation covered a broad array of perceptions and interpretations.

S.T.A.T. was a variation of the Regional/Urban Design Assistance Team (R/UDAT) formula (See R/UDAT Handbook published by the American Institute of Architects, January 1980). Two advantages of this model are its inter-disciplinary approach and its on-site work arena. There are also disad-vantages. To the "non-visualist" members of the team, the time available for data collection is less than satisfactory and provisions for follow-up are lacking.

NOTES

1. D. C. Phillips (December 1980: 19) describes part of this problem
    as follows:

    "There is a gap between the world of fundamental research in the
    sciences and the everyday world in which human activity takes place.
    The researchers use sophisticated techniques and their world is a
    theoretical one in which findings do not automatically apply to the
    everyday world because everyday terms do not appear in their theories;
    links of some sort have to be established."

2. This description is based upon the senior author's participation
    as a team member in a recent effort to help a small town identify
    needs and problems and create a data base for formulation of projects
    and programs.

CHAPTER 4

A COMPOSITE KNOWLEDGE TRANSFER MODEL

Because knowledge transfer models described in the literature em-
phasize different aspects of the knowledge production, transfer, and utili-
zation process, it is difficult to compare them with respect to their
potential for enlarging a university's public service role. Sashkin,
Morris, and Horst (1973) rated the "action-research" model as the "most
complete and sophisticated" of the five models they compared, but they
acknowledge neglect of "important dimensions of the models, along which
comparisons and contrasts could be drawn" (p. 510). Their rating of
the models is based on three research activities which they define as
"of primary importance: evaluation of the effects of knowledge use; evalua-
tion of the model itself and the change agent's actions within the model;
and research on change in general, on the processess and problem of change"
(p. 520).

Moe's (1978) seminal paper, focusing on the concept of "partnership,"
offers a perspective that recognizes the values associated with institu-
tionalization of organizational linkages and interaction between producers
and users of knowledge. This perspective is not restrictive; that is,
it allows for variations in structural arrangements within the university
setting. As Moe points out, a university interested in expanding its
service role can strengthen or establish working relationships with client
systems. Viewing the university as a parent unit on one side of the model,
one can identify a number of sub-units: colleges, departments, research
institutes or centers, and service organizations such as the Cooperative
Extension Service and Divisions of Continuing Education. It probably
is the case that these sub-units, some of which are more relevant to the

university's service role than others, are operating at levels compatible
with resources available for public service activities and that enlarging
the university's contribution to the public sector would require additional
resources or reallocation of available resources.

Since there are various sub-units that exist as a starting point,
some type of knowledge transfer and service delivery coordinating mechanism
apparently might be the most appropriate model. Such a model--an appropriate
title might be Community Services Office[1]--that performs two basic functions
would be a viable option for universities desiring to achieve coherency,
effectiveness, and efficiency in the performance of their service role.
One of the basic functions is a clearinghouse operation that is simply
an information exchanging process within the university. It would include
receiving from the distributing to the various sub-units information about
their knowledge producing and knowledge transfer capabilities and activities.
This process would involve no great amount of paperwork; nor would it
require a large number of reports from any one sub-unit. That is, it
would be internally efficient.

Information received by the Community Services Office could be coded
for computerized data bank storage, and associated retrieval procedures
and software could be established for rapid search and retrieval of resource
information relevant to various client system needs.

The second basic function of the model is a linking function. It
is the key element of the model because the development of workable uni-
versity-user partnership rests upon the successful linking of the two
entities (Moe, 1978). The role of the Community Services Office in the
linking process would vary with respect to different university sub-units
and with different client systems. It would be inappropriate for the

Office to inject itself into an established university-user relationship,
but given the number and variety of client systems and the changing needs
and problems of the public sector, there should be many opportunities
for the Office to assist in the development of linkages.

Activities of the Community Services Office could include (but not
necessarily be restricted to) some of those listed by Moe (1978: 25):

> o Contacts with various public sector agencies, organizations,
> and groups in order to identify potential partnership members.
>
> o Interpreting to the public and to users the university's
> research role and functions.
>
> o Helping identify development and policy issues from the user
> point of view involving researchers, research administrators,
> department heads and other college or university administra-
> tors.
>
> o Assist in the planning and scheduling of various kinds of
> liaison between university sub-units and a variety of users.
> In this regard, it might be appropriate to consider the estab-
> lishment of new types of university-user advisory and techni-
> cal groups. Consideration might also be given to having
> persons from user groups in liaison capacity on campus for
> extended periods of time.
>
> o Helping define user needs for continuing communication and
> how various media might be used to transfer research findings
> to users.

These activities can be classified as coordinative, facilitative,
and linking functions. They may also be viewed as developmental and main-
tenance functions. The linking role of the Office can be operationalized
by instituting a "circuit rider" process similar in operation to the way
that concept is defined in the Community Technology Initiatives Program.
The primary responsibility of the circuit rider would be to help maintain
university/user relationship and to service client systems in various
ways. In this sense, the role of the circuit rider is similar to that
of the Community Development Specialist role as described in Pennsylvania
State University's Title V program (PENNTAP).

NOTES

1. Hilton T. Bonniwell, Dean of Continuing Education at Mississippi
    State University, speaks of the Office of Campus Resources in <u>MSU</u>
    <u>Memo</u>, Vo. 4 (No. 5) October, 1980, indicating that "in some places
    it's called community services, or the non-instructional programming
    office." He points out that "it's around almost everywhere in some
    form."

CHAPTER 5

UNIVERSITIES AND CLIENT-SYSTEMS:
A METHODOLOGY FOR ASSESSING KNOWLEDGE-TRANSFER RELATIONS

It is taken as given that a concern with the "problem" of the know-
ledge producer and user linkage is compatible with a parallel interest
in somehow making the transfer process more efficient. Indeed, our re-
ference to Moe's recent writing (1978) suggests that a confluence of forces
internal and external to the primary producer of knowledge, the university,
will continue to force this issue into the forefront of discussions about
contemporary higher education.

With this acknowledgement aside, we attempt to move toward a more
agnostic position in this chapter. In following basic evaluation research
perspectives (e.g., Weiss, 1972), we develop the notion that for any model
to be rationally devised to coordinate knowledge-transfer at the grass-
roots level, it should be based on an empirical awareness of the <u>existing</u>
relations between the university (producer) and its clients (user).

In this chapter we overview some observations on the social organiza-
tion of both universities and their client-systems, develop a simple metho-
dology for empirically assessing knowledge-transfer relations, and give
a few brief hypothetical examples of how this method might actually be
implemented.

The Macrosystem of Knowledge-Flow

Knowledge and technology flow from <u>producers</u> (in our case, universities)
to <u>consumers</u> in an institutional framework that can be viewed as having
sub-systems. Havelock (1971) presents a detailed analysis of the "macro-
system of knowledge-flow" in which he describes the components of these

sub-systems. The macrosystem consists of both <u>mainstream</u> and <u>subsidiary</u>
channels which connect: (1) the university, (2) the scientific professions,
(3) the practice profession, (4) the product organizations, (5) the service
organizations, (6) the consumer organizations, (7) the government, and
(8) the media. Figure 1 presents an adaptation of this conceptualization.

While we do not attempt to further address this macrosystem in this
chapter, it is important to our immediate task. All of the non-university
components in this macrosystem framework can be considered <u>client-systems</u>
for the knowledge/technology "wares" of the university. It is important
to the development of a needs assessment methodology for determining know-
ledge-transfer relations to understand the sheer complexity of this in-
stitutional framework. There is also much overlap in these components
as, for instance, a given consumer can be a member of a service or product
organization, and so forth. The main point of the discussion is this:
"clients" and "client-systems" are relatively fluid. They may vary by
university (private vs. public, land grant vs. non-land grant, etc.),
geographical proximity (rural vs. urban setting) or even temporally <u>(ad</u>
<u>hoc</u> clients or systems). Thus what we utilize as concrete examples here
are by no means firm models at all. They are presented as illustrative
of the nature of knowlege-transfer system that we are addressing.

Social organization of universities as Knowledge/Technology Producers

The myriad interactions implied by this institutional framework would
appear almost to defy even description. However, what we propose is that
it is indeed possible to describe the "producer" (university) - "user"
(non-university) linkage. Moreover, it is preferable to Jo so before
attempting to decide upon, and certainly before implementing, a
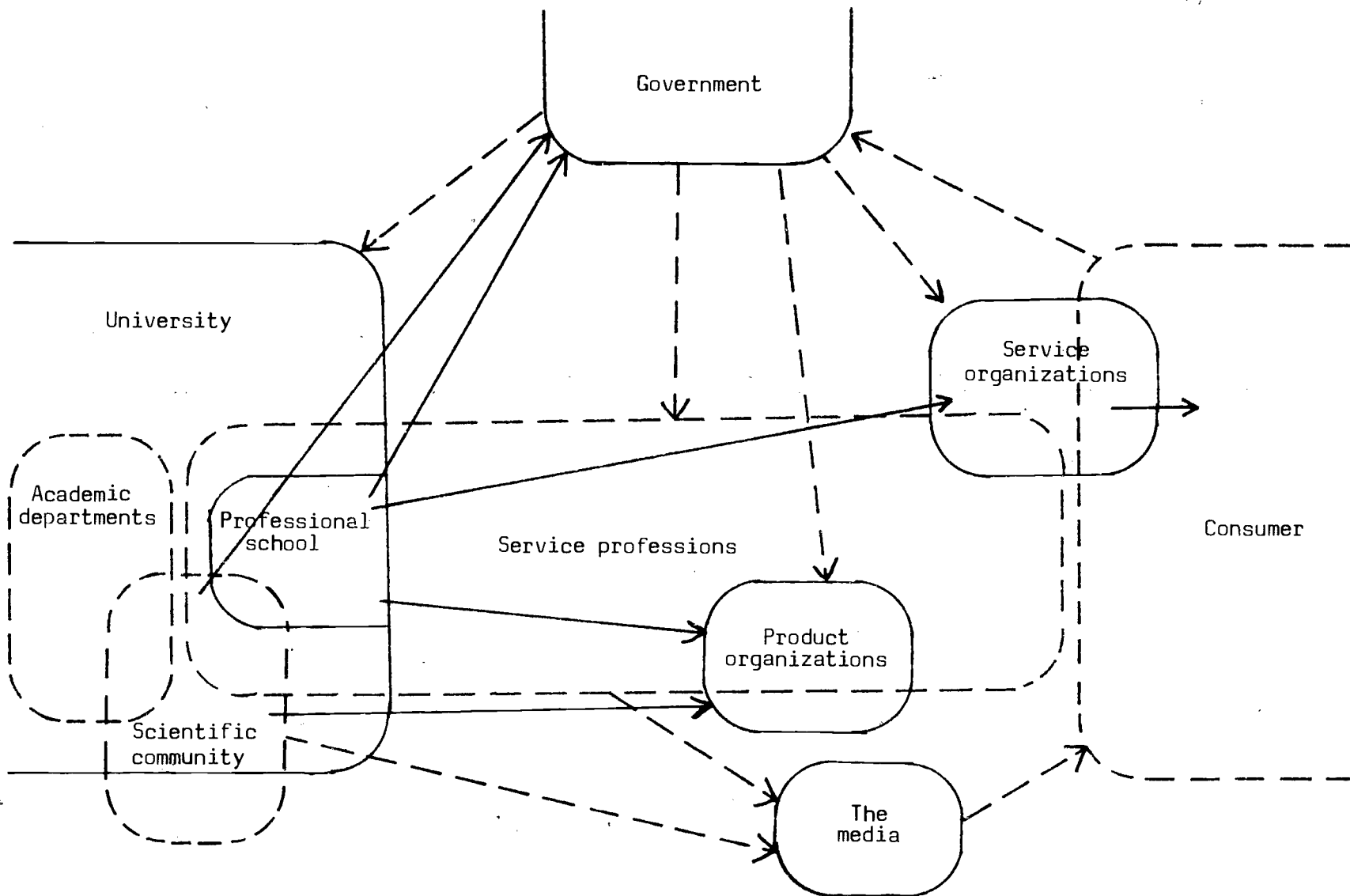
Figure 1. Conceptual Diagram Showing Institutional Relationships of Knowledge/Technology Production and
          Transfer to Consumers.

particular knowledge-transfer model. (This is similar to what is commonly called a "situational statement" by CES workers).

Prior to this, however, it is imperative to define (or codify) the "units" producing tangible knowledge and technology. We might describe the knowledge production sub-system as the "research world" of the university (Havelock, 1971). Organizationally, these are institutionalized as university departments, scientific societies and research institutes. The division can be exceedingly complex. As an illustrative example, we have taken a medium-sized state land-grant university and listed its relevant internal units in Table 1. Many of these units overlap, especially with regard to the teaching and research sectors. Obviously, many of the individuals who "produce" have joint-type appointments across these various units for the expressed purpose of generally facilitating the "knowledge-transfer" process. This point has ramifications beyond the obvious. It may be that, if indeed academic (teaching) units have less to offer clients or client-systems, this is partially a result of organizational specialization itself. On the other hand, the "internal hierarchy" which de-emphasizes applied efforts and the traditional academic reward structure (basic research publications requisite for promotion and tenure) have produced organizational mechanisms that relegate client-oriented service activity to a less prestigious level.

The internal dynamics of the university are important and should be kept in mind when conceptualizing a knowledge-transfer model. There exists an implicit hierarchy within the university so that policy-oriented ("applied") work is viewed as less distinguished vein by the more central, discipline-oriented, academic departments. Due to focus promulgated to some extent by the (federal) government, these new components are increasingly

Table 1. Codification of Knowledge/Technology - Producing Units of a Hypothetical State Land-Grant University

GROUP I

TEACHING

Agriculture and
Home Economics

Agricommunication
Agricultural Economics
Agricultural & Extension
   Education
Agricultural Engineering
Agronomy
Animal Science
Biochemistry
Dairy Science
Entomology
Food Science & Tech-
   nology
General Agriculture
Home Economics
Landscape Architecture
Plant Pathology & Weed
   Science
Poultry Science
Turfgrass Management

Business and Industry

Business Services
Business Research
Accounting
Business Statistics &
   Data Processing
Economics
Finance
General Business Ad-
   ministration
Management
Marketing
Secretarial Science

Architecture

Arts and Sciences

General Science
Medical Technology
Medical Records Ad-
   ministration
Physical Therapy
Botany
Chemistry
Computer Science
Geology
Geography
Mathematics
Microbiology
Physics
Zoology
Anthropology
Art
Communication
Economics
English
Foreign Languages
History
Journalism
Music
Philosophy & Religion
Political Science
Psychology

Social Work
Corrections
Health-Related Child &
   Family Services Program
Sociology
General Liberal Arts

Engineering

Aerospace Engineering
Agricultural & Biological
   Engineering
Chemical Engineering
Civil Engineering
Electrical Engineering
Industrial Engineering
Mechanical Engineering
Nuclear Engineering
Petroleum Engineering
Engineering Mechanics
   Group

Veterinary Medicine

Education

Educational Psychology
Student Personnel &
   Counselor Education
Elementary, Secondary
   & Special Education
Industrial & Occupational
   Education
Music Education

Physical Education, Health
   Education & Recreation
Educational Administration
   & Community College
   Education
Adult Education

GROUP II

RESEARCH/EXTENSION

Experiment Station

Agricultural Economics
Agricultural & Biological
   Engineering
Agronomy
Animal Science
Biochemistry
Dairy Science
Entomology
Forestry
Home Economics
Horticulture
Plant Pathology & Weed
   Science
Poultry Science
Sociology & Rural Life
Veterinary Medicine
Wildlife & Fisheries

38

Table 1. (continued)

Cooperative Extension Service

Agricultural Economics
Agricultural Engineering
Agronomy
Animal Science
Community Development
Dairy Science
Entomology
Food & Fiber Center
Forestry
4-H Youth Development
Home Economics
Horticulture
Marketing
Plant Pathology
Poultry Science
Rural Development
Land Use Center
Sea Grant Advisory
    Services
Soil Testing
Special Projects
Veterinary Medicine
Wildlife & Fisheries

GROUP III

OTHER

Division of Computing Affairs

Computer Center

Administrative Data Processing
    Center
Computer Science
Statistical Services

Office of Research and Graduate Studies

Biological & Physical Science
    Research Institute
Business Research
Bureau of Education Research &
    Evaluation
Electron Microscope Center
Engineering & Industrial
    Research Station
Food Science Institute
Institute for the Humanities
Center for Environmental
    Studies
Research Center at the National
    Space Technology Center
Social Science Research Center
Water Resources Research
    Institute

Boll Weevil Research Lab

Engineering Extension Services

Forest Products Utilization Lab

Research & Curriculum Unit for Vocational- Technical Education
---

State Chemical Lab

Chemical Regulatory Division
Petroleum Products Division

Institutional Research

Division of Business Services

Forest Experiment Station

Dept. of Agriculture & Commerce
Division of Plant Industry

Institute of Archaeology

State Seed Testing Lab
---

becoming the intermediaries between "academic" knowledge and "consumable"
technology. In disseminating academe's favors, peripheral units (such
as research institutes, etc.) are perhaps more internally-organized to
interact with client-systems. The academic reward system is also geared
toward traditional academic departments (see Blau's excellent discussion,
1973). The importance of these dynamics for knowledge-transfer relations
will become more evident when the method is presented in more detail.
Explicitly, in operationalizing the linkage between "producers" and "users"
where the specific datum is how (or how much) a production unit relates
to a consumption unit, the pattern of resulting information is constrained
by the organization of either set of units.

Social Organization of Client-Systems

While universities do possess a finite organizational structure,
their clients and client-systems, as consumers of knowledge/technology,
have no absolute boundaries in principle. Client-systems may also be
ad hoc and temporally-bound in the sense that some clients may have rela-
tively constant needs while others may be of the "one-shot" variety.
Moreover, clients may also be said to be relatively "organized" and "disor-
ganized," depending on the extent to which they consume university products
on a collective or individual basis (Havelock, 1971).

Alternately, to assess producer-user relations we must have some
codification of clients and client-systems. There are perhaps many solu-
tions to this situation. One is a "fluid" classification scheme following
institutional lines (e.g., private industry, civic organization, state
government, etc.). This typology would be revised as necessary depending
upon the setting. A second set of categories could be topic area of client

need: energy, health, human services, public works and utilities, and
so forth.

A more appealing approach might combine "institutional" client-systems
with topical need. For instance, using municipal government as a client-
system, a summary classification of principal needs in small cities includes
the following: management, budget formulation, assistance with citizens
groups, planning, assistance in goal setting and local staff training
(Institute for Governmental Administration, 1975: 43). Using "municipal
government" as the client-system, these general areas would suffice as
individual categories of client needs. If necessary, these summary areas
could be broken into finer gradations to facilitate assessments.

These client-system typologies are suggestive but should be modified
to fit a given application. Moreover, they should be responsive to changing
and new (or newly perceived) clientele.

A Methodology for Assessing Knowledge-Transfer Relations

As indicated previously, it is indeed a complex web of relationships
that link the internal units of a university with their (real and supposed)
client systems. As we have found in our own, although limited, experiences,
knowledge/technology relevant to client systems is often "cloaked" or
disguised within the organizational setting of the university. That is,
expertise and services desired by a given client may be located within
the university in an organizational unit that is not necessarily perceived
as offering the appropriate skills to satisfy a particular need. The
empirical degree to which this "cloaking" phenomenon occurs is unknown.

Is it possible to determine, systematically, how universities relate
to clients and client system? Organizationally, is it feasible to attempt

to map the linkages between knowledge/technology-producing units and real
or perceived clientele? In thinking about the abstract linkage of know-
ledge producers and client systems, we derived the Social Mapping Matrix
which quantitatively constructs the communication (or "knowledge-transfer
relations") between producing units and client needs.

In its most general form, the Social Mapping Matrix can be illustrated
as follows (see Figure 2). The logic of the procedure follows that of
an n-way cross-classification (see Babbie, 1975). The basic linkage is
that between the university unit (or producer) and the needs of a given
clientele (or user). For any given client (e.g., Client A) who has de-
finable needs (e.g., needs A_n), there exists some ascertainable degree
of relationship to what each production unit (e.g., Unit A, etc.) has
to offer. In each cell of the cross-classification could reside a wealth
of information ranging from a simple "yes" or "no" indicating whether
or not Unit A has "anything" to offer a particular client need to some
quantitative coefficient designed to measure "how much" the unit offers
such a need. We are not currently aware of the latter types of human
resource accounting measures that may be available, but do not deny that
they may be informative under the right circumstances. This cross-classi-
fication is repeated over all known clients (and their needs) generating
a social mapping of the relations that a given university has with its
clients and their definable needs.

It would seem expedient for the institutional research division on
a given university campus to implement the SMMA methodology on a campus-wide
basis as a means of providing baseline information on community services.
Other units, however, may handle it. Although we have not yet done this,
a survey design could be used effectively to gather the basic data for

Client-System A

Need Areas

UNIVERSITY:	NA_1	NA_2	NA_3	NA_4	NA_5	NA_6	. . . .	NA_j
UNIT #1	A_{11}	A_{12}	A_{13}	A_{14}	A_{15}	A_{16}	. . .	A_{1j}
UNIT #2	A_{21}	A_{22}	A_{23}	A_{24}	A_{25}	A_{26}	. . .	A_{2j}
UNIT #3	A_{31}	A_{32}	A_{33}	A_{34}	A_{35}	A_{36}	. . .	A_{3j}
UNIT #i	A_{i1}	A_{i2}	A_{i3}	A_{i4}	A_{i5}	A_{i6}	. . .	A_{ij}

Client-System B

Need Areas

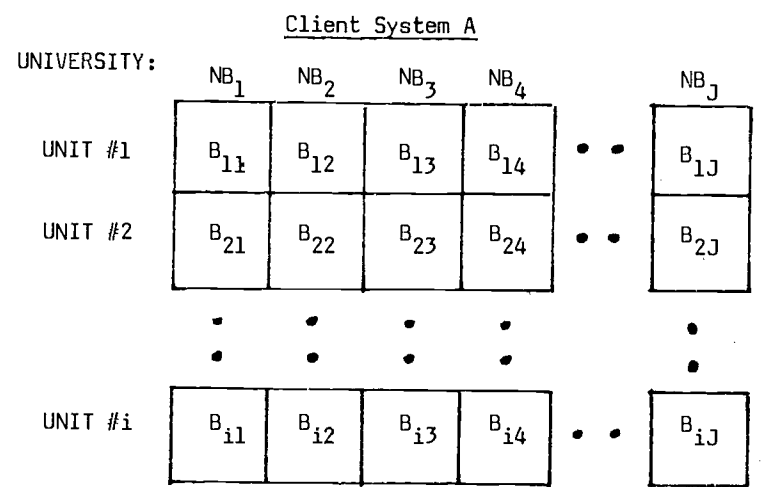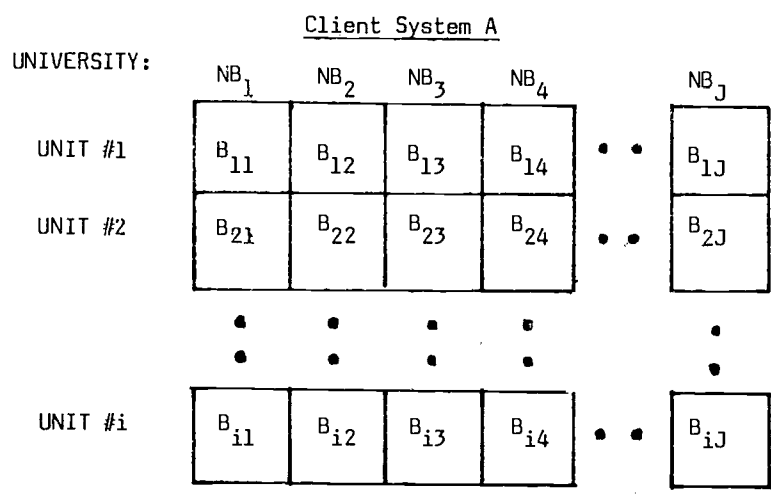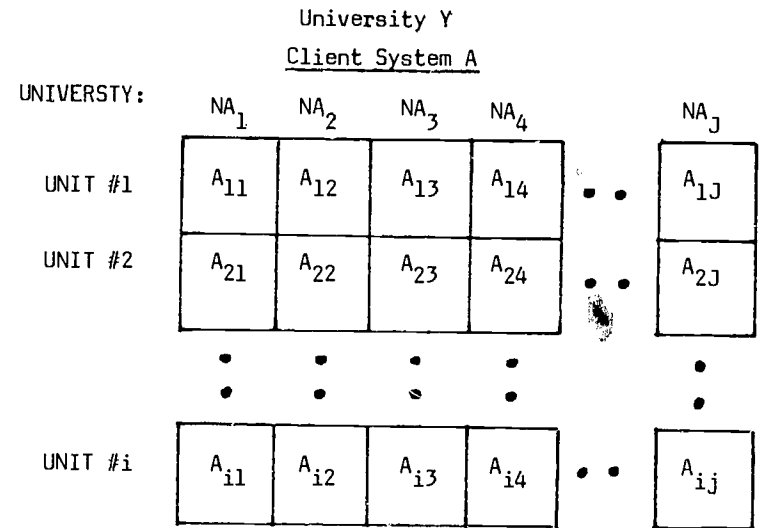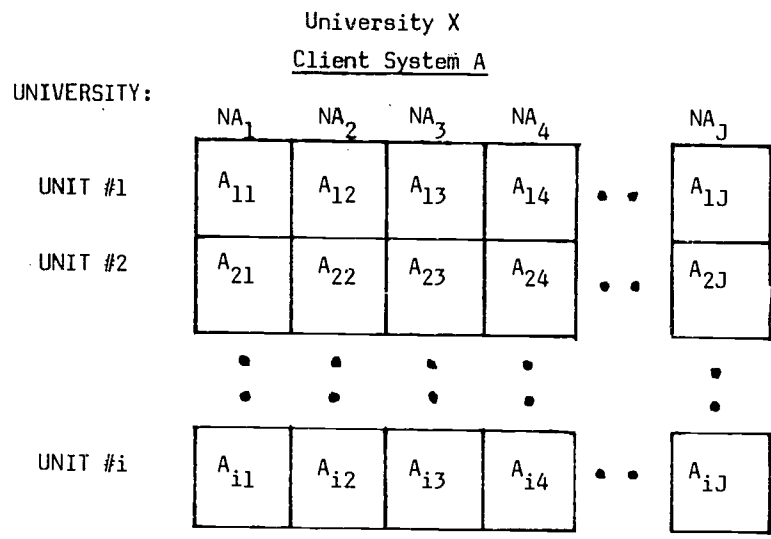| UNIVERSITY:	NB_1	NB_2	NB_3	NB_4	NB_5	NB_6	. . . .	NB_j
UNIT #1	B_{11}	B_{12}	B_{13}	B_{14}	B_{15}	B_{16}	. . .	B_{1j}
UNIT #2	B_{21}	B_{22}	B_{23}	B_{24}	B_{25}	B_{26}	. . .	B_{2j}
UNIT #3	B_{31}	B_{32}	B_{33}	B_{34}	B_{35}	B_{36}	. . .	B_{3j}
UNIT #i	B_{i1}	B_{i2}	B_{i3}	B_{i4}	B_{i5}	B_{i6}	. . .	B_{ij}

ETC.

Figure 2. Social Mapping Matrix Assessment (SMMA) of Knowledge-Transfer Relations.

the assessment on a continuing basis. Faculty expertise could be coded
into a "Faculty Resource Data Bank," and an initial typology of client-
systems could be surveyed for their needs (and need-areas). Obviously,
the latter endeavor would be more difficult to do, but we feel that if
it is continually monitored and updated, it would have substantial pay-off
in improving the knowledge-transfer process. More details on the specific
problems and preferred data collection strategies are needed, however.

The SMMA methodology is also expandable to a state level. That is,
with state boards of higher learning being forced through fiscal restraint
to seek ways of increased accountability through public service, this
type of needs assessment data will be more and more necessary to monitor
progress along such lines. Once the "kinks" of data-gathering and im-
plementation are worked out, this cross-classification procedure may be .
extended to all appropriate institutions of higher learning (see Figure
3).. The implementation of this facet of the SMMA method has broad impli-
cations for evaluation of services. This is a point that we feel needs
extremely careful consideration with regard to the effective and ineffective
uses of such data.

Social Mapping Matrix Assessment: An Example

In this section, a hypothetical but specific example of the SMMA
methodology is described and some suggestive alternatives are given.
A specific illustration can be found in Figure 4. Using a state land-
grant university as a model, the needs of the local municipal government
serves as an example. This hypothetical matrix operationalization quite
clearly delineates the unit-by-unit producer-user relationship. [For example,
·it is evident that academic departments (especially liberal arts) have

University X
Client System A

UNIVERSITY:

	NA_1	NA_2	NA_3	NA_4		NA_J
UNIT #1	A_{11}	A_{12}	A_{13}	A_{14}	$\cdot\cdot$	A_{1J}
UNIT #2	A_{21}	A_{22}	A_{23}	A_{24}	$\cdot\cdot$	A_{2J}
UNIT #i	A_{i1}	A_{i2}	A_{i3}	A_{i4}	$\cdot\cdot$	A_{iJ}

University Y
Client System A

UNIVERSTY:

	NA_1	NA_2	NA_3	NA_4		NA_J
UNIT #1	A_{11}	A_{12}	A_{13}	A_{14}	$\cdot\cdot$	A_{1J}
UNIT #2	A_{21}	A_{22}	A_{23}	A_{24}	$\cdot\cdot$	A_{2J}
UNIT #i	A_{i1}	A_{i2}	A_{i3}	A_{i4}	$\cdot\cdot$	A_{ij}

Client System A

UNIVERSITY:

	NB_1	NB_2	NB_3	NB_4		NB_J
UNIT #1	B_{11}	B_{12}	B_{13}	B_{14}	$\cdot\cdot$	B_{1J}
UNIT #2	B_{21}	B_{22}	B_{23}	B_{24}	$\cdot\cdot$	B_{2J}
UNIT #i	B_{i1}	B_{i2}	B_{i3}	B_{i4}	$\cdot\cdot$	B_{iJ}

ETC.

Client System A

UNIVERSITY:

	NB_1	NB_2	NB_3	NB_4		NB_J
UNIT #1	B_{11}	B_{12}	B_{13}	B_{14}	$\cdot\cdot$	B_{1J}
UNIT #2	B_{21}	B_{22}	B_{23}	B_{24}	$\cdot\cdot$	B_{2J}
UNIT #i	B_{i1}	B_{i2}	B_{i3}	B_{i4}	$\cdot\cdot$	B_{iJ}

ETC.

Figure 3. Social Mapping Matrix Assessment (SMMA) of Knowledge-Transfer Extended to Statwide System of Universities.

Client System:
LOCAL GOVERNMENT

UNIVERSITY UNIT: N e e d   A r e a s

	ENGY	CED	HLTH	ENV	HS	PWPU	FSDP	TRANS	POLCJ
I. Teaching									
Ag-He	No	No	Yes	Yes	No	No	No	No	No
Engineering	Yes	No	No	Yes	No	Yes	No	Yes	No
A & S	No	No	No	No	Yes	No	No	No	No
B & I	No	Yes	No	No	Yes	Yes	No	No	Yes
Educ.	No	Yes	Yes	No	Yes	No	No	No	No
II. Research-Extension	• •	• •	• •	• •	• •	• •	• •	• •	• •
Exp. Sta.	Yes	No	Yes	Yes	Yes	Yes	Yes	No	No
CES	Yes	Yes	Yes	Yes	Yes	No	No	No	No
ORGS	Yes	No	No	Yes	Yes	No	Yes	No	No
	•	•	•	•	•	•	•	•	•
S.C.L.	Yes	No	Yes	Yes	No	No	Yes	No	No
	• •	• •	• •	• •	• •	• •	• •	• •	• •
(See Table B)									

Source: ISETAP (1979: 5-6)

Legend: ENGY = Energy
            CED = Community and Economic Development
            HLTH = Health
            ENV = Environment
            HS = Human Services
            PWPU = Public Works and Public Utilities
            FSDP = Five Safety and Disaster Preparedness
            TRANS = Transportation
            POLCJ = Police and Criminal Justice

Figure 4. Social Mapping Matrix Assessment Hypothetically Applied to Local Government Client System.

less to offer than engineering, business and other technical areas.]

Additionally, important potential gaps in the matrix --- where producer
expertise is perhaps "cloaked" from the user's perception and vice versa
--- can be ascertained and dealt with through public service management
channels. Again, it is likely that individuals with appropriate expertise
may channel their public service "energies" through service-oriented units
where they have joint appointments.

Other information could readily be stored in the cells of the pro-
ducer-user matrix. Instead of discrete "yes-no" data, some human resource
accounting measure would quantitatively assess the level of commitment
by any given unit to any given client-system and need area. This option
might resolve the potential anomaly of tracking efforts by joint-appointees,
for instance.

More pragmatically, if this needs assessment method were effectively
implemented, perhaps via a Faculty Resource Data Bank on a university
or state-wide basis, the matrix cells could service in a referral mechanism.
Using a clearinghouse telephone hotline, individual faculty/staff members'
areas of expertise and service could be stored on a computerized version
of the SMMA, along with the pertinent contact information for carrying-out
the referral. In the case of absolutely no relation (i.e., a "no" in
the relevant cell), the "next best" referral within the university, or
perhaps to another university, is possible.

It is perhaps at this point that we should raise a parallel issue.
That is, the legitimacy of a given unit not having anything to "offer"
a given client. The general expectation of being "all things to all people"
runs counter to the principle of specialization extant in higher education
in general and university departmental organization in particular (see

Blau, 1975). Very complicated issues of accountability are involved in constructing "expected" degrees of relation between university units and client systems. We do not attempt to treat them here.

Summary

In this chapter we have attempted to briefly touch on some of the issues and problems involved in assessing knowledge-transfer relations and broadly outline a general methodology for empirically describing the "producer-user" partnership. The most important aspects of this process involve the dynamics internal to the university and client-systems at large. These two sets of social organization characteristics necessarily constrain any rational model designed to facilitate the linkage between the two.

The Social Mapping Matrix Assessment (SMMA) method was described only in broad and somewhat preliminary terms. The next phase of work on the SMMA lies in perfecting a set of data-gathering techniques which facilitate the continuous monitoring of university "units" and client-systems. The potential for the SMMA to augment to various "Faculty Resource Data Bank" systems now planned (or in operation) was discussed. Finally, the "agnostic" position of an emphasis on empirical description was concluded with an urging for the careful consideration of how such evaluative data should be effectively utilized by policy-makers.

CHAPTER 6

KNOWLEDGE TRANSFER: AN OVERVIEW AND SUGGESTIONS FOR IMPLEMENTATION

According to Perkins (1966: 87-88), the university can justifiably
claim an ability to integrate teaching, research, and public service an
no other agency "above the level of university." The vitality of the
university as the leader in the whole system of higher education can be
maintained only as academicians "increasingly conduct themselves as members
of a much larger community. . . ."

In this report we have dealt mainly with one aspect of the triple-
pronged role of the university, that of public service. Our literature
review therefore, has been selective, focusing first on the continuing
dialectic between those who favor and those who oppose enlarging the public
service role. In our literature search we found no broadly- based survey
of faculty and staff opinions about university involvement in public service,
but what we did find indicates that there is an opinion favoring a more
responsive stance on the part of universities. Support for this position
exists within the academic community and among non-academicians who see
the university as a source of knowledge needed as data bases for decision-
making in various kinds of action programs. There is some feeling that
the time has come when the academician and the citizen should "work to-
gether in building a more viable education structure" (Budig and Rives,
1972: 73). Enlargement of the public service role is seen by Moe (1978:
24) as a "developing partnership" between universities and the users of
research, a view that is reflected in the writings of certain well-known
university administrators and others.

In essence, although there is still some reluctance and lack of interest,

even some hostility, in responding to new clientele, the basic question

has moved from one of educational philosophy to one of strategy: ways

to relate to client systems of various kinds in a continuing relationship

that is reciprocally beneficial.

The second form of our review dealt with the question of product,

what the university has to offer to client systems. Although Long (1977:

82) listed seven different types of public service activities, we focused

on knowledge as the product since most of Long's categories include the

transfer of knowledge in one form or another.

We found that the transfer of knowledge as one component of the service

role of universities has been the subject of much research, with rural

sociologists having made significant contributions in their studies of

the diffusion and adoption of new ideas and recommended practices and

technologies. We also found conceptual variances with respect to knowledge

as the product. The relevance of these variances to our report is reflected

in Havelock's (1971: 8-1) question: "What knowledge, what range of phenomena

deserve the label 'knowledge' or 'scientific knowledge' or 'innovation'?"

Different writers propose different classification schemes, and the trans-

ferability of knowledge is discussed at some length. The position we

take with reference to types of knowledge is that the ultimate determination

of its usefulness within the public service perspective is the acceptability

and application by clients.

Not only is knowledge of different types, it can also be transferred,

and is transferred, in different ways. With the objective of responding

to public sector requests for assistance and of making the university

more relevant to societal needs and problems, much attention has been

given to knowledge transfer structures and processes. These structures

and processes are treated in the literature as models. Essentially, a
model is viewed as a conceptual framework consisting of several basic
concepts. As they are described in the literature, knowledge transfer
models emphasize different aspects of the knowledge production, develop-
ment, and dissemination process.

After describing several different knowledge transfer models, we
then present a composite model, one which utilizes selected concepts from
other models. The basic thrust of our composite model is the concept
of university-user partnership as proposed by Moe (1977). Two basic func-
tions of our model are identified. First, there is a clearinghouse func-
tion within the university, and second, there is a linking function.
The linking function is the key element of the model; that is, institu-
tionalization of university-user partnership depends upon the effective
linking of the two entities.

Both of the basic functions of the model can be operationalized through
a relatively small organizational structure which we suggest may be identified
as the Community Services Office. To facilitate the operation of this
Office, we offer a needs assessment methodology, the Social Mapping Matrix
Assessment (SMMA). The SMMA can be used for inventory purposes to identify
on-campus resources, such as institutes, departments, and other sub-units
and the types of services they are capable of providing. A second use
would be as a type of catalog for use by university sub-units and by clients.
The matrix form of the SMMA allows for different types of information
cataloging.

To bring this model to an action stage would require several steps.
A necessary initial step would be an analysis of existing university-user
contacts. Obviously, responsibility for conducting this analysis must

be assigned to someone; and at many universities the Office of Institutional
Research, or its titular equivalent, would seem to be a logical choice
for this task. In conjunction with this analysis, steps should be taken
to identify the service providing capabilities of the various university
sub-units, that is, services they are capable of but are not providing.
The SMMA format can be used for these activities.

A second step will require more work, but it is essential. It calls
for the identification of potential client systems and at least a partial
listing of the services they might need that the university can provide.
This step is not viewed as a "once-and-for-all" effort, but as a dynamic
building effort extending through time. Again, the SMMA format will be
useful for this activity.

A third step in the sequence is the initial contact with potential
clients for the purpose of developing university-user partnerships. Some
partnerships might be established as a part of the second step operation.

Development of the partnerships will involve discussions between
university personnel and potential clients leading toward definitions
of mutually agreed upon goals, methodologies and responsbilities. Institu-
tionalization of the partnership arrangement may include a formal state-
ment of agreement between the parties involved, but this statement should
be general and flexible. In some instances it might be necessary to prepare
specific documents relating to a specific service or university-user task.

From the university perspective, discussion with potential clients
and any commitments to clients for providing services must follow clearly
stated guidelines. That is, the client system must be made fully aware
of university policies and practices relevant to its service role, with
an explanation of limitations and restrictions within which the university

must operate.   63

Implementation of the knowledge transfer model described in this report as a university strategy would necessarily require initiation by administrators with authority to commit university resources.

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RESEARCH PROJECTS OF
THE SOUTHERN RURAL DEVELOPMENT CENTER
1975 to Present

Project	Research Associate	Status
A Synthesis of Evaluative Research Literature for Rural Development	Dr. Arthur G. Cosby Texas A&M University	Completed
Citizen Participation in Rural Development Concepts, Principles and Resource Materials	Dr. Donald E. Voth Mr. William Bonner University of Arkansas	Completed
Inventory and Appraisal of Research Concepts, Methods and Results in Land Use Issues	Dr. Buri F. Long Virginia Polytechnic Institute and State University	Completed
Synthesis of Research Results Relevant to the Impact of Governmental Transfer Payments on Human Resource Development	Dr. E. Evan Brown University of Georgia	Completed
Solid Waste Disposal and Financing	Dr. Michael S. Salkin Oklahoma State University	Completed
Health Care and Rural Development	Dr. R. David Mustian North Carolina State University	Completed
Housing Research Relevant to Rural Development	Dr. Savannah Day Florida State University	Completed
Industrialization of Rural Areas	Dr. Eldon D. Smith University of Kentucky	Completed
A Review and Synthesis of Research Relevant to Small Farm Operation	Dr. W. Arden Colette University of Florida	Completed
Educational Needs Projection and Rural Development	Dr. Gerald C. Wheelock Alabama A&M University	Completed
Development and Testing of a Working Model for Transfer of Computer Technology to County Officials	Dr. Gerald A. Doeksen Oklahoma State University	In Progress
Effect of Taxation and Financial Management Policies on the Delivery of Community Services in Rural Areas of the States	Ms. Pamela H. Rodgers Southern Rural Development Center	In Progess

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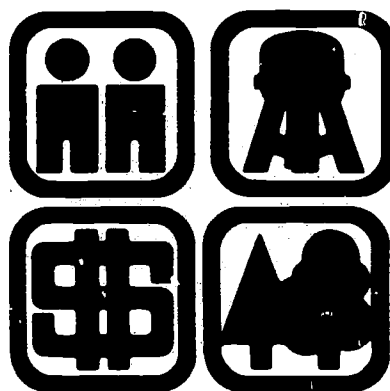 Forestry Experiment Station
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