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A HISTORICAL AND CONCEPTUAL OVERVIEW: Using Knowledge and Technology to Improve the Quality Of Life of People Who Have Disabilities

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Abstract

Preliminary, the practical use of knowledge and technology to improve people's quality of life with disabilities requires understanding the many meanings of disability and quality of life. It also requires exploring whether rehabilitation services and knowledge utilization can make a difference in life quality. Understanding the disability constructs helps increase understanding of the relevance of the prosumer concept for people with disabilities. The knowledge utilization literature traditionally has focused on scientific knowledge and not intuitive, meditative, or experiential knowledge. Its emphasis has been on getting research results into practice and only more recently expanded to include getting exemplary practices more widely known and used. Because the literature on knowledge utilization is often intermixed with Research on the scientific knowledge cycle, it is essential to understand what is meant by the scientific knowledge cycle. The discussion that follows leans heavily on the editorial work of Dr. Robert Rich, past editor of the Knowledge journal, past president of the Society on Knowledge

Keywords: Disabilities, Research and Knowledge, Technology, People

INTRODUCTION

In 1983 two books, Diffusion of innovations and putting knowledge to use, summarized the state-of-the-art Research on getting exemplary programs, processes, products, or ideas used more widely. The key authors of those books had written state-of-the-art publications twice before. Both presented their analyses of the past, present, and future from multidisciplinary and international perspectives—both highlighted time lags between the inception of products and the use of these.

They differed, however, in areas of emphasis and approaches. While one book emphasized societal changes, the other emphasized organizational changes. One centered more on products and the concept of Diffusion; the other centered on research findings and knowledge utilization. From a methodological perspective, one focused on models and paradigms; the other focused on factors influencing use. One used meta-analysis research strategies and produced ninety-one generalizations about state of the art, citing the numbers of research studies supporting each. The other cited and summarized the literature without identifying propositions and quantifying evidence. Neither set of authors indicated being aware of the other's state-of-the-art works about to be published in the same timeframes. Why? Perhaps the answers lay in the history behind the knowledge cycle and its interrelated subfields.

The knowledge utilization literature traditionally has focused on scientific knowledge and not intuitive, meditative, or experiential knowledge. Its emphasis has been on getting research results into practice and only more recently expanded to include getting exemplary practices more widely known and used. Because the literature on knowledge utilization is often intermixed with Research on the scientific knowledge cycle, it is essential to understand what is meant by the scientific knowledge cycle. The discussion that follows leans heavily on the editorial work of Dr. Robert Rich, past editor of the Knowledge journal, past president of the Society on Knowledge

Utilization and editor of the book, the knowledge cycle. It also incorporates Dr. Michael Q. Patton's interpretations of the kinds of Research that help create scientific knowledge within the many formalized and validated knowledge fields. Dr. Patton has written widely on the subject of Research and utilization-focused evaluation.

Disability: What is it? Who defines it? Who has it? Is it contagious?

Disability is a medical, legal, and social construct that has evolved. As a medical construct, disability is intertwined with definitions from medicine, illness, sickness, diseases, health conditions, and impairment. As a legal construct, disability is defined by Congress in such Acts as the Soldiers Rehabilitation Act, Workmen's Compensation, the Rehabilitation Act, Social Security Act, the Education for all Handicapped Children Act, Disability Reform Act, and the more recent Americans with Disabilities Act. As a social construct, disability is defined by "a formal administrative category that determines the rights and privileges of many people" (Stone, 1984:27).

Disability as a legal construct

As a legal construct, disability definitions begin with legislation passed by Congress and the President. Most of the legal definitions of disability are linked to specific benefits or services from a given program. The legal definitions of disability have been applied to wounded soldiers, injured industrial workers, congenitally and adventitiously impaired students, social security insurance beneficiaries, as well as individuals with physical or mental impairment needing help in entering, returning to, or remaining in gainful employment or independent living. While each program--Veterans, Vocational Rehabilitation, Special Education, Social Security Disability Insurance, Workman's Compensation, etc.--has delineated the criteria for determining disability and eligibility to that program carefully, it has continued to rely on the medical profession's interpretations of impairment as its foundations.

The latest legal definition of disability became law July 26, 1990, in the Americans with Disabilities Act. That Act defines disability as: "a physical or mental impairment that substantially limits one or more of the major life activities of such individual; a record of such an impairment; or being regarded as having such an impairment."

Disability as a social construct

Laws are subject to interpretations by regulatory and administrative bodies at the federal, state, and local levels and the courts. Through its case by case interpretations of laws and contracts, the judicial system has expanded administrative definitions of disability. For example, insurance companies as far back as 1910 have included disability clauses in their life insurance policies and

defined disability as "wholly" or "totally" unable to work. Courts reasoned that literal interpretations would deny people the protection they had purchased the insurance (Stone, 1984:74). Therefore, claimants received compensation they otherwise might have been denied. Similarly, the courts restored to the Social Security Disability Insurance rolls individuals who claimed that they had been inappropriately changed from "disabled" to "non-disabled" status (Mezey, 1988:1).

Claire Liachowitz (1988) traced the history of disability in American society through historical and legal documents stemming from the eighteenth century. She concluded, as have others (such as Robert Scott, the author of The Making of Blind Men), that disability is a social construct and not limited to physical status. As a social construct, disability has been linked with poverty and nonproductivity, dependency and segregation, charity work and public caregiving, entitlements, and more recently, rights (Ibid).

Deborah Stone (1984) also defined disability as a social construct. She compared disability in European and American societies. She concluded that "disability is a formal administrative category that determines the rights and privileges of a large number of people" (Ibid, 27) as a category "disability accounts for a substantial proportion of income redistribution" (Ibid, 4). Medical certification validates the genuineness of disability and thereby attempts to weed out deception, which in the modern understanding of disability "has become part and parcel of the concept itself" (Ibid, 28). As an administrative category that grants privileges, it carries permission to enter the need-based system and be exempt from the work-based system. It can also provide an exemption from other things people typically consider worth avoiding: military service, debt, and criminal liability (Ibid, 28). The connections between disability definition and the work world can be found in several legislated programs such as Social Security, Rehabilitation, Veterans Administration, and others. Stone says: "Nowhere is the connection between disability definition and labor force requirements more explicit than in the American Social Security 'vocational grid,' with its matching of individual characteristics to the operational requirements of jobs, and in the notion of 'residual work capacity' (Ibid, 180).

Each construct affects the other constructs. Medical advances enabled the structuring of the first disability legislation for soldiers and later for civilians. When the proposed legislation for Social Security Disability Insurance was being debated in the 1950s, the medical profession told

Congress members that they could not determine disability. They gave two reasons (1) because "medicine is not an exact science" and (2) "disability is a social and psychological problem not amenable to exact definition by physicians" (Ibid, 80). Congress rejected their arguments saying there is no other group better qualified to judge the potential impact of physical and mental disabilities on work abilities. Today most federal and state disability or rehabilitation programs require medical certification as entree' into the service system.

I. THE KNOWLEDGE CYCLE

The knowledge cycle consists of at least three components, also known as interrelated subfields of study: knowledge creation, knowledge diffusion, and knowledge utilization. When studies in the area of knowledge utilization began, those subfields had not been defined, nor is there consensus today on each study area's boundaries. Without clear demarcations, subfields initially overlapped in some areas and remained relatively discrete in other areas. While some interdisciplinary perspectives on the subfields did evolve, researchers replicated and extended knowledge studies in their disciplines before the sixties. Therefore, their terminology, methodology, and data interpretations reflect a discipline-specific perspective. When researchers failed to define terms such as utilization, readers could only guess at the intended meaning: "practical use," "conceptual use," or "adaptive use." With hindsight, some of the subfields' differentiating attributes, amid the overlapping attributes and mixed terminology, become evident.

A. Knowledge creation

Knowledge creation may stem from five differing kinds of formalized research efforts: Basic Research, Applied Research, Summative Evaluations, Formative Evaluations, and Action Research (Patton, 1990:150-162). Fundamental Research focuses on knowledge building among researchers, while applied Research focuses on knowledge building specific to practice areas. Program evaluation forms of research look at the outputs and outcomes of programs and the processes that could be improved to make ongoing programs and projects more effective. Action research is generally linked to the organization within which it occurs and addresses its specific problems.

Products of knowledge creation efforts include research findings, demonstration results, program evaluation findings, and general-purpose statistics (Nelson, in Rich, 1981:58-60). Consensual

validation from the experts in a given field of study puts the stamp of scientific knowledge on findings that have been tested and replicated by more than one group of researchers. Knowledge creation may also encompass technology or tangible prototypical products deemed worthy of transfer or mass manufacture. Researchers who study how scientific knowledge is created represent the disciplines of sociology of knowledge, intellectual history, the history and the philosophy of science, sociology, and the psychology of science (Nelson, in Rich, 1981:41).

B. Knowledge diffusion

Researchers focusing on knowledge diffusion study communication channels used to disseminate innovations, rates of adoption, earliness of knowing about an innovation, innovativeness of members of a social system, opinion leadership, who interacts with whom in diffusion networks, and consequences of an innovation (Rogers, 1983:80-81). A meta-analysis of several hundred diffusion studies has resulted in a set of propositions for each significant study area.

Disciplines studying knowledge diffusion include communications research, information science, library science, and science sociology (Nelson, in Rich, 1981: 41). Rogers (1983) described nine major disciplines as making significant contributions: anthropology, education, early sociology, rural sociology, public health and medical sociology, general sociology, communications, marketing, and geography. Many diffusion studies have been associated with society's profit-making sector and with technological advances or innovations (Ganz, in Rich, 1981:193).

C. Knowledge utilization

Researchers in knowledge utilization, according to Rich (1981:33), seek to measure information pickup, processing, and application. Information pickup means the process of retrieving or receiving information whether from a data bank, a library shelf, a consultation session, or other means.

Information processing:

It involves understanding the information, testing it for validity and reliability, testing it against one's own intuition and assumptions, and transforming the information into a usable...Testing does not necessarily refer to formal experimental models; it may involve cognitive procedures (Rich, 1981:34). The application part of the knowledge utilization process may include rejection of the information as well as acceptance.

Researchers in this area of study considers the results from diffusion research and technology transfer findings and their studies of planned change, determining factors of use, and decision-making or problem-solving uses by policymakers, administrators, and practitioners. Products of knowledge utilization may include, but are not limited to, models, factors, strategies, and processes found most predictive of generating use. Researchers studying utilization may focus on bringing about planned change in individuals, organizations, or societies. They may also focus on practical use, perceptual use, adaptive use, selective use, premature use, rejected use (i.e., deliberate nonuse), discontinued use, and misuse. Researchers focusing on utilization include those affiliated with disciplines or areas of study such as industrial psychology, motivational psychology, psychology of thought processes, organizational theory, management theory, social and political theory, and communications theory.

II. KNOWLEDGE PRODUCTION AND USE: THE ROOTS

A. Greeks to the twentieth century

The intellectual tradition behind the studies of knowledge use and production includes intellectual and diverse thinkers such as Aristotle, Plato, Sir Francis Bacon, the Marquis de Condorcet, Henri Saint-Simon, Auguste Comte, Thomas Henry Huxley, Matthew Arnold, Karl Marx, and Max Weber (Rich, 1981:7). More recently, leading scientists such as Adorno, D. T. Campbell, Einstein, Habermas, Kuhn, Lazarsfeld, Lewin, Machlup, Merton, and Whitehead have concentrated on this area (Rich, 1981:7).

Diverse thinkers contributed to the 20th-century belief that civilization's advancement is interwoven with the advancements in knowledge and its uses. Atkinson (1979b) and Rich (1981:23) suggest that a social contract or social compact evolved between the producers of knowledge (philosophers, theorists, theologians, lawyers, scientists) and society. The common unwritten understanding was that as long as knowledge producers conducted studies consistent with societal goals and long-range interests, they would enjoy a measure of independence, and their institutions would prosper (Rich, 1981:23).

B. Early twentieth to mid-twentieth century

Rogers (1983:40) traced the knowledge diffusion roots back to the European beginnings of social science with Gabriel Tarde's 'Laws of Imitation'(1903) and early anthropologists known as the British German-Austrian 'diffusionists'. North American roots began in the 1920s with studies such as Diffusion of agricultural innovations to farmers and spreading new teaching ideas among school personnel. The 1943 hybrid-seed corn study by Ryan and Gross, "more than any other study, influenced the methodology, theoretical framework, and interpretations of later students" (Rogers, 1983:54). Rogers and Shoemaker (1983:47) tracked diffusion research studies from the twenties through the seventies and illustrated the significant jump in publications during the sixties. They attribute the jump to the intellectual integration among the disciplines studying knowledge diffusion.

Feller identified three reasons the federal government-sponsored studies in Diffusion and utilization (in Rich, 1981:93). The policymakers believe that innovation dissemination can help promote a higher rate of economic growth. Defense and space-related Research can benefit citizens in other ways than originally intended. Mission agencies want to more rapidly promote the adoption and extension of their technologies, practices, and findings.

C. Mid-twentieth century to present

Some authors view the mid-sixties as the starting point for knowledge utilization studies. Why? Johnson's Great Society and the War on Poverty launched new health, education, and welfare programs at massive federal expense. Those programs represented one way to improve the quality of life for disadvantaged groups (Aaron, 1978; Patton, 1986; Wright, 1984: 4-5). Because questions were raised about the effectiveness of those rapidly launched or expanded programs, the government began turning more and more social science researchers for help (Aaron, 1978). The government increased funding for program evaluation (Patton, 1986:18-21) and the uses being made of Research. Those studies paralleled the explorations into Program, Planning, and Budgeting (PPB), Management by Objectives (MBO), and Zero-Based Budgeting (ZBB) "to help bring economy, competence, rationality (and even less politics) to the public arena" (Wright, 1984:5).

Roberts and Frohman (1978) contrasted the late fifties and late sixties from Industrial Research's perspective. They looked at shifts in objectives, activities, and the mix and balance of skills.

Objectives shifted "from furthering scientific goals to satisfying market needs....The ivy was swept from the walls and replaced by large panoramic windows through which the researchers could see and be seen" (Ibid, 33).

They say that activities shifted from scientific Research and problem-solving domination to management techniques (e.g., formal plans, goals, and control systems) and marketing practices (examine potential new products, test prototypes in the marketplace). Researchers had to "sell the seeds" to see the "fruits of their labors" used. "The myth that technology sells itself on its own merits or that "new" technology is inherently "good" was exploded" (Ibid, 34).

Passive and scientist-oriented research utilization approaches--publications, symposia, speeches--shifted to active ones to facilitate the transfer of research outputs to managers and marketers. Research organizations began developing better customer relations even when there was no technology to push. The mix of skills grew to include marketing, business, finance skills, and idea-generating ones.

Today, researchers recognize knowledge utilization as a complex process involving individuals, organizations, societies, and political, socioeconomic, psychological, and other situational factors (Larsen, 1980:424). Knowledge utilization studies cross many disciplines and specialty areas (Rich, 1981:41). Huberman (1987:589) describes the trends in knowledge utilization as moving from a "naive, linear view of research utilization" to a "more dynamic, transactional approach to knowledge utilization."

At the Fourth Annual Meeting of the Society for Knowledge Utilization and Planned Change (April 1990), President Backer defined the field as encompassing the following: Knowledge transfer and utilization, technology transfer, sociology of knowledge, organizational change, policy development, and interpersonal and mass communications.

III. STRENGTHS AND WEAKNESSES OF THE KU SUBFIELD

A. Strengths

The strengths in the budding knowledge utilization subfield are many. First, it has breadth gained from multidisciplinary studies. Second, it has several state-of-the-art studies on putting

knowledge to use that have been consistently updated. Third, it is significantly represented in the multidisciplinary journal, Knowledge: Creation, Diffusion, and Utilization, and researchers have access to journals specific to the diffusion or technology transfer component (e.g., Journal of Technology Transfer, Technology Transfer), and to the knowledge creation component (e.g., Knowledge in Society). Fourth, many scholars who began studying knowledge utilization have continued with it (Altman, 1987:1). Fifth, it has the Knowledge Utilization Society that promotes Research and scholarly study in knowledge utilization and planned change. It fosters "research that can be effectively translated into action on urgent social problems" (Backer, Rich, & Data, 1989:317). Sixth, the government has funded studies in knowledge utilization through several federal agencies.

B. Weaknesses: Information access

At one time, she stayed updated depending on the researcher using an informal network (Larsen, 1980:422). There were no formal mechanisms for coordinating the growing volumes of literature on research utilization. One had to search through countless discipline-specific resources and guess whether unrelated book titles might have a chapter related to the desired subject (Larsen, 1980:422). Even with computerized databases accessing information is complicated because of terminology. For instance, although the journal Knowledge has existed since 1979, database searches by this author using knowledge or Research or information and dissemination or use or utilization produced only four of the many related articles from the journal. While Diffusion as a keyword would have extracted a few more, still indexers and users have a long way to match needs with resources.

C. Weaknesses:

Few empirical studies, few tested models, much redundancy Until more recent times, researchers used linear models, single outcome measures, and limited definitions of utilization (Larson in Rich, 1981:151; Huberman, 1987:589). They did not fully grasp at that time the complexity of knowledge utilization. Adaptive use, discontinued use, disuse, and misuse were not part of the utilization researcher's vocabulary. However, researchers did recognize some of the difficulties in designing empirical studies because few of them are compared to conceptual ones (Rich, 1981; Glaser et al., 1983; Wright, 1984). Many of the theoretical models proposed are relatively young, untested, or compared (Wright, 1984). Both Rogers (1983) and Huberman

(1987:587) identified the redundancy among studies and lack of newness within knowledge utilization studies.

D. Weaknesses: Biases

Rogers speaks of two significant forms of bias related to knowledge production studies and use pro-innovation bias and an individual-blame vs. system-blame bias (1983:92). The pro-innovation bias, Rogers says, is an often unrecognized and unstated assumption that innovations should be diffused and adopted. Such assumptions have led researchers to ignore the study of ignorance about innovations, underemphasize the rejection or discontinuance of innovations, overlook re-invention, and fail to study anti-diffusion programs designed to prevent the Diffusion of "bad" innovations (Rogers, 1983:92).

Recipients of funds for Research are more likely, Rogers says (1983:103), to "side with the change agencies that promote innovations rather than with the audience of potential adopters." This sometimes leads to individual-blame bias rather than system-blame, even when appropriate. Roe (1988) adds other biases in describing diffusion research criticisms, which overlap with knowledge utilization research. He points to (1) the tactics and goals of modernization and (2) the attempts to generalize from American Research and experience to "patterns of cultural and social change prevalent within developing nations" (Ibid, 50) several unresolved issues and underlying factors affects. The weaknesses.

IV. FACTORS AFFECTING STRENGTHS AND WEAKNESSES

Research traditions affect what is studied, how it is studied, and who works within studying the subject (Rogers, 1983:85). That fact is both the greatest strength and greatest weakness of studies in knowledge utilization. It is a strength in that it promotes replication of studies and consensual validation of the paradigms developed in a given discipline. On the other hand, it narrows rather than broadens the subjects studied and methods used in conducting the studies. It discourages the use of alternative approaches to research studies. Although some research traditions may be primarily associated with one or two universities, these transcend any one-university setting and form an "invisible college" (Ibid, 43). Before the sixties, many of the disciplines studying diffusion practices focused on one kind of innovation and studied in relative isolation (Ibid, 46). In the sixties, with its proliferation of government-funded Research and subsequent research

utilization projects, researchers began studying more intensely the diffusion studies results from other research traditions.

The government's funding patterns for Research have contributed to the peaks and valleys in knowledge creation, dissemination, and use. Funding sources and levels affect the volume of Research, the numbers, and quality of personnel to conduct utilization studies, the quality of equipment, the quality of facilities, and the quality of scientific information to disseminate and use (Nelson, in Rich, 1981:49-63).

V. SELECTED ISSUES AFFECTING STUDIES OF KU

Several issues surface when one studies knowledge utilization. The five chosen represent some of the complexity and global scope associated with knowledge utilization studies. Rogers highlighted the first issue in discussing the pro-innovation bias. Is Research inherently good, and should its results be promoted and used? Other issues equally important are: Who should have access to and control knowledge, primarily when produced with public funds? Is scientific knowledge the only form of knowledge worthy of significant transfer and dissemination efforts? What constitutes use? What research methodology should be used in studying knowledge utilization?

A. Is Research inherently "good," and should its results be promoted and used?

"Yes," say those who still believe social progress is inextricably linked to scientific and technological advances. "Yes," say change agencies and government agencies with a mission. Researchers say, "yes," provisionally; "use research if it is reliable and valid." Some imply that the Research must also be generalizable or conducted under selected methodologies. Besides the soundness of the Research, other factors add to the provisional answer of researchers. If the Research reflects societal biases, such use could reinforce rather than help eliminate those biases. Other researchers say that if the researchers collected the data unethically (e.g., in Nazi death camps), no matter how sound the research study, nor how well designed and conducted, Research should not be used (Leiter, 1989). Organizations holding patents for their research discoveries may have a different attitude about the inherent goodness of Research. It is suitable for their organization's survival and growth rather than for the public good. Therefore, they may deny use or demand compensation for use. Members of the public who have suffered the consequences of applied scientific and technological knowledge are questioning the efficacy of

use. While on the one hand, they enjoy the improved standard of living such use can bring, they reject the destructive and disabling features of some products and processes. Consider, for example, the differing effects on society of the atom bomb, pesticides, genetic engineering, institutionalization, deinstitutionalization, and sociologically planned communities (Dickson, 1984).

The pro-innovation bias that Rogers (1971:78,79 & 1983:92-94) identified among diffusion research studies assumes that new products or practices are inherently better than established ones; delay or rejection of innovations, therefore, may imply that late adopters or nonadopters are laggards, irrational, or conservative.

Roberts and Frohman (1978:33-34), in contrasting the changes in industrial research activities, believed that the myth of inherent goodness had been exploded. Active marketing of research results rather than passive production was now required. New technology was not inherently good unless it met some consumer needs.

Glaser (1983) reminds us that knowledge can be used to harm as well as to help. "It can put new tools into the hands of misguided or oppressive, powerful people" (Ibid, 4). Even when knowledge is used for beneficial purposes, harmful secondary consequences can occur. "Frequently, as a technology becomes more widely diffused and used, such secondary consequences increase proportionately faster than the primary benefits" (Glaser, 1983:4).

Because of harmful effects that sometimes result from innovations, Dickson suggests (1984:222) that the price of unrestricted scientific and technological progress may be too high. This leads us to the next issue.

B. Who should access and control knowledge, primarily when produced by public funds?

The question of access to and control of knowledge is a continuing and changing issue of international scope. The answers to the control question have implications for what is studied when it is studied, how it is studied, where it is studied, how much it is studied, who studies it, and how those studies are funded. The answers also have implications for who has access to and uses the results.

Debaters of the issue range from scientists to politicians, from policymakers to chief executive officers, and from practitioners to consumers (Dickson, 1984). After all, knowledge in this lauded information society and information age is a commodity, especially to universities and industries. Dickson adds that it is power for the military and imperialism for foreign policymakers.

Who, therefore, should control knowledge: its production and use? Scientists? The universities, corporations, or organizations from which the knowledge is derived? Perhaps the government should control access and use. If so, whose government should have control, developed nations only? Or should the people, the taxpayers, the public control it, and if so, how?

Regarding scientists' control, Woodrow Wilson expressed concern about the role of nonelected experts in government:

What I fear is a government of experts. God forbid that in a democratic society, we should resign the task and give the government over to the experts. What are we for if we are to be scientifically taken care of by a small number of gentlemen who are the only men who understand the job? Because if we do not understand the job, we are not free (Quoted in Wright, 1984:2 and Rich, 1979a:18). President Eisenhower, in his farewell message in 1960, echoed that same concern "public policy could itself become the captive of a

Scientific-technological elite'"(Quoted in Rich & Rydell, 1979 cited in Rich, 1981:26).

Dickson (1984) describes the scientists' control in the fifties and sixties in terms of cultural authority that subsequently faced challenges from the seventies' anti-science movement. The latter movement demanded environmental impact regulations and impacted studies as part of the scientific process. The eighties saw the pendulum swing back in the anti-anti-science movement. Its emphasis was economic impact. Dickson believes industrial and academic leaders are pointing to the scientific method as the key to the future international competitiveness of U.S. industry while at the same time "tightening private control over the channels through which research results are transferred from the laboratory to the outside world" (Dickson, 1984:313).

Dickson (1984) argues for a new politics of science that moves toward a democratic strategy. Such a strategy would minimize secrecy and publicly promote open discussions about research priorities, findings, and use. It is a strategy for science that encourages public participation in decision making about knowledge production and use. It recognizes the scientists' expertise in technical and purely scientific matters while giving the layperson a voice in the social and political arena (Dickson, 1984:260).

C. Is scientific knowledge the only kind of knowledge worthy of significant dissemination or transfer efforts?

While there is no consensus on science's definition, much less scientific knowledge, generally, that term has come to connote knowledge obtained and tested through the scientific method. The scientific method, according to Webster, consists of:

Principles and procedures for the systematic pursuit of knowledge involving the recognition and formulation of a problem, collecting data through observation and experiment, and the formulation and testing of hypotheses (1981).

Those principles and procedures vary in interpretation among the various fields of study. Therefore, the scientific method may involve Research that is inductive or deductive, quantitative or qualitative, value-laden or non-value-laden, laboratory-based or field-based, experimental or non-experimental, pluralistic or nonpluralistic, theory confirming or theory disconfirming. What is widely accepted about the scientific method is who practices it: researchers who are most often found in academic settings.

Though not everyone would agree, there are forms of knowledge besides "scientific" knowledge. There is knowledge passed down from generation to generation-through apprenticeships, parenting, and mentoring. There is knowledge gleaned individually from daily life experiences and reflection on professional practices. There is legal knowledge, banking knowledge, pastoral knowledge, and common sense that differ from scientific knowledge. There is also the knowledge that some businesses have used to increase profits in competition with less informed businesses. Furthermore, there is knowledge gleaned from exemplary practices.

Should equal efforts be made to identify and transfer exemplary practices as well as exemplary research findings? Several governmental agencies such as the Department of Education do sponsor exemplary practices projects. Those projects set criteria for exemplary practices in organizations and help promote the adoption of such practices. Should such efforts be increased, or should exemplary research findings be the primary target for knowledge transfer?

What about knowledge gleaned from individuals practicing and reflecting on their professional work? Should equal attention be given to linking the work of full-time researchers and full-time practitioners? Or should emphasis be placed on making each part-time in both worlds of practice and Research? Or should their worlds remain miles apart? Several authors suggest that practitioners objectively observe, document, reflect on actions taken and their consequences, and subsequently report the results. In this way, they too could contribute to the development of knowledge. Schon (1983) details how this could be done from the reflective practitioner perspective while Barlow, Hayes, and Nelson (1983), as well as Agras and Berkowitz (1980) and Kent (1985), detail models and methods from a scientist-practitioner perspective.

Finally, what about consumers' daily experiences: clients, students, patients, significant others? Should they have a more active role in contributing to the body of knowledge? Are they used actively throughout the research process, including the validation of research findings? Reason and Rowan (1981) point to signs of change in research methodology across fields of inquiry. Participatory Research, they say, is needed. Consumers need to be involved in the entire research process rather than merely as subjects. There are societal changes that also point to taking more seriously the involvement of all parties in producing and using goods, services, and knowledge. Some of those changes include consumerism, the self-help movement, the growing global economy, increased individual responsibility, and power shifts based on knowledge access, production, and use.

D. What constitutes use and the purview of knowledge utilization studies?

Definitions of knowledge utilization differed so much among researchers in the seventies that in 1977 Weiss questioned:

Is 'use' the adoption of research recommendations intact, the nudging of a decision in the direction suggested by research findings, the reinforcement of a likely decision by Research, the

consideration of research findings (even if these are overwhelmed by other considerations in the situation), rethinking the nature of the policy issue, redefining informational needs? What kind of use is 'real' use? Furthermore, how much is enough (Weiss, 1977:213 cited in Larsen, 1980:425)?

In 1981 Jack Knott and Aaron Wildavsky suggested from a policymaker's perspective a range of uses. Uses begin when the research findings reach the potential user's in-basket and end with the agency's consumer population's desired impact. Their chart of standards for use includes reception, cognition, reference, effort, adoption, implementation, or impact. By reception, they mean the policymaker has the policy-relevant information on their desk rather than in a file or on someone else's desk. Cognition refers to the actual reading, digesting, and understanding of the material. Reference implies a change in the frame of reference of the policymaker because of the new information. Effort furthers the utilization stages to encompass influencing actions and adopting the study's recommendations. Adoption implies that policy results from the policy-relevant information. Implementation takes adoption integrally into practice. Impact means the yielding of tangible benefits to citizens.

While few usage studies in the past centered on deliberate nonuse, misuse, selective use, and premature use, perhaps it is time that the subfield of knowledge utilization expands its range to be more comprehensive. Larsen states that no utilization is a legitimate study and essential beyond the policymaking studies in knowledge utilization (Larsen, in Rich, 1981:153; Larsen & Werner, 1981; Zaltman, 1980; Dunn, 1980). In defining what constitutes use, the timing, time, and consequences enter the picture. The consequences of use is a relatively new focus for researchers and needs greater attention. As the impact of personal computers and global networking is felt, the 1990s may very well witness a new interpretation of knowledge and its uses. I hope that mixed terms surrounding adaptive use such as modified use, cooperative use, and reinvented use will become standardized by then. E. What research methodology should be used to study knowledge utilization?

Researchers representing differing disciplines have touted the relationship between research methods and research findings. Their research methods identify many disciplines, and those researchers often believe the 'how' of the study is more important than the findings. Unlike those disciplines, the subject matter for utilization studies crosses disciplines and even transcends

them. As one might expect, its methodology is not guided primarily by the classical laboratory approach typical of the natural sciences nor by any one-field research method used in the social sciences.

In a review of the five major inquiry systems used in scientific methodology, Ratcliffe (1983) said, no one method works for all problems. Well structured and simple problems require one method while ill-defined and complex problems require another. Some methods begin with theories, while others begin with observations. Some methods synthesize; others create opposition. Some methods are best for transdisciplinary problems. What is vital to selection, he says, understands each method and what it does best.

The deductive inquiry system (Leibnizian) begins with theories and then proceeds to fact gathering. It is well suited to structured and straightforward problems. Validity is linked to proof for a proposition, the inquirer's scientific reputation, and internal or logical consistency (Ratcliffe, 1983:152-153). The inductive inquiry system (Lockean) is the "prototype of the experimental, consensual approach to inquiry" (Ibid, 154). Empirical work leads to theorizing rather than vice versa. Its strength is its rich database; its weaknesses include the fact that widespread agreement among the scientific community cannot guarantee any given paradigm (Ibid).

The synthesis inquiry system (Kantian) views theory and data as inseparable. It requires many perspectives on the problem and observations to produce valid information. Validity lies in the "degree of fit between the theory (deductive conceptualization) of the problem and the empirical evidence (fact net) specified as relevant by the theory" (Ibid, 155). This approach bodes well with ill-structured and complex problems. Its strength lies in its use of alternatives, and its weaknesses lie in its "inherently difficult, imprecise, and time-consuming approach" (Ibid, 155). The dialectic inquiry system (Hegelian) produces theoretical opposition on a given problem. Data sets expose the assumptions regarding the nature of the individual, society, and the world that informs each theoretical perspective. The intense conflict reveals to the public what might be obscured in inquiry systems that emphasize scientific community agreement (Ibid, 156). This system works best on challenging, complex, ill-structured problems with which there is little agreement and poorly on well defined and well-structured problems.

The relative inquiry system (Singerian) takes a holistic, synthetic, and transdisciplinary approach to problems that are continuing to unfold (Ibid, 157). This system is useful for studying other systems of inquiry. Science and human inquiry are not separate. Validity is only approximate and lies in data comprehensiveness from relevant populations and disciplines involved in the problem. Its weaknesses relate to "its enormous complexity and breadth of focus, and the potentially prohibitive costs of its application to substantive, 'wicked' social problems" (Ibid, 158).

In addition to discussions of multiple approaches to inquiry, Ratcliffe argues convincingly that qualitative and quantitative, subjective, and objective forms of Research are not on extremes. Instead, they are integral to one another regardless of the methodology selected. Numbers and words are part of the same phenomena. Theory, data, method, and measurement are equally dependent on subjective and objective behaviors.

Because of the process's complexity, knowledge utilization studies should not be limited to only one principal methodology. Larsen says (1981:154-159; 1980:424-429) that with cognitive processes to the study of knowledge utilization, direct observations cannot be the only method used. Indirect studies for conceptual uses or latent uses must be employed rather than the classic laboratory approach. Nor can single indicator studies be as useful as those focused on multiple indicators. Rich (1981:38) suggests the need to reassess the use of utilization as the dependent variable. He suggests that it is more appropriately used in research studies as "an intervening variable: use for what and what purpose?"

SUMMARY:

The knowledge cycle consists of knowledge creation, Diffusion, and utilization. Differing periods have given differing emphases to each component of the cycle. Knowledge utilization as differentiated from knowledge diffusion dates back to the sixties. At that time, early models used a simple linear view of knowledge use. Today the complexities and the dynamic, transactional aspects of knowledge utilization have become more widely recognized. Strengths associated with the budding field of knowledge utilization include its multidisciplinary approach, dedicated researchers, journal, society, and funding. Weaknesses include difficulties in information access, few empirical studies, few tested models, much redundancy, and biases.

Issues affecting knowledge utilization studies include debates over inherent goodness of research results, who should access and control knowledge publicly funded and produced, kinds of knowledge worthy of use, definitions of use, purview of utilization studies, and best research methods. The prosumer approach to knowledge production and use sides on these issues with equal access and control of knowledge, consideration of experiential and scientific knowledge, use of a wide range of research methods, and user control and responsibility for maintaining the integrity of the research results.

A LOOK AHEAD:

With the historical overview of knowledge utilization in mind, Division Three focuses on knowledge utilization within the Department of Education, emphasizing rehabilitation and, more specifically, the National Institute on Disability and Rehabilitation Research. It identifies the ways federal programs involve people with disabilities in the process of knowledge production and use.

A Short Selected List of Recent Books

Among the hundreds of books dealing with various aspects of Research and knowledge utilization in education, here are a few selected titles that may prove useful in obtaining an overview of more recent thought and practices.

1) Chapman, D. W., Mahlck, L. O. and Smulders, A. E. M. (eds) 1997. From Planning to Action: Government Initiatives for Improving School-Level Practice. Paris: UNESCO.
2) Fullan, M. 1993. Change Forces: Probing the Depths of Educational Reform. London: Falmer Press.
3) Haddad, W. 1994. The Dynamics of Education Policy Making. Herndon, VA: World Bank EDI Development Policy Case Series
4) Hargreaves, A., Lieberman, A., Fullan M. & Hopkins, D. (eds.) 1998. International Handbook of Educational Change. Boston: Kluwer Academic Publishers.
5) Hargreaves, A., Fullen, M. & Hopkins, D. (eds.) 1998. International Handbook on School Improvement. London: Cassell.
6) Hutchinson, J. & Huberman, M. 1973. Knowledge Dissemination and Utilization in Science and Mathematics Education: A Literature Review. Washington, D. C.: National Science Foundation.
7) Lindblom, C. & Woodhouse, E., 1993. The Policy-Making Process. New York: Prentice-Hall.
8) Murphy, J. & Louis, K. S. (eds.) 1999. Handbook of Educational Administration, 2nd edition. San Francisco: Jossey-Bass.
9) Reigeluth, C. & Garfinkle, R. (eds.) 1994. Systemic Change in Education. Englewood Cliffs, NJ: Educational Technology Publications.

10) Riley, K. & Louis, K. S. (eds) 2000. Leadership for Change and School Reform: International Perspectives. (Educational Change and Development Series). London: Falmer Press.

Select Bibliography

1) Brown, J. S., Collins, A. & Duguid, S. 1989. Situated Cognition and the Culture of Learning. Educational Researcher, 18(1): 32-42.

2) Cohen, W., Florida, R., Randazzese, L. & Walsh, J. 1998. Industry and the academy: Uneasy partners in the cause of technological advance. In R. G. Noll (ed.) Challenges to Research Universities: 171-199. Washington, D.C.: Brookings Institution Press.

3) Drucker, P. 1994. "The Age of Social Transformation," The Atlantic Monthly, November. Eidell, T. L. & Kitchel, J. M. (eds.) 1968. Knowledge Production and Utilization in Educational Administration. Eugene, OR: Center for Advanced Study of Educational Administration, University of Oregon.

4) Fuhrman, S. 1994, April. Uniting producers and consumers: Challenges in creating and Utilizing educational Research and development. In Tomlinson & Tuijnman (eds.),

5) Educational Research and Reform: An International Perspective (pp. 133-147). Washington, D.C.: U.S. Department of Education.

6) Glaser, E. M., Abelson, H. H. & Garrison, K. N. 1973. Putting Knowledge to Use: Facilitating the Diffusion of Knowledge and the Implementation of Planned Change. San Francisco: Jossey-Bass.

7) Hall, G. E., George. A., & Rutherford, W. 1979. Measuring stages of concern about the Innovation: A manual for using the SoC questionnaire (Report No. 3032). Austin: The University of Texas, Research and Development Center for Teacher Education. (ERIC Document Reproduction Service No. ED 147 342)

8) Hall, G. E., & Hord, S. M. 1987. Change in schools: Facilitating the process. New York: State University of New York Press.

9) Havelock, R. G. 1969. Planning for Innovation. Ann Arbor: Center for Research on Utilization of Scientific Knowledge, University of Michigan.

10) Kelly, G. A. 1955. The psychology of personal constructs. (vols. 1-2). New York: W.W. Norton & Company.

11) Kelly, G. A. 1963. Theory of Personality: The Psychology of Personal Constructs. W.W. Norton & Company.

12) Kozulin, A.1990. Vygotsky's Psychology: A Biography of Ideas. Cambridge, MA: Harvard University Press.

13) Kuhn, Thomas. 1996. The Structure of Scientific Revolutions. 3rd edition. University of Chicago Press.