

VARIETIES OF INTERDISCIPLINARY APPROACHES
IN THE SOCIAL SCIENCES: A 1981 OVERVIEW

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Presented at the Third Annual Conference of
The Association for Integrative Studies
April 3, 1981

Published in *Issues in Integrative Studies: An Occasional Publication of the
Association for Integrative Studies* (1982) pp. 1-37

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I. Historical Interplay between Specialization and Integration

Ever since the appearance of the social sciences as separate domains of inquiry in the late nineteenth century, an interplay has occurred between movements for greater specialization on the one hand and efforts at interdisciplinary integration on the other hand.¹

Auguste Comte, one of the founders of modern social science, envisaged a unified social science. In the middle of last century he expressed a concern that specialization in human thought, while permitting a "felicitous development of the spirit of detail otherwise impossible . . . spontaneously tends . . . to snuff out the spirit of togetherness, or at least to undermine it profoundly."²

Toward the end of the nineteenth century, the American Social Science Association was struggling heroically to keep the social sciences together and focused on solving human problems. But the centrifugal forces of specialization and professionalization associated with the industrialization of America spurred the establishment of one separate social science discipline after another. With the founding of the American Political Science Association in 1903 and the American Sociological Society in 1905 the original Social Science Association was reduced to an empty shell that totally collapsed a few years later.³ Yet, ironically, Professor Albion Small, one of the founders of the American Sociological Society and the first editor of its journal, wrote in 1910:

Specialized science, whether physical or social, inevitably passes into a stage of uncorrelated scientific piece-work. In this stage of dismemberment, science is as inconclusive through its lack of coherence as it was in an earlier period from its superficiality. That is, it then had breadth without depth, it now has depth without breadth.⁴

The Social Science Research Council was organized in the 1920's with the explicit purpose of providing a forum for integration across disciplines.⁵ And in the 1930's, Otto Neurath at the University of Chicago initiated an impressive effort to prepare an *International Encyclopedia of Unified Science*. Despite these efforts, a painful fact of reality was stated by R. S. Lynd in 1939:

The failure of the social sciences to think through and to integrate their several responsibilities for the common problem of relating the analysis of parts to the analysis of the whole constitutes one of the major lags crippling their utility as human tools of knowledge.⁶

The problem and the need have not disappeared to this day. In fact, the situation may have worsened in some respects while improving in others. Disciplines and subdisciplines are now more numerous and more firmly entrenched in the academy than ever. Yet the social movements of the sixties spawned several new interdisciplines which are still in existence. Moreover, the prevalent vocationalism of the seventies has shifted attention from the theoretical to the applied fields of study, which are by necessity interdisciplinary in nature.

An interdisciplinary program that offers a curriculum explicitly designed to help students overcome some of the fragmentation of knowledge soon discovers that neither students nor faculty are satisfied with a program that does not go beyond strident critique of excessive specialization or exhortations to "put things together, to make man whole again," no matter how cathartic this may be. To further complicate matters, the label "interdisciplinary" itself became a buzzword for all the curricular reforms introduced in the late sixties and intended to make college education "more relevant." A plethora of "innovative" "interdisciplinary" programs sprouted up all over the country. Many of these were stronger on admirable sentiment than on intellectually defensible content or structure.

Interdisciplinary faculty had to articulate more effectively just what it was they were about so that they could answer the students who wanted to know what interdisciplinary studies were as well as to respond to skeptical colleagues in the traditional departments who were displaying an increasingly jaundiced eye towards "all this interdisciplinary stuff."

During the turmoil of the late sixties I wrote a small paper in which I attempted to make some basic distinctions between various kinds of interdisciplinary approaches in the social sciences.⁷ A few years later the seminal OECD study appeared, entitled *Interdisciplinarity: Problems of Teaching and Research in Universities*. Not only did this study set the framework for almost all subsequent discussion on the subject, but it also established the term "interdisciplinarity" in our professional jargon.⁸

The early 1970's also witnessed that diffusionary phenomenon of an idea spreading like wildfire through the nation's higher academies, namely Thomas Kuhn's *Structure of Scientific Revolutions*.⁹ All at once, anyone not talking about the "paradigms" of scientific disciplines was hopelessly out of it. That included social scientists, even though Kuhn himself had called their disciplines "pre-paradigmatic." Interestingly, Kuhn's book is part of the first and only published volumes of Professor Neurath's *International Encyclopedia of Unified Science* mentioned above. Kuhn's work in the history of science does help us to clarify the meaning of that fundamental concept, academic discipline.

II. The Concept of Discipline

The term discipline refers to areas historically delineated by departmentalization. Thus in the social sciences the generally recognized disciplines are anthropology, economics, history, geography, political science, psychology and sociology. Within each discipline there are rational, accidental and arbitrary factors responsible for the peculiar combination of subject matter, techniques of investigation, orienting thought models, principles of analysis, methods of explanation and aesthetic standards. Each social science discipline looks at a part of the world of human behavior in its own peculiar way.¹⁰ They have divided this same material field into "several conceptually distinct levels, aspects, functions and dimensions."¹¹

In fact, disciplines in any field are characterized by their special filtering and interpreting devices. Over time, the members of a particular discipline acquire a shared set of principles by which their inquiries are directed. These principles direct the disciplinarian to observe certain facts out of the virtually infinite variety of possibilities. These facts are organized by the conceptions -- the "make-sense patterns" -- of the discipline, and thus are given meaning. As Joseph Schwab has so persuasively demonstrated,

The scientific knowledge of any given time rests not on the facts but on selected facts and the selection rests on the conceptual principles of the inquiry. Moreover . . . it is of the facts interpreted, and this, too, depends on the conceptual principles of the inquiry.¹²

The structure of the discipline, therefore, tends to determine what aspect of reality is studied, how it is understood, and the relative validity of the descriptive and explanatory statements derived therefrom.¹³

Kuhn's discussion of paradigms makes essentially the same argument about what guides scientific inquiry; only the concept paradigm is used to stand for all the elements defining a discipline mentioned above. In his 1969 postscript, Kuhn labeled the "common possession of the practitioners of a particular discipline" its "disciplinary matrix" and discussed four components: symbolic generalizations, beliefs (including beliefs in particular models), values and exemplars (the

previously successful problem-solving approaches). He now wishes to limit the meaning of paradigm to the last component, but admits that it will be difficult, as it has "assumed a life of its own."¹⁴

Whatever one calls the basic shared views of a group of scholars-teachers-researchers organized into a discipline, there is no doubt about their existence or their impact on the transmission and pursuit of knowledge. Speaking of higher education, Joseph Kockelmans recently observed,

Our world has become splintered and fragmented by the fact that each individual discipline has developed its own general conceptual framework, its own set of theories and methods, all of which in the final analysis rest on implicit philosophical assumptions and ultimately lead to different conceptions of the world.¹⁵

In other words, each disciplinary community shares its own unique world view.¹⁶

Robert Redfield described world view as the way a group of people organize their conceptions, their feelings about their experience and things in that experience. It is a "stage set." "World views are visions outward from the self . . . and conceptions of everything." They contain a sense of order, of what is real and how knowledge is obtained. They are the "underlying premises" of thought.¹⁷

The advantages of using "world view" as a conception in understanding disciplines are several. World view is a universal concept. Every culture, every subculture and every group has one. Students can more easily acquire an understanding of something if they themselves have experienced it. No arguments arise over whether a group has acquired one yet or not. The degree of unanimity surrounding a group's world view is a question to explore, but not its presence or absence. Furthermore, world view points to the conceptual construction which is used by a group to interpret reality. In my view, it is that conceptual framework, the associated images and metaphors, plus the understandings of relationships among them which pre-eminently influence how the members of one discipline think in contrast to the members of another discipline. It is not subject matter or the naming of a single central concept that identifies the essence of a discipline, but the predominant thought model or models. "Any kind of discourse in the social sciences presupposes a model which specifies the basic relationships of human beings to the environment. This is true even when the details of the model are not spelled out."¹⁸

Economics, which probably has the most conceptual order among the social sciences, has its market model. It is a fully articulated logical model with assumptions on human nature; a specified set of roles and relationships; a single, commensurable, all-pervasive indicator; a calculus; a mode of representation and a predictable set of consequences if certain conditions hold. Does it not meet Heckhausen's "most crucial criterion level of a discipline -- the level of theoretical integration"?

Each empirical discipline tries to reconstruct the 'reality' of its subject matter in theoretical terms in order to get hold of that overwhelmingly complex reality, in order to understand, explain and predict phenomena and events involving the subject matter.¹⁹

Certainly the degree and type of theoretical integration varies from one discipline to another, due largely to accidents of historical configurations. The range in political science from philosophers to behaviorists produces compartmentalized subfields; yet the elan of identity with the overall discipline manages to hold the parts together. In other disciplines, such as psychology, different schools of thought compete to explain the same subject matter: behaviorists vs. psychoanalysts vs. phenomenologists etcetera. As Professor Newell contends, these competing schools of thought do complicate matters further.²⁰ Nevertheless, there are underlying premises which members of disciplinary groups do share and which distinguish one group from another. Would anyone deny the existence of important world-view differences between political scientists and psychologists? The

problem comes in identifying them, describing them and finding ways to verify them.

Another advantage of using world view as the primary means of distinguishing one discipline from another is its efficiency. No one can learn all the research specialities, techniques and findings of a single discipline, let alone several. Nor can very many individuals be expected to achieve enough conditioning in several disciplines so that they fully internalize their respective paradigms. Needed is a consciously explicit, feasible and valid device for acquiring an effective comprehension of the key distinguishing attributes of the social science disciplines. World view meets that need.

Finally, world view provides a conceptual handle for making distinctions between different interdisciplinary approaches. To what degree components are coordinated and conceptually ordered provides one axis of differentiation. Shared underlying premises serve as another basis for categorizing.

The following taxonomy of different interdisciplinary approaches elaborates on a scheme which I proposed in my earlier paper. It has also benefited from other definitional and classification proposals²¹ which appeared in the 1970's, but it differs substantially from each of them. There is no eternal verity to the definitions or labels proposed. Nevertheless, the distinctions themselves are useful as an aid to communication within both educational and research contexts.

The three basic approaches to interdisciplinary study in the social sciences can be conveniently identified as multi-disciplinary, cross-disciplinary and trans-disciplinary. Interdisciplinary then remains the generic all-encompassing concept and includes all activities which juxtapose, apply, combine, synthesize, integrate or transcend parts of two or more disciplines. Multi-disciplinary activity involves juxtaposing, but experiencing little contact between the participating disciplines. Cross-disciplinary approaches involve real interaction across disciplines, though the extent and nature vary considerably. Trans-disciplinary approaches feature overarching thought models which propose to replace existing disciplinary world views.

III. The Multi-Disciplinary Approach

The multi-disciplinary approach involves the simple act (not easily accomplished in many graduate schools) of juxtaposing several disciplines. A student might take courses from several departments, or individual courses might be team-taught by professors from different disciplines. This approach involves no systematic attempt at integration or combination, but merely an exposure to more than one discipline. Many research teams and conference panels follow this pattern. Each disciplinarian does "his own thing" in his own universe of discourse. Consequently, communication is poor, and whatever breadth is achieved remains superficial. Introductory general-education courses in social science often take this multi-disciplinary form. Though interdisciplinary work of this "multi" kind may be better than narrow specialization, a questionable eclecticism tends to emerge. The most outspoken critics of interdisciplinary work usually have this approach in mind.

Nevertheless, whenever the public calls for solutions to a serious social problem, multi-disciplinary research teams tend to be established.

Undoubtedly, when it is a question of solving a problem bearing on social and economic development, it is essential to look beyond the horizons of one specialized discipline; it quickly becomes evident that many links exist between elements which a specialized monodisciplinary scientific analysis would be liable to separate, and the natural impulse is to go beyond the frontiers of particular disciplines in order to get a more general and complete picture.²²

The "real world" is not divided up in the same fashion as academic departments, and policy

proposals based on the narrow view of one discipline are at the least naive and in the worst case may lead to disastrous mistakes. Economists have learned this lesson the hard way, for many of their recommendations to the less developed countries have proven irrelevant or erroneous due to their failure to consider the social and political context or the applicability of their culture-bound models.

Many multi-disciplinary research projects produce reports with a chapter from each of the participating disciplinary specialists that show little evidence of communication between them. Professor Millikan of MIT, in reporting the results of a multi-disciplinary research project concerning agricultural problems in less developed countries, complained,

After we had conducted quite a number of these interviews we found we could pretty much predict the answer we would get from any particular specialist if we had enough information in advance about the nature of his specialty. Analysis of agricultural failures tended . . . to follow the discipline of the diagnostician. Each specialist would find that the factor familiar to him was crucial in the given situation, though he might also acknowledge the role of factors in fields other than his own. His prescription would read: 'Do something about my factor first -- and the others will follow.'²³

Professor Kenneth Boulding encapsulated this problem in verse:

Economists, it's plain to see
All think that prices are the key.
For no economy will grow
With inputs high and outputs low.

Markets and competition now
Must be the hand that speeds the plow –
Making in one Rostowian leap
Corn dear and fertilizers cheap.

Some think the answer lies in Risk;
Others, that land reform's the whisk
To brush away the blocks that bar
Development's immobile car.

For Anthropologists, Tradition
Remains the major inhibition,
And peasants, oftener than we think
When led to water, do not drink.

With facts too many now to list'em
The answer is a General System.
So what has got to be advised
Is 'get the stuff computerized.'²⁴

Some multi-disciplinary research teams actually begin talking with each other and start perceiving that communication difficulties are hindering their effectiveness. When they initiate efforts at translating, coordinating, combining and even building conceptual bridges, they are no longer a problem-focused multi-disciplinary group, but one with cross-disciplinary attributes.

Many so-called interdisciplinary courses are problem focused, and as long as the problem continues as the only common thread, they manifest the conceptual compartmentalization of the multi-disciplinary approach. A problem is a good place to begin, because it generates interest on the part of

students and faculty from several disciplines and the bringing together has value in and of itself. However, the problem does not provide a conceptual framework for its own analysis, but has to be provided by the investigators -- the teachers, curriculum builders, researchers. Good education should concern itself with human problems, but collective analysis requires general principles and conceptual frameworks which make possible not only a better comprehension of the nature of the problem at hand and possible solutions but also a set of analytical tools which can be transferred to the understanding of other comparable situations as they present themselves in the future.

IV. The Cross-Disciplinary Approach

Guy Michaud, in his introduction to *Interdisciplinarity*, while defining what I consider the generic term came fairly close to defining what I call the cross-disciplinary approach.

A cross-disciplinary group consists of persons trained in different fields of knowledge (disciplines) with different concepts, methods, and data and terms organized into a common effort on a common problem with continuous inter-communication among the participants from the different disciplines ... interaction may range from simple communication of ideas to the mutual integration of organizing concepts, methodology, procedures, epistemology, terminology, data, and organization of research and education in a fairly large field.²⁵

I have divided the current state of cross-disciplinary efforts into seven categories: topical focus, professional preparation, life experience perspective, shared components, cross-cutting organizing principles, hybrids and grand synthesis.

Cross-disciplinary topics frequently emerge from perceived social problem areas. Crime (law and order) is a social concern. Every one of the social science disciplines has something to say about crime. Cross-disciplinary research has been conducted on the subject. Cross-disciplinary courses and programs in Criminal Justice have been established at many institutions of higher learning. Another topical example is Area Studies. World War II gave a boost to Area Studies, and though their fortunes have varied over the years, most universities still offer one or more cross-disciplinary programs in Area Studies (Latin American Studies, East Asian Studies, American Studies, etc.). In response to labor-management conflicts, research institutes and academic programs in Industrial Relations were initiated around the country. More recently, problems in central cities have led to Urban Studies. Concern over an aging population has fostered the new cross-disciplinary field of Gerontology. Worries about the degradation of the environment were instrumental in the appearance of Environmental Studies. Some universities have an entire school devoted to Environmental Studies, such as Griffiths in Queensland, Australia. A few colleges are totally organized around this field, such as Green Bay, Wisconsin. The list of cross-disciplinary topics could go on and on: Religious Studies, Futurism, Human Sexuality Studies, and so on.

The degree of conceptual order in these topical studies varies greatly. In fact, some of the older ones, such as Area Studies, seem to be going through periodic identity crises. In my view these crises are highly related to low degrees of conceptual coherence. Environmental Studies usually has a high degree of conceptual integration, because it has the thought model of ecology,²⁶ which in turn has kinship with general systems -- a trans-disciplinary approach which will be discussed briefly below.

Academic programs organized around these cross-disciplinary topics frequently utilize courses taught by the various disciplines on their topics (Urban Sociology, Urban Geography, Urban Economics, etc. in Urban Studies programs) and are thus boundary-crossing in that respect. They are not necessarily limited to the social sciences in the disciplines on which they draw -- Environmental

Studies being a germane example in that respect. The programs based on these topics are generally considered liberal arts in nature, even though the familiarities acquired by students majoring or minoring in particular fields may be prerequisite to obtaining initial employment in them.

The next cross-disciplinary category, professional preparation, differs from the topical by being programmatically self-contained and self-defined as professional rather than a liberal arts education. It has an unequivocally clear vocational focus. Examples include Business (the most thriving field of study today), Nursing, Home Economics, Social Work, Recreation, Health Education, Public Administration, etc. These fields usually have national associations which set standards and accredit the institutions which meet them. The ritual of accreditation binds the practitioners together in common experience and curricula. Many have state certification procedures as well.

Though cross-disciplinary approaches which share a life experience perspective are not unknown in the past, the developments of the late sixties and seventies have made this category a much more prominent one than ever before. Academic programs in Ethnic Studies and Women Studies are outgrowths of the civil rights and women's rights movements of the recent decades. San Francisco State University, for example, has a B.A. program in Women Studies plus an entire School of Ethnic Studies, including programs in Asian-American Studies, Black Studies, La Raza Studies and Native American Studies, all established in the 1970s.

The fundamental premise of these life experience perspective programs holds that people who have experienced a similar state of oppression share a similar perspective on all facets of life which differs substantially from the perspective of those representing the white, male-dominated segment of society. The advocates of this view contend that science, especially the biological and social sciences, manifests this biased social reality as profoundly as any other social product.

Operating under the guise of objectivity scientists perpetuate a subjective myth of women's inferiority which is contrary to the life experience of women
When this leads to the kind of thinking which polarizes the objective and subjective, the rational and emotional, male and female, a dichotomy of knowledge is created which Women Studies rejects.²⁷

Though the life experience perspective cross-disciplinary programs of Ethnic and Women Studies claim to holistically encompass all disciplines normally taught within the university, they tend to be either more "humanistic" or "social scientific" in orientation. They are seeking their own unique conceptual framework. Women Studies has an excellent journal (*Signs*) in which this objective is explicitly pursued.

The cross-disciplinary category of shared components has a much longer and quieter history. Similar research methods are often shared across the empirical disciplines. Nearly all the disciplines and sub-disciplines in the social sciences utilize the techniques of statistical inference. Statisticians are supposed to be able to ply their trade in any disciplinary context. There are degree programs and professional associations in quantitative methods based on this premise. Many have contended that the mathematics of probability, or game theory, or information theory could serve as a converging conceptual vehicle, albeit at a high level of abstraction, cross the separate disciplines. The fact that the symbols in the mathematical structures are not immediately connected to any elements in the material field presumably serves as a special advantage. But not everyone has been convinced by this argument:

How can mathematical or computer models bridge the gaps between the various subject matters and their respective levels of theoretical integration for disciplines like economics, psychology and geography?²⁸

One component which the various disciplines do not share is a common language.

A basic law is that speakers of the same language, once isolated into separate communities, drift into local idiosyncrasies and eventual unintelligibility, once the discipline of common conversation is removed.²⁹

Yet this very lack has motivated some ambitious individuals to create a language into which all the differentiated disciplinary jargons could be translated -- a metalanguage. A few information retrieval projects have attempted this task, but none has been widely accepted, or even noticed much, for that matter. Creating an effective metalanguage is no easy undertaking, as my colleague Professor Bailis has observed.

First, single terms must be devised to stand for similar things and events that are differently named or identified in the disciplinary jargons.

Second, terms are needed to express relationships among interactive things and events which are discretely represented in the several jargons.

Third, these terms must be explicated in a way that represents the disciplinary elements (related conceptions, methodologies and subject matter claims) for which they (these terms) stand as coalescent with respect to a common material field.³⁰

This third requirement involves the means of "repairing the diremptions" which "pervasive specialism" has wrought.³¹

A popular cross-disciplinary approach involves the use of cross-cutting organizing principles which are usually encapsulated in a focal concept or a fundamental social process. The concept "role," for instance, can be used to organize ideas and findings across disciplinary lines. All of the disciplines use the concept role to signify certain types of human behavior, though this is embedded in the particular discipline's thought model (the consumer role in the market model, the person playing a role in the social structure as conceived by sociology's structural-functional model, an individual performing a role in history, a person serving as a "role model" in the conceptual framework of one school of thought in psychology, and so on). Another cross-cutting concept is exchange. People, whether in interaction with themselves, others, collectivities or the environment, can be conceived as engaging in exchange relationships. Though the nature and content of the exchange may differ, the overall form may not. Professor George Homans and others have gone further than just organizing findings, statements and research efforts around the concept of exchange: They have proposed an exchange theory which encompasses the total material field of all the social sciences and thus assumes the characteristics of a trans-disciplinary approach.³²

Social processes, like acculturation, socialization and modernization provide highly viable bases for cross-disciplinary cross-fertilization, cooperation and conceptual reorganization. In the course of centering attention on a human social process -- one that is widely experienced and that has observable dynamics with many interrelationships -- conventional disciplinary boundaries are often perceived as stultifying and confining. Modernization studies since World War II have amply demonstrated this point.

An integrated approach allows the researcher and the experimenter to concentrate on problems of development in general, no less than its parts. The option to this open-ended approach is a further emphasis on disciplinary boundaries. This would yield formal elegance at the expense of the whole spectrum: economic development apart from political development, political development apart from social development, etc.³³

In one sense modernization studies have turned specialization inside out, because it is modernization itself which has produced greater and greater specialization in all institutions of the

society, including the scientific enterprise. To then turn around and presume that the highly differentiated reality construction of modernity fits the more diffuse and holistic circumstances of less modernized societies flies in the face of the historical process which the more modernized societies themselves have just been through.

Probably the most readily recognized cross-disciplinary approach is the hybrids. These involve the combining of parts of two existing, related disciplines to form interstitial new cross-disciplines which attempt to bridge perceived gaps between disciplines. Well known examples include social psychology, economic anthropology, political sociology, biogeography, culture and personality, economic history, and so on. As Professor Bailis would note, an effort has been made to combine or converge certain levels, aspects, functions and dimensions.

Thus, where personality deals with an individual's organization for response to a perceived environment, culture, social structure, economy and polity all pertain to the collective or aggregate level of human activity. Moreover, where culture generally designates the symbolic aspect of collective behavior, the rules of right behavior that are ostensibly followed by an entire population, social structure most often refers to the material aspect, to the way that behavior is affected by membership in specific categories and groupings of people within a population. Polity and economy, on the other hand, view the collective level in terms of specific functions: how the power to make decisions for a people is allocated and used; how the material means of satisfying wants are produced, distributed and consumed. The material field of social science is also divided along the dimensions of time and space, for historians seek the pasts of various aspects, levels, and functions of human behavior, while their spatial distributions concern geographers.³⁴

Some of the cross-disciplines have developed very distinctive world views, which are then borrowed by scholars back in the home disciplines. Social psychology's symbolic interaction is one case in point.

Finally, there is the cross-disciplinary approach which I have labeled grand synthesis. I introduced this category to my taxonomy in order to distinguish certain proponents of unification of knowledge from my sense of the trans-disciplinary approach. The grand synthesizers are scholars who argue that interdisciplinarity correctly refers to the systematic integration of all disciplinary structures. They seem to envisage a merging-together of all the scientific disciplines that deal with the same material field, i.e., human behavior. Unfortunately, even though these disciplines may superficially share some attributes, the differences between them are formidable. They do not naturally tend to converge even when brought together in close interaction, because their frames of reference, their languages, their respective world views are fundamentally incommensurable. Each term, each proposition is inextricably embedded in the make-sense pattern of the discipline. There is really no feasible way to add up all the disciplinary components and produce a coherent whole.

V. The Trans-disciplinary Approach

The third major category of my classification schema is the trans-disciplinary approach. Trans-disciplinary approaches are articulated conceptual frameworks which claim to transcend the narrow scope of disciplinary world views and metaphorically encompass the several parts of the material field which are handled separately by the individual specialized disciplines. These overarching thought models are holistic in intent. They propose to reorganize the knowledge structure in the social sciences (and in some cases, other fields of inquiry as well). Though some supporters of trans-disciplinary approaches suggest that their favorite conceptual framework should actually replace existing disciplinary approaches, others see them as alternatives or as providers of coherence for cross-disciplinary efforts. The various trans-disciplinary approaches differ from each other in several

characteristics. One dimension in which they differ is the type of isomorphism claimed between their conceptual structures and the "real world" which they presumably represent. Some claim a greater specificity of correspondence and receptivity to quantitative manipulation while criticizing others for their loose formulations and weakness in empirical application. Supporters of general systems, one of the major trans-disciplinary approaches, sometimes criticize other trans-disciplinary approaches such as Marxism and structuralism in this fashion. Professor Phillips, an analytic-reductionist, criticizes all trans-disciplinary approaches for their methodological inadequacies; but as Professor Bailis states,

Holist conceptions clearly provide a different way of looking at the world We may be able to use such conceptions to investigate and understand the objects of our experience in fresh and interesting ways Furthermore, these conceptions are the heuristic guidelines of scientific inquiry and explanation. Modern holism's central ideas -- internal relations and isomorphism -- call attention to a pair of important possibilities. First, that it may be fruitful to regard as related or alike those things which we have learned to regard as different or discrete under the impress of analysis and reductionism. Second, that it may be fruitful to attempt to comprehend things so regarded under common sets of assumptions that cross-cut and even integrate our existing systems of knowledge -- our disciplines, if you will, that have become profoundly differentiated under the influence of analytic specialization.³⁵

Other trans-disciplinary approaches besides general systems, structuralism and Marxism include phenomenology, policy sciences, evolution, sociobiology, etc. (I am not making any claims to completeness or mutual exclusivity in this category list or in others in this paper. My intention is a better classification schema -- one that makes clear, helpful distinctions between different types of interdisciplinary approaches.)

Probably the most prevalent and influential transdisciplinary approach in American social science is general systems theory. It has its own professional association, and many disciplinarians have attempted to imperialistically absorb it within their discipline -- both sure signs of its stature. Robert Williams, a student of general systems theory and especially its modern father, Ludwig von Bertalanffy and its prolific current spokesman, Ervin Laszlo, has identified the six major tenets:

1. Nature is composed of a hierarchy of systems, each with a specific structure made up of certain maintained relationships among its parts and manifesting irreducible characteristics of its own.

2. Homologies or isomorphisms -- There are similar structural patterns up through the whole succession of physical, biological and social systems.

3. Similar developmental patterns are manifest throughout all of nature's systems. Evolution is toward order, integration, complexity and individuation and away from multiplicity and chaos.

4. Cybernetics -- Open systems are interacting wholes with inputs, throughputs and outputs of energy and information. Through negative feedback, systems maintain a dynamic equilibrium. Coding (communication triggers), negative entropy (organization of energy from the environment in order to maintain the system) and equifinality (different development paths can lead to the same destination) are basic concepts in the cybernetic model.

5. Macrodeterminism -- Prediction of individual events is neither possible nor necessary, though general movements and state qualities of systems can be predicted.

6. Holism -- Systems are viewed as integrated wholes of their subsidiary components and never as mechanistic aggregates of parts in isolatable causal relations.³⁶

Walter Buckley summarizes the advantages of the general systems thought model as a trans-disciplinary approach in another set of six points:

1. A common vocabulary;
2. A means of understanding large, complex organizations;
3. A synthetic approach that keeps things together in their holistic contexts;
4. A focus on information and communication nets;
5. The study of relations rather than entities with an emphasis on process and transition probabilities;
6. "An operationally definable, objective, non-anthropomorphic study of purposiveness, goal-seeking system behavior, symbolic cognitive processes, consciousness and self-awareness, and sociocultural emergence and dynamics in general."³⁷

Of course, many of these advantages can be questioned, and some critics accuse general systems of possessing the very attributes which it professes to avoid. They call general systems mechanistic, overly cognitive, prescriptive, too structured, not translatable into available mathematical relationships, open to serious misuse by zealots, etc.

The most extensive and successful application of general systems to basic social science has been done by Alfred Kuhn.³⁸ As above, the basic model is the cybernetic system -- a controlled, feedback system with three components: detector (information), selector (preferences) and effector (action). Individual behavior can be analyzed within this formulation, as can interpersonal behavior in which detector equals communication, selector equals transaction and effector equals organization. Interpersonal components can be combined into social composites. "This volume uses a conceptual structure which sees the basic social science disciplines not as sociology, economics and political science, but as communication, transaction, and organization, approached through a base in system analysis."³⁹ Despite earlier hopes by Professor Boulding and others that college curricula would be revolutionized by Kuhn's Herculean efforts, acceptance has not been overwhelming.

On the other hand, general systems as a conceptual approach enjoyed widespread influence across America in the sixties and seventies. It was the basis of the new approach to public budgeting introduced by the Kennedy administration and codified by President Johnson in the PPBS (Planning, Programming and Budgeting Systems) Executive Order, which influenced the planning and evaluation approaches to virtually all large organizations in the United States. The ecological movement also relied on general systems for much of the conceptual coherence in its intellectual case, though general systems itself incorporated some older ecological principles in its formulation.

Structuralism, another major transdisciplinary approach, shares some assumptions with general systems. These assumptions include the relatedness of all things, their organization into levels of isomorphic structures with laws of transformation, structures (or systems) manifesting homeostatic self-regulation and holism. But structuralists do not deal primarily with the empirical observables of systems, nor do they believe that the participants in them are necessarily aware of the latent structures which are influencing them. Structuralists look for the underlying formal structures, the deep structures, which they believe reflect the basic cognitive, biologically derived structure of human thought. They see these structures as binary oppositions, at times with mediators, such as hot-cold, me-other, raw-cooked, life-death, etc.

The unconscious activity of the mind consists in imposing forms upon content, and if these forms are fundamentally the same for all minds -- ancient or modern, primitive or civilized (as the study of the symbolic function, as expressed in language, so strikingly indicates) -- it is necessary and sufficient to grasp the unconscious structure underlying each institution and each custom in order to obtain a principle of interpretation valid for other institutions and other customs.⁴⁰

According to Professor Gardner, the structuralist position threatens the behaviorist and functionalist views which currently dominate Anglo-American social science, for not only does it rely on innate mental structures and non-historical, universal similarities but it also "finds no need to posit 'needs for' or 'functions of' structure."⁴¹ The most important part and test of the structuralist method in Professor Deetz's view is the effort "to take logical permutations from a formulated structural unity and find empirical instances in widely varying situations which fulfill these possibilities."⁴² Piaget, on several occasions, has suggested that structural analysis will provide the basis for eventual interdisciplinary integration.

Structuralism, especially the Levi-Strauss variety, has come under heavy attack from many quarters, including proponents of competing trans-disciplinary approaches such as Marxism. Marxism and structuralism differ in their starting premises, Marxism giving pre-eminence to the material forces of production in the formation of human societies, including its symbolic manifestations, whereas structuralists look to the deep structure in the human mind as influencing the eventual form of human customs and institutions.⁴³

Yet Marxism shares certain assumptions with structuralism and even with general systems. They all share the assumption of the interrelatedness and interdependence of nature. Marxism shares a belief in progressively differentiating evolution with general systems, but the driving force and form of the process are different. Some of the basic principles of Marxism have been applied to nature in general, such as continuous change through quantitative accumulation leading to periodic qualitative revolutions, but essentially Marxism is a non-discipline-specific thought model for the study of human societies and history. There are Marxist schools of thought, small though they may be, in all social science disciplines in the United States.

Change is continuous, teleological and ineluctable. It proceeds through the dialectic of contradiction -- one state leads to its opposite and the contradiction between them produces a synthesis which immediately generates its opposite, and so on. In human history the state of technology determines a particular mode of production, which in turn determines a particular set of productive relations -- classes, pre-eminently one of owners and controllers of the means of production and one of workers and non-owners -- which have a necessary built-in contradiction. The struggle between the classes finally reaches a climax, at which point a revolution occurs and the next mode of production comes on the scene. In his simplest model Marx identified five major modes of production in all of human history: primitive communism, slavery, feudalism, capitalism and communism.

Thus, if a researcher undertakes a Marxist analysis, he or she directs attention to the peculiar manifestations of the elements mentioned above in the particular society under study.⁴⁴ For Marx these materialist conditions have an objective reality about which scientific laws can be discovered. In capitalism, the mode of production to which Marx understandably devoted most of his attention, the controlling class -- the bourgeoisie -- is able to extract an exploiting surplus value from the workers -- the proletariat -- because of the nature of the system. In order to protect this power of oppression, the bourgeoisie engage in all means of tactics to prevent the workers from becoming conscious of their shared exploited state, including the encouragement of bourgeois social science with status-quo-supporting thought models.

Sociobiology, one of the newest fads in trans-disciplinary approaches, has been vigorously attacked by Marxists as yet another rationalization for capitalistic exploitation under the guise of scientific respectability. Sociobiology is the application of the principles of natural selection and evolutionist biology to the study of animal social behavior. It assumes that genes are selected out from a variable pool in interaction with the environment over time so that they provide for the maximum fitness to individual and kin survival and reproduction. This evolved genetic inheritance programs the possible range of human behavior, i.e.

the form and intensity of emotional responses and the more general ethical practices based on them, the thresholds of arousals, the readiness to learn certain stimuli as opposed to others, and the pattern of sensitivity to additional environmental factors that point cultural evolution in one direction as opposed to another. . . The challenge to science is to measure the tightness of the constraints caused by the programming, to find their source in the brain, and to decode their significance through the reconstruction of the evolutionary history of the mind.⁴⁵

The major spokesmen for sociobiology consider it the "new synthesis." "The only way forward is to study human nature as part of the natural sciences, in an attempt to integrate the natural sciences with the social sciences and humanities."⁴⁶ "No paradigm approaches natural selection in its ability to explain a wide range of behavioral phenomena among animals and none offers equivalent promise of cutting a clean swath through the morass of data and theory currently surrounding research on human behavior."⁴⁷ "The evolutionary epic is probably the best myth we will ever have."⁴⁸ Biology's evolutionary model has been incorporated into social science before, in the form of social Darwinism at the turn of the century. Most social scientists would agree with Professor Boulding that the results were "almost catastrophic."⁴⁹ Evolutionary models have always been prevalent within anthropology, though the extent of their influence has varied. After World War II, with the emphasis on modernization studies, many disciplinarians began looking for evolutionary theory to explain the process of societal development that eventuated in industrialization. Though there were analogies to biological evolution, the basic thrust was cultural evolution as an adaptive form of behavior to a changing environment. The environment was primarily changed by increases in knowledge, accumulating energy control, and improvements in the technology of production. Cross-disciplinary efforts were undertaken, and some suggested "the increased usage of evolution as a holistic concept for handling the increasing data dealing with the question of how societies change."⁵⁰ However, the effort did not receive wide backing, and then sociobiology took over the stage. The cultural evolutionists are fighting back, and the drama of competing world views goes on.

Biology, while it is an absolutely necessary condition for culture, is equally and absolutely insufficient; it is completely unable to specify the cultural properties of human behavior or their variations from one group to another.⁵¹

The trans-disciplinary parade could go on, but the above examples should suffice to demonstrate the nature of the category. It is a crucial category for interdisciplinarians, as it contains the contending synthesizing models. A curriculum in interdisciplinary social science is not complete if it does not include introductions to most of the major transdisciplinary approaches.

Thus we have three major approaches to interdisciplinary social science -- multi, cross and trans-disciplinary. Multi-disciplinary approaches are limited to the juxtaposing of disciplines -- usually generated by the need to deal with some social problem. Cross-disciplinary approaches involve an effort at connecting and combining across disciplinary boundaries. I have suggested seven categories of cross-disciplinary activity: topical focus, professional preparation, life-experience perspective, shared components, cross-cutting organizing principles or concepts, hybrids and grand syntheses. Trans-disciplinary approaches involve overarching non-discipline-

bound thought models, of which I have discussed four examples: general systems, structuralism, Marxism and sociobiology.

Though no immutable quality is claimed for these categories, I would like to exclude from the last category one approach which has been labeled trans-disciplinary. That is the approach which calls for "an all-encompassing philosophy of science that concerns itself with all essential aspects of all the sciences and disciplines."

This unity is continually to be brought about and accounted for by those who actually engage in scientific research. These efforts will remain fruitless if we cannot first come to some agreement about the totality of meaning in which, in light of our Western tradition, we would like to live, and about the position that the sciences will have in that totality of meaning in addition to religion, morality, the arts, and our sociopolitical praxis. And this agreement cannot be brought about except by philosophical reflection.⁵²

I cannot imagine a more difficult, if not impossible agenda to accomplish. The quest for the good life, for the solutions to all of humanity's problems, and for a unified world philosophy -- are all virtuous endeavors. An interdisciplinary background and orientation may be of assistance to those engaged in them, but they are comprehensive utopian quests, beyond the scope of the trans-disciplinary endeavors as defined in this paper.

Finally, I must reiterate that the above schema makes no claim to deep structural truth, or to clarifying all of the confusing diversity in the disciplinary and interdisciplinary arena within the social sciences. In addition, the taxonomy is a static one; yet an interdisciplinary activity that is a multi-disciplinary approach at one period may evolve through various steps into a new discipline at a later date, or it may dissolve back into its constituents, or something else may happen.⁵³ Since the observable world of academic groupings is not composed of internally consistent, unchanging, homogeneous entities, one can never be entirely sure that where one has placed something through personal impression of chosen modalities will coincide with others' views today or tomorrow. Nevertheless, it seemed worth a try to propose some order.

FOOTNOTES

¹Bert Hoselitz, *Reader's Guide to the Social Sciences* (Free Press: New York), 1959, pp. 15-16.

²Quoted in William Kapp, *Toward a Science of Man in Society: A Positive Approach to the Integration of Social Knowledge* (Martinus Nijhoff: The Hague, Netherlands), 1961, p. 60.

³Thomas L. Haskell, *The Emergence of Professional Social Science* (University of Illinois Press: Urbana, Illinois), 1977, pp. 230-31.

⁴Quoted in Ernest Becker, *The Structure of Evil: An Essay on the Unification of the Science of Man* (George Braziller: New York), 1968, p. 95.

⁵Martin Landau et al., "The Interdisciplinary Approach and the Concept of Behavioral Science" in Norman Washburne, ed., *Decisions, Values and Groups* (Macmillan Company: New York), 1962, p. 12.

⁶Quoted in Kapp, *op. cit.*, p. 3.

⁷Raymond C. Miller, "Interdisciplinary Social Science and San Francisco State College," mimeo, 1969.

⁸Leo Apostel et al., *Interdisciplinarity: Problems of Teaching and Research in Universities* (Organization for Economic Cooperation and Development, Centre for Educational Research and Innovation: Paris), 1972.

⁹Thomas Kuhn, *Structure of Scientific Revolution*, (University of Chicago Press: Chicago), 1962, 1970.

¹⁰Miller, *op. cit.*

¹¹Stanley Bailis, "The Social Sciences in American Studies: An Integrative Conception," *American Quarterly*, Vol. XXVI, No. 3 (August 1974), p. 205.

¹²"The Concept of the Structure of a Discipline," *Educational Record*, Vol. 43, No. 3 (July 1962), p. 199.

¹³Hugh .G. Petrie in "Do You See What I See? The Epistemology of Interdisciplinary Inquiry," *Journal of Aesthetic Education*, Vol. 10, No.1 (January 1976), pp. 29-43, calls these make-sense patterns of disciplines "cognitive maps." They include basic concepts, modes of inquiry, what counts as a problem, observational categories, representation techniques, standards of proof, types of explanation and general ideals of what constitutes the discipline.

¹⁴Kuhn, *op. cit.*, pp. 174-210.

¹⁵"Why Interdisciplinarity?" *Interdisciplinarity in Higher Education* (Pennsylvania State University Press: University Park), 1979, p. 145.

¹⁶Professors William Newell and William Green of Miami University in Ohio, in the recently written, unpublished "On the Nature and Teaching of Interdisciplinary Studies," develop their ideas on discipline in a similar manner, including the use of the concept "world view."

¹⁷*The Little Community* (University of Chicago Press: Chicago), 1955, pp. 86-95.

¹⁸Edmund Leach, "Models of Man," in William Robson, ed., *Man and the Social Sciences* (Sage Publications: Beverly Hills, California), 1974, p. 169.

¹⁹"Discipline and Interdisciplinarity," in Apostel, *op. cit.*, p. 84.

²⁰Newell and Green, *op. cit.*, p. 7.

²¹David Abbey, *Designing Interdisciplinary Studies Programs* (Board of Regents, New York State University: Albany), 1976; Apostel, *op. cit.*; Caroline Eckhardt, *Interdisciplinary Programs and Administrative Structure* (Pennsylvania State University Press: University Park), 1978; Joseph Kockelmans, ed., *op. cit.*; William Mayville, *Interdisciplinarity: The Mutable Paradigm* (American Association of Higher Education: Washington, D.C.), 1978; Richard Meeth, "Interdisciplinary Studies: A Matter of Definition," *Change*, Vol. 10, No.7 (August 1978); and Geoffrey Squires et al., *Interdisciplinarity* (Nuffield Foundation: London), 1975.

²²Pierre de Bie, "Multidisciplinary Problem Focused Research," *International Social Science Journal*, Vol. XX, No. 2 (1968), p. 200. For a full discussion of the problems of multi-disciplinary team research, see Margaret Baron Luszki, *Interdisciplinary Team Research: Methods and Problems* (The National Training Laboratories: Washington, D.C.), 1958.

²³Max Millikan, *No Easy Harvest* (Little, Brown & Co.: Boston), 1967, p. v.

²⁴*Ibid.*, p. xii, abridged version.

²⁵Apostel, *op. cit.*, pp. 25-26.

²⁶Stanley Cain, "Can Ecology Provide the Basis for Synthesis Among the Social Sciences?" in Morris E. Garnsey, ed., *Social Sciences and the Environment* (University of Colorado Press: Boulder), 1967, pp. 27-52.

²⁷Lynn Ellingson, "Asking the 'Women' Question," unpublished manuscript, San Francisco State University, p. 3.

²⁸Heckhausen, *op. cit.*, p. 87.

²⁹Donald Campbell, "Ethnocentrism of Disciplines and the Fish Scale Model of Omniscience," in Sherif & Sherif, eds., *Interdisciplinary Relationships in the Social Sciences* (Aldine: Chicago), 1969, p. 337.

³⁰Bailis, *op. cit.*, p. 207.

³¹Joseph Schwab, *College Curriculum and Student Protest* (University of Chicago Press: Chicago), 1969, p. 241.

³²Jack Mitchell, *Social Exchange, Dramaturgy and Ethnomethodology: Toward a Paradigmatic Synthesis* (Elsevier: New York), 1978.

³³Irving Louis Horowitz, *Three Worlds of Development* (Oxford University Press: New York), 1972, p. ix.

³⁴Bailis, *op. cit.*, p. 205.

³⁵Book Review of D. C. Phillips, *Holistic Thought in Social Science* (Stanford University Press: Stanford, California), 1976, delivered at the Behavioral and Social Science Book Forum, San Francisco State University, May 3, 1978.

³⁶Robert Williams, "Pillars of the Temple: A Brief Appraisal of the Various Elements of the General Systems Paradigm," unpublished manuscript, 1978; Ludwig von Bertalanffy, *General Systems Theory* (Braziller: New York), 1968; and Ervin Laszlo, *The Systems View of the World* (Braziller: New York), 1972.

³⁷Walter Buckley, *Sociology and Modern Systems Theory* (Prentice Hall: Englewood Cliffs, New Jersey), 1967, p. 39, as quoted in Jack Mahan, *Toward Transdisciplinary Inquiry in the Humane Sciences*, unpublished dissertation, United States International University, San Diego, California, 1970, p. 145.

³⁸ Alfred Kuhn, "A Manifesto for System-Based Unified Knowledge," Association for Integrative Studies Newsletter, No. 1 (September 1979), and his three books, *The Study of Society: A Unified Approach* (Irwin-Dorsey: Homewood, Illinois), 1963; *Unified Social Science* (Dorsey Press: Homewood, Illinois), 1975; and *The Logic of Social Systems* (Jossey-Bass: San Francisco), 1974.

³⁹ Kuhn, *Unified Social Science*, p. vi.

⁴⁰ Levi Strauss as quoted in Jean Piaget, *Structuralism* (Harper & Row: New York), 1971, pp. 110-11.

⁴¹ Howard Gardner, *The Quest for Mind* (Random House: New York), 1974, p. 221.

⁴² Stanley Deetz, "Structuralism: A Summary of its Assumptions and Conceptual Bases," *Review of Social Theory* (April 1973), p. 163.

⁴³ Gardner, op. cit., pp. 222-23.

⁴⁴ Irving Zeitlin, "Marx's Paradigm for an Analysis of the Structure and Change of Whole Societies," *Marxism: A Re-examination* (D. Van Nostrand Co.: New York), 1967, pp. 152-55.

⁴⁵ Edward O. Wilson, *On Human Nature* (Bantam Books: New York), 1979, pp. 6 & 49.

⁴⁶ Ibid., p. 7.

⁴⁷ David P. Barash, "Evolution as a Paradigm for Behavior," in Michael Gregory et al., eds., *Sociobiology and Human Nature* (Jossey-Bass: San Francisco), 1978, p. 32.

⁴⁸ Wilson, op. cit., p. 209.

⁴⁹ "Sociobiology or Biosociology," in Gregory, op. cit., p. 272.

⁵⁰ Claude S. Phillips, Jr., "The Revival of Cultural Evolution in Social Science Theory," *The Journal of Developing Areas*, Vol. 5, No. 3 (April 1971), p. 338.

⁵¹ Marshall Sahlins, *The Use and Abuse of Biology: An Anthropological Critique of Sociobiology* (University of Michigan Press: Ann Arbor), 1976, p. xi.

⁵² Kockelmans, op cit., pp. 151 & 153.

⁵³ Raymond C. Miller, "President's Task Force on Interdisciplinary Studies," mimeo, San Francisco State University, 1979.

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