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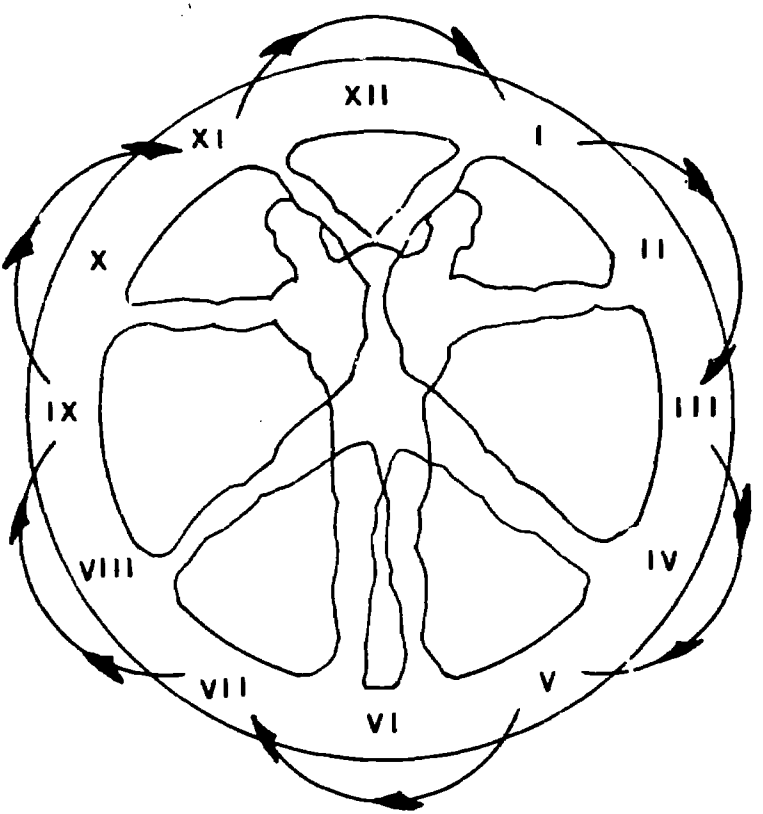
ABSTRACT

Within a setting of dynamic rather than static knowledge, the academic structuring of disciplines begins to lose meaning. Interdisciplinary courses are one result of this perception of knowledge. A polydisciplinary approach, however, would be a more accurate construct of reality. Given the following four aspects of a polydisciplinary approach to the study of man--environment, actions, knowledges, and pulsating growth--a three dimensional matrix described by the first three aspects, of which the fourth is an integral part, is possible. Each aspect breaks down into small parts: action consists of doing, deciding, dreaming, and discovering; knowledge consists of sciences, technics, humanities, and praxis; and environmental areas consist of socio, psychic, abiotic, and biotic. The interrelatedness of the parts becomes multifaceted in a three dimensional matrix. This approach is action-oriented in that it relates to existing situations that face man and involves an experiential study of the interactions of man and his activities. (Author/JH)

POLYDISCIPLINARY
Study of Man



MONOGRAPH 1973

A POLYDISCIPLINARY APPROACH FOR THE GENERAL STUDY AREA OF HIGHER EDUCATION

PROLOGUE . . . . . Professor William E. Huss

THESIS . . . . . Professor Rex A. Nelson

EPILOGUE . . . . . Professor Donald F. Hackett

monograph 1973

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PROLOGUE

The tremendous growth of knowledge has not only changed basic assumptions about man and his universe, but has given rise to the expression of the new perspectives in terms which have little in common with their conventional dictionary meanings. Such terms as "system", "personality", "culture", or "communication" are meant to be understood as shorthand descriptions of total configurations of a distinctive kind. They are used to identify wholes which cannot be reduced to discrete constituent elements and parts. Moreover, many of the new concepts do not refer to a static situation but are intended to embody the idea of process and change.

New theories and insights cut across the usual academic disciplines "Communications theory", for example, cannot be adequately subsumed under the traditional headings of physics, chemistry, biology, psychology, sociology, or anthropology.

When man projected himself out into space, he had to release his thinking. He was forced to change his ideas about the nature of knowledge itself. His attitude toward knowledge as fixed and static was changed to an understanding of knowledge as moving and dynamic in a space-oriented world combined with a new understanding of the basics of systems and structures.

The new ideas and concepts also convey a more flexible, less dogmatic approach to knowledge itself. Anchor points of understanding are continually being revised and scientific conclusions are considered as a "temporary codex", not as absolute and unalterable assertions.

To meet this challenge, Dr. Rex A. Nelson developed a multidimensional systems structure of knowledge to be used as an improvement on the atomistic arrangement of information.

The multidimensional approach developed by Dr. Rex A. Nelson effected a joining of efforts of scholars of the sciences, humanities, technologies, and applied arts in piecing together an understanding of the nature of knowledge. The new understanding was based on the discovery that the principles and concepts developed for one discipline are relevant to the others.

Perhaps this monograph may stimulate faculty groups to become instruments for cross discipline efforts in the application of knowledge to the problems of man.

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A POLYDISCIPLINARY APPROACH TO GENERAL STUDIES

Introduction

A merger of disciplines, knowledges, and man's actions presents a process of involvement and investigation of experiential situations for learners in the general studies area. This merger should make the learning process relate to the realities of man's existence rather than merely being a prescriptive or descriptive process. If the merger includes only actions which relate to a single discipline, only a two-dimensional study would result. This two-dimensional study would not relate to the realities of man's existence where situations are multi-dimensional. Consequently, a polymerization of disciplines is necessary to add the "actions" area to the knowledge and environmental areas before learning can reflect the realities of man's existence where knowledges, actions and environments blend into a single entity.

The polymerization of disciplines to include the environments, knowledges and actions of man can best be described by defining the process of polymerization. In polymerization:

> The method may be linear, by addition of small structural units to form a chain; cyclic, by the formation of rings; or cross-linked, by a three-dimensional fusion of either linear or cyclic elements. (6)

The nature of a study which polymerizes disciplines to study man, his knowledges, actions and environments, merges these elements into a whole rather than fragmented study. The learning process, therefore becomes an involved experiential investigation, rather than a mere acquisition of information or a prescriptive or descriptive process. The learner therefore studies a unified rather than fragmented man utilizing knowledges to take actions in environments. Consequently, the learner may begin to know man (himself) in perspective, and, to identify an area of specialization while keeping all man's knowledge in proper relationship to man's actions and environments.

The rationale for the polydisciplinary approach to general studies evolved from a study of the many attempts to enlarge learning for the general studies area. Evidently, these attempts have been made due to the inadequacy of utilizing courses from isolated, or one dimensional, disciplines to provide general studies learning experiences. Apparently it is presumed that these single dimension experiences will somehow be congealed into relevant knowledge by learners who are seeking their identities, relationships, and purposes within the galaxy of man's existence. Frequently these fragmented discipline courses, which were originally designated for general studies, have evolved into prerequisites designed for specialized studies within the disciplines.

The need to alleviate these difficulties is evidenced by the efforts of singular discipline areas to develop cross-discipline studies for the general studies area. These efforts have been accepted and developed to the extent that definitions have been made of the approaches. Most of these approaches are encompassed by the definitions of two of these efforts: (a) the inter (or multi) disciplinary effort which is, "characterized by participation or cooperation of two or more disciplines or fields of study;" and, (b) the intra-disciplinary effort where the study is, "being or occuring within the scope or academic discipline or between the people active in such a discipline." (6)

The attempts at cross-discipline approaches for the general studies area, seemingly, negate the realities for situations which face man. In situations facing man, disciplines, knowledge and action merge and are not isolated. By not relating to the actions of man, these efforts tend to deny the existing realities of man to the learner by providing a single dimensional study of knowledge for the sake of knowledge.

The polydisciplinary approach is designed to alleviate the separatism of disciplines in the general studies area by eliminating the need for numerous single discipline courses in this area. Through this approach students are provided the opportunity to: (1) learn that academic disciplines and man's actions, knowledges, and environments are not isolated one from

another, but merge in man's total existence; (2) identify their future academic speciality from real s[illegible]tions facing man; and (3) identify how their selected academic [illegible]iality relates to the existing realities of man.

A Review

Numerous reports are made of cross-discipline attempts within the academic structure. The content for these reports is drawn from professionals, both within and without the academic structure, who are concerned with the value and relevancy of learning in the general studies area.

A report by Daniel Aloert, on "The Role and Structure of Interdisciplinary and Multidisciplinary Research Centers", published by The Council of Graduate Schools, indicates the numbers and types of cross-discipline efforts. The annotation of this report states that:

> Although innumerable interdepartmental institutes, centers, and laboratories have been established on U. S. campuses since World War II, they are largely ineffective and unproductive. There are three distinct types: (1) the cross-disciplinary centers, in which researchers with problems in one discipline seek new methodologies, solutions or problems from

another discipline; (2) the multi-disciplinary centers in which individual scholars from different disciplines share facilities. . ., and (3) the inter-disciplinary centers where the problem determines the selection of personnel involved in a given project. (1)

Peter Drucker, in his book, The Age of Discontinuity, devotes much effort to the changing approaches to new and existing knowledges. He indicates a need for more than just cross-discipline approaches when he states that:

> The emergence of knowledge as central to our society and as the foundation of economy and social action drastically changes the position, the meaning, and the structure of knowledge. Of all the discontinuities dealt with in this book, this is one of the sharpest and most important one. (Italics mine) Knowledge areas are in the state of flux. The existing facilities, departments, and disciplines will not be appropriate for long. . . What is totally new, however, and in contradiction to all the modern university has ever believed, is the shift away from disciplines as the center of teaching and learning. . . Now we are increasingly organizing

knowledge and the search for it around areas of application rather than around the subject areas of the disciplines. Interdisciplinary work has rapidly grown everywhere these twenty years...

This is a sympton of the shift in the meaning of knowledge from an end in itself to a resource, that is, a means to some result. What used to be knowledge is becoming information.

We will, therefore, see more and more of the work of the university organized towards areas of effectiveness rather than toward a discipline. (3)

Drucker's identification of snifts from single disciplinary studies to interdisciplinary approaches gives impetus to the statement that the search for knowledge is increasingly taking place around areas of application rather than a mere acquisition of information. Apparently the search for knowledge around areas of application precludes the previously defined cross-discipline efforts since in application, knowledge goes beyond its own sake and the academic structure.

The assumption that cross-discipline efforts need to be extended beyond the academic structure is emphasized by Martin Tarcher in a paper entitled, "Leadership--Organization and Structure," delivered to the 1967 National Conference on Higher Education. In this paper Tarcher states that:

> There is no knowledge without understanding of relationships. And the relationships we wish to understand are those between man and nature, man and man in his natural and social settings. No meaningful relationships however, no problems, are so obliging as to fall graciously within the limits or boundaries of any single discipline. So long as we ignc e the comprehensiveness of all things; so long as we continue to divide our institutions into clearly defined and delimited departments and cram each department with sharply defined and delimited specialities within specialities, we shall continue to graduate men and women who are alienated from the realities of their time. (4)

Tarcher emphasizes that knowledge and learning should not be delimited to "specialities within specialities", but should be extended to the realities of man. His paper further stresses the need for a comprehensiveness of learning which relates to the nature and setting of man in situations beyond the academic structure.

Arnold Toynbee, in his book Experiences, relates his early discovery of the need to extend learning beyond that of merely accumulating knowledge. He states that:

> I had now (1911) found a way of my own for banning infinity. Instead of going on acquiring knowledge ad

infinitum, I had started to do something with knowledge that I had already possessed, and this active use of knowledge gave direction, for the future, to my acquisition of knowledge. I would limit infinity by directing my acquisition of knowledge to meet the demands of action. The knowledge was there, at my disposal, stored on the shelves of libraries and in galleries of museums. I need not after all, be in such a hurry to master it, for it would not run away. I could and would take as much of it as I wanted, when I wanted it, for use in making something with it. In other words, I would acquire knowledge, henceforward, for use in projects of my own, not for the sake of satisfying an imaginary post-mortem examiner. (5)

Toynbee strongly emphasizes the need to extend the acquisition of knowledge beyond the academic structure or "for the sake of satisfying an imaginary post-mortem examiner." By directing his acquisition of knowledge to meet the demands of actions he eluded "the fate of becoming a life-long examinee." (5)

The preceding are only a few statements from the many reports that pertain to cross-discipline efforts. The content of these documents not only reflect a need for cross-disciplinary efforts within the scope of the academic structure, but also, indicate a need to merge cross-discipline efforts with the activities and demands for actions in existing situations which face man.

A POLYDISCIPLINARY STUDY OF MAN

The following is a description of a polydisciplinary approach to the study of man for the general studies area.

Man, a relatively defenseless biped, has evolved to a place of dominance through his approaches to and knowledges gained from actions taken in the situations he has faced. Man takes actions to meet situations in his environments through the use of knowledge gained from prior actions. A study of the interface between the activities of man and his existence reveals the presence of four major factors. These four interfacial factors are: (1) the factor of environments; (2) the factor of actions being taken; (3)the factor of knowledges being used and expanded; and (4) the factor of time and the resulting pulsating motion of growth. These factors merge in the reality of situations which face man and give impetus to the study of man.

In the polydisciplinary approach these four factors are studied as they relate to man in real situations beyond the academic walls. Thus, the polydisciplinary approach differs from other inter-disciplinary approaches which attempt to broaden the study of man, but, usually only involve elements within one dimension, such as the sciences in the knowledge area.

The polydisciplinary approach to the study of man merges and blends multi-dimensional factors into an understandable and viable study of man and the existing situations which face man.

The polydisciplinary study of man integrates the environmental, knowledge and action areas of man. This approach presumes that there is a need for blending disciplines and purposefully attempts to assist students in learning how to learn; relating to man and his environments, actions, and knowledges; and identifying how they and the application of the theory and data of their future individual disciplines merge into the broader context of existing realities of man. The study intimately involves students in investigative situations of the environments of man, the actions man takes in these environments, the knowledges he uses to take these actions, and the resulting new knowledge gained from man taking action in his environments.

MATRIX OF MAN'S EXISTENCE

In order to identify and describe the components of the polydisciplinary approach to the study of man, a matrix of man's existence is utilized. The aggregate of the systems involved in the four factors, environments, actions, knowledges, and pulsating growth, are encompassed by the matrix. Since the motion of growth in the other three factors is pulsating with time, it is an integral part of the composition of the other three, consequently a three dimensional matrix is used to identify and describe areas of man's existence and the components of the polydisciplinary approach. The matrix assists in the identification and description of the polydisciplinary approach, shows the interlocking of the areas and elements involved, and assures that input from all four of the interfacial factors of man's activities

and existence are included when a situation of man is being studied.

The first order matrix of the polydisciplinary study illustrates the three broad areas of man's existence, environments, knowledges and actions. (see Figure 1)

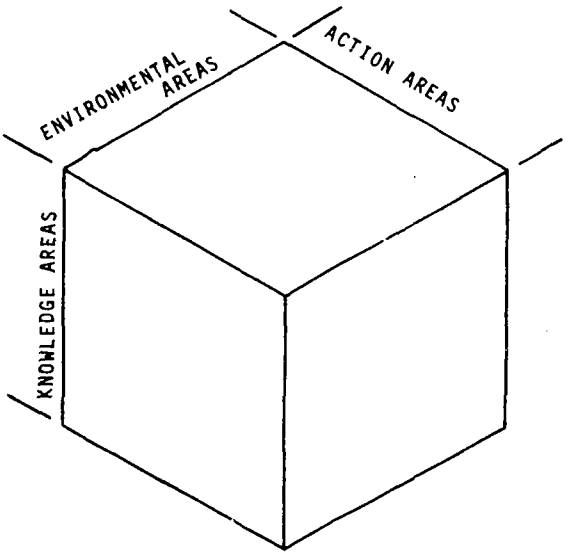

Fig. 1 - First Order Matrix for Polydisciplinary Study of Man

These three broad areas are brought together in the study of existing realities of man, and each contains more than one element.

ELEMENTS IDENTIFIED

The second order matrix of the polydisciplinart study illustrates the elements of the three broad areas of man. Figure 2, shows that these elements involve the biotic abiotic, psychic and socio environmental areas; the discovering, dreaming, deciding and doing action areas; and the sciences, technics, humanities, and praxis knowledge areas. (see Figure 2)

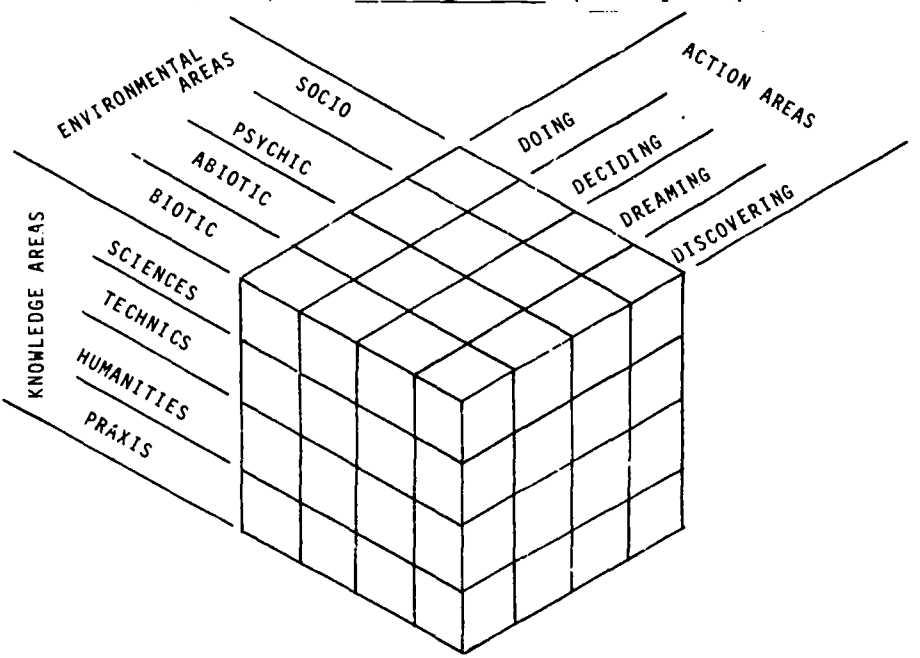

Fig. 2 - Second Order Matrix for Polydisciplinary Study of Man

The second order matrix illustrates that these elements are interrelated within their respective broad areas, interlocked with each other across broad areas, and merge in the study of existing realities of man.

The environmental areas include four elements (Fig.2). These four elements are: (1) the biotic environment, which comprises all living or animate components, including biological man; (2) the abiotic environment, which comprises all non-living or inanimate components, including man-made objects; (3) the psychic environment, which comprises the mental, emotional and spiritual phenomena of man; and (4) the socio environment, which includes the cooperative and interdependent components of man.

These environmental areas of man are usually studied as separate disciplines, interdisciplinary within the environmental areas, or multi-disciplinary utilizing two or more of the environmental areas; seldom have they been blended into interacting integrated systems as happens in real life. Futhermore, where cross-discipline studies have been involved, the action and knowledge areas of man have been largely neglected.

The action areas include four elements, (Fig. 2) These four elements are: (1) discovering, embracing actions man takes to explore his identity, his environments, and his relationships; (2) dreaming, embracing actions man takes to improve on the past, to make the present palatable, and to project himself into the future; (3) deciding, embracing actions man takes to determine his direction; and (4) doing, actions man takes to bring ideas into reality, to achieve things he is capable of achieving, or in pursuit of a goal.

The inclusion of the action areas of man in cross-discipline studies have been grossly neglected. This neglect possibly has stemmed from an attitude that actions of man do little to extend knowledge and consequently are not worthy of inclusion in cross-disciplinary efforts. This attitude, while correct in substance, negates the real responsibility of study simply because study should either result in action or non-action in the environments, or, the result is study for the sake of study. Futhermore, for either theoretical or applied knowledge to be of value it must be put to the test of a changed behavior, or, spring from man taking actions in environmental areas.

The knowledge areas include four elements (Fig. 2). These four elements are: (1) sciences, man's knowledge of what is in the environmental and action areas, obtained through observing and classifying facts; (2) technics, man's knowledge of what could be in the identification and development of techniques in pursuit of purposeful change in the environmental and action areas; (3) humanities, man's knowledge of what should be in determining human attributes and qualities in the environmental and action areas; and (4) praxis, man's knowledge of using information and skill in developing the practice of making or doing things in the environmental and action areas.

Probably the least neglected of the areas of man, in cross-discipline efforts, are the knowledge areas. Most cross-discipline efforts have utilized the knowledge elements either singularly or in multiples, although, a few recent efforts have attemped to

utilize the environmental areas alone, in multiples or merging with singular or multiple knowledge areas. Cross-discipline efforts which involve only the knowledge areas tend to deny the existing realities of man by studying knowledge for the sake of knowledge. This leaves something to be desired especially where the cross-discipline efforts involve students who are seeking an understanding of man, their identities, and how to relate to man and his environments, actions, and knowledges.

The elements of the knowledge areas in the polydisciplinary approach represent man's study of information which results in knowledge (Fig. 2). The elements in the knowledge areas encompass: (1) the sciences, where man studies his environments and actions with the purpose of discovering new information or knowledge about his environments and/or actions; (2) the technics, where man studies discovered information or knowledge in order to identify and develop techniques to make use of the new knowledge in pursuit of purposeful change in his environments and/or actions; (3) the humanities, where man studies identified or developed techniques to decide which technique(s) he will put into practice to bring about a felt or needed change in his environments and/or actions; and (4) the praxis, where man studies to perfect or develop the practices he uses to bring about the new or continued change he wants or needs in his environments and/or actions.

A POLYDISCIPLINARY EXAMPLE

The third order matrix of polydisciplinary study illustrates the blending and interrelatedness of the approach as students engage the equation of man, environments, actions, and knowledges, (see Figure 3).

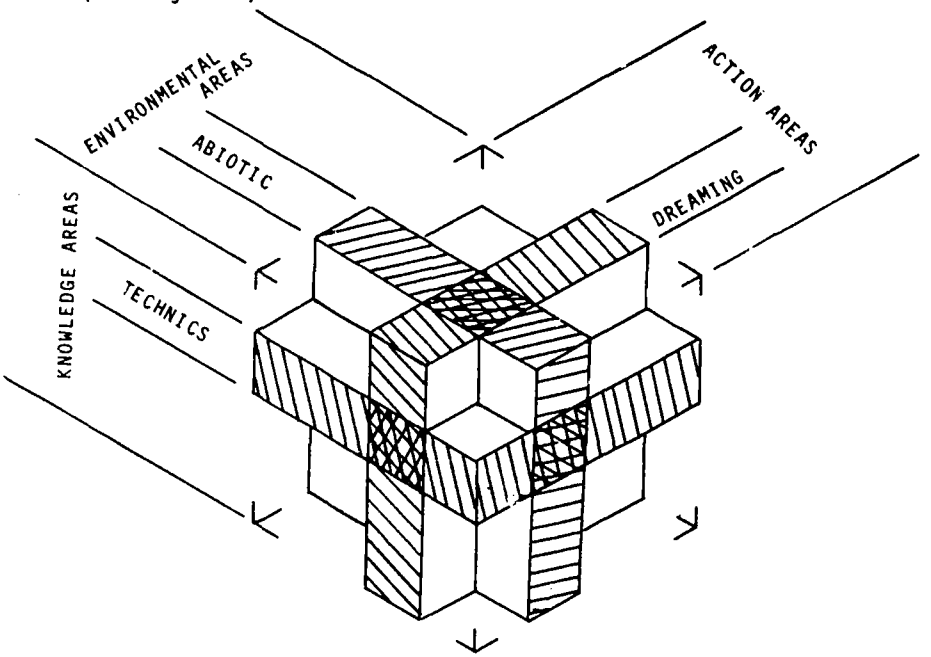

Fig. 3 - Third Order Matrix for Polydisciplinary Study of Man

Figure 3, provides a graphic example of a situation for investigation involving man dreaming about uses of technics in the abiotic environment. The fact that this third order matrix extends the investigation to the extremities of the matrix indicates that the remaining environmental, action and knowledge areas, while not

at the core of the situation being investigated, are interrelated and considered in the investigation.

Figure 3, graphs only one of the options available in the polydisciplinary approach. The approach is applicable whether the situation to be investigated has an environmental, action or knowledge base. Regardless of the base from which the situation appears to stem, the approach is designed to involve the three areas of man and the intimate personal participation of learners as they learn how to learn, how to relate to the areas of man, and to identify how they and their future individual disciplines merge into the broader context of the existing realities of man.

SUMMARY

The polydisciplinary approach to the study of man is inclusive of major discipline areas. But, more importantly, the approach blends disciplines into an understandable and viable study of man by mobilizing the energies of students, teachers, consultants, and study materials around existing situations facing man. The polydisciplinary approach precludes other cross-discipline approaches. It precludes the inter-disciplinary approach, which usually involves only one of the elements of the broad areas of man, such as science; and the multi-disciplinary approach, which usually involves only one of the broad areas, such as an environment. The polydisciplinary approach unifies disciplines into a study which reflects how the disciplines exist in situations which face man. Subsequently, the learners who engage the equation of the polydisciplinary approach have the opportunity to discover

that a unified, rather than fragmented man is utilizing knowledges to take actions in environments.

The polydisciplinary approach also presents learning experiences through involvement and investigation of experiential situations. The merits of the polydisciplinary study of man can best be stated by describing what it is designed to do. The approach is designed to:

1. Provide students with experiential learning which will assist them in entering a society increasingly in need of specialists, who see the theory, data and application of their individual contributions within the broader context of man's environments, actions and knowledge.

2. Assist students in learning how to learn and to prepare themselves to meet the challenge of change and its intra-relationships.

3. Assist individuals in understanding man and his environments, actions and knowledges and the realities of living.

4. Assist individuals in identifying and selecting a discipline for study.

5. Eliminate the need for numeruous single discipline courses in the general studies area, thus shortening the time now required of students in this area, thus more

effectively using the time now required of students in this area.

The polydisciplinary study is not a study of disciplines, but is based in a study of situations of man wherein disciplines merge and wherefrom they emerge and develop. The polydisciplinary approach is an involved and experiential study of the interactions of man in his activities by learners as they seek their identities, relationships, and purposes within the galaxy of man's existence.

A quote from J. Bronowski's work on The Identity of Man possibly gives meaning to the polydisciplinary study of man. In his third essay entitled, "Knowledge of Self", Bronowski writes:

> I hold that each man has self, and enlarges his self by his experiences. That is he learns from experience; from the experiences of others as well as his own, and from their inner experiences as well as their outer. But he can learn from their inner experiences only by entering it, and that is not done merely by reading a written record of it. We must have the gift to identify ourselves with other men, to relive their experiences and to feel its conflicts as our own. And the conflicts are the essence of experience. (2)

by: Rex A. Nelson

EPILOGUE

The serenity of educators is again being threatened, this time by a relatively new interdisciplinary approach in which the application of knowledge to the problems of man is combined with a new understanding of the basics of systems and structure.

Perhaps it is appropriate at this point in time to consider the consequences of a practical application of the philosophical statement presented by Professor Nelson. It may be further appropriate to establish the notion that a crucial test of any product is an examination of its performance characteristics under a practical load.

Intellectual endeavors of such leaders as Plato and John Dewey have provided concepts dealing with the structure of knowledge and its application to educational processes. The application of these principles has been exemplified by Professor Nelson in the development of the matrix for a polydisciplinary approach. He has taken ideas of Plato and John Dewey and nurtured them into an organically whole, completely intergrated, but stronger-than-fact logical structure.

The reflections of Plato created the concept that Man uses information to define, analyze, assess, compare and otherwise deal with the world around him. These processes become saleable skills for individuals in a knowledge oriented society; they are the behaviors of man--of homo sapiens. It is ironic to note that knowledge as information, was placed into categories of school subjects long after Plato's time.

John Dewey believed that learning must be based in the experiences of the learner as an individual. He recognized that subject matter is only a means to the important ends of the learner becoming human.

Professor Nelson has developed a structure of knowledge where the learning process is an "experiential investigation." He believes that in any discipline the learning process should not be developed as knowledge for the sake of knowledge, but rather for action.

The interdisciplinary approach effected a joining of efforts of scholars in humanities, arts, sciences, and technologies in piecing together an understanding of the nature of knowledge and action. The new understanding was based on the discovery that the principles and concepts developed for one discipline are relevant to the others. This led to experimentation and manipulation of the basic structure of man's knowledge to achieve desired ends.

Professor Nelson suggests that it is desirable to introduce the student to the process of learning and to the interdependence of knowledge by placing him in a problem analyzing situation. From this experience of undetermined length, the student may begin to know and understand himself in the perspective of the structure of knowledge. And perhaps, he can then identify an area of specialization and maintain the specialization in proper relationship to the organically whole, completely integrated structure of knowledge.

The idea as presented is fine and the plan in action would be intellectually stimulating to a scholar. A teacher like Socrates, Plato or Nelson could implement the process. This type of teacher should utilize this approach as a method even when teaching within a narrow discipline. The best teachers probably do utilize this approach. It is only when we become infatuated with minutia that we teach as most "teachers" teach using a method of dispensing information rather than knowledge. The truly saleable skills in the knowledge oriented society of today and tomorrow are those habits, actions and behaviors developed as information becomes knowledge through relevant applications. The success of this approach depends primarily on the substitution in the minds of everyone, the concept of competencies developed with this approach rather than facts acquired in the time honored practice of "stuffing the cranium."

I would wager that students involved in this kind of study would be at least as successful as those who plod the present course of study. I believe it would be naive, however, to think that a mediocre student would benefit greatly by this approach. He needs direction and encouragement (perhaps this is caused by the traditional system), but he would prefer to allow the initiative to rest with the teacher simply because this seems to him to be more leisurely. Mediocre students are able to do problem solving, but it takes a high level of intelligence to do problem finding and problem identifying.

The major elements Professor Nelson has not specifically dealt with are: (1) What are the real goals in terms of behavior, and, (2) How will they be evaluated? I believe that if we "try it we'll like it."

Professor Donald F. Hackett
Georgia Southern College

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