Interdisciplinary Studies in Communication and Information Sciences: Promises and Problems

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ABSTRACT

A discussion of the case for interdisciplinary study is presented in the context of an example of a newly formalized interdisciplinary doctoral program in communication and information sciences (CIS) at the University of Hawaii-Manoa. Interdisciplinary study is seen as necessary in the acquisition of knowledge especially as it pertains to the study of information technologies and human communication endeavors. Understanding a broad range of conceptual ideas across a number of more traditional disciplines is a must to more fully understanding the implications of the information age. Advantages and disadvantages of such a study strategy are presented within the organizational structure and processes of the modern day university. There are very formidable obstacles awaiting the student who attempts interdisciplinary studies even in a formalized program, not the least of which will be the support for interdisciplinary research.

Introduction

Academicians, entrepreneurs, inventors, executive managers and politicians as examples all need, by the nature of their various endeavors, to necessarily be oriented toward an interdisciplinary viewpoint. Not that members of these groups are all specifically interdisciplinary in all their endeavors. But, the matters which they study, the means by which they accomplish tasks and the manners in which they seek and gain knowledge require at least an amiability to numerous ways of thinking and the analysis of problems across a whole range of subject matter.

The specialized expert or professional in a particular subject matter, or the line manager whose primary function is a single or at best multiple set of disciplinary tasks, is required to apply a particular knowledge set. That particular knowledge, however, is not very meaningful without a context. Necessarily, even specialists need a form of interdisciplinarity if for no other reason than to function adequately as a specialist responding to broader contexts.

The tendency of universities to divide into specialized disciplines for easily administered organizational purposes has, in part, contributed to dividing intellectual thought and the acquisition of knowledge into ever more specialized fields. As a result, there are also ever increasing modes of protection of that knowledge in order to maintain a rationale for the continued division of resources along definable boundaries. These are boundaries which may be set more for the convenience of administration than for the purposes of creating and acquiring knowledge.

But division and separation of intellectual endeavor is contrary to the very nature of knowledge acquisition. As is often the case, individuals within universities or across universities begin to form informal groups in which ideas can be exchanged, say, among an economist and an electrical engineer or between a sociologist and an historian. Formation of these relationships among faculty and even students of diverse disciplinary focus at an informal lunch or discussion session is but an initial attempt at the fulfillment of the pursuit of knowledge in academic endeavor. It supports the belief that understanding of ourselves and our world can only be more fully realized if we try to understand each other's various disciplinary viewpoints as well as begin to try to understand their convergence and divergence.

Unfortunately, the very pursuit of wide ranging intellectual activity runs counter to the power structure and operational norms of the modern day university. At times, it is almost heretical to cross disciplinary boundaries and support for such activity is still very difficult to obtain. Yet, to be honest as academicians, to pursue knowledge and expand it, we must consider the interdisciplinary nature of knowledge and activities which foster increased interdisciplinarity thought.

In this paper, we will describe a case for interdisciplinary study and present an example of a formalized program at the University of Hawaii-Manoa which grew out of the informal discussions of several faculty in different fields and disciplines. It was believed that interdisciplinarity might be an appropriate approach to the study of subjects such as human communication, computers, information storage and retrieval, and management of information systems in our emerging information age. Some advantages and disadvantages of this line of study, called Communication and Information Sciences (CIS) at the University of Hawaii-Manoa, will be explored from the students viewpoint.

A Case For Interdisciplinary Studies

Klein [6] admits to the complexity of the concept of interdisciplinarity. "It is linked with curricular reforms, theories of unified knowledge, attempts to solve social and technological problems, and the evolution of new hybrid..."
disciplines (e.g., social psychology, biochemistry, sociolinguistics), new academic divisions (e.g., American Studies, Black Studies, Women's Studies, Area Studies) and new fields (e.g., immunopharmacology, oral history, and the study of written discourse) in addition to a number of complex research projects and problems..." [6, p.117].

Klein [6] presents a case for interdisciplinary studies by citing research linked with the establishment of the regional land grant universities in the United States. She points out that the land-grant tradition provided various organizational support contexts for interdisciplinary collaboration, especially in the combined efforts of agricultural, economic and biological studies. According to Klein, this collaborative spirit was very evident with the Manhattan Project which built the first U.S. atomic bomb, and interdisciplinary research became more common with the establishment of the National Science Foundation (NSF) and the National Institute of Health (NIH). Nonetheless, Klein finds that many interdisciplinary studies through the late sixties were plagued by disciplinary chauvinism and the psychological, social, and epistemological problems of communicating across specialties" [6, p.119].

Bulick [2] focused attention on the question of where the real boundaries of the disciplines lay. In the general perspective of Kuhn, Bulick was interested in three aspects of disciplinarity. These were the relative consensus about disciplinary subject matter among discipline members, the use of materials from other disciplines within a particular discipline and the relative existence of disciplinary boundaries in the social sciences. Bulick's study showed that while the social science disciplines present unique subject use profiles, all except economics show a wide range of inter use outside their own disciplines. He also found that while joint use of materials could be found across pairs of disciplines, relative levels of use were different. As might be expected, many activities were strictly disciplinary in nature. He found that the social science disciplines enjoy closer affinity with other social science disciplines and history than with humanities disciplines other than history.

The point is, of course, that interdisciplinarity is certainly not a replacement for nor should it be a threat to disciplinary studies. Use of materials from other disciplines should not be determined by questions of "turf", ego, and "disciplinary chauvinism." Rather, the decision should be based on the relative utility of bringing together such materials as are conducive for a better understanding, both theoretically and practically, of the various problems of broad social, political and technological importance which are to be considered.

A number of scholars have addressed the problem of the inability of disciplinary studies to adequately explain a number of complex problems and issues facing societies today. Nearly a decade ago, several researchers began to focus concerted attention on the problems inherent in disciplinary studies. Roy [13] submits that there is an "inexorable logic that the real problems of society do not come in disciplinary-shaped blocks" [13, p.163].

Ross [12] contends that specialization in a subject has resulted in "a quickening of knowledge," and is highly pursued because of personal reward as well as for the sake of knowledge. Nonetheless, Ross indict specialization as "the fragmentation of the mind and of subject matter" [12, p.20].

Van Nieuwenhuijze [15] on the subject of world development issues, finds that "as much as development is total or comprehensive, affecting entire societies and groups in societies, there is no reason to expect that any particular discipline, any particular span of the social sciences or of science, is likely to succeed in mastering it" [15, p.1]. Van Nieuwenhuijze claims that we are living a myth if we believe that the plurality of disciplines is somehow just waiting to be formulated into one global, comprehensive approach. On the other hand, he also sees that becoming a "virtuoso", encyclopedic scholar is an equally unattainable feat. Rather, the art of "looking across the fence" between disciplines is a necessity of complex problem solving. Therefore, interdisciplinarity is a virtue rather than necessarily a concrete program for action for Van Nieuwenhuijze, and may be no more than "the systematic attempt to give second thoughts, perhaps a bad conscience, to the person who trusts that his own discipline is all he needs to be a student of development."

In claiming a need for interdisciplinarity in long-range planning, Helmer [5] states that we must not fail to require contributions from a variety of disciplines to be truly effective. Because of the length of time for long-range plans to take effect, environments will change, new technologies will emerge and socio-economic and political conditions may change. Not that disciplinary study of social, economic, political and technical issues is without merit in and of itself. However, such an approach can only be partially explanatory at best. At worst, explanations derived from purely disciplinary approaches can be misleading as to the relative importance of the findings, the generalizability of the theoretic approaches to the complex problems, and the application of various solutions.

White [16] claims that interdisciplinarity "helps us to understand why a question may be crucial in one context and meaningless in another, and how insight and ideas in seemingly unrelated disciplines can illuminate such fundamental questions as the nature of order in the universe."

Boulding [11], a founder of general systems theory which he describes as evolving because "the real world was not really divided according to the usual disciplines," has eloqued that "disciplines are the strongest unit in both the academic and professional communities...[yet there remains] a hankering for a larger view, a broader perspective than can be found in single departments or disciplines." At the very least, according to Boulding, perhaps the contribution of general systems will be to show that disciplines that are too-self contained or remain too closed to outside information will fail to detect error and will remain inadequate.

The last decade has seen the emergence of interdisciplinary telecommunications programs at several U.S. universities (Lewin, [7]). Lewin claims that it would be a mistake to see certain subjects related to the information age such as telecommunications treated too narrowly. For example.
dealing only with the technical aspects of designing and operating a communication network is misleading according to Lewin. He points out the importance of understanding many factors which are determinants of the shape of the telecommunications industry such as "features concerned with government regulation at international, national and local levels, the economics, the management, the legal and social impact..." [7, p. xix]. Lewin further argues that to understand the impacts of changes, particularly with the interaction of computers and telecommunications networks, a much broader curriculum is essential and necessitates the development of interdisciplinary programs. Finally, Lewin presents his case for the need for interdisciplinarity by stating, "In the long run, we need people who are both knowledgeable and flexible and creative in their thinking and action. One of the great advantages of an interdisciplinary program is that it gives an opportunity for an holistic approach to otherwise disparate subject matter, and prevents the student from specializing too narrowly" [7, p.xii].

Cross-disciplinary courses can be found in most colleges and universities across the country (White, [16]). Nevertheless, according to White, "interdisciplinary teaching and learning may always be at some cross-purpose with disciplinary commitments because most scholarship is done within the disciplines and, increasingly, within sub-specializations of the disciplines" [16, p.5].

Notwithstanding the examples of programs in universities which have an interdisciplinary focus, the overwhelming organization of the university in the United States today is along structural boundaries, in a bureaucratic formation, tied to accepted disciplinary areas of study. It is the tie of disciplinary study and research with bureaucratic organizational control that has resulted in the self-reinforcing process of ever increasing probes of more and more specialized and narrowly focused research questions. At the same time, the acquisition and control of funds and resources to ever increasingly specialized areas of interest is played out in a political context of competition for exclusive rights to scarce resources.

We submit however, that it is important to understand that an interdisciplinary approach to academic and practical pursuits recognizes that disciplinary structures, reified as a result of bureaucratic necessity, are wholly arbitrary. As such, interdisciplinary does not depend as much on the existence of a number of disciplines as it depends, according to White [16], on the existence of a point of view toward the subject matter and toward knowledge in general. It is more the context rather than the content which is important.

**Interdisciplinarity in Communication and Information Sciences**

The study of communication and information sciences is in itself born out of numerous disciplinary fields. It studies the confluence of activities surrounding the emergence of information processing and exchange which Porat [10] has shown has become the primary work activity in the United States. The interdisciplinary nature of communication and information sciences was seen early on. Davis and Rush [4] contend that information science is an interdisciplinary field which is concerned with all phases of the information transfer process. They see information science as a broad spectrum of activities which include the convergence of information theory, information technology and service-oriented functions. Even Warren Weaver [14], in a book in which Claude Shannon presented his mathematical theory of communication, was skeptical of the utility of the theories explanatory power outside the technical arena. The theory, powerful and relevant as it was and still is to understanding information as entropy in a system network fundamental channel capacity, could not explain how meaning is transmitted and received or how messages are generated and interpreted. A broader explanation was still needed. Weaver seemed to be addressing the fundamental inseparability of the concepts of communication and information.

The study of the field of communication has many facets. Communication as a social science has roots in psychology, sociology, anthropology, economics, linguistics and many other subject disciplines. Indeed, communication theory is really a body of theories (about which there is considerable disagreement) that make up our understanding of the communication process (Littlejohn, [8]). Communication as one of the humanities includes the more traditional study of speech and rhetoric as well as communication as an art form and in performance. Clearly, no one disciplinary approach to the study of human communication can provide adequate explanation of the complex processes and problems.

The combination of the study of the various mass media (print, television, etc.) and face-to-face communication has led to theories and empirical research in audience effects, media content, and interpersonal communication analysis as well as critical analyses of media structures and impacts. When communication study is increased in scope to include more interactive media channels such as computer and telecommunications exchanges, theory and research begins to broaden from more one-way views of mass media communication toward exchange models which include not only the social considerations of communication processes but also and necessarily, the technical, economic and political as well. A multitheoretical approach to communication study is necessary, according to Littlejohn [9], as disciplinary divisions do not provide the best method for packaging knowledge. Littlejohn sees that "interdisciplinary cooperation is essential for a useful understanding of communication" [9, p.4].

A number of approaches to interdisciplinary theory and research in communication and information sciences have been suggested.

Rogers [11] has attempted to describe a theory of human communication in interactive media environments. Called Convergence Theory, Rogers' theory draws on concepts from a number of disciplines including sociology and economics to describe what he believes is a fundamental process of human interaction in these new media environments.
Similarly, the interdisciplinary study of information science from the economic business context and the management of information systems in business is beginning to challenge the very nature of the structure of organizations and the theories of organizational communication. Contingency theories in management science and organizational communication, which describe organizational structure along longitudinal cooperative planes and flexible groupings of individuals for task and goal-oriented projects, are gaining adherents as reasonable and interdisciplinary ways of understanding fundamental organizational change in rapidly changing technological information environments (Conrad, [3]).

These are but two promising approaches to interdisciplinary study in the broad ranging area of communication and information sciences.

The case for interdisciplinary study is compelling. In the field of communication and information sciences, interdisciplinarity may indeed be necessary in order to begin to adequately understand the complex problems posed. However, it remains for those who choose such an approach to formulate the tenets of communication and information science within accepted theoretic descriptions and explanations as well as propose relevant researchable questions.

The Interdisciplinary Doctoral Program in Communication and Information Sciences at the University of Hawaii

After more than 10 years of discussion, negotiation, and proposals, a new interdisciplinary doctoral program in communication and information sciences was established at the University of Hawaii at Manoa (UH-M) in 1985, admitting its first students in fall, 1986. In this section we first briefly describe the structure of the program. Then we discuss some of the structural problems the program faces, which hinder its ability to fulfill its objectives.

The stated objectives of the UH-M interdisciplinary doctoral program in communication and information sciences are that students will: 1) acquire an understanding of the major information technologies facilitating communication in society and become proficient in techniques involving one or more areas of technological application; 2) study developments in communication and information transfer in society and address the major issues surrounding the formulation of policy for technology transfer; 3) gain the ability to design research approaches to problems in the field and to utilize specific research skills in their solution.

The program is sponsored by four academic units: the Department of Communication, the Department of Information and Computer Science, the Department of Decision Science, and the School of Library and Information Studies (figure 1). The program is governed by an executive committee consisting of the doctoral program chair (a position which is expected to rotate among the sponsoring academic units) and the chair or graduate chair of each department. Day-to-day program administration is handled by the program chair. Admission to the program requires a Master's degree in one of the relevant fields, and work experience is preferred. Additional prerequisites are knowledge of elementary computer programming and statistics. A reading knowledge of an appropriate foreign language is required, and must be demonstrated by passing a translation exam, with dictionary, administered by a University of Hawaii language department.

The program of study involves core courses, four written comprehensive examinations in selected areas of concentration, an oral comprehensive component, and a dissertation proposal and defense. The student's committee should include a graduate faculty member representing each of their selected areas, as well as an outside member not in any of the four sponsoring departments. Further, no more than two members from within the PhD program may be from the same academic unit.

There are three required core courses which were developed specifically for the program: Communication/Information Theories and Policies, Communication/Information Technologies, and Communication/Information Research Methods. To date, these courses have been taught by faculty in the departments of Communication, Information and Computer Science, and Decision Sciences respectively.

Each student selects four areas of concentration from the eight areas listed below. Two are chosen as primary areas and two as secondary areas, and students are required to pass written exams in each of them. The exams are prepared and evaluated by a committee consisting of at least the student's committee member representing the area and an area coordinator appointed by the program executive committee. A primary exam is typically five to six hours and a secondary exam is typically three hours. Specified areas of concentration are: communication and information theories, computer software systems, data communications, information storage and retrieval, management information systems, organizational communication, policy and planning, and quantitative modeling methods. Students may also propose new areas of concentration to the executive committee; the only one accepted to date has been a secondary area in natural language processing. Following successful completion of the four written exams, an oral exam is conducted by the entire committee.

Next, we turn to some of the practical problems facing the program.

We begin by noting that the proposal to establish the program explicitly stated that no additional resources would be required. In the context of harsh contention for resources in the public university of today, this was undoubtedly an important factor in the program's establishment. However there have been a number of negative effects of this strategy.

First, the lack of new personnel, academic or clerical, has meant that the not insubstantial energies required to establish a new program on solid footing have had to come from already thinly stretched departmental resources. In
Figure 1. Organization Structure of the Interdisciplinary Doctoral Program in Communication and Information Sciences at the University of Hawaii at Manoa.
particular, faculty time is required for overall program administration, development of the new courses, examination preparation and evaluation. These tasks are noted specifically since they carry relatively little academic reward or gratification. As an example, it took nearly the entire first academic year to develop policies and procedures relating to administration of the comprehensive examinations.

This resource problem is further exacerbated by the program's organizational structure -- that of a cooperative program among many departments rather than that of an academic unit. This means that faculty involved in the interdisciplinary program must often serve double-duty. Members of the program's executive committee must also chair or attend their own departmental meetings. Members of the program's admissions committee often must serve on their own department's admissions committee as well. And the same occurs with other common functions such as colloquia and curricula.

No new office space or funds for graduate student support were requested nor made available to the program. This has meant that students have had to align themselves, often quite early, with one of the cooperating departments. In general, this alignment has followed along lines determined by Master's degree. That is, students with Master's degrees in information studies have found office space in the School of Library and Information Studies, and students with Master's in computer science have, in general, found offices and assistantships in the Department of Information and Computer Science. One of the disadvantages of this has been a compartmentalization of students into the disciplinary niche from whence they came, rather than the hoped for transcending of disciplinary boundaries.

There are several structural and non-structural obstructions to the program's ability to achieve interdisciplinarity. First and foremost is the fact that the program has as yet, provided few specific models of interdisciplinary teaching or research. The new Communication/Information Theory course has basically been taught as a social science theory course, though naturally often superimposing the boundaries of the social sciences and technological impacts on societies. The Communication/Information Technology course has basically been taught as a survey of relevant scientific theory, practice and technologies. And the Communication/Information Research course has been a research methods survey, with guest presentations from each of the departments.

The remainder of the students' coursework is focused on preparation for the comprehensive exams. This is drawn from standard University course offerings, which are generally disciplinary in nature. Of the eight areas, four are clearly "owned" by individual departments and the four others involve at most two departments, often with one clearly dominating the other. The area exams themselves are conducted individually, so the students are not required themselves to integrate the four areas as part of the formal comprehensive examination process. At best, we can call the current curriculum multidisciplinary rather than interdisciplinary in nature.

A second threat to the blossoming of interdisciplinarity in the program is the fact that none of the sponsoring academic units have Ph.D programs of their own. While there was substantial and compelling justification for the establishment of the interdisciplinary program, it was also understood that none of the sponsoring departments had adequate resources or the political clout to establish their own disciplinary doctoral programs. Thus in many ways the CIS program is seen as a substitute path for promising Master's students in each department who aspire to a higher degree, not necessarily an interdisciplinary course of study.

The lack of doctoral programs at the departmental level has also placed a greater burden on the CIS program to develop advanced opportunities for its students than would have occurred if the program were in an environment with flourishing disciplinary doctoral programs. First, there were no Ph.D. level courses offered by any of the departments when the program began. Coursework generally consists of classes designed for Master's students. And as it happens, a very substantial portion of the Master's students in the sponsoring departments can be classified as seeking professional development and accreditation rather than academic enlightenment and exploration.

Similarly, there are relatively few established large research programs in any of the departments, partly due to the lack of any Ph.D students in the past. Of all four sponsoring faculties, there is only one faculty member (in Information and Computer Science) who offers financial research support to more than a single graduate student. Thus, CIS students do not readily have the opportunity to align themselves with an ongoing disciplinary research program and pursue its interdisciplinary aspects. Nor have there been many, even small, interdisciplinary research projects conducted by cooperating faculty members from more than one of the departments sponsoring the CIS program.

We should point out that many of these problems are faced by any new doctoral program, and many are faced by any interdisciplinary program. However, as a new interdisciplinary doctoral program, not grounded in a single academic unit, the Interdisciplinary Doctoral Program in Communication and Information Sciences at the University of Hawaii-Manoa faces all of them at once.

Summary Discussion

Klein [6] points to similar conclusions among those who have evaluated interdisciplinary research over the last few decades. "Because interdisciplinary research is problem-centered, whereas universities are discipline-centered, universities must adapt their organizational structures" [6, p.137]. It was not, however, with the intent to adapt organizational structure to better set-up a research program that focused on communication and information problems that the interdisciplinary doctoral program in communication and information science at the University of Hawaii-Manoa was created. Rather, a compromised middle ground was taken that provided a program that could fit the existing disciplinary lines. In fact, fundamental organizational change was clearly rejected as is evidenced by the failure of a recent proposal for a School of Communication and Information Science at the University of Hawaii.
Nevertheless, the case for interdisciplinary study in communication and information science is a compelling one. Despite the favorable conceptual enthusiasm for an interdisciplinary doctoral program, it remains as yet largely the student's task to find and develop the interdisciplinary links among the disciplinary academic structures which make up the program at the University of Hawaii.

As students, this is seen to us as both a potential blessing and a possible curse. The positive side tells us that we are truly breaking new ground in terms of trying to cross disciplinary boundaries in order to better our acquisition and understanding of knowledge. Indeed, crossing academic boundaries may work well in terms of course work and opening the students to a breadth as well as depth of subject matter.

On the other hand, the doctoral program must also include a credible interdisciplinary research component. This is where the structural organization of current universities including the University of Hawaii may fall short of the intended mark. Students are left in the somewhat uncomfortable position of proposing interdisciplinary research to a faculty largely disciplinary in focus and reconcile differences not only among faculty of the same department (an already difficult task) but also with faculty from different departments. With almost no current interdisciplinary research efforts on the part of the faculty, students are left to devise their own, while trying to meet the demands of a disparate faculty. For even as faculty members are participating in the interdisciplinary program, they must still yield to the pressures of their own departments including acquisition and allocation of resources along departmental lines, and adherence to disciplinary standards for promotion and tenure.

The credibility of interdisciplinary research under these circumstances can and probably will be brought to question given that the real focus of academic research remains a largely disciplinary affair. The challenge remains as to whether the research muscle can be put onto the conceptual bone structure of the interdisciplinary program.

Our intent here has not been to negatively criticize the program in which we are enrolled. There are indeed many positive aspects to the program and certainly the program will not flourish without some initial and perhaps traumatic growing pains. Rather, we see that a fundamental shift in attitude, resource allocation and research action is also going to be needed to match the conceptual goodwill in order for an interdisciplinary program in communication and information sciences to succeed.

REFERENCES


