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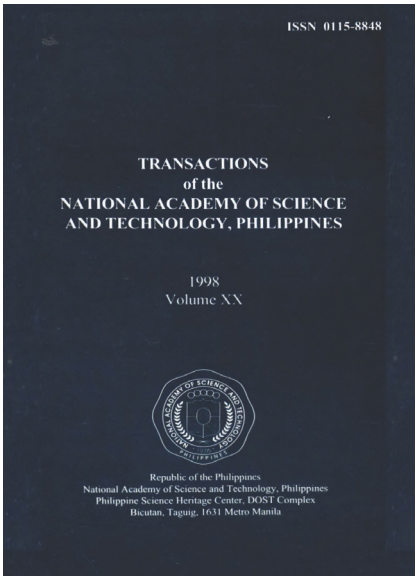

The Social Sciences and Other Branches of Knowledge

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PLENARY SESSION II

"THE SOCIAL SCIENCES AND OTHER BRANCHES OF KNOWLEDGE"

THE SOCIAL SCIENCES AND OTHER BRANCHES OF KNOWLEDGE[1]

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INTRODUCTION

The Annual Scientific Meeting (ASM) of the National Academy of Science and Technology (NAST) is being held today in conjunction with the triennial National Social Sciences Congress (NSSC) sponsored by the Philippine Social Science Council (PSSC), Division VIII of the National Research Council of the Philippines (NRCP), Pi Gamma Mu (the honor society of social scientists), and the UP College of Social Sciences and Philosophy (CSSP). Its special theme is "The Social Sciences in the Life of the Nation." This signal coming together of the social sciences with the other disciplines takes place under an even more grand occasion – the centennial of our nationhood. In order to tackle the theme, three modules were organized: (I) The Development of the Social Sciences in the

[1]This paper is based on the individual papers presented in the Round-Table Discussions on the relationship of each discipline with the Social Sciences held in January to March 1998, and on the synthesis papers of such RTDs presented at the Pre-Congress on March 20-21, 1998.

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Philippines; (II) The Interrelationship of the Social Sciences and Other Branches of Knowledge; and (III) The Social Sciences and Public Policy and Practice. This paper deals with second module of the trilogy.

The Content Focus of Module Two

To talk about the interrelationship of the social sciences and other branches of knowledge means a description and analysis of three interrelated issues. First, we looked at the branches of knowledge in their status as sciences and disciplines. In this connection, we started our work by analyzing primarily their concepts, theories, and methodologies, rather than their practice and applications.

Second, it is an assessment of how the social sciences and other branches of knowledge have affected each other. We looked for the contributions of the social sciences to the fields they have interacted with, or lack thereof, and vice versa.

Third, the discussion of these interrelationships has its main locus in Philippine research and developments. Nevertheless, since all disciplines claim to contribute to universal knowledge, our assessments were not parochial and recognized international developments as they touch on and illuminate the local situation. However, the realities and problematics of the Philippines and the approaches and answers generated here have been given particular emphasis

Method

What was studied is the interrelationship of the social sciences and the following branches of knowledge: agriculture, engineering and technology, environment, health and medicine, humanities and the arts, information technology, law, management, and media studies. To undertake this assessment, we requested prominent scholars to convene a collaborative group of social scientists and practitioners of each named discipline. For the most part, this brought together people from the two sides who already work with each other and recognize the contributions and interactions of their respective fields. At the same time, to keep the discussions "honest," scientists and professionals of other disciplines who have not collaborated with social scientists, and social scientists who work mainly within their own disciplines were also invited to participate.

Each working team decided on how the interrelationship of the social sciences and their particular branch of knowledge will be assessed. In the round-table discussions they held between January 29 and March 17, 1998, the nine groups utilized four different models.

1. Under the first model, the other branch of knowledge was regarded as one integrated field relating with separate social science fields. This was how the papers in agriculture, environment, and law were assigned. Thus, there was a paper each on the interaction of agriculture with the field of communication, on economics, and on anthropology; a paper each on the interaction of law with

economics, social criticisms, and on anthropology; and papers on the interaction of environment studies with anthropology, political science, and economics. The agriculture papers were presented by the respective social scientists, those from law by lawyers, and those on environment by both environmentalists and social scientists.

2. The second strategy, used in three round-tables, swung to the opposite tack. This time, all the social sciences as one field were analyzed relative to different subdisciplines of the partner branch. The first example of this type were discussions on the interrelationship of management and the social sciences. These were subdivided into the former's subfields of business, military, and public administration, presented by a psychologist, a military officer, and a public administrationist, respectively. The second covered interactions of the social sciences with media studies and were studied from the viewpoint of specialists in the latter's subdivisions – film, press, and broadcast media. Papers here were presented by mass media specialists with reactors from both media studies and social science. The third was the RTD on arts and culture where humanities professionals discussed aspects of arts and culture using various theoretical perspectives of the social sciences.

3. The third strategy combined the first and the second. For example, for the health and medicine group, one set of papers were prepared on the interaction of health and social science from the perspective of different social sciences (economics, anthropology), and another set, this time from the perspective of selected health fields (epidemiology, public health).

4. The engineering, architecture, and technology group and the information technology team used a fourth strategy. In the former, an engineer presented the main paper which described the transportation system of Manila at the turn of the century. His colleagues from the more technical fields – architecture and engineering, as well as some social sciences – sociology, anthropology, and political sciences – reacted to his paper from the perspective of their different disciplines. In the latter, a computer scientist introduced the main issues and all the participants in the round-table- a mix of social scientists and IT specialists – became his discussants.

Integrated papers arising out of the RTDs for each of the nine fields were presented in the pre-Congress of March 20-21, 1998. The present paper is an attempt at synthesizing these earlier syntheses and individual papers.

Problems and Limitations

This paper is based largely on these earlier papers. Thus, many fine examples of the interactions of the different disciplines with social sciences not mentioned in these papers, the RTDs, and the pre-Congress may have been inadvertently omitted. We tried to obviate this problem by inviting as many as possible of the leading scholars of the fields as paper writers and participants but the short notice

and their heavy schedules prevented some of them from attending and thus enriching our discussions and insights.

Module II yielded almost thirty papers using the perspective and jargon of ten or so disciplines. Leaving aside the fact that many of them were not available at the time of writing this paper, we also admit to being unable to do justice to the richness of their information and insights. This is due to our inadequate background on some of the issues they raised, the difficulty of summarizing conceptual and theoretical debates in a few paragraphs, and some failures of interpretation on our part. Readers interested in checking these out can read in depth the individual papers, which we hope to bring out in a single publication in a year's time.

Content aside, we also fear that some of our colleagues may take offense from the fact that we have identified them as coming from "other branches of knowledge." Please accept that we had no pejorative intent. Rather it is a limitation of the language we use. Were we dealing only with disciplines known also as "sciences," the title of our module could simply have been :The Interrelationships of Natural and Social Sciences," with the offending word "other" omitted because unnecessary. However, in our effort to be comprehensive, we decided to include fields like law, media studies, and humanities and the arts which would usually not call themselves sciences. Thus we were constrained to find a more inclusive and appropriate term.

But whether we opted for "discipline," "field of study," or "branch of knowledge," we would necessarily have to use "other" since the social sciences are also disciplines, fields, and branches. We could have opted not to mention the social sciences in the title, as in "The Interrelationships of Branches of Knowledge," but that would have obscured a major objective of the exercise, which is to determine how the different fields have interacted with or contributed to the development of the social disciplines, and vice versa. Thus, this cumbersome and seemingly chauvinistic title.

After this long explanation, we hope people will understand why we have often called the other disciplines "partner-fields" in this paper, although that word may bring its own problems.

PRESENTATION OF FINDINGS

The call for participation in Module II tickled the imagination of scholars on both sides of the disciplinary divide with the following questions:

- How have the concepts, theories, and methodologies of one branch of knowledge illuminated the concerns of another?
- How has the application of theories of a discipline to real-life situations led to an appreciation of the models of a seemingly unrelated field?
- What factors have given rise to interdisciplinary collaboration and joint research, and with what results?

In the course of conducting Module II, it became obvious that these queries were no more than points to lead the participants to think about how the partnership of the social sciences and other branches of knowledge starts. In addition to adding more factors that trigger the start of the interdisciplinary exchange, the papers and the discussions also took up what the results of the encounter are and the problems they face. From these emerged an agenda for the future which includes how the exchanges may be made more fruitful among the scholars involved, as well as how the society can nurture these positive transdisciplinary outcomes.

The Start of the Partnership

The guide questions suggested the key factors to open up the exchange of concepts, theories, and methodologies as well as social science solutions to practical problems faced by applied researchers of other disciplines. The choice of the factors assumed a neat rational process to an ongoing reality that is infinitely more complex. In fact, the principal trigger is often simply the recognition of the presence of human beings and other social data surrounding the other scholars' world. Thus, it is to this issue that we turn to first.

Social Factors as Constituting Context. It is only after a particular fact is identified as a social datum that a need for analysts trained to study them arises. Scholars of other disciplines may find, after getting out of the vacuum of their laboratory into field research or practical application, that social data surround their major variables of study. That gives new meaning to their findings in the realm of social science if not in a partner-field. The following examples illustrate the point.

1. Leonardo Q. Liongson, an engineer studied the transportation system in Luzon at the turn of the century. Apart from finding a simple transport infrastructure, he opened roads for social scientists (*double entendre* intended). When he showed that the old *tranvia* routes all ended in cockpits, he gave sociologists a glimpse into machismo as part of the social hegemony. His pictures showed not only trains but also how people dressed when they board trains, manifesting patterns of social stratification. The housing along the railway reinforced the same concepts and also gave insights on how poor people lived. He found bridges being destroyed and others being built in wartime, and, like a political scientist, he saw them not as simple products of engineering but as weapons to facilitate transport of arms or to halt the progress of the enemy. Also, the reason tranvias vanished could not be explained by the science of engineering, but by the science of politics. It is understandable only against the colonial regime imposed by Americans which pushed for the sale of its cars and the consumption of oil.

2. Teresita Maceda studied protest songs and found them not only as art but as artifacts of politics, history, and anthropology. Thus she saw these oral literary pieces as breaking the hegemony of written history which privileges elite viewpoints and their hold on both culture and power.

3. In management studies, people are not just human resources, one of the resources that an organization may purchase, allocate, enhance, or sell. Rather, as Jasmin Acuna points out, they are people that psychologists motivate, that sociologists structure into hierarchies, and that economists provide incentives to.

4. Jaime Galvez Tan recounted that in community-based health programs, a person is not just a patient but also a product of poverty and maldistribution of resources, which makes him or her a matter of social scientific interest.

5. Rolando B. Tolentino studied the ill-fated Cebu Pacific Flight No. 387 and the Ozone Disco Disaster not only as items of journalism but as social science data. It is a great leap from one perspective to the other, but, as Carolina Malay argues, a fruitful one. In her own words,

> The rawness, the shallowness, the hidden biases, set journalistic data-gathering and presentation in opposition to the norms of science, even of the social sciences that make allowances for the unruliness and unpredictability of human individuals, communities, and processes. That is why, precisely, the journalism curriculum gives our students access to the study of history, sociology, political economy, philosophy, literature, public administration, education. Hopefully, such exposure will foster in these future professionals a lifelong respect and desire for the products of careful thought and in this way temper the rawness of journalism, provide depth, and make biases a responsible choice. . . Good journalism needs the social sciences.

The Partner's Application of Knowledge as an Occasion for Interdisciplinarity. The recognition of the utility of a social science to another branch of knowledge may arise out of problems in applying their theories and findings to the real world. This would lead their scholars to seek explanations outside the confines of their usual theoretical framework, as the following instances show.

1. Sociological concepts may become salient to agriculture when the findings of their farm experiments cannot be replicated in certain kinds of tenurial situations. Neither the science nor the technology of agriculture is deficient in this instances. Nevertheless the transfer of agricultural knowledge and technology requires understanding the operation of sociological variables.

2. Another example arises from the aftermath of the Pinatubo disaster. Here, the findings of geologists and engineers about the inadequacy of certain dams to hold off the flow of lahar in some areas are adequate within the terms of geology and engineering. However, they need to be completed by analyses of political science and public administration to explain why the state keeps on building the dams.

There were also negative examples where social data, if not social sciences, could have solved application problems of the other branches. The following show instances of lost opportunities for interdisciplinary collaboration.

1. In the round-table discussion on Engineering, Architecture, and Technology, Jun de Leon of the College of Arts and Letters raised the question: Why did maritime transportation lose its primacy in the Philippines? Answering his own intriguing query, this humanist showed a missed opportunity for engineering and social science to connect. The reason that our areas and rivers are no longer our main transportation artery appears to be not an engineering failure as much as a failure of engineers to apprehend social data. Coming from the large land mass that is the United States, their expertise was in cars and highways. They continued to apply that expertise even when confronted by the situation of an archipelago, ignoring lessons of geography and sociology that could have been brought to bear on their administration of public works in the Philippines.

2. Antonio Contreras states a similar issue more forcefully and in theoretical terms:

> A failure to document the manner by which power relations are articulated in structures and processes, and to systematically inquire into the positive and negative political forces and impacts which operate in such domains, may lead to the non-surfacing of vital lessons which are useful in developing sustainable models to capacitate communities. In the end, we end up with a host of environmental interventions which are economically efficient but are politically unsustainable... (because) privileging economic over political benefits and costs.

Transfer of Theory and Methodology into Partner's Analysis. Originally, we framed the interaction questions non-directionally, e.g.: "How have the concepts, theories, and methodologies of one branch of knowledge illuminated the concerns of another?" This is the equitable and neutral stance so that the mutual effects of the fields of study on each other may both be assessed.

Such mutual learning was highlighted in the discussion of Nic Briones. He pointed out that when economists and environmentalists come together, they find a clash of methods, Simply put, "Mainstream ecologists accept experimentation, often at the expense of theory; mainstream economists do the opposite." The lack of behavior-based observation in economics shocks ecologists while the descriptive nature of their experiments dismays economists. But by working together, ecologists and economists not only develop methodological pluralism but also provide insights on key issues of mutual interest, like sustainability, inter- and intra-species distribution of wealth, discounting, and intergenerational justice and nonmonetized values, imprecision, and uncertainty. Moreover, as Briones asserts,

> As the theory behind these issues matures, experimentation provides a mechanism for rejecting poor theories, testing competing theories, and examining the robustness of a theory given alternative parameterizations on the relevant variables. Proper identification of those relevant variables is a task for both economists and ecologists.

The flow of contributions actually mentioned in the discussion was preponderantly from the social sciences to the other disciplines. This may be due to recency: the effects of the natural sciences to the social occurred in the early stages of the latter's development. When the social sciences were trying to gain equal recognition as science, the use of the models and methodologies of the "hard sciences" seemed imperative. Indeed, they provided heuristic models for many social sciences. The management and sociology fields are indebted to engineering and biology for the isomorphism of the machine and the system on the one hand, and the organism on the other to their object of study – organizations.

Fred Riggs of political science and public administration went to optics to illuminate the development of societies from simple "fused" structures to complex "diffracted" ones, with the developing world viewed as "prismatic." In the last, formal structures are starting to emerge but have unclear boundaries and functions, much like colors which cannot be clearly distinguished from each other as they pass through a prism. Jose Lacson borrows from physics in describing communication as centrifugal (with notions of change, freedom, diversity, and fragmentation dominant) or centripetal (order, control, unity, and cohesion). In his analysis, Filipino mass media tend to be more centrifugal than centripetal.

As social sciences mature and receive recognition on their own, they have become more critical of the inability of the natural sciences to use their knowledge to benefit society and more courageous (or arrogant?) to put forward their own interpretations. Happily, this seems to have come about at a time when those from the other disciplines are more concerned about the applicability of their findings to real-life situations, and thus more tolerant – and needful – of the guidance and use of social science in such knowledge transfer.

Borrowing methods and modes of framing questions may be the first step in this recognition. Some examples of such borrowing are the following:

1. In the field of law, Ma. Lourdes A. Sereno shows how the application of criminal sanctions may profit from a benefit-cost analysis favored by economists:

> The optimum criminal sanction is determined first by comparing the cost of the action to the victim as against the expected benefit to the criminal. If that is so, then society must force the criminal to enter into a voluntary transaction with the victim if he wants the benefits. If the criminal is unwilling or unable, then the performance of the act prohibited must be outweighed by the cost of the crime to the criminal, measured by the severity of the punishment multiplied by the probability of apprehension and conviction less the expected benefits from the crime. Thus, in a society where the probability of apprehension and conviction is very small, property crimes are very attractive, as a method of saving on the cost of entering into voluntary transactions with the victim.

2. The interaction of the health and social sciences is illustrated by evidence-based medicine, defined as "the conscientious, explicit, and judicious use of current best evidence in making decisions about the care of individual patients" (Tan Torres). Following EBM, physicians are led to reformulate questions on patient care for economic evaluation and to develop instruments to capture the beneficiaries' preferences for certain health outcomes. Benefit-cost analysis and decision trees are among the prominent methods relevant here.

Results of the Partnership

The partnership of the social sciences with other branches of knowledge has led to many significant results. The outputs range from the simple recognition of social variables, to the incorporation of concepts, theories, and methodologies of one field into another, the growing acceptance of multidisciplinary approaches in the subject sciences as the interaction proceeds, as well as the creation of a new body of knowledge sired by a continuous fruitful relationship.

Recognition of Social Variables. Interdisciplinary work has led practitioners of other branches to recognize social variables as important inputs to their own studies. Interestingly enough, some of these are the same objects of study of the partner-fields, but viewed from a new perspective. For instance, an engineer may now realize that bridges are built for people. They are not simply technological creations but are tools to signify solidarity and power relations, not to mention beauty (this time, borrowing from the humanities).

Indeed, social phenomena lurk everywhere. Thus, we may need to heed the advice of Gerardo Peralta of the Broadcast Department of the College of Mass Communication of UP. Positing the soap opera of Marimar as "a treasure trove for the social scientists," he suggests that "The serious may need to tinker with the silly, the scholarly to investigate the sentimental. For sometimes, if not oftentimes, what may seem or appear patently silly and unworthy of scholarship may hide what scholarship really needs to look into."

Redefinition of Major Concepts. Another fruit of the encounter is to define old concepts in new social garb. Here are a few examples.

1. Sereno suggests that "distributive justice" may be redefined as "the tolerable degree of economic inequality in society... (in) which issue economics can definitely help" and the notion of due process and rights as "illustration of the value against waste of resources," that is, at bottom, an efficiency concept.

2. Germelino Bautista decries that conventional measures of development do not account for depreciation of natural capital, an insight brought about by the interaction of ecology and social science.

3. Erlinda Burton views magic as a theory of disease which may guide health scientists caring for patients convinced that they have been victims of black magic and witchcraft.

The round table on engineering, architecture, and technology opened the way for the specialists in these fields and social scientists interested in their subject matter to get acquainted with each other and possibly engage in regular meetings and seminars. They represent the youngest interdisciplinary team to emerge from Module II.

In the same discussion, Honrado Fernandez, the Dean of the College of Architecture, revealed that at least part of that field is social science, for the following reasons:

- Architecture is an expression of culture and cultural values.
- It regards the philosophy and history of ideas as influential.
- It is a product of human beings and how they use space.
- Its designs are based on human behavior and what are accepted, rather than what are needed (or else, he asks, why are there no designs of bathrooms geared for the use of the *tabo*?)

Other teams formalized an interactive relationship that has been going on for years without formal recognition. The union of law and social science is manifested in law based on social criticism. As Raul Pangalangan points out, the blending is not new since "lawyers and judges have historically drawn their most compelling insights from other fields of study," notably, in the Philippines, history.

Another blending is the mix of media studies and social sciences which Elena Pernia calls "communication crossover." She also coins a new term, "media morphosis" to refer to media tech changes and adaptations. Besides them, there is the "cultural studies approach," which is "concerned with how the dominant ideology of a culture subverts other ideologies via various social institutions, the media in particular."

From the humanities side, Tolentino offers a different perspective on *"pangkulturang pag-aaral,"* looking at it this time as the linkage of social science and humanities. He claims that it is both a discipline and not a discipline:

> *Hindi ito disiplina dahil wala itong pinoprotektahan at pinapaunlad na* terrain *ng pag-aaral. Ito ay disiplina dahil ang mismong rasyonal, metodolohiya, at etika... ay naghihimok ng pagpapalawak at pagpapailalim ng mga ugnay ng* terms of critical engagement *at* practice... *Ang "disiplina" nito ay ang pagiging interdisiplinaryo. Tinatangka (nito) na baklasin ang borders ng mga disiplina upang magkaroon ng mas kumprehensibo at holistikong pagtingin sa mga bagay at kultura.*

In many cases, social scientists and scholars of other disciplines have already formed enduring relationships all the way up to creating new subfields or even disciplines.Agricultural economics and rural sociology are estblished disciplines internationally. The influence of the social sciences on recent developments in forestry management is concretized in "social forestry."

In the Philippines, public administration is also an interdisciplinary field, much more so than in the United States where it is still largely viewed as a child of political science. Here it is a field of management as well a social science, unlike its counterparts in the business world and the military which are identified largely if not purely as management fields.

Orville Solon described how "a network of research from various disciplines, each one looking at the same thing from their own perspective, biases, and methods: demonstrated "the proof of the pudding is in the eating," that is, how they managed to price health care services. Solon summarized 26 studies undertaken by researchers from economics, sociology, demography, anthropology, public health, and clinical epidemiology, using a sampling design of experts in national survey design, biostatistics, public health, hospital management, and medical practice. This is the new field of health economics, part of the still larger network of health social science, which has been mature and confident enough to form its own professional association, the Philippine Health Social Science Association.

CHALLENGES TO SOCIAL SCIENCE EMERGING FROM THE ENCOUNTER

The discussions with other disciplines have forced a focus on the nature and state of social sciences in the Philippines. These relate to the enhancement of their relations with each other, with the other fields, and with Philippine society as a whole.

Relations with Each Other. Perhaps a discovery for many in the partner-fields is that social science is not one. It is itself divided into full-blown disciplines which may close doors to each other just as they used to close doors to other branches. Indeed, an unintended consequence of the implementation of Module II is the recognition among social scientists themselves that there is a lack of interdisciplinarity among their different fields. This was evident in the use of the first and third strategies in the round-tables where separate social science fields tackled their interaction with the partner-discipline as a whole.

Social science is not just divided into disciplines. It is also divided into theories, some of which even cross disciplinary boundaries. The positivist, Marxist, functionalist, and critical approaches are salient to economics, sociology, anthropology, and political science, to name a few social science fields. Yet positivists of different social disciplines, for instance, do not necessarily work together or build on each other's work. This situation can confuse social science sympathizers and users from other fields of study.

A related issue is the presence of what Alice Guillermo calls ideology in social science. The hegemonic idealogy is positivist and leads to what Contreras perceives as a bias against a partisan form of scholarship. This in turn can result, he warns, in the decentering of political analysis from the field of policy studies. Absent politics, policy analysis may result in mere quantification without the appropriate weights for public interest values.

These considerations suggest that social scientists must now be challenged, as we have challenged scholars of other fields, to build bridges to each other.

Relations with Other Branches. What easily emerges from the discussions is the recommendation to continue the dialogue and develop interdisciplinarity with the other branches of knowledge. Perhaps at this point we should separate the interaction of the social sciences with the established hard sciences as against the interaction with arts, media studies, and the law which tend towards qualitativeness and depth of understanding of specific cases. For this we turn to Malay who points out the uses of journalism to social sciences: "Providing information worth clipping out, alerting the academic to developments that may be interesting to pursue, shedding unexpected light on problems, and, not least, even just 'humanizing' them." But once turned over to the social scientist, the "excitement, contradictoriness, and confusion (of journalism), reminds us of the limitations of science – the excruciating slowness with which it comes to tentative conclusions, the hesitations, the remoteness from ordinary concerns and real people."

This point needs stressing because, on the part of "harder disciplines," the advantage of social science is precisely its humanizing influence. Levita Duhaylungsod asserts that concerns for sustainability and the environment have led to more "soul" in the way development is articulated, an issue that would not have been recognized if ecology remained only a "hard science." Indeed, Emil Q. Javier assesses social science influence on agriculture and on his person as an agricultural scientist as "civilizing."

Beyond changing the disciplines internally, the interaction seems to have led to a change in the definition of the role of subjects. For Duhaylungsod, "theorizing should not be confined to academe but is similarly a domain of any group of people when they articulate their way of believing how their society works and who have developed systems of building their own knowledge." Tolentino gives a different perspective, believing that the mediation of the scholar (whether social scientist, natural scientist, or humanist) must be recognized and not transmagnified into the voice of the people. In his own words:

> *Hindi inaako ng mananaliksik ang tinig mula sa ibaba. Nilalagay niya ang mga naturang tinig sa ibang perspektiba na paningin makakapagbigay-linaw sa kanyang relasyon sa mga tinig... Ang layunin ng pangkulturang pag-aaral ay bigyan ng* subject position *ang mismong mananaliksik para siya makapagsalita para sa nasa ibaba.*

What this suggests for us is that as it develops and becomes more systematic and even quantified, social science must not lose sight of one of its strengths: its connection with people and the depth of its analysis because of that.

Relations with Society as a Whole. If the general recommendation is for the social sciences and other branches of knowledge to continue learning from each other, changes must be made in other parts of society to support such a process. The following steps may be taken.

1. Ensure that every Filipino gets general education so that regardless of one's major or occupation, he or she will profit from the insights to the social sciences, the natural sciences and all other branches of knowledge. This is what Galvez Tan credits for his development into a broadminded physician.

2. Reform board and bar examinations which now pressure schools to maintain narrow curricula which do not admit of social science insights and theories. For instance, alternative law, health economics, ergonomics, and other disciplines emerging from the interaction of social science and other branches will never be open for all students of the relevant disciplines unless such examinations free the mind to range across all subjects of interest.

3. Lobby for the presence of social scientists in strategic positions. It enhances the legitimacy of social scientific views in policy making and thus their possible popularity in non-social science circles.

4. Make social scientists contribute not only social data but also theory, for it is ultimately their explanations of social phenomena that will help the other disciplines when we interact with them.

5. Social science must primarily address the Philippine social situation. This will not only be our best contribution, but also our principal means to contribute to the universal discipline. For instance, it should encourage more doctors to deal with diseases prevalent in the Philippines, being cognizant not only of germ theory, but also of our disposition to magic, our level of poverty, environmental considerations, and other social factors.

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Initial comment re the paper of the Engineering, Architecture, and Technology group who used the fourth method of presentation of the interrelationships of the social sciences and other branches of knowledge:

One main (engineer's) paper dealt with a particular engineering theme which had a common or interdisciplinary interest (19^{th} century transportation system) while the other members – the social scientists, architects, and other engineers – reacted. Transportation systems, like many other technological inventions have qualities and elements which are simultaneously considered and studied in various fields of the natural and social sciences and other professions. In particular, for bridges, their qualities can be viewed as follows:

TECHNOLOGICAL CONTEXT –

Materials of construction: bamboo, wood, masonry, steel, others; their sources and manner of deliveries.

Form and design:

simple beams, arch, cantilever, truss, suspension;
fixed bridges or drawbridge;
abutments, piers, footings, piles, and other foundations;
approach road, embankments;
railings, roofs.
(What do you want and what can you afford?)

Construction:

construction methods; construction management;
labor force; equipment; delivery of supplies; utilities;
onsite facilities; failures, delays, and accidents.

SOCIAL, ECONOMIC, POLITICAL, and CULTURAL CONTEXTS –

Functions and processes related to bridges:

to carry vehicular, animal, cargo, and pedestrian traffic;
to serve as aqueduct (water pipe or canal) and crossings of other utility lines.
(Why are pedestrian lanes of modern bridges so narrow?)

to be a technological example of its type of design and construction;
to serve as a geographic and/or cultural marker, or tourist spot;
to have a welcome sign;
to exist as a monument or shrine by its old self;
to exist as a monument to someone after whom it may be named (a hero, statesman, politician... engineer?).

to link places and unite peoples separated by ravines and rivers;
to provide a right of way where none existed before;
to have a dry crossing of rivers – to replace or substitute boating or swimming;
to be painted or repainted by concerned people and authorities;
to offer space for campaign or commercial posters and billboards;
to be structurally at the mercy of floods, lahar, earthquakes, and natural decay, corrosion, and wear and tear;
to remain in disrepair and ruins for months and years.

(Is a bridge part of the road or part of the river?)

to accept tolls to pay for itself;
to provide a reason for budget and expenditures for its maintenance, repairs, renovation, rehabilitation, or replacement;
to offer examples of fast-track projects;
to be a good use for "pork barrel."

for the urban poor:
to provide living space underneath the bridge;
to provide shares of water supply coming from leaking lines.

etc.

The paper provides a framework for defining interrelationships and interdisciplinarity among branches of knowledge (multidirectional).

FINDINGS –

A. Social factors as constituting context:

examples: flood control and drainage

1. Disaster-mitigation engineering:
   Structural and nonstructural measures
   Risk and hazards management
   Benefits and costs
2. Structural measures:

Household scale:
Traditional houses on stilts or "silongs"
"tambak" or elevated lots.
one's own "banca" or "balsa."
(swimming ability, dirty flood water, health risks)

Community scale:

Upstream measures:
flood-detention dams; Magat and Pantabangan Dams.

Downstream measures:
dikes or levees Pampanga River levees.
river walls, revetments: Pasig River walls.
catchment basins (natural or mandate): Candaba swamp
floodway and river cutoffs: Mangahan floodway
drainage facilities (inlets, sewers, canals, pumps,
flood gates): Manila "esteros" and pumping stations
storm-surge barriers and reclamation:
Manila Bay closure???

Flood engineering and management aspects:
scientific inputs: meteorology, geology,
soil physics, oceanography, volcanology,
other earth sciences.

engineering technology: hydrology and hydraulics,
structural and geotechnical engineering,

environmental engineering,
remote-sensing and GIS, cost engineering.

design philosophy: return period of frequency of
design flood, expected costs and damages,
IRR, BCR – economics and decision science (IE)
other benefits: fisheries, water transport.

right of way and water rights: law, economics, agriculture.

financing: state funds or BOT?
can flood control be privatized (like roads, power,
and water supply)?

people's acceptance of flood structures: sociology,
psychology, public health, people's history and
tradition, resilience; perceived damages and risks
(real and imagined).

environmental impacts: flora, fauna, settlements,
livelihood, water and air quality, solid waste,
scenic, cultural, and historic sites.
more than just a checklist!

environmental process models: transport, sources/sinks,
from planktons to BOD to heavy metals.

3. Non-structural mitigation measures:

upstream:
watershed management, soil and forest management.
Conservation vs. Sustainability.

downstream:
land-use planning and zoning
seasonal use of land.

forecasting and warning:
telemetry, telecommunications, computers, GIS
mass media.

flood insurance (?)

disaster relief work:
food, medicines, transport
social work, health workers, military, LGUs, NGOs.

relocation sites and/or resettlement sites:
shelter, roads, markets, fuels for cooking
water supply, sanitation, health care

livelihood, education, sports and recreation.
(structures in support of nonstructural measures)

B. Application of knowledge as an occasion of interdisciplinarity:

Sound engineering design:
should ideally be a product of the joint undertaking of engineers, natural scientists, economists, finance managers, lawyers, health workers, environmental specialists, sociologists, psychologists, historians, etc.

C. Transfer of theory

Multiobjective and optimization techniques and formulations in engineering; derived from concepts developed in the management (decision) sciences, psychology, and economics.

RESULTS OF PARTNERSHIPS –

A. Recognition of social variables:
e.g.
structural and nonstructural measures in
flood engineering: reinterpreted as nonsocially and socially oriented measures, respectively.

people's acceptance, utilization and concern for structures and machines are design elements to be considered.

B. Redefinition of major concepts:

A rephrasing of minor examples:

A bridge is as much a part of the road as that of the river, though the latter two are forced to be separate. People used to cross rivers by wading (low tide), swimming and boating (high tide) before they started crossing bridges. Bridges started as pedestrian crossing before they became motor vehicle crossings.

A flood control structure is designed to protect people and property; the benefit of flood protection may not always outweigh the negative impacts of the construction. Benefits and impacts need quantifying and qualifying. The planners and builders do most of the quantifying while the people "beneficiaries" provide the qualifying that counts a lot.

The immediate product of flood control (protection or mitigation) is not a commodity like road, power, and water supply that one can convey or utilize on a regular basis. It takes a less regular disaster to realize the flood control service. It is similar to police and military protection.

By the way, bridges, after accumulating debris, can cause local flooding by blocking the flow of water.

C. Emergence of new disciplines:

Forensic engineering: engineering expertise and opinion are lent during legal and court hearings regarding accidents and mishaps, whether natural or man-caused. Techniques and results are both shared. Laws of Newtonian mechanics are applied in some cases. Oftentimes, knowledge of statistical data becomes very handy.

Ergonomics: a common field of interest of industrial engineers, sociologists, and many who sit in front of a computer or a factory assembly line.

Geographic Information Systems (GIS) is actually a tool rather than a discipline. With adequate input data (remotely sensed or ground based), one can develop a GIS of almost anything, for as long as it has a latitude, longitude, or UTM (Universal Transverse Mercator) coordinates (UTMs are more fashionable). To what extent have social scientists graphically "overlayed" their socially oriented themes with the "resource maps" or "infrastructure maps" of scientists and engineers? Are political boundaries and class boundaries visible in GIS? Do the themes of "pork barrel" allocation and "flood control" projects offer enlightening overlays in GIS?

Scientists can earn a diploma or a master's degree in Remote Sensing, IT, Geographic Information Systems: Bachelor of Computer Science → medical computing → MD; Bachelor of Science in Civil Engineering → lawyer litigation → LLB.