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COMPUTERS, PROFESSORS
AND INTER-AMERICAN RELATIONS

October 1965 152-65

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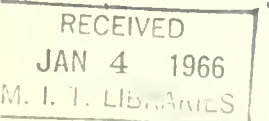
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Computers, Professors and Inter-American Relations

by Charles H. Savage, Jr.

A university computer center may seem to be far removed from matters of improved Inter-American relations. The research professors who use them may seem to be the least relevant toilers in the vineyard of an improved hemispheric circumstance.

But watch yourself! Don't get caught in the fallacy of building tomorrow's structure out of yesterday's bricks. There are new elements in the picture today. There are the new problem-solving machines themselves, the special languages and thought systems that they employ, and the new breed of professionals on both continents who are unhappy trading in any other currency. Soon these machines and people will be linked by communications satellites and more rapid air travel into a massive processing construct. When this happens, we will have married the problems of underdevelopment with the possibilities of space age technology and many of our historic approaches to economic development may suddenly become obsolete.

The nature of this phenomenon has yet to be spelled out. For instance, there is still the business of guiding the fledgling structure through the shoals of obstructive and non-functional mentalities on both continents. But evidence of at least partial understanding of what is beginning to take place is already coming in:

- # East Germany has been vigorously promoting its computers at Latin American trade and industrial fairs.
- # The director of a computer center at an important Latin American university has a European machine operated by nationals educated in Europe. The opportunity for cooperative research with a top-flight U.S. university has arisen. This means trips to the United States and the probable conversion to compatible U.S. equipment. He frets over what all of this will do to the center's image in university political circles where Marxist elements exert considerable influence.
- # An engineering faculty in a national university had entered into a cooperative research association with a U.S. school. The things that had to be done to sustain this relationship threatened to reconstitute the faculty's university-wide relationships. The Dean proposed that the U.S. relationship be terminated. The faculty, however, chose to continue the relationship even though this meant changing to a new dean who could support the new faculty-university relationship.
- # The young, U.S. trained director of a university research center had planned a career of scientific research. Now he finds himself under heavy family pressure to revert to the mix of commercial engineering, part-time university teaching, and social and political fence tending which has been historically the route to professional success in his country.
- # M.I.T.'s Inter-American Program in Civil Engineering has been experimenting with intercontinental computer hookups involving its center in Cambridge and an affiliated university in Buenos Aires. The first transmission was by teletype and short-wave radio.

Socio-Political Confrontation Resulting From
New Communications Possibilities

The new university computer centers that are materializing in Latin America have deeper significance than is immediately apparent. They constitute the basis for a hemispheric network of professional interest that will upgrade professional practice in Latin America and deepen and enrich professional research in the United States. This network will season and condition the generation of professionals currently studying in the Latin

universities. It will make it possible for first class research to survive at a distance from the science center and closer to the field problems and thus counter the flight of top professional talent from these countries. It will reconstitute professional faculties at Latin American universities, change the way that they are viewed by local practicing professionals and bring about deeply-rooted changes between these faculties and the universities to which they pertain.

For these reasons a great deal of interest centers around the location and conditions of machine installations. They pose a deep socio-political confrontation the exact nature of which has yet to be specified. This must be done if U.S. government agencies, companies, foundations and universities are to be serviceable in helping Latin educators bring off the episode effectively so that the possibilities inherent in the activity may be realized. The next two years will be the critical ones.

There are three principal parties to the action. They are the equipment companies who provide the machines, the U.S. universities attempting local application of the computer-based sciences, and the Latin American professional faculties themselves. In the background are the U.S. foundations and government agencies which provide funding and support and their counterparts in the Latin setting. There are also the national and international communications companies which will soon be linking up. Each of the three principal parties has two basic interests. The first is to make a substantive contribution in line with their own purposes. The second is, in so doing, to create an image which will make their continued activity in the area possible.

(1) The Equipment Companies want to sell computers. They recognize that today's student is tomorrow's consumer. They wish to see his appetite for computer utilization whetted during his university years. They also wish to survive in Latin America so that they can capitalize on the market so created. This means attention to their image as a company, to the image of free enterprise capitalism in general and to the image of U.S. free enterprise capitalism doing business in Latin America in particular. Responding to all of these requirements is no easy matter.

(2) The U.S. Universities Active in Latin America want to upgrade local professional practice. They also want to provide for their own continuity in Latin American activity. They have learned that such activity provides a personal payback in terms of the development of their own faculty. If this payback is to be achieved, their faculty must be able to develop and provide for the survival of compatible local associates. And both parties must have access to adequate computation facilities on site.

(3) The Latin Universities, particularly those which are government sponsored, have had to balance the output/survival equation somewhat differently. Most observers agree that, historically, substantive professional output has been overshadowed by the sheer need for survival in an unstable circumstance. The domestic image has been paramount even where promising professional undertakings have had to be sacrificed. Many of these institutions are locked in doctrinal debate which may once have been pertinent but which is about to be out-dated by new technological considerations ready to go into place.

Relief from the unfortunate (historical) circumstance is now in sight. There are new elements at play which - adroitly maneuvered - can upend

the historic balance. These new elements are primarily the new machines themselves and stepped up Latin activity by U.S. university professionals capable of using them. There are others. The purpose of this paper is to specify these elements and to speculate about how they may be effectively employed to the advantage of all parties to the encounter.

Historic Structure of the Latin Professional Faculty

We must start at the starting point--the Latin American professional faculty as it currently exists. Structurally this entity can best be discussed if we regard it as a system of related aspects, a compound of (A) the relevant views to which faculty members subscribe, (B) the manner in which these faculty members relate to adjacent groups, and (C) the kind of quality of activities which these views and manners of relationship are able to sustain. In the following pages as we talk about the current structure of this system and speculate about its upgrading, it will be in terms of a threeway system whose stations are identified in Figure 1.

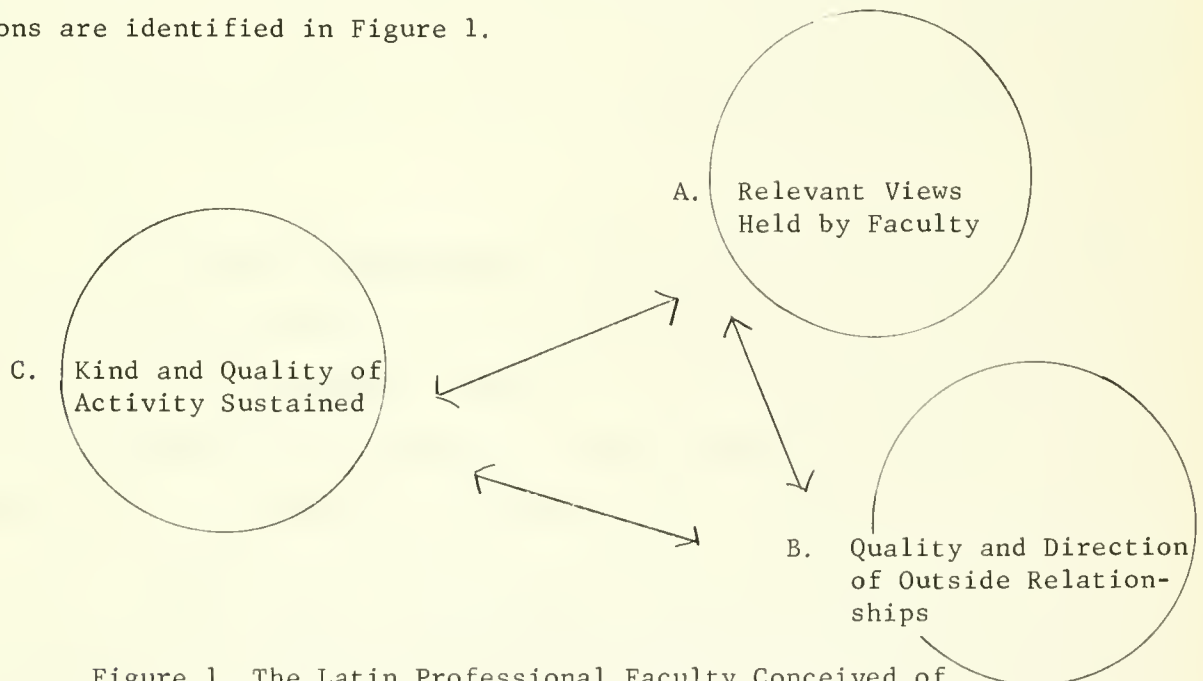


Figure 1 The Latin Professional Faculty Conceived of as a Three Station System of Interacting Components

It must first be recognized--and here we are speaking of Station A-- that the Latin professional faculty has a severe identity problem. It has not developed a self concept with enough integrity to forward its central reason for existence, the upgrading of local professional practice. A mature, balanced academic community has not emerged. One finds, for instance, few mid-career university professionals whose prior activity is scientific inquiry and application. Young aspirants to academic careers have no model upon which to base their career aspirations. The institutional strength to provide reasonable shelter for career commitment has not been forthcoming.

The full-time academic career in the usual sense of the term has not been possible historically. It has been necessary for the individual to hedge in one of two directions, one in terms of accepting what comes to be prior commitments outside of the university, the other in terms of accepting such commitments within the larger administrative machinery of the university itself. Both of these hedges compromise the central purpose of the professional faculty. Both keep professional output at an undesirably low level. Let's look at each.

(1) The External Career Hedge is based upon a career as part-time professor, part-time government servant, and part-time professional practitioner. While this arrangement provides for personal career security, it washes out the group whose independent integrity consists in upgrading professional practice. The professional practitioner whose role is current practice and the university professional whose role is updating that practice are one and the same person with the result that the dynamic interplay between the two discrete roles is absent. Professional practice suffers. Industry

and the professions cease to look to the universities for the traditional academic services. They see the university not as a source of help, but as an object of philanthropy including the contribution of part-time teaching services at a low rate of pay.

We have now played through the circuit of our system from views held (Station A) to condition of relationship (Station B) to level of activity supported (Station C). As with any true system, we return to the starting point. The relationships which engender such an unfortunate level of activity must be justified by closely-held views. Thus the sentiments around "Alma Mater" as an entity to which one gives rather than from which one derives. Thus the emotional and defensive rallying around obsolete and ineffective academic institutions to which all parties respond on the grounds that nuestro vino puede ser agrio, pero es nuestro vino. Thus the strange cliché in underdeveloped nations that individual pursuit of scientific inquiry is suspect and must in all cases be subordinated to the "national interest."

Another attribute of most systems is their self-reinforcing capabilities. The neophyte moves into the professional faculty system in the desire to contribute to his besieged Alma Mater. The Latin American universities are loaded with these individuals. He soon wearies with the level of activity permitted. Concurrently, he finds himself drawn outside into professional practice by the local set of rewards and penalties. Once there he justifies his hedge in terms of widely-subscribed viewpoints.

(2) The Internal Career Hedge draws the university professional away from the laboratory and classroom and into the university's administrative machinery. Seeking in an uncertain circumstance to achieve some security

for his professional undertakings and interests, he becomes a dean or department head, an institute or project director. Once there, he is swept up in the task of negotiating his entity's survival in terms of the requirements of adjacent entities. If he works for a government university, the requirements of the local industrial/professional community will have become equilibrated at an unfortunately low level, and his prior attention will be directed at negotiating his entity's survival in terms of the requirements of adjacent entities within the university itself and, to a lesser degree, within the government. In the process he finds his capacity to shop for the kind of help that his group desperately needs further compromised.

At this point we must consider an intricate dilemma that the university professional attempting the internal hedge must confront. This dilemma runs through all stations in the current structural system. Its understanding is vital to U.S. institutions and companies that wish to be serviceable to Latin universities in strengthening their capacity to upgrade domestic professional practice.

The required help that the professional faculty administrator in Latin America needs is to be found in the advanced nations where there has been the time and the wherewithal to develop more effective academic structures. The required facilities include the hardware that is in part an expression of the dynamic interplay between academic inquiry and enterprising practice typical of the advanced societies. The administrator's problem is to wire his entity into this help and these facilities without generating political playback from adjacent entities in his own institution that will wash out the advantages gained.

Suppose the administrator requires a computer in order to accomplish his educational purposes. This addition constitutes an important change in our system at station C, (level of activities supported). But the systemic condition tells us that a change of weights at one station will play around to the other component stations. At least we hope that it will. The opposite would be for the machine to be nothing more than a totem of status symbol that will reinforce the pre-existing and dysfunctional set of viewpoints and relationships will make no net contribution to the faculty's serviceability to its students, its profession and professional practice within its country.

Free play within the system requires revision in external relationship patterns (Station B) and professional viewpoints (Station A) as well, if the new input is to be effectively accommodated. At Station B we would expect higher interaction with foreign professionals, possibly a U.S. professional faculty, in order to back up the hardware with the software including procedural systems required to make the installation operational. We would also expect some softening of the industrial-professional blockage in view of the faculty's expanded ability to be serviceable. These new external patterns would in turn play back upon and affect professional viewpoints (Station A) including the local entity's self concept or identity problem. It is the systemic chain of events which the new installation sets off that proves so troubling.

Educational administrators in Latin America want the new hardware. They want the added status and survival capacity that attaches to it. They are not so sure that they want the systemic consequences that hardware

acquisition entails. One of them said: "Look! If I have a plumber into the house to fix the pipes, he does his work without mixing into family affairs. Can't you guys get that computer in without meddling in local social arrangements?" The reason that this is such a sticky business is to be found in the image problem endemic in most government universities in Latin America.

With no consistent image of its own, the government university in Latin America becomes the child of external events. It is a radar picking up external signals rather than a gyroscope with an abiding purpose of its own. The administrative procedures of the university forward this unfortunate purpose. Faculty promotion usually involves an open hearing where all elements of university life gain a ready platform. Defending one's past actions against the vociferous extreme factions is not a pretty business. It is much easier to take a shelter option involving a hedge as to one's political commitment.

Political Commitment and Administrative Survival

In his own terms, the range of possible political orientations open to the Latin university professional run the spectrum from Russian Marxism at one extreme to Free Enterprise Capitalism at the other. His critics will search his record for any emphasis in identification with countries running from the Soviet Union, through Eastern and Western Europe, to the United States - with their products, university degrees, exchange programs, or extended working arrangements. The safest gambit is to slot oneself in near the center of the spectrum, avoiding like the plague over-identification with

the extremes.¹ Charles De Gaulle played to this theme during his recent tour. If one is to err, let it be in the direction of Marxism which can be later charged off to youthful enthusiasm or misplaced nationalism. Moreover, the free societies have proven more receptive to converted Marxists than the reverse is true. One may get immediate additional mileage by permitting a touch of Marxism to attach to his campus image, whether he be a true believer or is merely exploiting the circumstance for opportunistic advantage.

These facts of life flavor the response of many Latin university professionals to the overtures from U.S. companies and institutions. Local circumstances require that they assess the impact of any proposed relationship on the eventual public inspection of their dossier of personal identifications and enthusiasms. If they can gain the advantage - hardware, teaching help - without the attendant relationship and viewpoint updating, their personal case may be strengthened. They have outwitted the foreign imperialist at his own game. Unfortunately, they will not have contributed to the desired end of upgrading professional practice. In this larger sense, unless it's a package deal, it will have been a hollow victory; the prior ploy of the external helping agent must be to see that it is a package deal.

We have now identified the elements usually found in the current Latin professional faculty. They consist in a system of viewpoints, special kinds of relationships, and activity levels as illustrated in Figure 2. The

¹Many Latins will contend that the East-West struggle is not their concern and that to get their countries involved in it is to squander scarce resources at hand for economic development. The point here is not to debate this contention, but simply to assert that political orientations involving the larger international issues do play an important part in how university issues are resolved.

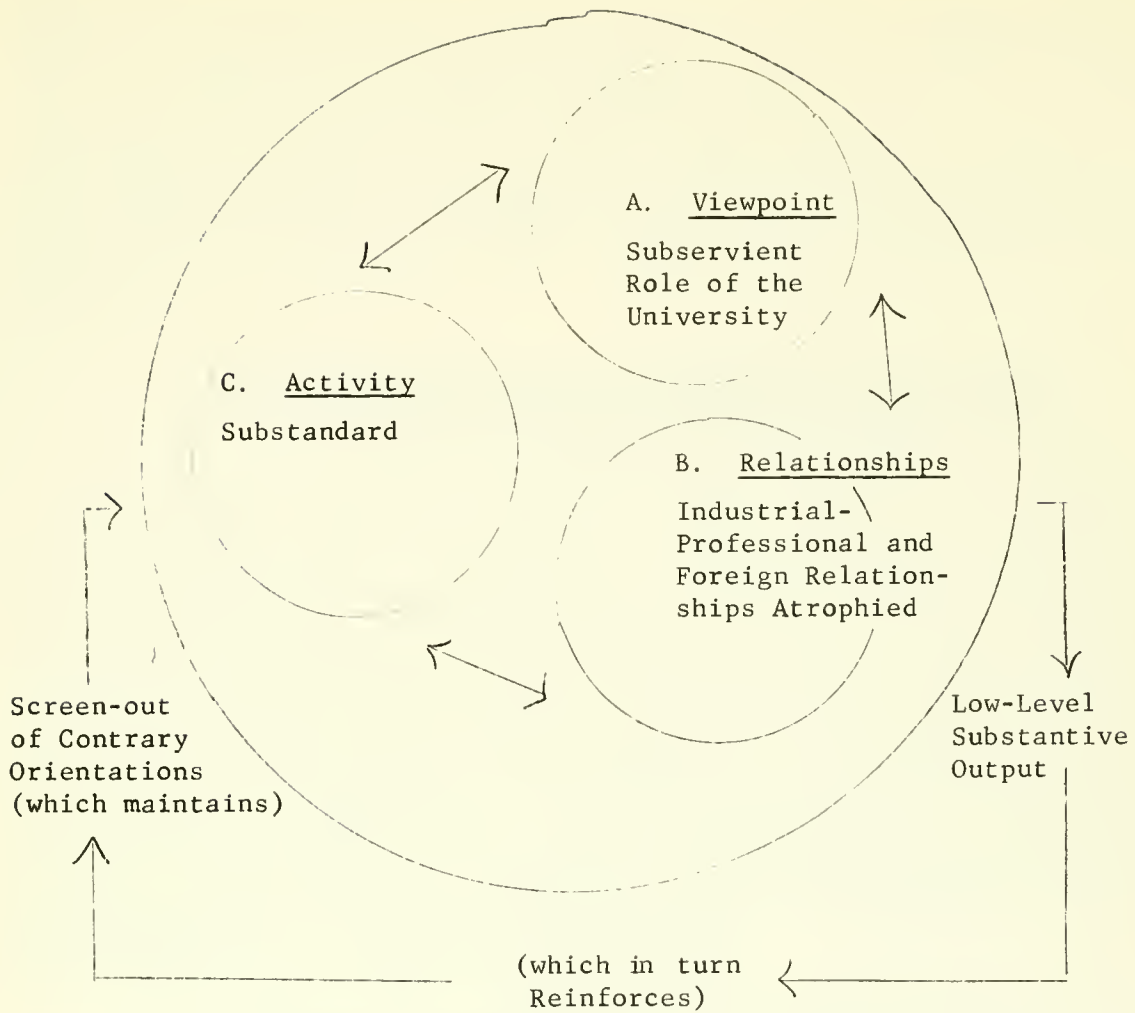


Figure 2 Self-sustaining Nature of the Current System of Professional Education Elements

system is self-sustaining in that the level of output it permits is not such that will retain the new inputs that might generate contrary ways of thinking and acting. Yet poised on the frontier of this system are new forces which might be used to sustain this input and to achieve the desired internal revision.

Achieving Effective Internal Restructuring by Means
of Sophisticated External Activity

There are at play on the Latin educational picture at least three new inputs which brighten the picture. Effectively employed, they can bring about the indicated academic modifications, importantly upgrade the level of local professional practice and at the same time serve the ends of those who seek to be serviceable. These inputs are the activities of the rapidly emerging private universities, the needs and desires of the upcoming generation of younger university professionals, and the stepped-up activity in Latin America of U.S. university researchers.

(1) The Private Universities including those under church sponsorship have felt themselves pulled into the vacuum that exists between the government universities on the one hand and industry and the professions on the other. They find themselves less restricted in being serviceable to the practitioners. They relate more readily to U.S. programs and projects, U.S. institutions and products. These circumstances are having a cumulative effect. Important support from local industrial and professional groups is coming to bear on private institutions. U.S. cooperating agents find the absence of political static welcome in terms of getting on with the job. Yet these institutions represent academic mutations whose major impact may well be the changes they stimulate over the long run in the government institutions.

They should be accorded the required support, but of the open-ended variety that can be shifted elsewhere as changing circumstances warrant.

(2) The Upcoming Generation of University Professionals, many of them U.S. trained, find the status quo unacceptable. They identify with professional counterparts in the U.S. and relate to U.S. professional standards and equipment. Their appetites have been whetted for later generation equipment and new problem-oriented languages. These dissatisfactions should be cultivated but not in an indiscriminate manner. It is not either the mid-career professionals or the upcoming ones. Both are needed and both can survive. In fact, the mid-career university professionals want and need the upcoming generation. What needs to be done is to strengthen their hands vis-a-vis other elements in the university picture so that they can effectively negotiate their inclusion. This will be a delicate and trying undertaking, but the elements for carrying it off are already at hand.

(3) Stepped-up Activity in Latin America by U.S. University Researchers represents perhaps the most important negotiating point in tipping the scales in the direction of a more favorable circumstance. These researchers search out, attract, and attempt to provide for the survival in the university setting of the new types described above. They tend to sustain the dissatisfactions of the younger professionals while helping them find acceptable outlets through which they may be channelled. They require adequate computation equipment on site and compatible local associates to aid in its operation. They are in Latin America because they have found a personal payback in being there and they are not about to be dislodged.

What remains to be done is to bring these new elements into dynamic interplay with the pre-existing ones in such a way that systematic revision results. When we spoke earlier of a "package deal" we meant that important changes must occur at all three stations. At Station A we would expect new views about the faculty's role to take root. At Station B we would expect shifts in the kind and quality of relations that the faculty is able to sustain both with foreign professionals and with the domestic industrial/professional community as well. At Station C we would expect this new externally-reinforced self concept to importantly change the kind of work done and the level of equipment required to do it. The question remains, who can provide the impetus to set into motion the desired chain of reactions?

The restructuring job requires an external agency, but this party's prior role will not be active intervention in the usual sense. His task will be more that of propping up and supporting forces and viewpoints already locally extant. The younger professional wants to survive in the university. What he lacks is a level of activity that matches his professional competence and provides for his legitimate developmental needs. The mid-career university professional wants to ensure this survival. What he lacks is additional leverage to offset contrary university sentiments to which he is required to respond. One way for him to achieve this leverage is to trade on the possibility of future hardware acquisitions. The alternative he can plead, is for his institution to be blocked out of the new international professional networks which will be in large part shaped by hardware location.

In pleading his case, the mid-career professional will require sophisticated guidance and hard-headed support from outsiders who are not immediate

parties to the local university situation. In providing this guidance and support, two groups will encounter early blockage while a third enjoys a built-in advantage.

(1) Local Nationals long conditioned to the restrictive historic sentiments will find it personally disturbing to effectively press for the new circumstances. The cloak of ingrained social usage is not lightly divested. Especially in the early stages, the first overtures will have to come from abroad, or from one who has a very special circumstance of local involvement, or from a local national acting in concert with external forces.

(2) Representatives of the Equipment Companies will also find it easier to follow another's lead rather than make the initial gesture. Whatever their personal finesse and dispassionate dedication, they will be viewed as agents of Free Enterprise Capitalism and attitudes towards private industry have not mellowed in Latin America nor taken final form. Furthermore, it may be healthier for equipment acquisitions to emerge as a natural consequence of professional activities already under way rather than as a prelude to such activity. Equipment people have a critical role to play, but it is one that slots in later in the chronological sequence.

(3) The U.S. University Researcher active in Latin America may prove to be the party best equipped to serve as change agent. His relationship with the local faculty while tentative is powerful. His local presence is output based. He selects local associates in terms of their output potential. His relationship with a particular institution is open-ended. There need be no cutoff point where the local institution demonstrates capacity to house the requirements that he imposes. Where this does not prove to be the

case, the nature of his mission requires that he cast his nets elsewhere. His presence represents an overture which cannot be ignored, but which can be responded to only at the price of important internal modifications. It is for these reasons that he is in a strong position to insist that equipment acquisition be accompanied by concurrent or prior updating in the other systemic elements, that it be truly a "package deal."

Yet in imposing such requirements, the U.S. researcher will be charged with less bias. The nature of his mission equips him with a built-in exemption. He arrives on the scene with contrasting professional standards which he unabashedly seeks to replicate, but it is assumed that these contrasting standards are science based. He wears blinders that blot out the peripheral cultural considerations that wash out the contributions of others, but this too is in the scientific tradition. He imposes a strange model of working relationships, but these prove somehow palatable because of the shared premise that "science knows no frontiers" or should know none in terms of a future eventually to which both parties are committed.

The researcher represents the optimum point through which the power that external helping agents can bring to bear should be focused; he also needs specific support from these agents in carrying his intervention off. Strongly interacting with the local scene, yet working at the edge of its institutional parameters, he requires linkage with other external parties at points where their interests converge. He requires, for instance, the additional leverage implicit in having an important say in which institutions merit the endorsement that equipment assignments represent.

A Proposed Action Program

We are now prepared to derive from this conceptual exercise certain guidelines for action. With the proviso that the institutional picture in Latin America is changing and these guidelines will require up-dating commensurate with both the rate and direction the change takes, let us assume that the principal parties agree to abide by the dictates of this conceptual model. What sequence of activities is indicated? What part will the various parties play? What will be the criteria for equipment assignment? These questions can best be asked with reference to Figure 3. Our program envisions two action steps, the second of which is predicated upon two intervening emergent phases. The steps and emergent phases will then be related to the model and certain readings proposed for determining the system's readiness to incorporate the next step or phase.

Action Step No. 1 - The establishment of cooperative relationships with U.S. researchers on an experimental basis.

Model Reference - Tentative external intervention in the system at Station B.

Efficiency Readings -

1. What ingenuity and flexibility is demonstrated by the local system in countering the competition for such arrangements offered by the private institutions?
2. Is the faculty willing to release personnel from other educational activities? What kind of people are assigned? What are their histories of research productivity?
3. How does the faculty handle the static received from other university sources at the time such relationships are being negotiated?

4. How imaginative is it in conceiving of an expanded and revised relationship with its local industrial/professional community?
(If this phase is successfully accomplished, Phase 2 will follow.)

Emergent Phase No. 1 - Increase in substantive research output.

Model Reference - Change at Station B communicates itself to Station C.

Efficiency Readings -

1. Is there some publication of research findings? What form does it take? Does it meet at least minimal standards of U.S. research-based universities?
2. Is research being accorded at least parity with teaching and other educational activities?
3. What projections does it have for expanded future activity in the research area? Are these activities realistic in terms of resources in sight?
4. What does it see its facilities requirements, including computation facilities, to be? Are these requirements locally viable?

Emergent Phase No. 2 - Emergence of a broadened self-concept.

Model Reference - Changes at Stations B and C playback on Station A.

Efficiency Readings -

1. What response is made to the legitimate needs of the new generation professionals? Is a serious effort made to retain them on a long term basis?

2. Has the faculty demonstrated increased ability to contend with contrary forces within the university?
3. Does the faculty see itself offering service to the industrial/professional community as well as accepting help?
4. Does the faculty realize that its relevant professional viewpoints are undergoing change? Does it recognize and accept gradients in change orientation among its sub-sectors?

Action Step No. 2 - Assignment of Important Computation Equipment.

Model Reference - Reinforcement of total system by external intervention at Station C.

Efficiency Readings -

1. Have improved external relationships with both the industrial/professional community and foreign researchers taken shape and endured? Is a realistic extension of these relationships programmed?
2. Has there been tangible evidence of research productivity in the form of publication that meets at least minimal professional standards? How has this publication been received by the local industrial/professional community and by the cooperating U.S. researchers? Is a realistic extension of this activity programmed?
3. Has the faculty developed a viable if variant relationship with the total university? Is this relationship based on durable faculty beliefs and standards?

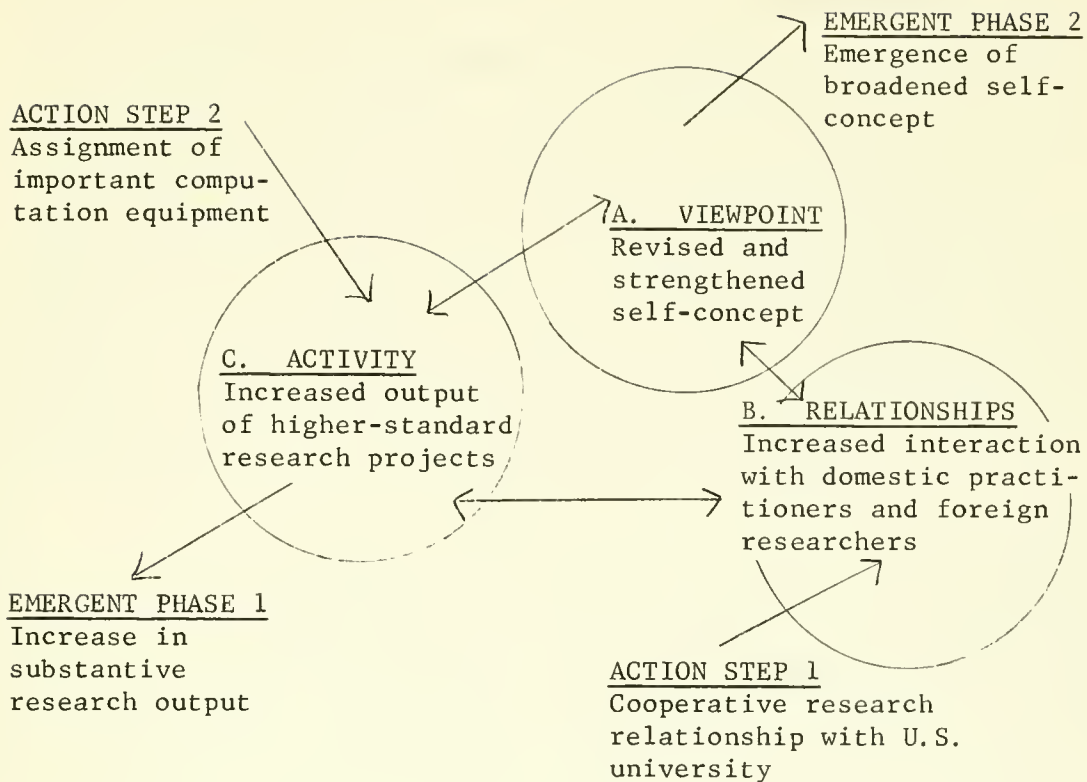


Figure 3 Action Steps and Emergent Phases of Cooperative Programs Derived from Systemic Model

It has been the central premise of interested parties on both continents that the established order needs important up-dating if Latin American countries are to share in the advantages of scientific and technological innovation to which they - as partners in the Western experience - are heir. It has been a second premise that the universities are the critical instruments by means of which an improved circumstance will be achieved. The Latins cannot experience important national development using underdeveloped university systems. University structures have been, therefore, the target of developmental activities emanating from both spheres.

But the impact of expensive developmental activities has been sporadic and disappointing. Our current repertoire of developmental formats, some fifteen years and hundreds of millions of dollars after the effort was launched, has not had the expected impact on the structure of Latin American universities. Time runs out. Resources are squandered. Promising professional careers die aborning. Expectations are not met, and political and social pressures rise.

The time is ripe for testing new formats that take into account new technological circumstances, that marshal the power that external presences represent, that unabashedly focus this power as an explicit input to what have been dysfunctional educational systems, and that finally, taking their own needs into hand, step back and permit the local consensus forces that may not properly be intervened to work through their inevitable processes. This paper is offered as an example of how these conditions may be met at one dimension of the hemispheric encounter.

October 20, 1965

