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PORTUGAL UNIVERSITY INSTITUTES DEVELOPMENT PROJECT
(Contract AID/NE-C-1701)

REPORT ON
SHORT-TERM STAFF ASSIGNMENT
AT THE
INSTITUTO UNIVERSITARIO DA BEIRA INTERIOR (IUBI)
COVILHA, PORTUGAL

May 30 - June 30, 1985

Submitted by

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INTRODUCTORY REMARKS

The area of consultancy was graduate education, both in terms of advising the faculty of the Institute on gaining admission to graduate schools in the United States and advising the faculty and administration relative to the possibility of initiating a graduate program at the Institute. The Portuguese counterpart was Professor Cândido Manuel Passos Morgado, the Reitor of the Institute. However, both the Reitor and this advisor relied heavily on the local AID Coordinator, Mr. Joao Lisboa.

Meetings during the week of June 3 with Reitor Morgado, whether in private or in the company of the other short-term advisors and/or faculty at the Institute (hereafter referred to as IUBI), produced a consistent theme in the form of a question: what advice can be given IUBI toward implementing certain goals or objectives? The Objectives are as follows:

1. An expansion of the licenciatura granting programs from the current level of six (as of October 1985) to as many as 23 by the end of this century.
2. An increase in the number of faculty with graduate degrees to deliver these programs.
3. The development of a type of academic coalition between IUBI, Clemson University and certain other universities in Portugal, Spain, and France such that the graduate degrees awarded by IUBI would be recognized and enjoy satisfactory academic prestige.
4. The facilitation of postdoctoral appointments of IUBI faculty to Clemson University and faculty exchanges in the forms of sabbatical leaves.

The connection between Objectives 1 and 2 is so obvious as to require no elaboration. Objective 3, however, appears to have origins in goals and aspirations partially disjointed from the first two. Each objective will be discussed in detail with recommendations. A grand summary with overall recommendations will conclude this report.

EXPANSION OF UNDERGRADUATE PROGRAMS

Existing Programs

IUPI presently offers the licenciatura in five majors or academic areas: management (with options in company management and regional management), textile engineering, paper and pulp engineering, mathematics and information sciences, and secondary education (mathematics). A sixth major, sociology, will be offered for the first time in the 1985-86 academic year. In addition to the licenciatura granting programs, IUBI offers a two-year program in pre-engineering for students who will transfer into the third year of five-year programs at one of three universities in Portugal.

Experience at Clemson University with three graduates of IUBI and three from the Technical University of Lisbon points to the superiority of the five-year licenciatura programs in Portugal relative to many B.S. degrees in the United States. Equally as important, the quality of the licenciatura at IUBI relative to that offered by the more prestigious Technical University is established and is favorable, if not equal. Admittedly, the sample is small and only two major areas, management and textile engineering, are examined. Nevertheless, the inference is clear: the licenciatura programs offered by IUBI provide a strong base for graduate study in the U.S.A.

Proposed New Programs

Plans presented by the Reitor call for the licenciatura to be offered in six areas of engineering: civil, electrical, energy, robotics, safety, and transportation; in applied physics, dentistry, food processing technology, tourism; and in seven areas of secondary education: chemistry, information sciences, management, physics, sociology, textiles, and tourism.

In addition, three programs in animal breeding, architecture, and physical education are proposed for continuation by students at other universities, analogous to the current two-year programs in chemical, civil, electrical, and mechanical engineering.

Critique

Considering the costs of starting and maintaining new programs vis-à-vis the apparent financial resources available and considering the apparent needs of the interior region of Portugal, this portion of the plan is overly ambitious. A small number of well conceived and adequately financed programs, focused on the training of professionals for the needs of the larger region, is preferred over a larger number of programs with popular titles but questionable in terms of needs and demands; programs whose sheer number and ensuing costs will certainly lead to inferior quality. One new program per year is an optimistic goal even for the well endowed universities in the United States.

With these points in mind, the following new academic programs are recommended and a priority list is presented at the end. The smaller number of programs should beguile no one relative to the cost, exclusive of buildings and faculty salaries. It will far exceed the amount originally proposed, roughly 15 thousand contos (86 thousand U.S. dollars) over a six year period.

Recommendations

Civil engineering. This is an area of high priority, one whose undergraduate teaching laboratories could be financed with an initial equipment outlay of roughly 500 thousand dollars. Included should be options in hydrology, sanitary engineering, structures, construction, and transportation (thereby eliminating a proposed program). The abundant water resources in the area, a growing problem of urban and agricultural wastes, significant building construction, and the pressing need of public roads and managing traffic congestion make these viable options. Sanitary engineering can thrive or languish, depending on the national government and the political views toward a cleaner environment. Accordingly, this problem may be one larger than the faculty and administration of IUBI.

Industrial engineering. Although not listed in the proposal, this is a natural discipline to encompass, as options, three or perhaps four areas which were proposed. Safety engineering is a part of

many well established industrial engineering (IE) programs. Similar to sanitary engineering mentioned earlier, safety engineering can thrive only if there is a national commitment to safety procedures, a policy that is enforced in manufacturing plants. Robotics engineering also can be an option, falling under the more common name of automated manufacturing. It is not obvious that the labor force is so scarce or the manufacturing processes so dangerous as to warrant a major push to robotics. Energy engineering (actually a subdivision of mechanical engineering) can be an option in IE but should be restricted to engineering economic analysis and energy conservation. To become heavily involved in thermal science research will escalate the costs far out of proportion to the practical benefits. A fourth option could be operations research (OR), covering production management and plant layout. It is important that this option be very engineering oriented and not overlap with industrial management. The two programs should be complementary. Approximately 200 thousand dollars would equip adequately an undergraduate teaching laboratory in IE provided robotics and energy play a less dominant role than safety engineering and operations research. This cost does not include computer facilities which will be discussed in a separate section. It is assumed that a machine shop necessary for civil engineering will suffice also for IE.

Electrical engineering. No evidence of a pressing need for this program was provided or observed. It is expensive and the cost grows annually if the program is slanted at all to computer engineering. This should be the lowest priority of the engineering proposals and, if encouraged at all, should be directed toward the power industry.

Applied physics. No justification can be found for this program. The areas of engineering just mentioned are, in fact, examples of applied physics.

Animal and food industries. This name is a slight deviation from the one proposed, i.e., food processing and technology. Animal and food industries implies, in addition to human food processing, studies in animal production, preparation of animal food stuffs, and animal nutrition. (The word "animal" as used here includes poultry as well

as cattle, goats, sheep, and swine). Whatever the name, there is a firm conviction that IUBI should offer a licenciatura program in a defined area of agriculture. There is significant agricultural activity in the Guarda-Covilha-Fundao area unrelated to viticulture or crop production on a large scale as exists in the Alentejo region. The State-owned farm at Caria (18-20 km from Covilha) is a natural experiment station for some of the agricultural activities associated with the proposed program. In addition, prepackaged and/or frozen foods are becoming part of the lifestyle of increasing segments of the Portuguese population.

Options within this licenciatura program could include poultry production, large animal production, and food processing. Each option will require faculty with a biological science background willing to concentrate on practical results. For the first two, it is most desirable that the faculty hold graduate degrees from an agricultural school in the U.S.A. Faculty in the food processing option should possess, in addition, a strong chemistry background and some training in manufacturing processes. Again, a graduate degree from an agricultural school in the U.S.A. is recommended. A close working relationship between the faculty in food processing and certain ones in industrial engineering will be mutually beneficial. The equipment cost for this licenciatura program over a six-year period will be approximately 175 thousand dollars.

Tourism. A licenciatura program in tourism commands a high priority for there is little arguing that tourism will continue to be a significant segment of the Portuguese economy. At present, the only training in tourism is in Lisbon and does not lead to a licenciatura. Persons in middle to upper level administrative or managerial positions of the tourism industry cannot help but interact with bodies of government and local chambers of commerce (or the equivalents thereof). The professional image associated with a licenciatura and the respect it commands should not be underestimated.

There are two natural options for this program; the commercial part associated with hotel management, promotion, marketing, recreation, etc. and the historical preservation part associated with restoring, preserving, and presenting the rich heritage of Portugal. It is recognized that the second option may meet resistance from certain established elements of society such as a State Division of Archeology or Archives. Such was the case in the United States but the resistance disappeared once the establishment recognized a mutual goal, namely, accessibility of national treasures (literally and figuratively speaking) to tourists without destruction, desecration, or loss of worth.

The costs for such a program, exclusive of faculty and classrooms, reside primarily in library additions, travel, and public information facilities such as printing, photography, radio, and television. Costs for preservation and restoration will fall, obviously, outside of IUBI. A rough estimate is 20 thousand dollars initially and an annual budget of five thousand dollars. These values are subject to considerable change depending on the scope of the Reitor's plans for creating a publication center.

Dentistry. A convincing argument was presented for the need of more dentists, both in rural and urban areas. However, a licenciatura program in dentistry divorced from medical training as exists in the U.S.A. is a totally new concept and this advisor is unqualified to form a meaningful position or opinion as to the advisability or cost of such a program. The best advice would come from a person in charge of an existing program in Portugal.

Secondary education. The seven new licenciatura programs proposed in secondary education fall into two groups: traditional subject area education (chemistry, physics, and sociology) and vocational education (management, textiles, information sciences, and tourism). For clarity in nomenclature, the term "traditional subject area education" will be called simply "secondary education."

The programs in chemistry, physics, and sociology would join the existing programs in mathematics and information sciences to form a

single licenciatura in secondary education with four options. There should be very little incremental cost above that necessary to hire new faculty. Some equipment necessary to demonstrate scientific principles and some administrative costs for overseeing the teaching internships could add two thousand dollars per year over an initial investment of five thousand dollars.

A single licenciatura program in vocational education with options in management, textiles, information sciences, and tourism would produce teachers to deliver career oriented curricula to high school students who most likely would not proceed to a university. Increasing the pool of young persons with technical skills is a high priority as businesses modernize their operations. The equipment used in this training should be modern and not castoffs from industries, so out-of-date as to have no relevance to what is found in the employment. An initial investment of 100 thousand dollars is not unreasonable with administrative costs being comparable to that in secondary education. Equipment donations of the correct type from businesses could cut the initial amount by perhaps 50 percent.

New two-year programs. The proposed two-year programs could utilize existing faculty and facilities, thereby decreasing considerably the incremental cost. The program in animal breeding is of highest priority if the proposed licenciatura program in animal and food industries does not materialize. Of the two remaining programs, pre-architecture is of lower priority. The crucial questions are whether the universities to be attended after leaving IUBI have openings and whether employment opportunities exist after receipt of the licenciatura.

Computer Needs

The new licenciatura programs, especially those in civil and industrial engineering, will require as a minimum a computer with 1.5 million bytes of memory such as a VAX 780 or its equivalent. This equipment can be purchased for about 400 thousand dollars in the U.S.A. A key ingredient to the computer facilities is a reliable

service contract. This does not come cheaply. IUBI should also explore network linkages with larger computers at Lisbon or Porto.

Library Needs

At least 50 more major journals are necessary for all combined programs. A sophisticated interlibrary loan system cannot replace the availability of selected journals unless more is expended in electronic equipment. A minimum of 100 thousand dollars initially is needed.

Costs (in U.S. Dollars)

The approximate costs given in the following table exclude faculty salaries, buildings as this advisor has no accurate knowledge of salaries, or building costs. In addition, costs pertaining to the proposed licenciatura in dentistry are not considered.

<u>Program or Facility</u>	<u>Initial Cost</u>	<u>Yearly Costs</u>
Civil Engineering	\$ 500,000	\$ 5,000
Industrial Engineering	200,000	5,000
Animal & Food Industries	100,000 ^a	15,000 ^a
Tourism	20,000 ^b	5,000 ^b
Secondary Education	5,000	2,000
Vocational Education	<u>100,000^c</u>	<u>5,000^c</u>
Programs Subtotal	\$ 925,000	\$37,000
Computer	\$ 400,000 ^d	\$20,000 ^d
Library	<u>100,000</u>	<u>10,000</u>
Facilities Subtotal	\$ 500,000 ^d	\$30,000 ^d
GRAND TOTAL	\$1,425,000 ^{abcd}	\$67,000 ^{abcd}

^aDependent on extent of utilization of State owned farm. Yearly cost should reduce by 2/3 after five years.

^bDependent on equipment and supplies in proposed publication center.

^cDependent on donations from businesses.

^dDependent on service contract or linkages with large mainframe computers elsewhere.

Summary

Of the 23 proposed licenciatura programs, the processes of combination and elimination lead to a recommendation of seven: civil engineering with five options, industrial engineering with four options, animal and food industries with three options, tourism, dentistry, secondary education with three new options, and vocational education with four options. Considerations should be given to adding a fifth option in vocational education, namely, allied health. High school graduates trained in this area could be employed as low level technicians in hospital and health clinics, ambulance attendants or paramedics in the total health support system.

Equipment, supplies, and other costs over a six year period (initial + next five years) is about 1.76 million U.S. dollars. Building costs, faculty salaries, and the dentistry program are excluded in this total. Because the civil engineering program and the computer costs account for 58 percent of the total, elimination of civil engineering plus a computer linkage with a large mainframe elsewhere could eliminate about 700 thousand dollars. Considering all factors; costs, apparent needs, and the role of the Institute, a descending order of priority of the programs is:

Animal and food industries

Tourism

Vocational education

Industrial engineering

Civil engineering

Secondary education

Dentistry.

It should be emphasized that the condensing of three or four proposed programs into a single program with several options does not decrease proportionally the time necessary to initiate the individual options. The faculty still must be hired, the curriculum developed, and the equipment purchased for each and every option. Thus, one new option per year remains a realistic minimum time.

INCREASE IN THE NUMBER OF FACULTY
WITH GRADUATE DEGREES

Present Faculty

For the 1984-85 academic year, the number of faculty at IUBI equaled 76: five professors, 10 associate professors, 10 auxiliary professors, 30 instructors, and 21 teaching assistants. A Ph.D. is required for any of the three professorship ranks, a master's degree for an instructor rank, and a licenciatura for the last rank.

The present faculty deliver five licenciatura programs and four pre-engineering programs to 500 students.

Proposed Faculty

For the 1990-91 academic year, the plan calls for 137 percent increase in the number of faculty as follows: 20 professors, 20 associate professors, 40 auxiliary professors, 45 instructors, and 55 teaching assistants. Assuming no retirements, or resignations, etc., this translates into a need for 55 new Ph.D. degrees and 15 new master's degrees. The proposed faculty numbering 180 would deliver all licenciatura and pre-licenciatura programs to students projected to equal 1800-2000 in number.

Critique

The plan to maintain the current student to faculty ratio of about 12 is a worthy goal and should be retained. However, considering that sound planning for a new licenciatura program, i.e., each option when appropriate, cannot produce new programs at a rate faster than one per year, the faculty need not equal 180 within six years. This depends on which programs are promoted first and the number of students desiring to enroll

Preface to Recommendations

Initial discussions on the subject (Objective 2) during the week of June 3 conveyed an impression that there existed two major concerns

in increasing the number of faculty with appropriate graduate degrees: minimum time and minimum costs. In that framework, an analysis of the problem (to be provided later) produced a clear and precise answer: the desired increase in the number of faculty members with Ph.D. or master's degrees could be accomplished with minimum time and cost by sending existing faculty to other universities in Portugal, Europe, or the U.S.A. At first glance, with no awareness of Objective 3, this conclusion appears as a trivial redundancy because no alternative now exists, i.e., IUBI does not offer graduate degrees.

A subsequent meeting on June 20 added new dimensions to the problem and revealed a subtle linkage of Objectives 2 and 3. A range of difficulties in sending persons to other universities, especially the U.S.A., was presented. These include very real human concerns such as a reluctance on the part of married faculty to be separated from their family (albeit temporary) and language and cultural obstacles; admission problems related to the time involved in the process for most graduate schools in the U.S.A. with the possibility that admission might be denied; and lastly, other problems best described as political or social - the desire of the Ministry of Education to spend in Portugal those funds allocated for faculty education and an implication that returning faculty members may have attitudinal problems affecting adversely their relationship with IUBI. While all of these concerns are real and should not be taken lightly, they are extraneous to the initial question raised in Objective 2. Suggestions will be given when appropriate but it is presumptuous, based on a month's experience at one university, to give advice on those problems of political or social nature.

Recommendations

It is recommended that IUBI take the immediate steps necessary to send the faculty desiring graduate degrees to a selected university in Europe or the U.S.A. The recommendation to have the proposed agricultural faculty educated at a land-grant university in the U.S.A. is an example of the term "selected university," i.e., matching the

person and the university. A variety of universities should be considered because a faculty with diverse education is important. The fact that smooth working relationships may exist with a given university in matters related to admission or financial assistance should not constitute a reason for adopting a closed position. Reliance on one country, analogous to reliance on one university, should also be avoided except in circumstances where a clear superiority has been demonstrated.

The Graduate School and selected departments at Clemson University can help IUBI establish good relationships with other high quality universities in the U.S.A. However, there is much that can be done by the Institute, independently of Clemson University. Printed information in international publications is a starting point. Universities in the U.S.A., Canada and perhaps the world place considerable stock in certain publications such as The International Handbook of Universities. A copy of page 844 taken from the ninth edition is shown on page 14 and the contrast in information about IUBI relative to that for the Instituto Universitario de Trás-os-Montes e Alto Douro is stark. While a wealth of printed information does not guarantee institutional quality, its absence creates an unfavorable impression and places applicants from that institution at a disadvantage.

The administration at IUBI should give strong consideration to providing necessary financial backing, up to 10 thousand dollars per year, so the faculty member can take his or her family. The value given here is applicable to Clemson University and other, but not all, publicly supported universities. Many married couples at Clemson live on less; not lavishly but not destitute. The best students have more than a 75 percent chance of receiving an assistantship in the second year, thereby decreasing the necessity of funds from IUBI. A written contract could be promulgated such that the faculty member is required, under severe financial penalty otherwise, to return to IUBI for a number of years related to the amount of financial backing, assuming his her return is desirable. This step could produce immediate results.

PORTUGAL

Universities and University Institutions

Head: Ilídio Rosário Santos Moreira; *staff* 144 (16)
I. of Economics and Management
Head: João Remy Teixeira Freire; *staff* 161 (178)
I. of Technology
Head: Júlio Martins Montalvão e Silva; *staff* 503 (109)
I. of Social and Political Sciences
Head: Oscar Soares Barata; *staff* 14 (12)
I. of Physical Education
Head: Henrique Melo Barreiros; *staff* 60 (9)
F. of Architecture
Head: Frederico Henrique George
 Also 30 associated research Centres.

Founded 1930, incorporating 4 previously existing institutions founded between 1830 and 1911. A State institution under the jurisdiction of the Ministry of Education and Universities. Budget 1981, 556,059,000 Escudos. Governing body: the Conselho Universitário, composed of the Rector, the Vice-Rector, the directors of the schools and institutes, and representatives of the academic staff and students. Residential facilities for c. 400 students.

Arrangements for co-operation with: Technical University Madrid; University of Compiègne; University of Paris X; Federal University of Santa Maria; Federal University of Bahia; Federal University of Rio de Janeiro; Pontifical Catholic University of Rio de Janeiro; University of São Paulo; Universidade de Luanda; Universidade Eduardo Mondlane.

Academic Year: October to July (October-February; March-July)
Admission Requirements: Secondary school certificate or recognized foreign equivalent, and entrance examination.

Fees (Escudos): 1200-1500 per annum.
Language of Instruction: Portuguese.

Degrees and Diplomas: Licenciado in—Veterinary Medicine; Agriculture; Forestry; Economics; Company Management, Social and Political Science; Anthropology and Ethnology; Physical Education; Metallurgical Engineering; Mechanical Engineering; Civil Engineering; Electrical Engineering; Mining Engineering, 5 yrs. Degree of Pós-graduação (Mestrado). Doutor, by examination and thesis after Licenciado.

Libraries: School and Institute libraries, total 200,000 vols.
Museums: Geology; Zoology.

Publications: Anais of the School of Veterinary Medicine; Anais of the Institute of Economics; Anais of the Institute of Agriculture; Anuário da Universidade Técnica de Lisboa (annually); Estudos de Economia; Lúdus (4 times a year); Revista de Estudos Políticos e Sociais (4 times a year).

Academic Staff, 1981-82:

Rank	Full-time	Part-time
Professores Catedráticos	104	7
Professores Associados	63	19
Professores Auxiliares	51	20
Assistentes	682	371
Leitores	3	—
Outros	2	—
Total	905	417

Student Enrolment, 1981-82:

	Men	Women	Total
Of the country	8564	3193	11,757
Of other countries	227	76	303
Total	8791	3269	12,060

INSTITUTO UNIVERSITÁRIO DA 'BEIRA INTERIOR'
 Covilhã
 Founded 1973 as Instituto Politécnico da Covilhã.

INSTITUTO UNIVERSITÁRIO DE TRÁS-OS-MONTES E ALTO DOURO
 Avenida Alameda Lucena 1, 5000 Vila Real
 Telex: 24436
 Telephone: (0099) 23688/9
Rector: Fernando Nunes Ferreira Real
Secretário: Francisco Joaquim Pires

D. of Biology
Head: Armando Alfredo de Melo; *staff* 22
D. of Economics and Sociology
Head: Joaquim Lima Pereira; *staff* 7
D. of Agriculture and Rural Engineering
Head: Luís Brito de Carvalho; *staff* 17
D. of Earth Sciences
Head: Luís Brito de Carvalho; *staff* 31
D. of Mathematics and Physics
Head: Luiz Paulo Mello Sampajo; *staff* 11 (1)
D. of Animal Husbandry
Head: Joaquim Lima Pereira; *staff* 37
D. of Forestry
Head: António Lopes Gomes; *staff* 19
D. of Food Technology and Microbiology
Head: Alberto Gomes de Castro; *staff* 5
D. of Pathology and Animal Hygiene
Head: Vergílio Pinto de Andrade; *staff* 13
D. of Plant Protection
Head: Armando Alfredo de Melo; *staff* 7

Founded 1973 as Polytechnic, and admitted first students 1975. Acquired present status and title 1979. A State institution under the jurisdiction of the Ministry of Education and Universities. Residential facilities for students.

Arrangements for co-operation with the University of Purdue, U.S.A.

Academic Year: October to June (October-February; February-June)
Admission Requirements: Secondary school certificate and entrance examination.

Fees (Escudos): Registration, 100; tuition, 1200 per annum.
Language of Instruction: Portuguese.

Degrees and Diplomas: Licenciado in Agriculture; Forestry; Animal Husbandry, 5 yrs. Also 1st and 2nd yrs of Licenciado in Engineering.

Library: Documentation Centre, c. 9000 vols.
Publication: Informação Bibliográfica (bi-monthly).

Academic Staff, 1981-82:

Rank	Full-time	Part-time
Professores Catedráticos	3	—
Professores Associados	3	—
Professores Auxiliares	4	—
Assistentes	52	2
Assistentes Estagiários	19	—
Total	81	2

Student Enrolment, 1981-82:

	Men	Women	Total
Of the country	315	106	421
Of other countries	1	—	1
Total	316	106	422

UNIVERSIDADE LIVRE DE LISBOA
 Rua Vitor Cordon 45, 1200 Lisboa

Portuguese Studies
 History
 Law
 Economics
 Business Administration
 Founded 1977.

UNIVERSIDADE LIVRE DE PORTO
 Rua Conde de Vila Boas 126, 4200 Porto

History
 Law
 Economics
 Business Administration
 Mathematics
 Founded 1977.

In the matter of admissions, the prospective student should become familiar with the requirements as much as a year in advance. The publication, Directory of Graduate Studies, is a starting point for universities in the U.S.A. Three copies of the 1984-85 edition were given to IUBI, courtesy of the publisher (Educational Testing Services) and this advisor. International students, throughout the free world, learn of admission requirements through their own efforts. They write letters and visit U.S. Information Agencies, Consulates, or the Embassies. In short, the prospective student takes the initiative.

Summary

That the number of faculty members at IUBI must be increased substantially to deliver the proposed new licenciatura programs is a foregone conclusion. Considering that 20 new programs of high quality will require no less than 20 years, it is doubtful that 180 faculty will be necessary by 1991. However, at least 100-120 could be required by the end of the century and this is a significant increase. Whatever the number, education of the faculty to the master's or Ph.D. level will be a major thrust of the institute.

In order to encourage persons to pursue a degree and to relocate for 2-4 years, sufficient funds should be provided to permit one's family to accompany. The institute should formulate a policy to assure itself of a return on this investment. Furthermore, efforts to publicize IUBI in appropriate books are crucial. Additional policy should be devised to prohibit any area of the faculty numbering five or more from having over half of the Ph.D. degrees from one university.

DEVELOPMENT OF A COALITION GRADUATE PROGRAM
BETWEEN IUBI AND OTHER UNIVERSITIES

Proposal

In order to decrease a perceived excessive cost in sending faculty away to other universities for their graduate education and in order to eliminate some of the non-cost related problems in such endeavors described previously, a coalition between IUBI, Clemson University, and other universities in Portugal, Spain, and France is proposed. This plan calls for faculty at the external universities to come to IUBI for a specified period of time to teach graduate courses, serve on graduate student advisory committees, and direct the dissertation research. Those in the three professorship ranks at IUBI would also participate and the degree would be awarded by IUBI or by an academic identity assigned to the coalition. As the number of faculty with doctoral degrees increased, participation of professors from external universities is expected to diminish.

Critique

Clemson University can enter into no agreement whereby it awards a joint degree. Neither can the University assume the role of a member of a joint accreditation team, thereby implying official sanction to a degree awarded by IUBI, even if members of the Clemson faculty may be under temporary contract, as individuals, with IUBI. However, the University is in no position to dictate how its faculty members spend their time during the period May 15-August 14. The granting of a sabbatical leave to come to IUBI during the academic year is a decision to be made by the dean of the respective college and the Provost. The Graduate School is not involved. It appears unlikely that the responsible academic officers will view with favor each and every request for sabbatical leave under these terms. It becomes a question of whether the activity at IUBI enhances the faculty member's professional stature, generally in research, thereby benefiting the University.

Let us now assume that the coalition is formed without the official participation of Clemson University. There are most certainly enough qualified faculty members from universities in Portugal, Spain, France, and the U.S.A. to participate as individuals. Precisely what arrangement will exist for awarding the degrees is not important for the following discussions. Let us deal first with costs. During a given academic year, for example, suppose two full-time equivalent research professors come to IUBI, either two persons for a full academic year or four persons for a semester each. The following costs can be expected as a minimum:

Salaries	2 x \$40,000 =	\$ 80,000
Incremental Living Expenses	2 x 300 days x \$25/day =	15,000
Travel		3,000
Administrative and Clerical Support		<u>2,000</u>
	Yearly Total =	\$100,000

Under the best circumstances imaginable, these two full-time-equivalent professors could teach eight courses in the academic year and direct six students over the full year. This assumes the professor's fluency in Portuguese or the student's fluency in the professor's native tongues or some more universally accepted language. Course content cannot suffer while the professor grasps for the correct word. And while the course offerings can be arranged to coincide with the availability of a given professor whose expertise resides in the course subject, there is a small chance that, within the collection of professors, there will be suitable dissertation research advisor for each of the six students. The multiplicative effects of constraints in languages, in course subject expertise, and in research expertise reduce to less than one in twenty-five (4 percent) the chances of a correct meshing of all gears in the graduate program machine. Perhaps in professional degrees, such as the Master of Business Administration (MBA), in which all students take roughly the same courses and no research requirement exists, the primary

constraint is one of language. But for research degrees, the correct professor at the correct time is unsurpassed in importance.

Let us now examine what can be done otherwise with 100 thousand dollars per year. It can send 10 faculty members to most, but not all, publicly supported universities in the U.S.A. for a year's study in pursuit of their graduate degree. And most will be able to bring their family. Although exact figures are unavailable, it is probable that even more students can be sent to universities in Europe, especially Portugal. Irrespective of the country, each of the students (IUBI faculty) can conceivably pursue a different major subject and each fitted uniquely to a research advisor. The coalition plan can never match that flexibility except at a prohibitive cost. Furthermore, the plan will require a longer time because of the inherent constraints.

A final disturbing feature of the coalition is that it will encourage inbreeding of faculty as external professors would be phased out for economical reasons. The hiring of one's graduates to faculty positions is to be avoided irrespective of how the initial growth began.

Recommendations

In the interest of academic quality of the faculty in both the immediate future and long term and in the interest of time and costs, the coalition plan is not recommended. IUBI should follow the route of the vast majority of reputable universities in the world: employ faculty who received their graduate degrees from a variety of universities whose reputations are equal to or greater than the employing university.

Summary

The author has long held the belief that a strong graduate program is built on a strong undergraduate base. This should be the first goal of IUBI and the first step is to hire faculty with degrees from existing universities. The coalition cannot be justified either academically or economically.

FACILITATION OF POSTDOCTORAL APPOINTMENTS AND
FACULTY EXCHANGES BETWEEN IUBI AND CLEMSON

Postdoctoral Appointments

The appointment of postdoctoral fellows to Clemson University is not under the jurisdiction of the Graduate School but proper advice can be given. Such persons must have actually received their Ph.D. degree and are given the title Research Associate.

The most crucial element leading to the appointment is contact with a faculty member at Clemson who has been awarded a research grant or contract and who agrees to have the postdoctoral fellow join his research group. Often the availability of funds for such appointments is published in professional magazines such as Chemical and Engineering News for chemists and chemical engineers. Personal knowledge of the researcher's professional activities is the most desirable approach. As a general rule, the funds are not part of the general education budget supplied by the State of South Carolina. All salaries are a matter of agreement between the two individuals.

Except for certain research activities related to national defense and security, postdoctoral appointments are open to foreign nationals. Because the appointment is considered as one of employment by Clemson University and not a scholarship, mandatory payroll deductions are made for federal and state income taxes and for social security contributions. Some of these deductions may be recoverable later. The duration of the appointment is by mutual agreement. Fluency in English is not a significant factor unless the person wishes to enroll in courses for graduate credit. Usually, such courses are attended in a casual manner, i.e., an unofficial audit.

Faculty Exchanges

This is an arrangement whereby a faculty member at IUBI and a counterpart at Clemson would swap positions for a year. The title of the person at Clemson would be Visiting Professor of, listed with the regular faculty.

As in the case of postdoctoral appointments, personal contact with a faculty member of Clemson would be the first step of the faculty member at IUBI. However, the person at Clemson must receive the approval of his or her superior prior to any agreement - a significant contrast from that of postdoctoral appointments. The Clemson faculty member continues to receive his or her regular salary and presumably the same would be true for the person coming to Clemson. Attempts are made to alleviate the unfavorable financial position when a visiting professor comes to Clemson and the incremental cost of living is prohibitive. World renowned scholars may command such an adjustment from University funds when his or her presence is considered to be an honor for Clemson. In the more routine cases, the cost of living adjustments would be requested by the visitor from external sources, i.e., sponsors of international exchange such as the Fulbright Exchange Program. Although the University would aid the visitor in these efforts, he or she must take the initiative.

The exchanges are complete in the professional sense, i.e., offices and classes taught are literally swapped and the phenomenon often extends to domestic concerns such as homes and automobiles. Fluency in English is mandatory and it is assumed IUBI would expect fluency in Portuguese. Analogous to postdoctoral fellows, exchange faculty are placed on a J-visa.

Summary

Clemson University encourages and fosters postdoctoral fellow appointments and faculty exchanges. Individual initiative is the key ingredient as no single body or office at the University is responsible.

SUMMARY

The Institute has made impressive strides in an initial phase of its goal to becoming a comprehensive university. Reference is made to the construction of buildings for classrooms and laboratories. It is now at a juncture where other phases must be tackled, phases whose evidence of progress is less visible.

Academic programs, defined as an option in a broader name attached to the licenciatura, should be developed at a rate not exceeding one per year. This includes the defining of the curricula, purchase of equipment, and advertisement in high schools or involvement in whatever process is used in Portugal to guide prospective students to IUBI. The order of programs chosen by the Institute will dictate the direction of growth of faculty with graduate degrees. Prior to attempting programs in animal and food industries or in tourism, it is most desirable to have a short term advisor in each area come to IUBI. The University of Nebraska and Clemson University are equally good choices for locating an advisor in animal and food industries while Clemson University is the choice for contracting an advisor for tourism.

Quality faculty must be developed as quickly and economically as possible. This is accomplished by sending those with master's or licenciatura degrees to other universities that award graduate degrees. These institutions may be in Portugal, the remainder of Europe, or the U.S.A. Funds should be sufficient to permit the faculty member to take his or her family, thereby removing one of the major obstacles toward pursuit of a graduate degree.

Although IUBI feels comfortable with its close relationship with Clemson University and we at Clemson are proud of this tie, the Institute should not rely on Clemson for a disproportionate share of its faculty's graduate degrees. Efforts to advertise the Institute in appropriate publications will facilitate the process of admission to a variety of universities in the U.S.A. It is incumbent on the faculty

to take initiative in learning the admission processes of universities they might attend. The many fine universities in Europe should also have their share of graduates on the faculty.

The coalition plan for a graduate program at IUBI or a plan for IUBI to award graduate degrees by utilizing visiting professors has, in addition to cost disadvantages, many shortcomings of academic nature. The most prominent of these is a naive belief that a collection of visiting professors can serve as an effective advisory committee for more than a few students. The feature unique to graduate education as a research degree, namely, the fitting of a research director to a student and the day-to-day interaction, is thwarted at the outset. Constraints inherent in the plan make it so. It possesses the markings of a shortcut to a graduate program whose need is not justified in terms of building the faculty required to deliver the licenciatura programs. There is a genuine fear that graduate degrees, awarded by an university in which the faculty responsible for the degrees are 75 to 90 percent visiting professors, will not be recognized by other universities.

If one accepts the premise that strong graduate programs spring from good undergraduates programs, it follows that IUBI should focus its efforts on building a strong record of 20 years in a licenciatura program before contemplating a graduate program in that area. It has done well in that respect in two areas, textile engineering and management. These are logical candidates for the first disciplines to award master's degrees. But only after a minimum of five faculty members in each discipline possess Ph.D. degrees from well established, reputable universities and sufficient financial resources exist.

There exist no philosophical problems for postdoctoral appointments and exchange professors as far as Clemson University is concerned. Certain arrangements as explained must be made and fluency in English ascertained absolutely for the professor visiting Clemson.

APPENDIX

DAILY ITINERARY

Farrell Brown

Thursday, May 30:

Allocated travel day.

Friday, May 31:

Arrived in Lisbon at 6:45 a.m. and cleared customs by 7:30. Was met by the AID coordinator at IUBI, Mr. Joao Lisboa. Arrived at Covilha and IUBI by mid-afternoon, was introduced to several administrative personnel, shown my office, and provided some office supplies.

Monday, June 3:

Met with Reitor C. M. Passos Morgado and Mr. Lisboa from 10:00 to 11:45 a.m. General scope of my activities with respect to graduate education at IUBI was discussed. Meetings were scheduled for June 5 and 7; the first between the five representatives from Clemson University and Reitor Morgado, Mr. Lisboa, and Mr. Pereira from IUBI, and the second meeting with the Clemson personnel, Reitor Morgado, and the entire Scientific Council at IUBI.

The remainder of the day was spent meeting the directors of the library and the computer center, faculty at IUBI (some of whom are perspective graduate students at Clemson), and in touring the buildings with Mr. Lisboa. Finally, there was the matter of attending to personal affairs related to the assignment, namely, moving into an office and executing the per diem payment.

Tuesday, June 4:

Reviewed copies of documents provided by Reitor Morgado describing the various academic programs leading to the licenciatura at IUBI. The minimal amount of translation into English was accomplished with a dictionary and the assistance of the other Clemson University advisors. This effort was necessary prior to meeting with the Reitor on Wednesday, June 5. Further effort was directed toward refinement of prepared seminars about graduate education at Clemson University, this being a continuing process as the local situation was assessed and better understood.

Wednesday, June 5:

Met with Reitor Morgado, Mr. Joao Lisboa, and Mr. Alberto Pereira of IUBI and Dr. Behery, Dr. Friedlob, Dr. Gaddis, and Dr. McKnew from Clemson University. The meeting began at 10:00 a.m. and ended at 4:00 p.m. with a two hour break for lunch, 12:30-2:30 p.m.

Reitor Morgado gave a review of the educational system in Portugal with emphasis on the degree programs of IUBI and the requirements for advancement of the faculty through the academic ranks. The majority of the meeting was devoted to an outline of the plans for expanding the programs offering the licenciatura and developing a graduate program in collaboration with Clemson University and other academic institutions in Portugal, Spain, and France.

A crucial question was raised regarding what academic institution would award the graduate degrees and what role Clemson University would play in formal recognition of degrees in which the University participated but might not actually award.

In the afternoon a short discussion was devoted to the possibility of an alternate and less costly approach to fulfilling a major goal, namely, increasing the number of faculty with Ph.D. degrees. Other fiscal projections related to equipment and the physical facilities were discussed.

Thursday, June 6:

National holiday. Worked at home as there was no access to the building.

Friday, June 7:

Met privately with Reitor Morgado at 9:30 a.m. and expressed a desire to visit several other universities in Portugal in order to better understand what educational standardization as well as differences exist. The goal was to obtain some point of reference for better assessing IUBI. It was emphasized to the Reitor that the absence of such information in publications of international scope worked to the disadvantage of Portuguese nationals hoping to pursue undergraduate or graduate degrees in the U.S.A. or Canada. He expressed a belief that the standardization was rather complete and that a person at IUBI would be an adequate resource for Portugal in general and IUBI specifically. Mr. Lisboa joined the meeting later and, based on personal experiences, reinforced the need for comprehensive written materials on the Portuguese educational system (and IUBI specifically), vis-à-vis, entering graduate schools in North America. A concluding discussion dealt with his (Mr. Lisboa's) financial support when returning to Clemson University for his Ph.D. studies.

At 10:30 a.m., four of the five advisors from Clemson met with the Scientific Council of IUBI. Only one-fourth of the members were

Friday, June 7 (continued):

present. The Reitor presented in brief form his plans for expanding the academic activity at IUBI as given in greater detail on June 5. Dr. Behery, Mr. Lisboa, and I are to prepare a reply based on the assessment of all Clemson advisors.

The remainder of the day was devoted to sorting, rearranging, and condensing all notes taken at the meetings of June 5 and June 7.

Monday, June 10:

National holiday. Worked alone at office reading the curricula at IUBI.

Tuesday, June 11:

Began a systematic review of the plans described by Reitor Morgado at the meetings of June 5 and 7. This was facilitated by obtaining copies of the transparent slides presented at the two meetings.

Wednesday, June 12:

Traveled to Lisbon with Mr. Lisboa for afternoon meeting with AID officials.

Thursday, June 13:

Returned to Covilha. Discussed with Mr. Lisboa the institute's response to the recommendations in the Project Implementation Plan submitted by Purdue University in April 1981 and approved with revisions in 1983.

Friday, June 14:

Discussed with Mr. Lisboa the donating to IUBI of two sets of the four-volume publication Directory of Graduate Programs: 1984 & 85, compliments of the producer, Educational Testing Services. Composed a letter of transmittal to Reitor Morgado.

Made tentative plans to present to the faculty two seminars: one dealing with graduate study at Clemson University and the other with graduate study in the United States.

Monday, June 17:

Worked on visual displays for the two presentations to be given on June 20. Refined each. Spent two hours with Mr. Joao Lisboa and Mr. Alberto Pereira discussing mutual concepts of what is envisioned in implementing the Reitor's plans. Began to prepare draft of report.

Tuesday, June 18:

Continued to prepare report. Discussed with Dr. Gaddis rough estimates of the costs of certain undergraduate engineering programs.

Wednesday, June 19:

Continued work on report. Visited a local wool factory late in the afternoon.

Thursday, June 20:

Met with Reitor Morgado, Dr. Behery, Mr. Lisboa, and Mr. Pereira from 9:00 to 10:45 a.m. Meeting was characterized by frank discussions about the Rector's expansion plans and especially that part concerned with joint efforts between Clemson and other universities in Portugal, Spain, and France.

Gave two presentations to faculty and students. Continued to work on report in collaboration with Mr. Lisboa.

Friday, June 21:

Worked on report.

Monday, June 24:

Worked on report.

Tuesday, June 25:

Worked on report.

Wednesday, June 26:

Worked on report. Met with Reitor Morgado, Mr. Lisboa and Dr. Behery from 5:00 to 6:00 p.m. Discussions centered around points of

Wednesday, June 26 (continued):

agreement and disagreement among the Clemson advisors relative to advice about the expansion plans. The Reitor was informed that a uniform response from Dr. Behery, Mr. Lisboa, and this advisor would not be forthcoming.

Thursday, June 27:

Completed report in typewritten rough draft form. A copy was left with the Reitor with the promise of a finished product to come later.

Friday, June 28:

Allocated travel day.