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REPORT OF VISIT  
POLITÉCNICO SYSTEM  
PORTUGAL

A.I.D.  
Reference Center  
Room 1656 NS

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## SCHEDULE OF CONFERENCES AND ACTIVITIES

July 12	Conference with-	Glenn Patterson (AID/P) Alberto Mora (AID/P) Roberto Carneiro (MOE) Dra. Regina Borroso (MOE)
July 13	Travel to OPORTO  Conference with-	  Vernon DuBois Penner, Jr. U.S. Consul-OPORTO
July 14	Travel to Vila Real  Conference with-	  Jose Torres Pereira Staff IPVR Fernando Bianchi De Agular " " Manuel Dias Nogueira " " Pinto De Andrade " "
July 15	Travel to Covilhã  Conference with-	  Dr. Duarte Simoes Director, IPC Dra. Manuela Barata Staff, IPC Dr. Passos Morgado " " Antonio Guericino " " Luis Filipe Mesquita Numes (Mayor, Covilha)
July 16	Travel - Return to Lisbon	
July 17	Conference with-	Glenn Patterson (AID/P) Alberto Mora (AID/P) Roberto Carneiro (MOE)
July 19	Travel to Evora and return to Lisbon  Conference with-	  Alberto Mora (AID/P) Ario Lobo Azevedo Reitor, IUE Eduardo Cruz de Carvalho, Chmn., Dpt. of Economics and Agric. Economics Mariano Feio, Chmn., Dpt. of Natural Sciences (Geography) A. C. Santos Junior, Chmn. Agric. Engineering Division Carlos Portaz, Vice President for Academic and Scientific Affairs and Chmn. Dpt. of Plant Science Manuel Patrici, Chmn. Dpt. of Pedagogy and Education Jose Albuquerque, Chmn. Dpt. of Plant Science
July 20	Conference with-	Alberto Mora (AID/P) Marques Lito (Director, Planning Div., Teleschola Network)

July 21	Conference with-	Glenn Patterson	(AID/P)
	Depart Lisbon for United States		
July 24	Report preparation		
July 29	Report preparation		
July 30	Report preparation and meeting with USAID/W		
July 31	Report preparation		
August 1	Report preparation		
August 4	Report preparation		
August 5	Meeting with USAID/W and report preparation		
August 6	Report preparation		
August 11	Debriefing - USAID/W		

## II. INTRODUCTION

The politécnicos in Portugal have three important potential functions. First, they will serve as the research and technical assistance arm to regional and national government agencies in their efforts to carry out the development of the region. This assistance will be at the policy and decision making level, and at the R&D level in program development. Second, they will serve as the "outreach" arm to provide technical information and extension services in all aspects of social and economic development to the people of the region in cooperation with the other agencies of the GOP. And third, they will provide training at the technical level, and eventually at the professional level, of the local youth and adults to meet manpower demands in the area as they develop. Training will be provided, through non-formal programs for out-of-school youth and adults, through in-service and pre-service training, and through guidance to primary and secondary school teachers in connection with development goals.

If our suggestions for technical assistance are adopted, we feel that the project will result in:

1. Expanded and upgraded politécnico programs leading to increased post-secondary student enrollments and impact on adult and continuing education.
2. Close coordination and resource-sharing among the four politécnicos.

3. Community agricultural and vocational teaching programs which have viable outreach and rural extension efforts.
4. Outreach education service, possibly using mobile units, radio/TV broadcasts, and/or learning resource center satellites operating in rural areas.
5. Improved capability for the design of a technical training course based on the successful transfer of instructional systems, procedures, and cost-effective multi-media based materials.
6. "Learning resource centers" operating in four politécnicos coordinated with University of Coimbra.
7. Expanded role of the politécnicos as a planning, research and development program.

The specific objective of the contemplated project paper is to assist in the development of a fully integrated vocational, industrial/technical education system involving a competency-based occupational curriculum for the post-secondary vocational/technical level. Assuming that objective, it then appears to us that the mechanism to be used in accomplishing this is technical assistance to be provided for a national politécnico system. This will result in the following outputs:

- (1) A design of a vocational/technical education program relevant to the GOP's national manpower needs and job training requirements.
- (2) An organizational plan and delineation of administrative and operational procedures for the politécnicos, so that they can become

and remain a viable institution capable of renewal and adaptation to changing regional and national conditions.

(3) A design of an integrated competency-based curriculum for the politécnicos based on the instructional systems approach.

(4) A plan for determining educational materials requirements, and the acquisition and modification of both print and non-print materials.

(5) A reproducible and adaptive instructional systems technology-based teacher training program for the politécnicos.

(6) A well-organized and coordinated research, development, and production program for current as well as projected subject matter in areas of concern

(7) Newly constructed and remodeled physical facilities provided with the necessary equipment.

(8) A plan to integrate the present educational TV facilities into the politécnico system.

Further, it is our finding that if this technical assistance should provide the above-mentioned outputs, mechanisms would then be established for achieving immediate and future goals. MOE should then be able to build upon the evolving "know how" from this technical assistance.

## A. Summary, Findings and Conclusions

These are the summaries of our conclusions based on our visits, interviews, and documentation review.

The polytechnical institutes in Couilhã, Vila Real, and Evora have the potential to serve the regions in which they are located as:

1. Centers for planning, research, and development.
2. Manpower development institutions from middle level and professional level technical personnel.
3. Outreach extension institutions for information, education, and commendation for communication with the population of the regions they serve.

In order to carry out these functions, it will be necessary for the polytechnical institutes to perform certain essential activities, which given the necessary technical assistance, they should be able to do.

By working together the Ministry of Education and the Ministry of Labor should be able to develop a vocational/technical education program that would be relevant to changing national and regional manpower needs and job training requirements. Essential to this effort, and provided with the required TA, the MOE could develop a well-organized and coordinated research, development and production program for all the institutes. This should include a plan for determining educational materials requirements and the acquisition and modification of both print and non-print materials.

With this aid, the MOE would then be able to plan for and develop a newly constructed and remodeled Learning Resources Center model provided with necessary software and hardware. (We suggest the University of Coimbra as the prime base for this project.) This model should lead to the development of a delivery system for outreach efforts which may or may not include the possible use of mobile training units, with packaged learning materials, to extend politécnicos teaching programs throughout the surrounding communities.

The provision of technical assistance would extend the services of the existing educational television system to include training programs for radio broadcast. In addition, the polytechnical institutes would develop a capacity to train the educational communication technicians required for the educational TV programming and services, and this would result in increased program output.

The polytechnical institute at Evora needs to develop and maintain a replicable and adaptive instructional systems technology-based teacher training program which can also impact on the politécnicos at Vila Real and Couilhã. The output of this activity will be a capability to design, develop and produce new educational teaching materials incorporating instructional systems technologies, methodologies and concepts particularly relevant to educational outreach system targeted towards vocational technical education for rural families and small town inhabitants and competency-based educational curricula for politécnico students and adults.

Technical assistance will help each politécnico with additional shop and laboratory training equipment and such teaching facilities as are

needed to expand the training capability of each in those specialities most related to its program orientation. For example, particularly important to the politécnico at Couilhã will be a textile research unit and training equipment for testing manufacturing innovations.

The Ministry of Labor and the Ministry of Education will conduct regional surveys of labor/manpower requirements with projected needs over the next five and ten year periods. The results of this study would be fed back into the politécnico curriculum design process.

It would be important for an inventory to be made of all teaching materials available in the public domain appropriate for use by politécnicos. Of interest are materials suitable for use in simplified teaching programs, including self-taught courses, particularly those appropriate for teaching through education extension programs. Such materials would be deposited in a clearing house of teaching materials in one politécnico chosen for that purpose; it could then be drawn upon by individual "learning resource centers" established in each of the four politécnicos and from the nucleus of a national clearing house.

### III. STATEMENT OF THE PROBLEM

As part of an overall economic and social development plan for rural vocational education in Portugal, it is important to maintain a balance between the different goals and functions of the four politécnicos in Vila Real, Covilhã, Evora and the Azores. Present financing tends to emphasize the university role, but the U.S. may wish to consider technical assistance for planning for training at levels other than post-secondary to the following areas: restructuring the curriculum, introducing new teaching methodologies, developing the educational outreach program, construction of new facilities such as learning resource centers, and facilitating the purchase of equipment, materials, furniture and transportation.

The development of a relevant politécnico system for Portugal appears, up to this point, to be fragmented and non-integrated. The post-secondary (higher education) program is a present unrelated to the vocational educational curriculum in the secondary school, and there is no relationship, horizontally, at the present time, to the thrust in the post-secondary education effort and to that of the Ministry of Labor Program, which has already begun the development of 15 schools.

The problem of retooling has been aggravated by the introduction of 700,000 refugees in a population of 9 million. The estimate of illiterates in the country was 1 million, although a good percentage of this may be semi-illiterates.

Until 1974 a selective system existed whereby only 5% of the working class went on to higher education, and the course structure at the universities was predominately oriented towards the professions of law, medicine, teaching, and the sciences. A comprehensive system of secondary education started about two years ago. In 1973, there was a bill to reform the education system, and a Development Plan to extend to 1979 was put into operation.

The great amount of working Portuguese population is involved with some form of agriculture, yet this is the area that has shown the least growth in the Portuguese economy in the last four decades. In order for this state of things to improve it will be necessary to change the rural world so that it becomes both more productive and satisfying to the people within it. It is not possible at the present time to find qualified staff in Portugal to take a dominant role in the transformation, either at the planning or operation level. No Portuguese university, for example, provides training in the processing of mineral materials (such as rocks, clay, sand, etc.), even though these materials constitute three-fourths of the exportation of the mineral materials, and through processing, would have their value substantially increased. Portugal is also the world's greatest producer of cork, and important in the production of resins, etc. The southern part of the country, where Evora is located, is the most important zone of cork production, and the ornamental rocks extracted in this area represent four-fifths of the value of the national production.

The lack of qualified staff is not peculiar to Evora. The problem cuts across all four sites. However, it should be emphasized that there are local or regional differences that should be taken into consideration. For example, the type of land holding in Evora is very different from the rest of the country. In Evora, the land was held onto, until recently, by big hacienda owners. Due to political events the land holdings were turned into large coops which are not, according to our information, working very well; neither, for that matter, are they in the rest of the country which has small land holders, particularly in Vila Real. In other words, there are different types of land holdings leading to different points of view held by the people in Evora, Covilhã and Vila Real and undoubtedly in the Azores. Therefore, the management problems in the transfer of rural extension technology differ. Whereas in the north and central parts of Portugal, the farmer was a small, independent landholder who decided for himself (though often incorrectly) as he was in charge, the agricultural worker in the south never had to decide anything - his employer told him what to do. He was dependent on the large landholder and now may be involved in one or another type of collective farm.

Therefore, any technical assistance program must be cognizant of the very different kinds of land holding structures and social structures which exist and that whatever is done in the agricultural division will probably have to be approached with two distinct modi operandi.

In addition, common to all four sites and forcefully articulated in Ofiesh's meetings with the key personnel in Evora, there is felt the need to train the University and Polytechnic professors in the realities

of the depressed rural society. There is a need for people with adequate training in sociology and communication techniques, in philosophy, and in the methods of techniques of rural extension. These observations lead us to suggest another separate technical assistance thrust.

In the past the Universities at Lisbon, Porto, and Coimbra, have been the traditional centers for virtually all higher education in Portugal. The course structures at these universities were predominately oriented towards the professions of law, medicine, teaching and the sciences. Course content, for the most part, had a theoretical bias that appealed more to the upper strata of Portuguese society. Graduates would usually enter private practices in one of Portugal's major urban centers. Students were not overly encouraged to address, even at theoretical levels, serious issues facing the country, such as in agriculture. Consequently, the system was geared to feeding new graduates into an elitist corps of professionals, while the force of mid-level technicians needed to work at less theoretical levels and problem-solving grew at a very limited pace. This gap in the institutional structure has led to the shortage of technical level talent especially in agriculture, health, primary and secondary teaching, to name several areas.

As concern grew about this shortage, under the leadership of a well-known Portuguese educator, Dr. Veiga Simao, a plan was adopted in 1971 to develop approximately seven new universities and polytechnical schools (politécnicos). The four new universities were in Minho, Aveiro, Evora, and Lisbon. The politécnicos in Vila Real, Couilhã, and the Azores were to offer two-year training programs that would be highly functional and prepare graduates for technical

level and vocational work in all sectors, but especially industry and agriculture. These politécnicos, dispersed through the interior of the country, were intended to respond closely to interests and educational needs of workers in the surrounding areas.

Some basic construction of two of the politécnicos in Couilhã and Vila Real was completed just before the Revolution, but since April 1974, the GOP has focused more on these schools and new impetus to accelerate the involvement of these schools in the "transformation" of the Portuguese society has been given by the GOP.

Formal courses are now being offered but on a very limited scale; the politecnicos at Vila Real, Evora and the Azores began this year; Couilhã opened in February 1975. These politécnicos will be responsible for (1) much of the industrial, agricultural or other research needed in the geographic regions where they are located (2) a major share of post secondary training of inhabitants of the neighbouring communities (3) teacher training for primary and secondary schools located in the area and (4) the dissemination, on a continuing basis, of new and practical technological and agriculture information resulting from the research, or collected by the politecnico data centers. The politécnicos are really intended as a focal point for all regional development in their respective areas.

These features make politecnicos essential links in the network of institutions bringing development programs to the interior of Portugal. They are to be educational outreach systems to help the —

rural and urban workers in the most undeveloped regions of the country, become more productive forces in the economy. The politécnicos require specialized technical assistance in expanding their programs rapidly so that they can serve as effective outreach institutions. As the programs are broadened, modern vocational teaching practices utilizing advanced teaching technologies will be needed.

The Ministry of Labor is now developing other elements of the institutional network that will provide vocational training programs for skilled manpower development.

At the meeting with the Evora Department Heads, the same concerns as expressed by the personnel at the other sites were surfaced, only better articulated and more specific- that of the development of adequate delivery systems using non-formal education techniques. This indicated to me (Ofiesh) that at Evora they had thought through the problems more carefully. In addition, much more thought and planning had been given to the rural extension problem. This may be due to the fact that Evora is located in the middle of a rural area that is in a more severe state of economic depression than other parts of the country.

#### IV. DISCUSSION

##### A. Community and Regional Development Role

We were called by the AID mission to explore the extent to which there was interest and willingness at each of the Institutes to look upon their resources and their facilities as centers for community and regional development. We found a sensitivity to this requirement in all the areas, but the main place this was most vividly articulated was in Evora. All the sites were receptive to a competency-based education system, however. Common to all discussions with personnel was a big interest in agricultural development and related rural extension efforts even in Couilhã which has other interests, such as textile.

The whole thrust of the politécnicos must be for the direct linking of the polytechnical-vocational areas to the needs of the environment in which they were established, renewing old universities and programs, and increasing the thrust at post-secondary schools and institutes in industry towards community and regional development concerns.

In the minds of some of the staff of the IPVE and of the MOE, the politécnico at Vila Real is seen as the nucleus of a future regional university moving toward multi-faculty status. We were told that there was a GOP decree requiring the Ph.D. within six years of a-1 teaching staff. (Experience, in many other parts of the world, demonstrates that this direction tends to increase the focus inward, and away from the outreach into the needs and problems of the people

of the region.) It was clear that this focus toward university status also existed at Couilhã.

On the other hand, at Evora where the politécnico is already based in a new university, the concern of the key personnel was directed more at making the politécnicos the focal point of the university and the rural extension program.

## B. Rural Extension

The Institute, in the town of Evora, Province of Alentejo, Portugal, seems particularly suited for the training of rural extension expertise. Evora is located in the middle of a rural area that is in a state of severe economic depression. The Institute is under the authority of the State University and the Ministry of Education. We feel that the creation of an R&D training program in Rural Extension will provide Portugal with graduates that have the rural extension skills that are sorely needed for agricultural development. It is also our suggestion that a correlated training program be established at Vila Real with Vila Real being the prime institute for this regional R&D effort.

The program presently planned at Evora is a tentative model which should be evaluated by the technical assistance feasibility group and considered with appropriate modifications for and by Vila Real. The programs, methods, and media should be based on two main considerations; first, the relationship of man to environment, and second, the adaptation to the cultural level of the agricultural people for the small-sized family farms as well as collective farms. As this level changes, so will the programs and methods be modified, and frequent refresher training programs made available to former graduates. The methods of teaching will include a minimum of class lectures by the staff, the concentration of student effort going mainly into seminars, workshops, and work-study programs where the student will work, both as an individual and as part of

a team on the farms, so that contact with the rural world and its problems will be constantly maintained.

The training program in Rural Extension at Evora is presently conducted over six semesters with further studies leading to Master's and Doctor's degrees, and provides courses in the following areas:

- 1 - Basic Sciences: Mathematics, Chemistry, Physics and Biology.
- 2 - Human Sciences: Anthropology and Sociology.
- 3 - Environmental Sciences: General and Regional Ecology.
- 4 - Engineering: Topography, Soil Conservation and Rural Construction.
- \*5 - Crop Science. Farming and Cropping Systems. Transformation of Agriculture Products.
- \*6 - Economy and Rural Economics. Farm Management. Rural Development. Farmers' Associations; Cooperatives. Home Economics.
- \*7 - Education and Social Communication.
- 8 - Methods and Techniques of Rural Extension.

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\* Our suggestion is that U.S. based technical assistance financed under the proposed loan be concentrated in these areas rather than other areas in the curriculum.

### C. Participant Training

All training programs should be project-study oriented. At Vila Real the plan is for the third tri-mester of each year to be devoted to work-study programs where the students are out in the field (the students are in training three tri-mesters year-round). However, the staff was more than willing to consider with favor the possibility of work-study programs during the first two tri-mesters of the year as well, while still devoting the last tri-mesters exclusively to this kind of effort. The other two politécnicos were not as project and work-study oriented in their perspective as was Vila Real. Therefore, it is our thought that technical assistance in this respect should focus in Couilhã and Evora, with Vila Real serving as the model.

### D. Outreach Program

Although there was a need to strengthen the outreach program at all three politécnicos, the best articulation of this felt-need was at Vila Real. Therefore, we must consider the creation of satellite centers in various parts of the region, possibly in connection with the local schools. The schools would then serve as community centers, maximizing the use of the facilities during evening, weekend, and vacation periods. The additional construction of workshops and meeting rooms, the additional equipment and materials, even the possibility of an experimental agricultural plot would also strengthen the formal school program at Vila Real, Couilhã, Evora and possibly the Azores.

## E. Integrating Agricultural and Other Human Resources Development Programs

A plan needs to be developed to integrate or at least to coordinate the politecnicos with the fifteen vocational schools sponsored by the Ministry of Labor, the industrial and military training programs, and the secondary and middle level schools under the Ministry of Education.

This plan will require integration with the regional planning and development project loan, and the GOP plans for decentralizing the country into five administrative regions and two metropolitan areas, to which the planning and governing responsibilities will be delegated. In addition, the national politécnico system must be eventually integrated with the economic development plans of the Azores.

The Regional Planning and Development Project presently has four outputs which are relevant to the politécnico project:

1. Diversification of agricultural production  
(building of (small) experimental farms)
2. Increasing the volume of agricultural and manufactured products suitable for export.
3. Formation of new cooperative arrangements for production and marketing of agricultural products (specific applicability to Vila Real and Evora).
4. Increased dissemination of agricultural marketing data and improving the marketing system.

There are geographic, cultural, economic and natural resource disparities, however, between Vila Real, Couilhã, E. ora, and the Azores, and this will require unique R&D efforts for each of the politécnicos in each region. The common concern that cuts across all four, however, is agricultural. Therefore, it is our suggestion that the initial basic thrust, and one that would be most cost-effective, is to develop an integrated pre-vocational and vocational agricultural and technical program for agriculture development.

Serious consideration should be given to the regional planning and development project, which is presently being considered by U.S. AID for the two needy regions in Northern Portugal and the Azores. However, any emphasis on the northern part of Portugal should take into serious consideration the relevance of the planning support package sponsored by U.S. AID, to the development of the Vila Real politécnico program.

In the North, the planning program has been under way since the late sixties under The Planning Commission for the North, and some effort should be made to integrate the curriculum in Vila Real with the concerns of this commission. Apparently, it was the planning commission which developed the regional plan. The statistical data that led to this regional plan and emerged from it should be checked out by the personnel who developed the project paper for the politécnicos, and any technical assistance input into the regional plan should also seriously consider the technical assistance projects which will be in support of the development of the politécnicos. For example, if the regional planning and development project is going to concern

itself, as the present PID implies, with regional soils laboratories and a regional center for agricultural research, then it appears to us that the technical assistance provided for Vila Real should be integrated directly into this effort.

All the projects, the Regional Planning and Development Project, the Azores Agriculture and Fishery Development Project, and the Politécnico Development Project should be coordinated efforts. This will lead to maximum use of all available technical assistance, and the most cost-effective use of materials supporting the regional planning program.

## F. Design, Development, Adaptation and Production of Learning Materials

Several salient factors, which were emphasized in our interactions with key institution personnel and with those most familiar with the politécnico programs, have implications for the organization and implementation of the project paper with respect to our recommendation for the selection, adaptation and development of learning materials.

1. The learning materials to be developed and adapted under this project are expected to be used in two environments, post-secondary school and adult-rural education.
2. The target population has communication skills which range from illiterate and semi-literate to post-secondary and university level competencies.
3. The technology communicated should be application oriented.

The first factor requires that the form of instructional materials be flexible so that they can conform to the range of experience and learning capacity, as well as to the applications to the two environments in which the instructional materials are to be used.

In the case of a school environment, it is recommended that a teacher manual provide the guidelines for student use of the instructional materials, as well as meet the institutional requirements for student evaluation and progression. In the case of adult education applications, the instructional materials must be completely self-administered.

The instructional materials production teams to be developed at Evora must have a standardized set of development techniques which will allow the basic instructional units, self-evaluation forms, field exercises, administrative guidelines, references, and visuals to be produced and assembled in forms suitable to the environment in which they are to be used.

The second factor, namely the wide range of communication skills of the target population, requires that both the technological concepts and scientific principles be communicated in accurate but very simple language, for the use of the outreach program and the more technical version for the post-secondary program. If layman language rather than abstract scientific terminology is to be used, then the subject matter experts should be selected from the para-professional ranks, if possible. The subject matter expertise provided, however, should be equally accurate and valid as that provided by an academically-oriented professional. The technical and scientific accuracy of the content of the instructional materials must be judged from an application rather than an academic perspective. The evaluation of the materials for technical accuracy and applicability should be pragmatic. Excessive layers of review and approval, each at a higher level, will inhibit the developmental process and result in revisions which will tend to make the materials less effective at the learner level.

The third factor - the technology to be communicated is application oriented. This requires an instructional design technique which demands of the learner performance application of the technical principles and

concepts. The focus on verbal behavior of usual programming techniques must be supplemented by laboratory-like exercises and performance guides which are an integral part of the technology of learning materials design that we are proposing be the basic self-instructional and tutorial learning format and process.

A good portion of the performance units will require well-designed visuals. Thus, the audio-visual personnel at Evora must be trained in the design of performance guides and the performance design strategies suitable and appropriate to the techniques of programming instructional materials.

There was a great deal of strong interest in Evora and Vila Real, and moderate interest in Couilhã in the availability of off-the-shelf, instructional systems and materials that may be adaptive to the politécnico curriculum requirements. Both Evora and Vila Real had already approached the AID/P office for information concerning materials produced by the USDA.

The U. S. Government Printing Office, for example, has on file publications which are annotated listings of curriculum materials suitable for vocational education programs. All materials are available from state education agencies; materials for agriculture, distributive education, health occupations, home economics, technical education, trade and industrial occupations, and office occupations. Whether these materials are relevant or not to the GOP politécnico requirement has to be determined. (See Attachment B).

Comprised listings will contain a short description of the material, price information, and how to order it, but it would be more relevant if the information contained information as to whether these materials are self-instructional in nature, whether there is any effectiveness criteria established from them, and to what degree they are appropriate for selection and adaptation to politécnico requirements.

Another source which is relatively rich and untapped is the military service in the U.S. We should also explore what materials are available in the military services in Portugal. In the U.S. Air Force, for example, 85% of career specialists have direct counterparts in civilian life. For every job, the Air Force has a validated course of instruction based on the systems approach to curriculum design. This is primarily the approach developed within the Air Force and other military agencies. These instructional systems provide students with essential job skills in the shortest possible time, and with the highest possible rate of retention. Many are in the public domain and could be adapted at low cost for use in the politécnicos. There was a receptivity to this on the part of the Ministry of Education (Dr. Carneiro) due to the high quality of technical training presently being provided by the Portuguese Army, Navy and Marine Corps. A tentative list of potential sources of public domain print and non-print self-instructional and semi-self-instructional, mediated materials in vocational technical education is provided in Attachment B.

It was quite apparent to us as well as to the key personnel at all three sites and at the Ministry of Education (Dr. Carneiro), that the politécnico schools require the development of improved instructional systems, and that these systems would be of considerable value and interest to all politécnico education and training activities, and any projects concerned with outreach and rural extension efforts.

There was a willingness on the part of all the personnel with whom we met to make their institutions highly flexible organizations, unhampered by existing traditional approaches, and to have on board an enlightened staff that will examine intensely, bold, practical instructional plans for the delivery of educational and training services in specific environments.

The wide diversity of innovative R&D programs, already supported by U.S. AID in the educational and training delivery services area, provide many opportunities for extrapolation to a wide variety of fields and curricular levels in the three institutions, and possibly for the Azores. Dr. Applegate should be able to fill in with greater detail on his future visit.

Our basic recommendation is that all education and training programs of the three schools be committed to the implementation of the individualized approach to instruction, based on the "systems approach," which has great potential for generally improving not only the rate and retention of learning, but also for lowering the costs of learning. It also

serves the broad range of audience which is the intended target group of the politécnicos.

We believe that the atmosphere in the politécnicos is very supportive of the self-instructional routines or procedures within a tutorial and responsive environment. In Ofiesh's discussion with the Rector and the Department Heads at Evora, for example, the willingness to accept the notion that the teacher's role be radically changed from that of a presenter of didactic information, to a manager of the learning process and environment, was quite evident.

Research and development projects should be undertaken and sought by all four institutions to:

- a. Assure the best possible instructional procedures and methods that will produce maximum student learning within reasonable costs.
- b. Provide validated, reproducible instructional results for utilization by other institutions concerned with maximal learning.
- c. Provide the materials, media, staff with related training, supplies, etc., to implement the tutorial laboratory and project approach.
- d. Support continuing studies of media, methodologies, etc., and comparison studies between them using different approaches

and procedures. These studies should concern themselves with all relevant variables in education, such as costs, results, student adaptation, etc. Such studies should be ongoing, encompassing successive groups of students.

- e. Support continuing research on the objectives of advanced instructional procedures and routines at the demonstration level. Such advanced instructional procedures might involve home study or school consoles, community and rural based study consoles, simple self-sufficient programmed multi-media packages, instructor sharing among systems and/or levels, etc.
- f. Assess learner input, output, and follow-up data over a period of years, essential information for a thorough and meaningful evaluation.

## G. Teacher Training

A report by the OECD in 1966 (MPR Report/Portugal, OECD, Paris, 1966) drew attention to the shortage of primary and secondary school teachers. [The follow-up visit by Applegate should update this problem area and the figures mentioned below.]

It was pointed out in this report that the shortage of teachers was so acute that students sometimes had to be asked to act as assistants. To help relieve the situation, a large number of assistants were appointed, but these were not qualified to give courses. This means that the staff was insufficient and badly adapted to the current needs, while at the same time, posts remained empty, waiting to be filled by qualified teachers or teachers from other categories. According to the same survey, only 39 percent of the posts offered to the extraordinary professors were filled in 1966, whereas over 40 percent of the teaching body were junior assistants, a percentage far higher than those provided for under the legislation.

Potential candidates were put off by the long period of study and the many competitive examinations leading to the top university posts. In addition, the salaries were relatively low, particularly if compared with those offered by many public and private organizations. Consequently, most of the teachers yielded to the temptation to spend some, if not most of the time working outside of the university. Sometimes when fellowships were inadequate or impossible to obtain, teachers were given extra classes to the detriment of their main teaching or research work.

This teacher shortage means that many had to give extra classes and the student-teacher ratio rose considerably. The survey results showed that it was at this level the teachers became the most overloaded, in spite of the fact that they were required to teach relatively few hours per week. Indeed, an established professor, who apart from his lectures directed practical work, was only obliged to do a minimum of statutory hours (i.e., from one to three hours per week). The "extraordinarios" had to teach for six hours a week and also take charge of practical work. The assistants taught for twelve hours a week (practical work), but in actual fact, did much more, as they were asked to give lectures as well because of this shortage of teachers.

In Portuguese universities the various levels in the academic hierarchy are assistants, associate professors, and full professors. Assistants have generally taken a first degree ("Licenciatura"). If they hold a doctor's degree they can be appointed senior assistants. Associate professors are recruited by public competitive examinations open to holders of a doctor's degree in the relevant branch of study. Attainment of an adequate standard in this examination qualifies those candidates who are not selected as associate professors for the title of "agregado."

Recruitment to posts of full professors is also by public examination, which is open to associate professors with at least two years' teaching experience, full professors of other chairs, and lecturers or doctors who have specialized in the relevant subject. In the case of scholars or artists of established reputation, chairs may be awarded without examination.

A critical problem articulated at all three politécnico sites, and mentioned as relevant to the Azores, is the lack of properly trained teachers in the secondary schools as well as the politécnicos. Several of the technical assistance project activities, such as assistance in restructuring the teacher training programs in the direction of making more effective use of self-instructional materials and the greater use of para-professionals in the learning resource centers will alleviate this problem to a degree.

## Educational Radio/Television Support

The educational television radio support program (Teleschola) was established about 11 years ago. It is under the sponsorship of what was then the National Center for Educational Technology, now referred to as the Institute for Pedagogical Innovation (INIP). It now has 25,000 children enrolled in the program, 2000 teacher/monitors and it covers areas of formal teaching, natural sciences, Portuguese history and French. All schools do not have television receivers, but there are in existence 1000 reception points which involve one-third of the total schools. That is not meant to imply that two-thirds of the schools do not have reception points; it is simply to state that the Government is managing 1000 reception points. There has been no significant evaluation of the television network.

Educational courses are transmitted by the national network of broadcasting. There is no specific educational network as such. Transmission is largely in the afternoon and viewing can be either public or private. All students throughout the country are required to take examinations based upon information and materials transmitted by the network. The tests are corrected by computer. All tests provided by the guide are given by the teachers and data from them transmitted for computer analysis.

The present plan is to expand the use of the Teleschola. A studio is being erected at Oporto which will be the main production facility. At Oporto there will be radio transmission and photography equipment. At present

there are 250 people working with the Teleschola in Lisbon, and 60 in Oporto. The present educational network suffers from lack of properly trained technicians and the relationship with the schools and universities is tenuous. There apparently has been impact on revising the curriculum in the schools of education for training personnel to work with the Teleschola. The interest in Evora in adapting the Teleschola procedures and network to the politécnico system is very high, much more so than we felt it was in Vila Real and Couilhã.

Next year the plan is to make all broadcasts directly from Oporto for the preparatory level in education for grades 5, 6, and 7. The plan is to concentrate in-service training of teachers in the use of Teleschola in Lisbon and to try to direct the network future activities to adult education and community services. This will be done largely in Lisbon. The Ministry of Education is presently making, in our estimation, a crude evaluation of the Teleschola. The planning for future development involves the first phase which is to establish a program in Oporto along with the one in Lisbon, the second phase to improve the transmission facilities and the recording and production facilities, and the third phase in which their own educational television network will eventually be developed. Ofiesh personally questions the desirability of the third phase.

## I. Ministry of Labor and Manpower Needs

There is an obvious requirement for technical assistance to be provided to the Ministry of Labor (MOL) personnel in order to develop internally produced models for the future use of translating manpower needs into education and training requirements.

Inasmuch as the MOL has already started the development of approximately 15 vocational educational schools that are tenuously related to those of the MOE, the models that are developed should take into consideration the role of all government and private agencies in manpower development. At present there is no viable manpower study undergirding the establishment of the curriculum of these schools to provide the basis for determining their number and size.

Following the establishment of vocational training requirements, both by region and nationally, and the allocation of training facilities and instructional support, the determination of instructional materials requirements should be undertaken.

Key staff personnel in the MOL and MOE as well as members of the planning staffs of the politécnicos, need to be trained in the procedures required to determine manpower needs and job performance requirements. This will provide the information for determining the types and content of future training courses.

Upon completion of the above, key personnel should be trained in the allocation of facilities to include the optimum use of classrooms,

learning laboratories, study carrels, mockups, training aids and shop facilities, and in programming such facilities to support the student flow and curriculum.

## J. Quality and Nature of Technical Assistance Required

The technical assistance required must be composed of highly professional specialists drawn from a number of disciplines and who have done extensive work in mass communications and instructional systems design in both the U.S. and other countries.

The TA must have a demonstrated capability to work in an adult and rural (primarily agricultural) learning environment, and to instill in the participants a comprehensive understanding of the art of communications in all its aspects, with special emphasis on approaches leading to the development of materials which will be easily understood, meaningful, and of value to audiences of limited and in many cases, nonexistent formal education.

The qualifications should include past experiences in having produced, published and developed multi-media approaches, both originally done, and adapted from writers and artists. The emphasis in their work has to have been in creating effective motivational and validated instructional booklets whose color/print techniques complement and supplement the text materials in order to achieve clearly understandable and effective messages from semi-literate and literate populations. The published instructional materials examples must utilize the graphic approach, and carry an effective message by means of illustrations alone to a semi-literate and adult illiterate population.

Specific list of qualifications for the external (USAID) technical assistance to be provided is listed in attachment A of this report.

## K. Potential Constraints and Issues

In the minds of some of the staff of the IPVR and of the MOE, the politécnicos at Vila Real are seen as the nucleus of a regional university moving toward multi-facility status. We were told that there was a GOP decree requiring the Ph.D. within six years of all teaching staff. (Experience in many other parts of the world demonstrates that this direction tends to increase the focus inward, and away from the outreach, into the needs and problems of the people of the region.) We feel that this focus also existed at Evora, and to a limited extent at Couilhã.

There are many constraints and issues that should be analyzed in the process of preparation of any project paper for the politécnicos. We noted the following:

1. Did the politécnicos grow out of a recognized need of the local leadership and peasant class? If not, what do the politécnicos propose to do to develop confidence among the people of the region? (The Vila Real staff were particularly sensitive to this problem.)

2. What can be done to insure that the regional community focus of the institution will not be diminished through the efforts to move the IPVR toward university status without losing the advantage to the region of a high level research and teaching facility?

3. Will the staff of persons with recent experience overseas be accepted by the leadership people, and by the small landholders in Vila Real and the community leaders in Couilhã, or will they be treated as unwanted refugees in competition for jobs with the locals? At the present

time; the housing for the staff and students is inadequate in the extreme at Vila Real and Couilhã. Evora has more than enough housing for students for the foreseeable future, but is critically short of adequate housing for staff. The personnel who are living there now are existing in precarious conditions, some in abandoned farm houses without running water and other basic amenities. There is no place for students except in private homes which can absorb no more. Because of this housing situation, it has been extremely difficult to recruit qualified staff. What can be done in the short range as well as over the long term to solve this problem?

4. Since the population is so dispersed, and the ground transportation difficult because of the mountainous and narrow roads, the politécnicos will not be able to attract the majority of the small landowners to them. If the outreach program is to be effective, the IPVR and Couilhã will have to find the means to overcome this problem.

5. Is the present request for facilities and equipment adequate to meet the needs of the politécnicos as centers for regional development?

6. Since the campus sites will be divided, and as "outreach" will require some transport of personnel, what arrangements will be made to provide adequate support of faculty and students?

## V. DESCRIPTION OF INSTITUTES AND FACILITIES

### Post-Secondary Education

Post-secondary education in Portugal is provided by the universities and non-university level establishments.

Admission to the higher education system is gained through examination open to pupils who hold the secondary school complementary course certificate or its equivalent. Candidates are exempted from the aptitude examination required for admission to certain courses, in the following circumstances:

(1) Candidates who have passed the complementary course examination with an average mark of at least 14 and who have obtained such a mark in the basic subjects of the examination for which there is also an aptitude examination.

(2) Candidates who have scored an average of at least 14 in the courses or training schemes for admission to technical university, to the faculty of economy, the Naval School, the Military Academy and the Marine School, provided by the commercial and industrial institutes and by the schools for agricultural superintendents.

People over 25 years of age who have completed their compulsory schooling and have passed an "ad hoc" examination may also enter university.

Certain faculties and schools award the grade of "bacharelato" after three years of study; students who hold this certificate can then complete two years of study leading to the "licenciatura" (1st university degree). In order to facilitate international comparative studies the "bacharelato" is considered as non-university level.

Only those students who have obtained their degree with a specific academic achievement can prepare for the doctorate.

Private higher education generally follows the same rules as the national state system but in certain specific cases the entrance requirements may differ.

## THE POLYTECHNIC INSTITUTE OF VILA REAL (IPVR)

The Polytechnic Institute of Vila Real (IPVR), founded in 1973, was the first post-secondary institution to be created in Northeastern Portugal with the purpose of promoting short-level university courses, and applied research and extension activities related to the needs of that region.

The Institute opened its doors in December 1975. At the time of our visit there were forty students enrolled in the program.

Northeastern Portugal (Trás-os-Montes) is an underdeveloped region in need of training programs in the fields of agriculture, cattle raising, forestry, mining and hydroelectrics.

The IPVR extends its influence through 32% of Portugal and serves 40% of the total Portuguese population. Out of a total regional population of 3,231,000 the potential labor force is 1,160,000. Thirty-four percent of that potential labor force is engaged in agrarian activity. Forty percent of the agrarian workers do not read or write.

The average annual net income of a family in this region is the lowest in all of Portugal (\$240 U.S. dollars), and there are in existence only a few, very limited, urbanized areas. The region is inadequately equipped

with water, electricity and sewage facilities, and the highway system consists of very poor, two-way roads. This underdeveloped region also suffers from inadequate health delivery systems, and the lack of technical supervision adds to its problems.

Still, rural Northeastern Portugal provides an important contribution to the agricultural production of the country. The Tras-os-Montes region produces 40% of the cattle raised in Portugal. Cattle-raising in the area, though, is deficient in planning, management, and marketing methodologies. Tras-os-Montes woodland production contributes significantly to Portugal's total woodland production; however, key personnel at Vila Real feel that technology transfer in production in this area is a critical training requirement and training in marketing skills are equally necessary.

It is our opinion that the basic concept of the IPVR as the center for economic and social development of the region is technically and economically feasible. We would recommend to the AID mission serious consideration of support of this role because there is no other regional development organization in the area which has the potential for an intersectional, interdisciplinary approach to development.

The Center is staffed by persons with considerable experience in development, many of them having come from high level technical positions in Angola and other ex-Portuguese colonies. We found

them to be highly sensitive to development problems and specifically to the problems of the rural poor.

The planned service functions will greatly increase the outreach potential of other GOP agencies which have programs in the area or plan to develop them. At the same time the service functions of the IPVR have the potential to reduce both capital and operational costs. The planned economic development of the area, according to the IPVR staff with whom we talked, will focus on a program with the potential for improved income distribution as well as growth.

The training program of the IPVR will be closely integrated with the regional development plans. Staff will be trained for new positions, in agro-industry, consumer and producer cooperatives, the building industries, highway construction, government technical and administrative services, and in the service sector in general. The IPVR personnel believe, for example, that the training of the management and accounting staff is as important as that of the technical staff for the development of successful cooperatives.

At the present time, the facilities and equipment are inadequate. The main buildings are old facilities on the edge of town which are now being extensively renovated and altered to serve as classroom laboratories and offices. There is no open space around them for expansion. There is a small farm of 53 hectares ten minutes away from IPVR by car, which will serve as the agricultural experimental

and training station. It may also be used as the site for the construction of school dormitory facilities, for faculty housing, and eventually for additional classroom and teaching space.

The equipment is minimal. It is impossible to say at this point, however, what would be needed since the requirements depend on the program which has not yet been fully developed. At the present time, most of the emphasis has been on teaching functions. The equipment needs identified by the IPVR staff are based more on that than on any other roles the IPVR may play.

The IPVR has submitted a proposal to the Government of Holland through the GOP for assistance in financing facilities and some of the equipment needs. It is not yet known whether or not the Government of Holland will approve the financing of the project.

The staff in IPVR with whom we were privileged to meet were highly trained persons with a long experience in development. We do not have resumes on the staff. Our judgment is based on the nature of the job they are doing and the obvious technical competence with which they discussed the issues and problems and constraints with which they must deal. One of the major problems which faces the center is the inadequacy of staff housing and other amenities. This problem has

made it very difficult, if not impossible, to recruit additional qualified staff. In spite of the serious unemployment of qualified people, there are few who are willing to accept the sacrifice they and their families would have to make to live in the primitive conditions now available. One of the staff members, for example, shares an abandoned farm house with another family.

The IPVR plans to man the technical/vocational education at various levels and to man the teacher/education in related fields. The IPVR proposes to serve as a regional development center. What the problems will be of coordination with the other GOP agencies and what feasible measures should be taken to resolve them must be taken into consideration. The staff are well-trained and highly motivated. Some of the proposed programs, however, require knowledge in areas which the staff may not have. There are pressing needs for staff upgrading, equipment and technical assistance.

Presently the IPVR has three important potential functions which can profit from U.S. technical assistance:

- a) To serve as the research and technical assistance arm to regional and national government agencies in their efforts to carry out development of the region. This assistance would be at the policy and decision making level and at the R&D level in program development.
- b) To serve as the "outreach" arm to provide technical infor-

mation in all aspects of social and economic development to the people of the region in cooperation with the other agencies of the GOP.

- c) To provide training at the technical level (bacharato) and eventually at the professional level (licentiatura) of local youth to meet manpower demands in the area as they develop; to provide training through non-formal programs of out-of-school youth and adults; and to provide in-service training and pre-service training, as well as guidance, to primary and secondary school teachers in connection with development goals.

We believe that it is important to maintain a balance between these goals and functions. Present financing of education tends to emphasize the university role.

## The Instituto Politecnico da Couilhã

The Instituto Politecnico da Couilhã (IPC), was created as an out-growth of the work of a Working Group on-the Creation of Post Secondary Education in Couilhã, organized in 1970 by the regional development organization. (The present director of the I.P.C., Dr. Simoes, is also the chairman of the regional development organization.) The members of the working group visited post-secondary vocational education in France, Belgium and in England, and the plan of studies was developed in part out of that experience. The IPC has been functioning, since February 1975, with the first semester consisting of courses in textile engineering, administration and accounting.

The I.P.C. was organized, according to director Simoes, to serve as a center for economic and social development of the region, with particular emphasis on related human resources development needs. The center will carry out the following functions:

1. Post-Secondary technical education in areas related to industrial and commercial development of the area.
2. Technical education for the last two years of secondary school.
3. In-service education programs for industrial workers.
4. Permanent Education. Course and seminars.
5. Services of library, museum, and auditorium to the general public.

## 6. Research and Development Services for local Industries.

Since the main industry of Couilhã is that of textiles, the first courses of the I.P.C. were focused on the needs of that sector. During the first semester, the I.P.C. offered the first part of three-year courses leading to a Bachelor of Science in Textile Engineering, and a Bachelor of Administration and Accounting. The course content and programs were noticeably academic in orientation due to the University professors who visited Covilha periodically for this purpose.

In the near future, it is expected that the I.P.C. will also create courses in Physical Chemistry, and in Electricity, and in the more distant future in Civil Engineering, Agriculture and Animal Husbandry. The I.P.C. is also considering courses in Tourism and in Transport Engineering.

The physical facilities of the I.P.C. are to be located in buildings which once served as a textile factory and later as an army post. The buildings were in ruins but it was determined that it was feasible to reconstruct them and adapt them for this purpose. The work is under way and a major part of the first phase building is nearing completion and is actually in use.

## INSTITUTO UNIVERSITARIO DE EVORA

The politecnico in the town of Evora (IUE), Province of Alentejo, Portugal, is located in the middle of a rural area that is in a state of severe economic depression. The politecnico is under the authority of the State University and the Ministry of Education and Culture. The University, at present, has 40 politecnico students with a faculty of 50. The plan is to take in 250 students next year, eventually reaching a maximum of 5,000. It is anticipated that the proportion of women students (25% at present) will increase substantially.

The region covers the four districts of Evora, Porta Allegra, Beja and Faro representing a population of 2.5 million (40% of the total population of Portugal). It should be pointed out that the University anticipates receiving very few students from the District of Faro due to the attraction of the universities in Lisbon; however the administration is embarking on a public relations program to attract students.

The university buildings and adjoining facilities are among the finest that I (Ofiesh) have seen. The original university was built in 1573. The buildings will require little if any renovation. The present Rector of the University (from Mozambique) started preparation for the University early in 1973 and is strongly convinced that emphasis in the University must be focused on the politecnico aspects if it is to meet its regional development charter. For this reason one of its main programs is the rural extension effort. The Department Heads that I conferred with indicated a similar commitment.

Housing for the students is very favorable due largely to Evora having been a university town for centuries. The Rector indicated, however, that if they build up to their projected enrollment they will have problems with student housing in five years. Housing for the Professors is very poor.

There was little, if any, request made for construction, facilities modification or housing for personnel. There was a strong interest voiced by all the key personnel, however, in technical assistance to help in their requirements for audio-visual and instructional technology support. The Staff is planning short modular courses to assist farmers in the maintenance of farm machinery and to augment their efforts to advise farmers to adopt inovative methodologies in their practices. There was a great deal of interest in developing their students into mini-ag-agents.

Even though the students have a strong impact on the University Administration, the faculty seems to have established a healthy reciprocal relationship with the student body. I was advised that the student body recently endorsed a "tutorial" plan where five students would be assigned to a professor for guidance, counseling and remedial education.

The Geography Department has an excellent film library and this has what the appetite of the other departments for the use of audio-visuals.

The Staff had experimented with Postlethwaites' audio tutorial approach and sought technical assistance in this area.

There was a great deal of interest in the availability of audio-visuals in agriculture.

Technical assistance was requested for helping the Staff to provide assistance in their rural extension program in soil conservation, fertilization, proper pasteurization and providing the farmer with advice on animal husbandry.

## Evora

The prime thrust of the Evora programs and methodology is presently based on two main considerations: first, the relationship of Man to Environment, and second, the adaptation of the goals and methods to the cultural level of the agricultural people in the region. As this level changes, so will the programs and methods be modified, and frequent refresher courses made available to former graduates. The methods of teaching include a minimum of class lectures by the staff, the concentration of student effort going mainly into seminars, workshops, and work, both as an individual and as a team, on the farms, so that contact with the rural world and its problems will be constantly maintained.

The academic and training program in Rural Extension is (conducted over six semesters with further studies leading to Master's and Doctor's degrees) includes; basic, human, and environmental sciences, engineering, topography, soil conservation, rural construction, crop science, economy, rural economics, education, social communication and methods and techniques of rural extension. Once properly established, it should contain 300 full time students with at least 50 graduates (bachelors and masters degrees) each year.

The course in Technology of Materials, (natural materials), will cover the same amount of time.

The program and methods will again take into consideration not

use them. The present administration at Evora recognizes that some qualified staff for this course can be found in Portugal, but in certain fields of technology it will be necessary to send people into foreign countries to obtain the required training.

The curriculum covers the following areas among others: structural geology, economics, mechanical, thermal, electrical, optical and magnetic properties of materials, extraction, handling, conveying and transportation, processing, fabrication, and management of materials. It is anticipated that 100 full time students will be enrolled in this program with at least 15 graduating (bachelors and masters degrees) each year. Once properly established, it should contain 300 full time students with at least 50 graduates (bachelors and masters degrees) each year.

A course in Technology of Materials, (natural materials), is also suggested to cover the same amount of time.

The program and methods will again take into consideration not only the materials studied, but the people that will work with them and use them. Some qualified staff for these programs can be found in Portugal, but in certain fields of technology it will be necessary to send people into foreign countries to obtain the required training.

## VI. RECOMMENDATIONS FOR ASSISTANCE

Following talks with AID/Lisbon, the Ministry of Education, the Ministry of Labor, the Institute for Pedagogical Innovation and key personnel at the politécnicos located in Vila Real, Couilhã, and Evora we suggest that AID assistance could assist the GOP in:

1. Conducting basic analytical and statistical survey models in manpower requirements and development.
2. Structuring and restructuring teaching programs and designing vocational technical courses in accordance with the principles and methodologies of instructional systems technology.
3. Introducing new teaching methodologies and validated off-the-shelf instructional systems into the current and planned curriculum.
4. Funding specialized equipment for rural extension programs.
5. Financing limited expansion of teaching or laboratory facilities to include the adoption of community-based learning resource centers.

We suggest the following action steps for AID assistance:

RECOMMENDATIONS FOR TECHNICAL ASSISTANCE

Estimated Costs

1. The specific objective of this suggested TA activity is to assist in the development of an integrated vocational industrial/technical education system (a National Politécnico System) involving a competency-based occupational curriculum in schools from the second cycle through the undergraduate and graduate degree level. Along this line we suggest that AID/P consider providing TA to:
  - a. The Ministry of Education and the Ministry of Labor to jointly develop a vocational/technical education program relevant to changing national and regional manpower needs and job training requirements. \$ 25,000.00
  - b. The MOE and the MOL to develop a plan for determining educational materials requirements and the acquisition and modification of both print and non-print materials. \$ 25,000.00
  - c. The MOE in developing a well-organized and coordinated research, development and production program for all four politécnicos. \$ 50,000.00

Estimated Costs

2. The MOE to plan for and develop a newly constructed and remodeled Learning Resources Center model provided with necessary software and hardware. (We suggest the University at Coimbra as the prime base for this project.) This model should lead to the development of a delivery system for outreach efforts which may or may not include the possible use of mobile training units, with packaged learning materials, to extend politécnico teaching programs throughout the surrounding communities. Other delivery systems which should be considered are Radio/TV, Remote Educational Labs, and a Satellite Learning Resource Center. Agriculture and health might be of first priority but such intermediate industrial training courses, for examples, in the area of textile manufacture and basic farm management and/or accounting, may also be included.

\$100,000.00
  
3. Extend the services of the existing educational television system (Teleschola) to the politécnicos and increase the program output of the Instituto Pedagógico Inovativo (responsible for Teleschola) to include training programs for radio broadcast. In addition, politécnicos would develop a capacity to train educational communication technicians required for the educational TV programming and services.

\$100,000.00

Estimated Costs

4. The politécnico at Evora to develop and maintain a replicable and adaptive instructional systems technology-based teacher training program which can also impact on the politécnicos at Vila Real and Couilhã. The output of this activity will be a capability to design, develop and produce new educational teaching materials incorporating instructional systems technologies, methodologies and concepts particularly relevant to educational outreach system targeted towards vocational technical education for rural families and small town inhabitants and competency-based educational curricula for politécnico students and adults.

\$ 50,000.00
5. In conjunction with the above, provide basic equipment for a "learning resource center" in each politécnico to include such items as visual teaching aids and sound equipment, with video-tape cassette programming and projection capability.

\$ 50,000.00
6. Assist University of Coimbra to renovate a portion of its library facilities so that it can coordinate with, and be responsive to, needs of each politécnico "learning resource center." This would involve some training of key library personnel from the University of Coimbra and from the politécnicos of Couilhã, Vila Real, Evora, and possibly the Azores to visit model programs in England and the United States.

\$ 50,000.00

Estimated Costs

7. Provide each politécnico with additional shop and laboratory training equipment and such teaching facilities as are needed to expand the training capability of each in those specialities most related to its program orientation. For example, particularly important to the politécnico at Couilhã will be a textile research unit and training equipment for testing manufacturing innovations. \$ 50,000.00
8. Conducting jointly with the Ministry of Labor and the Ministry of Education regional surveys of labor/manpower requirements with projected needs over the next five and ten year periods. The results of this study would be fed back into the politécnico curriculum design process. \$ 25,000.00
9. Conduct an inventory of and collect all teaching materials available in the public domain appropriate for use by politéchnicos. Of interest are materials suitable for use in simplified teaching programs, including self-taught courses, particularly those appropriate for teaching through education extension programs. Such materials would be deposited in a clearing house of teaching materials in one politécnico chosen for that purpose; it could then be drawn upon by individual "learning resource centers" established in each of the four politéchnicos and from the nucleus of a national clearing house. \$100,000.00

We suggest that immediately following Applegate's visit to Portugal the following feasibility studies and exploratory activities will be required from the middle of September through November 1976.

Estimated Costs

1. A management plan should be developed for the identification, selection, organization and management of technical assistance for the Loan. The plan will assess what local (internal) technical assistance is available to assist in the technical assistance program. \$ 10,000.00
  
2. A preliminary study of delivery systems should be provided for outreach and LRC activities, e.g.:
  - Radio/TV
  - Educational Labs
  - Politécnico Satellites
  - Mobile Labs \$ 20,000.00
  
3. A preliminary manpower study and analysis should be conducted. \$ 10,000.00
  
4. A preliminary inventory should be made of the agricultural learning materials in the public domain which will include a preliminary performance systems training requirement survey. In addition, explore existing local printing and photoengraving facilities in order to be able to supplement

- the production of materials, if and when the technical requirements of certain materials exceed the capabilities of the clearing house. In addition, assess the equipment needs for the materials production center, and make detailed recommendations commensurate with the proposed scope of its functions, the quantities, types and variety of materials to be produced. \$ 30,000.00
5. The development of an integrated plan for agricultural-rural extension should be developed for all four institutions. \$ 20,000.00
6. A preliminary analysis of present library training programs at Coimbra to determine the nature of realignment to meet requirement for future training of learning resource center personnel. \$ 5,000.00

## VII. ISSUES AND QUESTIONS SUMMARIZED FROM DISCUSSION

There are many constraints and issues that should be analyzed in the process of preparation of any project paper for the politécnicos. We noted the following:

1. Did the politécnicos grow out of a recognized need of the local leadership and peasant class? If not, what do the politécnicos propose to do to develop confidence among the people of the region? (The Vila Real staff were particularly sensitive to this problem.)

2. What can be done to insure that the regional community focus of the institution will not be diminished through the efforts to move the IPVR toward university status without losing the advantage to the region of a high level research and teaching facility?

3. Will the staff of persons with recent experience overseas be accepted by the leadership people, and by the small landholders in Vila Real and the community leaders in Covilhã, or will they be treated as unwanted refugees in competition for jobs with the locals? At the present time, the housing for the staff and students is inadequate in the extreme at Vila Real and Covilhã. Evora has more than enough housing for students for the foreseeable future, but is critically short of adequate housing for staff. The personnel who are living there now are existing in precarious conditions, some in abandoned farm houses without running water and other basic amenities. There is no place for students except in private homes which can absorb no more. Because of this housing situation, it has been extremely difficult to recruit qualified staff. What can be done in the short range as well as over the long term to solve

this problem?

4. Since the population is so dispersed, and the ground transportation difficult because of the mountainous and narrow roads, the politécnicos will not be able to attract the majority of the small landowners to them. If the outreach program is to be effective, the IPVR and Covilhã will have to find the means to overcome this problem.

5. Is the present request for facilities and equipment adequate to meet the needs of the politécnicos as centers for regional development?

6. Since the campus sites will be divided, and as "outreach" will require some transport of personnel, what arrangements will be made to provide adequate support of faculty and students?

## ATTACHMENT A

### QUALIFICATIONS FOR USAID TA

One of the recommendations we are proposing for AID/W to take, prior to project funding, is the development of a management plan for the identification, selection, organization and management of technical assistance for the Loan. The plan will assess what local (internal) technical assistance is available, in addition to third country (Brazil?) personnel, to assist in the technical assistance program.

We feel that the following qualifications are listed as guidelines for the funding of this project activity:

1. Prior experience obtained in the construction of successful programs essential to the development of effective student use of research facilities and source materials.
2. Evidence of responsibility taken for the airing of effective radio and TV programming that utilized a variety of medium forms; playlets, narration, spots, soap operas, etc., and that presented clearly understandable and effective messages for semi-literate and illiterate populations.
3. Prior experience in the presentation of filmstrip and slide films utilizing story boards and special art techniques, which combine to create an effective instructional and motivational message for a semi-literate and illiterate population.

4. Prior experience in construction and production of simple economical film animation techniques which afford a vital communicative exchange for a target population of semi-literate and illiterate members.
5. Experience with the packaging of video tape production and presentation including sound and lighting equipment to create an effective motivational and instructional tool for a semi-literate and illiterate population.
6. Experience in the use of games involving the playing out of real life situations. The design of this technique should offer alternative courses of action which can be carried to their logical conclusions to provide an effective motivational and instructional tool for semi-literate and illiterate adult populations.
7. Demonstrated ability to manage a feasibility study for a multimedia campaign for the delivery of a specific instructional or motivational message for a semi-literate and illiterate adult population.
8. Documented ability to conduct human performance analysis to enable the staff to select solutions that fit the evolving problems, and to know to what degree these solutions will solve the problems.
9. Demonstrated ability to conduct task analysis in the real performance environment; analysis should include politécnico program matter and performance experts, specifically in the area of agricultural development initially; and familiarity with graduates and the review of available off-the-shelf materials in instructional systems training

10. Documented ability to determine the content of the material developed for an instructional system developed for a semi-literate and illiterate adult population.
11. Evidence of previous experience in developing a plan of instruction and design of diverse subject content as well as previous experience in, and documentation of work, in instructional systems as related to the material development for a semi-literate or illiterate target population.
12. Demonstrated ability to conduct validation tests of self-instructional modules to train technical assistants and supervisors to plan and conduct the necessary training for SNPP personnel.
13. Documented ability to prepare evaluation instruments to determine the cognitive development of program participants from a semi-literate and illiterate population.
14. Demonstrated ability to organize and conduct short intensive workshops on instructional systems by using as a model an instructional systems format.
15. Demonstrated ability to prepare/obtain validated instructional materials on design, development, implementation (including change strategies), management, evaluation, and research of instructional systems pertinent to semi-literate and illiterate populations.
16. Documented ability to interpret people power demand and supply statistics in terms of realistic educational and training requirements for planning; ability to use qualitative as well

for people power in the training areas.

17. Previous experience demonstrated in the production of valid training materials for vocational technical educations subject matter at the post-secondary as well as preparatory level.
18. Previous experience in the production of valid training materials for rural extension programs and correlative target populations.

SOURCES OF POTENTIAL PUBLIC DOMAIN SELF-INSTRUCTIONAL  
MATERIALS IN VOCATIONAL TECHNICAL EDUCATION

AUBREY, R.H. (ed.). Selected Free Materials for Classroom Teachers (rev. ed.). Palo Alto, Calif. Fearon Publishers, Inc., 1967.

Educators Guide to Free Films. Randolph, Wisc.: Educators Progress Service, revised annually.

Educators Guide to Free Tapes, Scripts, and Transcriptions. Randolph, Wisc.: Educators Progress Service, revised annually.

Film Guide for Industrial Training. Chicago: National Metal Trades Assn., 222 W. Adams St., 1965.

Films on Vocations, New York: Educational Film Library Assn., Inc., 250 W. 57th St., 1955.

Filmstrips and Slide Series of the U.S. Department of Agriculture. (Agriculture Handbook No. 222.) Washington, D.C.: U.S. Government Printing Office, 1963. (Lists materials in the areas of agricultural economics, agricultural engineering, conservation, forestry, 4-H Club activities, historical, home economics, home gardening, livestock, marketing, nutrition, and rural life.)

Free and Inexpensive Materials for Teaching Family Finance. New York: National Committee for Education in Family Finance, 277 Park Ave., 1963. (Annotated list of booklets, films, filmstrips, and other sources in areas of banking, money management, life insurance, investments, Social Security, and taxes.)

HENDERSHOT, C.H. Programmed Learning: A Bibliography of Programs and Presentation Devices (3rd ed.). Bay City, Mich.: Carl H. Hendershot, 1965.

U.S. Department of Agriculture Films for Television, Washington, D.C.; U.S. Government Printing Office, 1963.

U.S. Government Films for Public Educational Use--1963. (Catalog No. FS5.234:34006-63.) Washington, D.C.: U.S. Government Printing Office, 1964. (Lists films and filmstrips from all agencies of the executive, judicial, and legislative branches of the federal government; but excludes international organizations, state and local governments, and other organizations associated with but not part of the federal government.)

Educators Guide to Free Filmstrips. Randolph, Wis.: Educators Progress Service, revised annually.

SOURCES OF POTENTIAL PUBLIC DOMAIN SELF-INSTRUCTIONAL  
MATERIALS IN VOCATIONAL TECHNICAL EDUCATION

VOCATIONAL EDUCATION STATE INSTRUCTIONAL MATERIALS. The following publications are annotated listings of curriculum materials suitable for vocational education programs. All materials are available from State education agencies. Each publication divides listings by subject matter and by the State from which they are available, and each listing includes a short description of the material, its price, and information on how to order it.

GOVERNMENT PRINTING OFFICE NO.:

- 108E MATERIALS FOR AGRICULTURE. Rev. 1974. 80 p.
- 109E MATERIALS FOR DISTRIBUTIVE EDUCATION. Rev. 1974. 58 p.
- 110E MATERIALS FOR HEALTH OCCUPATIONS. Rev. 1974. 42 p.
- 111E MATERIALS FOR HOME ECONOMICS. Rev. 1974. 42 p.
- 112E MATERIALS FOR TECHNICAL EDUCATION. Rev. 1974. 30 p.
- 113E MATERIALS FOR TRADE AND INDUSTRIAL OCCUPATIONS. Rev. 1974. 72 p.
- 114E MATERIALS FOR OFFICE OCCUPATIONS. Rev. 1974. 38 p.



**PORTUGAL**

- International boundary
- District boundary
- National capital
- District capital
- Road
- Railroad

*Districts are named after their respective capitals.*

0 25 50 75 Miles  
 0 25 50 75 Kilometers

Cádiz  
 GIBRALTAR (U.K.)

Tangier  
 MOROCCO