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TERMINAL REPORT

To Director, USAID/Afghanistan

Submitted by: Clyde H. Hoffman

Period Covered: September 1, 1966 thru August 27, 1968

Date of Report - August 20, 1968

A.I.D.
Reference Center
Room 1656 NS

Clyde H. Hoffman

A. H. Spalding
Acting Program Director

TERMINAL REPORT

I. INTRODUCTION

It has been suggested* that each departing contract team member include in his terminal report comments on his understanding of his assignment, a summary of his accomplishments and recommendations for further consideration. I shall attempt to comply with the first and third of these items. I believe that it is impossible for an individual to realistically assess his own "achievements" and will, therefore, confine my remarks on this item to a review of my activities. It is left for others to ascertain which of these activities might be considered achievements.

Prior to my departure from the United States in mid-August 1966, I had, from interviews and correspondence, the impression that my time in Kabul would be devoted to advising the Afghan Electrical Engineering staff on matters related to curriculum development and course content, teaching techniques, laboratory development and utilization, to be actively engaged in developing an Electrical Engineering curriculum suitable for an undeveloped country, to participate in the development of and teaching in a graduate Electrical Engineering program, and to administer the affairs of the Electrical Engineering Department of Kabul University and to direct the activities of the Electrical Engineering staff.

II. ACTIVITIES ON POST

My activities, which I alluded to in the previous paragraph, fall into five catagories. (1) Teaching, 50%; (2) Advising Afghan staff, 10%; (3) Development of curriculum, courses, and laboratories, 10%; (4) Administrative activities, 20%; and (5) Miscellaneous duties, 10%. The percentage figures represent my estimate of my total time/effort percentage devoted to the different activities. A brief summary of each of these activities follows:

*Memorandum dated 16 May 1968 from K. E. Howe to Contract Team Chiefs

(1) Teaching

By far the greatest single expenditure of time and effort during my tour was on teaching undergraduate students. This, of course, includes preparation of teaching materials suitable for low level of students here rather than that to which I had been accustomed in the U. S., actually conducting classes, grading and consultation with and advising students. Specifically, the courses taught each semester are tabulated below with the number of students and the class, recitation, and laboratory hours involved in each course. Outlines of these courses along with files of examinations, laboratory exercises, etc. are on file in the USET office and the E. E. Department in Kabul.

FALL 1966	Number of Students	Lecture Hours	Recitation Hours	Laboratory Hours
Second Semester Sophomore Calculus	66	3	--	--
Senior Circuit Design	12	3	2	--
E. E. Senior Laboratory II	12	--	--	3
SPRING 1967				
Senior Networks	14	3	3	--
E. E. Senior Laboratory I	14	--	--	3
FALL 1967				
Senior Circuit Design	10	3	3	--
E. E. Senior Laboratory II	10	--	--	3
SPRING 1968				
Senior Networks	9	3	3	--
E. E. Senior Laboratory I	9	--	--	3

(2) Advising

The function of advising the Afghan staff could and perhaps should be a full time activity rather than the estimated 10% of the time that was actually available. The staff which is made up of former participants, in addition to being woefully weak technically (in spite of their U. S. degrees advanced and otherwise), have very little knowledge of pedagogical techniques, what is and what is not important subject matter in the various textbooks to which they

have been exposed, the level of student achievement that can honestly be considered acceptable, and the intellectual attributes and attitudes that distinguish between a person who is educated rather than merely schooled. Hopefully, availability of more time in the future for the proper type of advising might help to improve this situation for some of the Afghan staff. One factor that must be recognized by USET in the capacity of advisors is the resentment that often arises against the advisor. This is probably not unlike, and possibly part of, the dislike if not hatred often developed by the recipient toward the donor of charity. This factor, coupled with the vanity that predominates in the character of the Afghans makes the advisory rank extremely difficult. It is not uncommon for an Afghan (staff or student) to argue at great length that he is correct when one tries to point out a simple computational error he has made. When he finally concedes that he is wrong, he is incredulous that he could have made a mistake! In view of this, it is understandable how difficult and frustrating the advisor's job becomes when trying to point out subtle technical or pedagogical concepts.

(3) Curriculum and Course Development

Perhaps 10% of my total effort was devoted to development of curriculum, courses, and laboratories. In addition to revision of the electrical engineering curriculum to better fit into the present four year program, a new curriculum was also worked out to fit into the proposed Five-Year Program. The separation of the Faculty, although a fait accompli, into separate departments was, I believe, premature. Although I am sure the action was irreversible, I feel that no other new departments, which would further fragment the human and other resources of the Faculty, should be considered for the foreseeable future.

As Chairman of the Five-Year Curriculum Program Committee it fell to me to convene the committee, work out compromises between the exponents of various divergent opinions, and prepare and disseminate documentation on the deliberations and conclusions of the committee. It is felt that the proposed

Five-Year Program, although not unanimously approved by the committee, represents a workable start once such a step by the Faculty is approved by the University.

In addition to the courses taught and developed (indicated in the Table, page 2) the development of the E.E. Senior Laboratory II represented considerable effort. On arrival in Kabul, I discovered in a storeroom a rather extensive, though incomplete, collection of unused equipment for the Malmstadt-Enke Instrumentation Laboratory. This equipment was supplemented by additional purchases to provide complete laboratory work equipment for five student groups. Laboratory exercises which demonstrate fundamental electrical phenomena and instrumentation techniques were prepared and the equipment was used in each Fall semester by the senior E.E. students to perform the exercises.

The mention of the equipment "discovered" in the preceding paragraph points up a serious shortcoming in the program. This is related to acquisition of equipment and supplies. Since most of the USET tours are of two year duration or less and a newcomer often does not have an opportunity to meet his predecessor (s) there is marked discontinuity, particularily relating to equipment. By the time a new staff member gets oriented and forms a judgment on what equipment is needed and suits the program, considerable time could have passed. Having formed his decision and submitted requisitions the delays in paper work, perhaps waiting for authorization of expenditure under a new fiscal year budget, and the time required for shipment can well, and apparently have resulted in equipment arriving after the departure of the man, who probably had clear-cut plans for its use, who ordered it. Although the major equipment acquisition phase of this program is over, some means should be devised for shortening this lead time for whatever equipment is yet to be acquired.

One effort toward developing the Faculty of Engineering into a modern engineering school that was thwarted, was the acquisition of an analog simulator

for the Faculty. The position presented by myself and the Program Director, Dr. Bergelin, is represented by the following excerpts from a proposal outline that I prepared and a copy of a memorandum from me to Dr. Martin dated 3 February 1967.

COMPUTER EDUCATION AT KABUL UNIVERSITY

I. INTRODUCTION

Education of engineers in the second half of the twentieth century cannot be considered complete if the graduating engineers with their first degree in any of the engineering disciplines do not have a working knowledge of the use of general purpose electronic computers as applied to engineering problems. This is surely one of the minimum capabilities expected of the output from institutions measuring up to "international standards". Aside from the desire to bring Kabul University up to international standards for mere show, there is a compelling reason for giving consideration to the introduction of computer technology into the programs of instruction and for acquiring a modest amount of computing equipment with which to carry out this instruction. The urgent need of people capable of carrying on high level engineering work in Afghanistan is obvious. There is limited capability, for the forseeable future, to train the quantity required of the quality necessary to carry on this work. It is this combination that suggests that the few we do train should be capable of delivering the greatest possible amount of engineering productivity. With modern computing tools in hand, and knowledge of their effective use, each engineer graduated from the Faculty of Engineering within a few years could, in effect, deliver much more to the technological development of Afghanistan than perhaps a dozen or a score or more without the specialized knowledge.

Based on the acknowledged validity of the multiplication of "per engineer output" as observed in the United States and Western Europe, to say nothing of the deeper understanding of physical phenomena that can be imparted due to the enhancement of the pedagogical procedures that will be possible, a program of education and equipment acquisition is proposed and support is sincerely requested.

Initiation and development of a program at this time is particularly desirable since the writer, who is presently with the USET, has had considerable experience in teaching courses, designing, administering the operation of, and specification and purchase of both analog and digital machines. In addition, the experience of Dr. Heuckroth, Dr. Rasof (when he joins USET), and a number of the other USET members with the use of computers can be exploited until 1968 or later. This will allow sufficient time, if promptly begun, for a program to get well underway before the disruption that occurs when team members come and go.

The following outline (proposal) gives the facts and expert opinion on which rests the justification for the inauguration of such a program along with plans for implementing the program. Estimates of facility needs, staffing, and costs are included in Appendix I and professional biographic data on the responsible individuals are given in Appendix II.

II. FEASIBILITY AND APPLICABILITY OF COMPUTER EDUCATION AT KABUL UNIVERSITY

A. Level at which computer instruction and use can be presented to and grasped by students.

1. Note that in the United States high school students are seen regularly at science fairs demonstrating their ability to not only use, but to design and build both digital and analog machines.

2. I.I.T.'s history of Saturday morning classes for high school students in computer programming and use.

3. Experience in colleges in the regular application of computers in sophomore analysis courses (circuits, mechanics, strength, etc.)

4. Experience in colleges with freshman programming courses.

5. With the above factors as background, and allowing for the differences of background of Afghan and American youth, it seems possible and plausible to start giving computer instruction in the Junior year immediately and later on possibly in the Sophomore year at the Faculty.

B. Areas of applicability of equipment (depending on the type of equipment available at any given time).

1. In Faculty of Engineering

a. Classroom instruction, demonstration, and laboratory solution of engineering problems.

b. Course homework problem solution by students.

c. Upper level student projects and Faculty Staff research.

d. Tie in with Seismic Station -- Data reduction.

2. By the University (and the Faculty)

a. Enrollment and student records (grades, etc.)

b. Accounting

3. By the Ministeries (with consultation available from the staff of the Faculty)

a. Census tabulations.

b. Data reduction from surveys, (manpower, resources, economic activity, etc.)

c. Power distribution studies.

d. Power system fault studies.

4. By the proposed Research Institute (if it comes to pass).

COURSE AND CURRICULUM CHANGES (Would depend on equipment available)

A. Initially, a single course on computer application would be offered in the Junior year.

1. Details of content.

B. Re-orient problem solving courses toward computer solution.

1. This would require some staff orientation and instruction.

2. Study of entire curriculum in light of the changes suggested.

C. Develop an introductory programming course at the beginning of the Sophomore year.

1. Combine analog and digital (FORTRAN)

D. Seminar Course for Afghan staff.

M E M O R A N D U M

8 February 1967

TO: Dr. E. L. Martin, Chief Education Division

FROM: C. H. Hoffman, USET

SUBJ: USET Requisition For Analog Simulator

I have read your memo of 6 February 1967 to Dr. Bergelin regarding the subject requisition and take exception to one of the statements therein. I feel that it is necessary to correct the ideas, that are frequently held, about the place of analog simulation in the undergraduate curricula of U. S. engineering schools. Rat er than being confined to senior and graduate level instruction and use, the trend has been to introduce this material as early in the student's program as possible. From my own experience during my last years at the University of Notre Dame (say from 1956 to 1962) and since then at Illinois Institute of Technology, I have introduced the use of analog simulation in introductory circuits courses at the sophomore level, and seen them used in junior level courses in civil, mechanical and chemical engineering.

I have also learned from my activities on a recent NSF supported program on "DISCRETE STATE CONCEPTS IN UNDERGRADUATE EDUCATION", as well as from personal contacts with other engineering educators, that many schools are introducing this material at the lower levels. In the case of the NSF program mentioned, well documented course material has been developed and used at the five schools participating in the Consortium that undertook the project for NSF. (Illinois Institute of Technology, Case Institute of Technology, Polytechnic Institute of Brooklyn, Carnegie Institute of Technology and Rensselaer Polytechnic Institute).

With our present program at Kabul University, introduction of the use of analog simulators in the solution of engineering problems would fit into the junior and senior level sequence of material in all of the disciplines. In addition, its availability would provide a valuable tool and stimulus to the staff and thus aid USET in its aim of development of the Afghan staff.

It should be noted that the appendices referred to in connection with time, staffing, facilities, etc. were never prepared as the initial request for the equipment was rejected.

(4) Administrative Activities:

Perhaps 20% of my time was expended on the catagory that includes not only the various aspects of administration of the Electrical Engineering Department but also those imposed by the Dean, USET, and USAID/A. Engr., staff meetings, conferences, committee work, post orientation and post departure clearance procedure, etc.

The recurrent tasks of selecting course offerings during the curricula transition period, making teaching assignments and collaborating with the scheduling committee on the scheduling of classes and labs were performed each semester.

In cooperation with the Participant Coordinator, some time was spent assisting in the selection of working out programs for, and evaluation of the progress of those participants studying in the field of electrical engineering in one of the Consortium schools.

Other tasks of an administrative nature that, although routine, were time consuming were related to the selection of textbooks, equipment, and supplies for the Department.

(5) Miscellaneous

The estimated 10% of my time that I have designated as miscellaneous was generally spent performing tasks of a consultant nature. This includes such activities as assisting the Shop personnel and the staff of other departments on matters pertaining to electrical equipment and installations in other (than E.E.) labs and the building proper (including the new annex).

Although research would normally be considered an activity under a category by itself, here, the time available puts definite limits on the effort in this direction. I did, however, succeed in initiating and directing two small research projects. Mr. A. W. Zia undertook a project to develop an effective low cost voltage stabilizer utilizing silicon controlled rectifiers (SCR's) that would be suitable for Kabul residential applications. Work is progressing slowly on the project due to other demands on Zia's time. The principal problem is due to the need to keep the cost low for such a device to be practical. A second research project in which I participated extensively, was an extension of some work I had done previously on the relative stability of automatic control systems. This work was done in collaboration with Mr. I. Ebadi of the Faculty of Medicine. Sufficiently meaningful results have been obtained to provide a joint paper which should be ready for submission to one of the American Technical Journals prior to my departure from Kabul.

II. CONCLUSIONS AND RECOMMENDATIONS

My main conclusion is that for the forseeable future this program in no way needs the services of the high professional level people it has been getting from the Consortium schools (Ph.D.'s with extensive experience in research, administration, and teaching high quality undergraduate and graduate students in the U. S.). It appears to me that the need is for "old fashioned engineers" (educated before World War II) who could teach the Afghans how to get things done with only the theory needed to do it being taught. Sufficient theory must, of course, be included to permit the students after graduation to carry on a "self study" program to keep up with the advances in their field. Perhaps the best people would not even come from college campuses but rather from U. S. industry.

Along the same lines, I believe that the participants are receiving theoretical training in the United States that is far beyond the needs of the Faculty or Afghanistan. The result, I believe, is that they are less effective than they might be in the selection and presentation of material to the Afghan students. In addition,

they become frustrated in their inability to use and develop the knowledge they have acquired in the United States. For this reason and for reasons of economy, it is my feeling that third country training should be the norm for participants.

The function of the USET staff should be more clearly defined, particularly regarding the teaching vs. advising and other duties. In order to make the functions of the staff truly effective, some way must be found to persuade the Afghans to heed the advice given, and if necessary, develop some means to give the authority to compel them to.

The recruitment and selection of USET staff, in my opinion, leaves much to be desired. To prevent this program from becoming a "haven for misfits on the Consortium school campuses" each prospective team member should be interviewed by several Steering Committee members and where possible, by previous USET members. Any other mechanism for evaluating a candidate's suitability for service in Kabul should also be considered.

A number of things have come up during the last two years that suggest the desirability of providing each candidate, prior to his making a commitment, with a document which would become a contract (or codicil to the contract he has with his home institution) when he agrees to join the Team. This contract should be binding for the duration of the tour he has initially agreed to irrespective of changes in AID rules whether made on Post or in Washington. This contract should clearly state compensation, allowances, and facilities to be provided as well as the requirements and conditions of the functions he is to perform. Specifically, I believe the following points should be spelled out:

(a) The exact duration of his tour (whether from departure from the U. S. to return or time on Post. How unused leave can be related to duration of tour, etc.)

(b) Exact specifications on the on Post, or on the contract for R&R eligibility, home leave, where applicable, etc.

(c) Detailed statement of commodities and services to be provided eg. housing, fuel, maintenance, transportation, medical care, etc. (If any agreed to are reduced or removed by AID such should become effective at the end of a man's agreed tour. Similarly, any increase in allowances would be applicable only to newcomers and those who extend their tours beyond the original agreement).

(d) Most academic staff members in the United States spend considerable time in evenings and on weekends preparing classroom materials, exams, doing grading, etc. In view of this, they are generally accorded the responsibility of adjusting their daytime hours to meet classes, advising and administrative duties and most expect the same here. If a fixed policy of working hours per day is to be enforced, prospective team members should be so advised. Furthermore, if this is to be done, the social and semi-official functions which occur outside of these fixed working hours should be put on a voluntary basis rather than being mandatory on the basis of "protocol".

All in all, the last two years in Afghanistan has been an exciting and interesting experience for my wife and me. Although one's professional growth is limited, I believe this is a small price to pay for the chance to participate in the opportunities available to him here.