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Project No: DP/MOT/86/001

Project Title: Improved Management through Computer Support
Montserrat, W.I. - Contract No. 87735

17338

FINAL REPORT

March 21, 1989

Octagon Consultants International Inc.
P.O. Box 1678
St. Thomas, U.S. Virgin Islands

"Improved Management Through Computer Support"
UNIDO Project No. DP/MOT/86/001

I. Development Objective of the Project

- A. The immediate development objective of the UNIDO project "Improved Management Through Computer Support" was computerization of the Montserrat Economic Development Unit to improve the efficiency and effectiveness of its efforts to attract foreign investment partners to establish labor intensive light industry in Montserrat. Montserrat is severely disadvantaged by its small size and population of 12,000, its high unemployment/underemployment especially among women, its lack of natural resources and its relative inaccessibility.
- B. The Montserrat Economic Development Unit desired to use computer technology to develop an industrial data base, perform financial analysis and project evaluation, respond to investment inquiries, and maintain records of investment inquiries and applications. The computer will enable systematic updating of investment promotion information.
- C. Limited use of computers by Government up to June 1987 (one P.C. in Treasury and one in Finance) provided insight into the potential effectiveness of computers.
- D. The Government of Montserrat considered the introduction and use of computer technology to be an essential step towards the efficiency of Government operations and the acceleration of the industrial development of the country.

II. Outputs Produced

- A. The targeted outputs were produced, including:
 - 1. Establishment of a comprehensive computer training program.
 - 2. Exposure of Government Officials to a computer literacy program.
 - 3. Training of the involved staff.
 - 4. Installation of UNDP financed equipment.
 - 5. Identification of future systems and management requirements addressing specifically the needs of the Economic Development Unit and the concerned government units.

B. UNDP through UNIDO financed 10 computers and subcontracted 7 weeks (5 man months) of Computer Training in application specific software to Octagon Consultants International Inc. of St. Thomas, U.S. Virgin Islands.

- 1. The original project document included UNDP financing of 5 PC computers and consultants providing an additional 5 computers on a lease basis for the training period. The consultants arranged a two month lease of 5 P.C. computers from a local computer dealer in St. Thomas.**
- 2. During the training the Government of Montserrat requested UNDP financing of the 5 leased computers to bring the total equipment portion of the project to 10 computers. Arrangement to purchase was completed with a credit of the lease fee against the purchase price.**

C. Octagon's six staff members conducted seven weeks of computer training in 4 daily sessions, 5 days a week from April 27, through June 10, 1987. A total of 180 classroom training hours was delivered. (Annex # 5 details trainers names and dates of field service.)

1. Subjects taught included:

- (a) Management Overview & Orientation**
- (b) Supervisor Overview & Orientation**
- (c) Word Processing**
- (d) Data Base Management (dBASE III+)**
- (e) Data Entry Methods & Techniques**
- (f) Electronic Spreadsheet (Lotus 1-2-3)**
- (g) Advanced Word Processing**
- (h) Computer Orientation for Educators & Teachers**
- (i) Technical - Repair & Maintenance of Computers**

2. Persons attending the training included a broad range of Civil Service members, with 275 persons receiving computer training.

- (a) Plans by the Development Unit to develop a computerized industrial database required a broader approach to training and hardware requirements than exclusive training and computerization of the Economic Development Unit itself.**
- (b) The insurance of a reliable stream of information as computerized data input for the national industrial data base, required placement of computers in related government departments and training of the Government officials and operating staff. The intention was to enable the contributing government departments to manage their statistics in a way that would make information available for the database far more efficiently than in its existing manual form.**

- (c) In addition, recent interest on the part of foreign investors had focused on the search for a labor force with computer literacy skills for development projects in computer related industries ideally suited to the transportation and other constraints of Montserrat.
- (d) The approach was feasible within the scope of the project because of the small size of Montserrat.

3. The Training Program followed the outline of the original Work Plan schedule (detailed in Annex # 1) developed in conjunction with C.T. John, Permanent Secretary of the Development Unit, prior to the training during two preparatory visits to Montserrat in July and October of 1986.

III. Objectives Achieved

The success ratio of the UNIDO Computer Training in Montserrat was the highest that we as consultants have seen in the Caribbean. The training was oversubscribed. Some 325 persons applied for training. By accepting 2 persons to each computer, instead of 1 student to each computer, the Training accommodated 275 students.

A. Computer Literacy Training

1. Reasons for the success of the Project begin with:

- (a) Solid support at the highest levels of Government including inspirational opening ceremonies with the Chief Minister and the Governor and participation in the training by high level government officials.
- (b) A modern Government Training Center with an efficient staff of four, in which the training sessions were held.
- (c) A high level of interest in the subject of Computers. Montserrattians had limited exposure to computers but were aware of their widespread use in more technologically advanced countries. Uniquely, Montserrattians are culturally driven to "stay abreast" of global developments.

2. The design of the project incorporated a "Contextual Approach" to computer training.

- (a) The goal of the "contextual approach" to Computer Training is to create an environment in which computerization/automation in a developing country can occur with support at all levels.

- (1) The concept of training must be extended up the chain of command to the very top levels and begin at the top. This process is designed to prevent "pockets of resistance" to new technology.
 - (2) Familiarization at the top with the tasks a computer can handle, as well as its limitations, provides for the opportunity of "life cycle management," the development of a plan for automation which includes staged implementation of targeted tasks and benchmarks for management evaluation.
- (b) Implementation initiates training at:
- (1) the top level of government or management first,
 - (2) the supervisory personnel second, and
 - (3) the staff or probable computer operator last.
- (c) The objective of the "contextual approach" to Computer Training is to:
- (1) Develop support for the process of computerization at the highest level of top management/government based on full understanding of the process. Most important of all is sufficient familiarization with the computer itself and the programs to be used, to allay any fears with respect to the issues of control and security. This is accomplished with "hands-on" computer orientation of this group, first, before training the actual computer operators. The goal is for the enthusiasm to start at the top.
 - (2) Provide orientation for supervisory personnel to understand new dimensions of their supervisory role as the computer is introduced as a tool and to learn new guidelines for supervision and controls required by the process of automation. This again is accomplished with "hands-on" computer orientation.
 - (3) Training staff-level personnel in operation of the computer and use of application specific software programs. With the successful completion of steps 1 and 2 the computer operators will then be able to operate in an environment which is oriented to computers.
3. Incorporating the use of self-paced computer tutorials as a part of each class session accommodated the differences in learning pace, allowing the students to choose to review or move ahead to more advanced material. The tutorials were selected to be entertaining and provide immediate validation.

4. Technical Training (maintenance, diagnostics and simple computer repair) was given for 8 people, preselected for their interest and technical inclination. The course was designed to achieve the goal of providing a level of self sufficiency in maintaining the new hardware. At the end of the training, this class (under the consultant's supervision) installed the computers in the designated government offices.

B. Computerization of the Montserrat Economic Development Unit:

1. Nine members of the staff of the Economic Development Unit received computer training. The Permanent Secretary of Development and the senior statistician attended the Management Overview week. The P.S., statistician and two economists attended two weeks of Lotus 1-2-3 spreadsheet training. The Executive Officer and the Economist attended the two week dBASE III+ data base training. The Executive Officer, P.S. and 3 clerical officers attended word processing. Two Clerical Officers attended Data Entry and a third Clerical Officer attended Advanced Word Processing.
2. During the seven week training period, Nine Staff members of the Development Unit received 22 man weeks of computer training covering 6 different courses, including management overview, data entry, word processing, advanced word processing, data base management and spreadsheet. The Development Unit was assigned computer equipment financed by UNDP and Application Software - Easy word processing, dBase III+ database program and Lotus 1-2-3 spreadsheet installed as menu driven for ease of use, as well as Octagon utilities for ease in administration of the computer.
3. The UNDP financed computer equipment and software equipped the Development Unit with tools and training to develop an industrial data base, maintain computer files of Investor inquiries, create and update promotional materials as well as personalize and customize responses to queries by potential industrial developers, according to their specific interests.

IV. Findings & Lessons Learned (Utilization of Project Results):

- A. In environments with little previous exposure to computers, using a Progressive Approach to Computer Training results in a more successful effort towards Computerization.

1. The design of the Montserrat project incorporated a restructured approach to computer training. This approach is different from prevailing methods of computer training. The consultants' recent experience of training computer operators at the staff level in a similar Caribbean environment formed the basis of using a new "Contextual Approach".
2. The Montserrat training served as a confirmation of this new training approach which addresses the global context of the environment to be computerized (in a human sense), instead of focusing exclusively on teaching the mechanics of operating a computer or computer program to a computer operator.
3. Most problems emerging from introduction of computers into Caribbean work environments with no previous exposure to computer literacy are seen at the supervisory and higher levels. This is especially true when the training occurs only at the staff (clerk or operator) level.
 - (a) A worst case scenario is the top Government Official who experiences a growing unacknowledged alienation and resistance as he sees a different generation at the staff/clerk level taking over "control" of often sensitive information when it is transferred to the computer. This is compounded by use of methodology and terminology he/she does not understand. This fosters feelings of inadequacy and a sense of loss of control; at its greatest extreme, this fear of losing control is perceived as a threat to his/her position of power. It is manifested by resistance in the form of refusal to purchase supplies, replace lost computer staff, refusal to approve a new automated procedure, all of which serves to undermine the process of computerization.
 - (b) The same kind of resistance has been seen in those who supervise new computer users. A supervisor who has not had the benefit of training and orientation senses a loss of control over the staff and begins to develop resistance to the process of automation. In this environment the work of the clerk is undirected and unsupported, and any impact of advantage from using the computer is at best a "trickle up" effect.
4. As consultants we had often seen the process of computerization get bogged down despite highly successful training at the computer user level. Our study and analysis of why the traditional training approach was not yielding the desired long range results in many projects we analyzed, resulted in the development of the "Contextual Approach."

B. Importance of Training at the Highest Level First.

1. The most important lesson learned, relevant to any future UNIDO computer training project, is the importance of training at the highest level of management or government administrator first. While these may or may not be the same persons responsible for day to day operation of the computer, these are the people who will use and be responsible for the ultimate computer output and be responsible (in a supervisory capacity) for those who actually use the computer on a daily basis. It is of great importance to pierce the "mystique of the computer" at the highest level with hands on experience:
 - (a) to enable the new user to see that a computer is not mysterious and that the computer operator is in control of what the computer does. At the same time it is technically possible to restrict access of the user to specific tasks.
 - (b) to provide a demonstration of the basic kinds of tasks a computer performs and what the terminology means with respect to word processing, spreadsheet and data base, with examples based on specific work from his/her own department.
 - (c) to help the Administrator understand that a computer system will not solve problems miraculously overnight and requires careful long range planning, establishment of priorities for manual procedures to be automated, and maintenance of parallel manual operations during a period of time until the automated procedure is running flawlessly.
 - (d) to provide an understanding of the realistic expectations of persons who will be using the computer, by knowing how it works, what it does and what it feels like, and the importance of taking periodic breaks to rest the eyes when working in front of a computer screen.
 - (e) to understand that moving from a manual to a computerized system requires creating a different set of disciplines and control procedures. This includes a thorough understanding of the issue of security of data or information.

C. Importance of Supervisor Orientation prior to computer operator training.

1. The supervisor needs to be introduced to a new set of procedures related to data entry and the quality of information transferred to the computer, specifically the importance of:

- (a) data preparation of source information for accuracy and completeness,
- (b) data entry techniques and motivation for speed & accuracy, and
- (c) immediate data verification (proofreading, re-keying) of information entered into the computer.

2. A new set of manual forms is required for "computer corrections" to report errors in computer output, as well as "trouble reports" for reporting problems with the computer and ancillary equipment so that operator can be given new instructions and/or equipment repairs can be made as soon as possible.

3. Introduction to supervisory guidelines for different requirements created by automation, insures a more active role by the supervisor in process of computerization. The supervisor can then feel comfortable that he/she will remain in control of the department which has always been his/her assigned responsibility.

D. Pitfalls of Training Computer Operators Without Proper Orientation of Supervisors and Government Officials.

It is an easy matter to train computer operators at the staff level. Many clerks and officers have a high level of discipline - an essential ingredient for learning to operate computers, where following directions explicitly is essential. The students themselves perform admirably. Unfortunately, most funded development programs involving computers stop at delivery of equipment and software, and training of operational staff. The training component of many projects is not sufficiently broad at the managerial level to fully orchestrate "technology transfer."

V. Recommendations

Meetings with the consultants and the senior Development Unit Staff identified the following major areas of focus for computerization of the Economic Development Unit.

A. Economic Development Unit (EDU) directives:

- 1. Development of an Industrial Data Base
- 2. Financial Analysis and economic forecasting
- 3. Project Evaluation
- 4. Project Monitoring
- 5. Recording and retrieval of Investment Inquiries and Applications
- 6. Creation and update of Investment Promotion Literature

B. EDU Priorities:

In prioritizing staged implementation of EDU computerization a threefold approach was recommended.

1. Immediate implementation of project monitoring for current development projects through use of a spreadsheet template made available from another assistance source.
2. EDU staff to begin the process of defining the fields of information for the design of a record structure for the Industrial Data Base and develop the interface with other Government departments, identifying the EDU requirements to insure the information streams for statistical data input.
3. Promotional information should be entered in the computer using the word processor.

C. EDU Equipment Requirements

It is recommended that the Economic Development Unit will ultimately require three microcomputers to insure adequate availability for the EDU staff.

D. The future of computerization of the Government of Montserrat:

The island of Montserrat, because of its small size and distinctive aggressiveness in embracing new technology, is an ideal microcosm for development of computer applications for automating procedures in government departments to serve as a model for English speaking countries in the Eastern Caribbean.

- ANNEX: # 1 WORK PLAN Schedule of Computer Training Courses, April 27 - June 12, 1987
- # 2 WORK PLAN DETAIL Schedule Computers in Education Week
- # 3 WORK PLAN DETAIL Computer Training - Seating Chart
- # 4 WORK PLAN DETAIL Teachers Software Evaluation Form
- # 5 SCHEDULE Dates and Training Personnel on Site

SCHEDULE FOR UNDP-UNIDO COMPUTER TRAINING - MONTSERRAT
APRIL 27 - JUNE 10, 1987

TIME	APR 27-MAY 1	MAY 5-8	MAY 11-15	MAY 18-22	MAY 25-29	JUNE 1-5	JUNE 8-12
8:30 AM TO 10:00 AM	Management Overview Ministers & Permanent Secretaries Class Size 20	* Spreadsheet Lotus 123 Group # 1 20	* Spreadsheet Lotus 123 Group # 1 20	* Data Base dBase III+ Group # 1 20	Data Base dBase III+ Group # 1 20	Computers in Education (Refer to detailed Schedule for this week.)	**Computer Technical Training Maintenance, Diagnostics & simple repair.
10:15 AM TO 11:45 AM	Management Overview Ministers & Permanent Secretaries Class Size 20	* Spreadsheet Lotus 123 Group # 2 20	* Spreadsheet Lotus 123 Group # 2 20	* Data Base dBase III+ Group # 2 20	Data Base dBase III+ Group # 2 20	Includes: Administrators All Teachers Program covers: Introduction to Computers-hands-on exposure to both Apple and IBM	Course limited to 8 prescreened applicants with technical aptitude. Hardware Installation and Maintenance. Hardware Diagnostics with Software tools. Board Replacement.
1:15 PM TO 2:30 PM	Management Overview Supervisors Class Size 20	Word Processing Group # 1 20	Word Processing Group # 3 20	Data Entry Group # 1 10	Advanced Word Processing Group # 1 10	Computers in Schools Computers in Administration	Electrical wiring requirements & Power Protection.
2:45 PM TO 4:00 PM	Management Overview Supervisors Class Size 20	Word Processing Group # 2 20	Word Processing Group # 4 20	Data Entry Group # 2 10	Advanced Word Processing Group # 2 10	Teacher Training Educational Software Evaluation	Course 5 full days. 3 days of classroom instruction. 2 days of equipment installation.

* Lotus and dBase III+ are 2 week courses.

** Technical Training Class will install the computers (with Consultants supervision) in the designated government offices at the end of the training course.

ANNEX: # 2 : WORKPLAN DETAIL - COMPUTERS IN EDUCATION WEEK

COMPUTER TRAINING - EDUCATION

SCHEDULE JUNE 1 - 5, 1987

DATE	VENUE	PARTICIPANTS	PROGRAM	TRAINERS
Mon. June 1	University Center	All Teachers (60) & Administrators	Introduction to Computers	Dr.Lyn Rosenthal
Tue. June 2	Government Training Center	20 Teachers	Computers in Schools IBM	Peter de Blanc Art Finley Dotty Sparks Larry Marin
	University Center	20 Teachers	Computers in Schools Apple	
Wed June 3	Government Training Center	20 Teachers	Computers in Schools IBM	
	University Center	20 Teachers	Computers in Schools Apple	
Thu June 4	Government Training Center	20 Administrators	Computers in Administration	
	University Center	10 Pre-trained Teachers	Teacher Training	
Fri June 5	Government Training Center	20 Administrators	Computers in Administration	
	University Center	10 Pre-trained Teachers	Teacher Training	

Each days session is an all-day program.

Monday - Plenary session

Tues. - Fri:

Morning groups will switch locations for the afternoon session.

Government Training Center - IBM (and clone) Hardware & Software

University Center - Apple Hardware & Software

ANNEX: # 3 WORK PLAN DETAIL - CLASS SEATING CHART

MONTERRAT TRAINING CENTER
COMPUTER TRAINING SEATING CHART

COURSE: _____ GROUP #: _____ MEETING TIME: _____

INSTRUCTOR: _____ ASSISTANTS: _____

Computer 1 A: _____ B: _____	Computer 2 A: _____ B: _____	Computer 3 A: _____ B: _____
Computer 4 A: _____ B: _____	Computer 5 A: _____ B: _____	Computer 6 A: _____ B: _____

Computer 7 A: _____ B: _____	Computer 8 A: _____ B: _____
Computer 9 A: _____ B: _____	Computer 10 A: _____ B: _____

SOFTWARE EVALUATION WORKSHEET

ENTER HERE THE NAMES OF THE PROGRAMS YOU EVALUATED:

- 1.....
- 2.....
- 3.....
- 4.....
- 5.....

1. INTEREST

IS THE PROGRAM INTERESTING ?

THIS DOES NOT MEAN WHETHER YOU YOURSELF ARE INTERESTED IN THE SUBJECT MATTER; THE QUESTION IS WHETHER THE WAY THE PROGRAM WORKS IS INTERESTING OR BORING.

	<u>POOR</u>	<u>FAIR</u>	<u>EXCELLENT</u>
--	-------------	-------------	------------------

1	---	---	---
2	---	---	---
3	---	---	---
4	---	---	---
5	---	---	---

2. TEACHING

DOES THE PROGRAM TEACH OR ONLY TEST YOUR ABILITY TO PERFORM?

A PROGRAM WHICH TEACHES WILL PROVIDE EXPLANATIONS WHEN YOU ARE WRONG, AND WILL OFFER HELP OR EXPLANATIONS IF YOU ASK FOR IT. THE BEST TEACHING PROGRAMS WILL HAVE DIFFERENT LEVELS OF EXPLANATION AND THE VERY BEST WILL SELECT THE APPROPRIATE LEVEL DEPENDING ON THE STUDENTS PERFORMANCE.

	<u>POOR</u>	<u>FAIR</u>	<u>EXCELLENT</u>
--	-------------	-------------	------------------

1	---	---	---
2	---	---	---
3	---	---	---
4	---	---	---
5	---	---	---

3. ROBUST

DOES THE PROGRAM WORK NO MATTER WHAT YOU DO?

A ROBUST PROGRAM WILL SIMPLY REJECT INAPPROPRIATE ENTRIES BY THE STUDENT, OR EVEN BETTER, INFORM THE STUDENT WHAT HE IS DOING WRONG; A POOR PROGRAM WILL GIVE AN UNINTELLIGIBLE MESSAGE, DESTROY THE WORK ON THE SCREEN, OR JUST NOT WORK AT ALL ANYMORE.

	<u>POOR</u>	<u>FAIR</u>	<u>EXCELLENT</u>
1	---	---	---
2	---	---	---
3	---	---	---
4	---	---	---
5	---	---	---

4. RELEVANT

DO YOU NEED THE PROGRAM FOR YOUR TEACHING ?

(WE AREN'T GOING TO ASK YOU TO RATE THESE PROGRAMS THIS WAY; THEY WERE SELECTED AT RANDOM AS EXAMPLES AND NO ATTEMPT HAS BEEN MADE YET TO DETERMINE YOUR REAL NEEDS AND SUPPLY PROGRAMS TO PICK FROM.)

5. EASY TO USE

WAS IT OBVIOUS WHAT THE PROGRAM EXPECTED YOU TO DO OR DID YOU HAVE TO GUESS OR READ LONG EXPLANATIONS ?

	<u>POOR</u>	<u>FAIR</u>	<u>EXCELLENT</u>
1	---	---	---
2	---	---	---
3	---	---	---
4	---	---	---
5	---	---	---

ANNEX: # 5 SCHEDULE - DATES AND PERSONNEL ON SITE
MONTSERRAT UNDP-UNIDO COMPUTER TRAINING

DATE	ACTIVITY
Dec 14-20, 1986	Home Base - Preparation of Course Outlines and materials.
April 23, 1987	Computer equipment delivered by Air Charter to Montserrat Peter de Blanc & J. Ackley set up electric transformers, UPS and Computer equipment in Government Training Center
April 25, 1987	Training Staff arrived Montserrat.
April 27, 1987 to June 12, 1987	Computer Training formal Opening Ceremony and Training began. Classes ran according to Work Plan schedule through June 12 th.

PERSONNEL ON SITE

Peter de Blanc
Art Finley
Dotty Sparks
Dr. Lyn Rosenthal
John Ackley
Larry Marin