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EDUCATIONAL POLICY AND PLANNING PROJECT

INDONESIA

Microcomputer Applications for Education Planning and Management: A Modular Training Program

MODULE III Use of the Management Information System for Management Control

Office of Educational and Cultural Research and Development
Ministry of Education and Culture

December 1986

IEES

Improving the Efficiency of Educational Systems

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Howard University
Institute for International Research
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PREFACE

The Educational Policy and Planning (EPP) Project is a six-year project conducted jointly by the Indonesian Ministry of Education and Culture (MOEC) and the Education and Human Resource Division of the United States Agency for International Development (USAID). The overall project objective is to improve the quality of education in indonesia by assisting the MOEC through the Office of Educational and Cultural Research and Development (Balitbang Dikbud) to formulate better policies and long-term plans. Specifically, the project aims to improve policy formulation and long-term planning by improving the timeliness, relevance, and accuracy of data collected, the subsequent analyses of such data, and the ultimate use for policy and decisionmaking.

There are three major components under the EPP Project: (1) to help the MOEC develop an integrated management information system (MIS), (2) to help the MOEC enhance its policy research and analysis capacity, and (3) to support the MOEC institutional development at the national and provincial level through training. Each of the above components is being implemented at the national level and in three pilot provinces. EPP technical advisory staff work closely with counterpart Indonesian staff as part of a collaborative process of developing institutional capacity.

As a part of the third major component (to support institutional development through training) the EPP Project has developed a set of four training modules in computer applications for educational planning and management. These prototype training modules are especially designed to demonstrate the application of computers for performing educational functions of management, control, monitoring, planning, and budgeting at the provincial level. The modules are laid out in a performance-based instructional design in order for the trainee to master computer skills and package program use in performing their educational tasks. The data utilized in the exercises is on four diskettes which can be obtained on request from Balitbang Dikbud. The program diskettes, i.e., DBASE III plus, Lotus 123 release 2, QuickCode II, and Quick Report, can be purchased in the commercial market. A task analysis of the three EPP pilot provincial education offices was conducted prior to and as a basis for the development of the instructional modules. The focus was on the Provincial Planning Unit which includes the subunits of Program Planning, Data Collection, and Monitoring.

The modules were developed by Mr. Yip Hak Kwong, consultant in Educational Statistics and Computer Applications and Dr. Nat J. Colletta, Education Planner and Chief of Party EPP in collaboration with the Center of Information, Office of Educational and Cultural Research and Development (Balitbang Dikbud). The materials were field tested in the process of training teachers at the Graduate Education Facility, Yogyakarta Institute of Teacher Training and Education (IKIP Yogyakarta). Balitbang has recently translated the materials into Indonesian for further field testing in the three pilot provinces. It is expected that after further field testing and revision the prototype modules would be disseminated through the appropriate MOEC unit.

Harsja W. Bachtiar, Head
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(December 1986)

INTRODUCTION TO EPP TRAINING MODULES ON THE DEVELOPMENT & USE OF MIS ON MICROCOMPUTERS

1.0 Purposes

1.1 These training modules on the development and use of the education management information system are primarily designed for planners and administrators at the provincial level, who are responsible for collecting, processing and analyzing statistics for educational planning and management. The main feature of the modules is the use of microcomputers to enhance the speed, flexibility, and versatility in the use of information.

1.2 The purposes of the modules are as follows:

- To introduce to the participants the basic framework of an integrated education management information system which could be used to serve the varied needs of different users;
- To demonstrate how such a system could be set up, making use of microcomputers, and how data could be retrieved for analytical purposes;
- To show how an interactive model(s) for diagnostic, forecasting, planning and budgeting purposes could be developed on microcomputers; and
- To show, as well, how the computer system and the models could easily be modified to cope with unforeseen changes in requirements, with the help of user-friendly software packages abundantly available on the market.

2.0 The Hierarchies of Information

2.1 When viewed in terms of the point at which information is collated and used, there are three main levels of information:

- The school level, at which detailed information about individual pupils, teachers and staff (including their name, age, sex, grade, home address, academic performance, qualification, salaries, etc.), as well as information about the schools (e.g., area, number of rooms, equipment, etc.) have to be kept for the smooth running of the schools concerned;
- The district level, where not all the data kept by schools are required. Only summary statistics such as the number of pupils by age, sex and grade, and the amount of recurrent expenditures are required for individual schools; and
- The national level, where, depending on the extent of decentralization, detailed information on individual schools may not be required. Only summary information is collected at the subdistrict or district level.

2.2 Alternatively, depending on the usage, information could be distinguished between that for:

- planning,
- management control, and
- operation.

2.3 Ideally, information at the school, district, and national level should be integrated and shared in one, or one network, of data base(s). For instance, information stored in schools could be computerized, and only the relevant data would be extracted and passed to the computer system kept at the district level;

and the similar procedure could apply to the flow of information between the district and national level. This could help avoid a lot of duplication of work, and solve the problems of quality of data and the time lag in producing the information. With the use of individualized data bases, more accurate information could be made available about pupil and teacher flow, which is extremely useful in planning school location, and teacher demand and supply. The individualized data base could also reduce considerably the data problems confronting educational researchers, especially those engaged in longitudinal studies.

2.4 Similarly, the same can be said of information for planning, management control and operation. For instance, a simple ledger accounting system, if carefully designed and computerized, could provide a wealth of information useful in monitoring spending, analyzing cost structure and efficiency, as well as for forecasting and planning educational expenditures.

2.5 For the purpose of the present training modules, it is not proposed to cover the entire spectrum of the information system as discussed above, which would be clearly beyond the scope of this training program. Attention will mainly be focused on the following:

- The flow of information from schools to the provincial and central offices via the usual channel of school surveys conducted by the Balitbang; and
- The use of such information for planning and administrative purposes at the central as well as provincial level.

Once the participants have mastered the basic principles and techniques discussed in this training program, they should have relatively little difficulties to applying them to different information environments in their daily work.

3.0 Organization of the Modules

3.1 There will be four modules in this training program, which are as follows:

- Module I: Overview of basic concepts and computer applications in educational planning, management, and research;
- Module II: The development of the Education Management Information System;
- Module III: The use of the Education Management Information System for management control; and
- Module IV: The use of the Education Management Information System for planning.

4.0 The Structure of Instructional/Learning Process

4.1 Much of the emphasis placed in this training program is the use of microcomputers and software packages. Although data base and spreadsheet programs for data files creation and manipulation and modeling have already been designed for the participants, they inevitably have to understand and practice the techniques in the use of microcomputers and software packages. With the availability of many user-friendly software packages and utility programs, computer programming could be kept to a minimum. It is also the aim of this training module to show to the participants that understanding the basic principles and operating system of the various software packages would be sufficient to enable them make full use of the information available to them for planning, management and research. For those participants who have a keen interest in computer programming and in mastering the software package, this training module will prepare them for further improving their computer skills by practicing the techniques demonstrated in this program.

4.2 It is recognized that the design of a management information system should be largely user oriented. It should start by looking at the potential uses of information rather than for the collection of information per se. However, it would be deceptive to assume that all potential uses of information could be foreseen at the time a management information system is constructed. Furthermore, the requirements and practices in educational planning and management in Indonesia vary considerably from province to province. Thus, it is almost impracticable to include the specific requirements of each and every province in designing the training modules.

4.3 Naturally, participants to the training program would come from different divisions of the provincial education offices. Some of them may mainly be concerned with say planning and budgeting, while others in the supervision of schools or other management functions. Some may be involved only in data collection. Consequently, not all parts of the training program would be of equal interest to the participants.

4.4 Taking into account the above considerations, the approach adopted in the design of the training materials is as follows:

- APPLICABILITY is emphasized in the training program. Wherever possible, practical sessions on microcomputer applications are included in the modules so that the participants can have "hands-on" experience in the course. They will also be invited to try to include some of their daily planning, management and research tasks into the practical sessions, making use of some of the techniques and methods discussed in the training program;

- FLEXIBILITY will be introduced in the design of the training materials so that alternate designs and applications of the management information system will be tested during the practical sessions, making full use of the versatility and flexibility of a computerized data base and the computer software packages; and

- a MODULAR approach will be adopted in the course so that each module is as self-contained as possible.

4.5 The structure of the instructional and learning activities for each of the four modules will thus be arranged as follows:

- Overall Objectives of each of the modules will first be stated so that instructors are aware of the while purpose of the module as well as the knowledge which is expected to be imparted during the instructional and learning processes;

- Module Performance Objectives will also be stated to enable the instructors to assess the extent to which the behavior of learners would be changed upon completion of the module. More specific performance objectives will also be given for different instructional units within a module;

- The actual instructional and learning processes are divided into four phases as follows:

  Instructional activities where the instructors will present to the learners the teaching materials for the module and unit concerned. The teaching materials will cover the basic conceptual issues related to the topic in question, and fundamentals of computer applications that will be demonstrated, highlighting strengths and weaknesses of such applications;

  - User manual where the instructors will carry on with the presentation, but using microcomputers to demonstrate the various applications in planning, management, and research. The detailed step-by-step procedures required to be followed in developing and using the different computer applications will be described in this user manual section. Therefore, this section is designed for both the instructors and the learners;

- Learning activities where the interaction between the instructors and learners will take place. The learners will be asked to:

  - practice the techniques in developing and using the data bases or models demonstrated by the instructors;

  - then the participants will be divided into groups to discuss the concepts, approaches and methods used in the training materials. During the group discussion, they will be asked to suggest alternative approaches to the development and use of the management information system;

  - based on the alternative designs suggested, the learners will, under the guidance of the instructors, actually develop a new management information system and different models of computer applications;

- Post-assessment where the instructors will attempt to evaluate the extent to which the learners have been able to have a firm grasp of the contents of the training materials. A number of questions and assessments have been proposed in the unit, and individual learners will be asked to do the assignments themselves.

5.0 Choice of Computer Software Packages

5.1 With the rapid development in computer technology, it is difficult to choose software packages which are both the most up- to-date and are familiar to both instructors and learners. Therefore, the factors used in choosing a computer software are the power of the software, the ease of use and its popularity.

5.2 Two types of computing functions are required for these training modules:

- data base management; and
- spreadsheet applications.

A number of software packages have been very successful in integrating data base management with spreadsheet applications, and some statistical functions. However, these packages have limitations which dictate against using them in the training program. Nearly all of these packages are memory (or RAM) based, thus severely limiting the size of the data base that could be handled by the package. The availability of RAM banks or boards can increase the memory capacity of a 16-bit computer like an IBM PC/XT or its compatible to something like 8 mega-bytes. However, these are not yet very popularly used. Furthermore, most of these integrated softwares are not designed to handle relational data bases, a feature which is required in developing the management information system proposed in this training program. As a result, two separate software packages have been used in this training program, with each performing one of the two functions mentioned above.

5.3 A large number of data base and spreadsheet packages are available. The choice of one set of packages does not imply that the others available in the market are not suitable. The following packages are chosen for reasons given below:

DBASE III (version 1.1 or 2) has been chosen for data base management. There are other data base packages which are as powerful as DBASE III, like RBASE 5000 and KNOWLEDGE 2. DBASE III is chosen mainly because it is more user-friendly with its assistant facilities. Other equally if not more powerful softwares like REVELATION and INFORMIX could be adopted in the training program. But it appears DBASE III is more popularly used in IBM PCs or the compatibles. In any case, the adoption of DBASE III in this training program does not preclude the participants from adapting the methodology and approach used in the training program to other data base management software, including newcomers like PARADOX (version 1.1); and

- LOTUS 123 (version 2) has been chosen as the spreadsheet software package largely because of its popularity and its extremely user-friendly approach. Other softwares like VP- PLANNER which is claimed to have almost the same capabilities as Lotus 123, to other software like MULTIPLAN (version 2) which has the additional facility of liking different spreadsheets, could well be adopted, following the approach and methods used in the training program.

5.4 Summing up from the above, the structure of this training program could be visualized as follows:

Module	Contents	Software
I	Basic concepts and computer applications	
	Unit 1: Issues & problems in educational planning,management and research	
	Unit 2: Microcomputer applications	
	Unit 3: Data requirements identification and assessment	
		WORDSTAR
II	Development of the Education Management Information System	
	Unit 1: Data base construction	
	Unit 2: Information retrieval	
		DBASE III QUICKCODE III
III	The Use of the Education Management Information System for Management Control	
	Unit 1: Routine administration of schools and projects	
	Unit 2: Monitoring performance of education system	
		DBASE III QUICKREPORT
IV	The Use of the Education Management Information System for Planning	
	Unit 1: Diagnostic analysis of pupil flow	
	Unit 2: Forecasting enrollment in school	
	Unit 3: Forecasting teacher and other resource requirements	
		LOTUS 123

It may be noted above that the use of WORDSTAR (version 3.3 or 2000) will be demonstrated when Module 1 is presented to the participants so that they may after the training program be able to use wordprocessing software for report writing.

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Module III

The Use of the Education Management Information for Management Control

I. Introduction

1. Overall Module Objectives

1.1 This module is NOT a module on the principles of educational management. A number of good references on the practices and principles of educational management are available, which participants in this module could consult. NOR is it one aimed at advising educational planners and administrators what norms and criteria should be set in managing their educational systems and the educational institutions under their control. Nevertheless, this module is still a module on "HOW TO DO" techniques, but the techniques are related to:

(a) The use of information, and
(b) The techniques employed to analyze the information for the purposes of management control.

Based on the results of the analysis, individual administrators have to make up their mind as to what standards should be set and how schools should be managed and their performance regulated.

1.2 Thus, the purposes of this module is to present to the participants:

(a) The use of the education management information system set up in Module II to, at a micro-level, monitor the performance of individual schools and projects;

(b) And at a macro-level, to monitor the performance of the education sector for the country as a whole, or for a particular province, district or subdistrict;

1.3 In this module, the participants will be shown how to take advantage of the computerized information system and other software packages available to manipulate the data and perform a variety of computations for analytical purposes. In other words, the "HOW TO DO" techniques will be demonstrated with the use of microcomputers and software packages, which will help to:

(a) Overcome the problems associated with the need to study statistics on a large number of schools;

(b) Simplify the tasks of the educational administrators in undertaking an excessive amount of calculations on the number of teachers required for individual schools, which could be a cumbersome process because of the large size of the school population and the complicated methods of calculation;

(c) Speed up considerably the response time of both the educational planners and administrators in detecting any malfunctioning of the educational system due to the fact that education indicators and other analysis could be performed quickly.

1.4 Module Performance Objectives. On completion of this module, the participants should be able to:

(a) Make use of the data base software package DBASE III to produce useful information from the education management information system, required for the routine administration of schools in a given district and development projects;

(b) Make use of the data base software package DBASE III to compile educational indicators from the education management information system, for the purposes of managing the education system;

1.5 It is stressed that although the package DBASE III has been chosen for this module, this does not mean that other data base packages are not suitable. Once the fundamentals of the package have been mastered, the participants should have little difficulty in adapting the techniques and methods demonstrated in this module to other data base packages or programs.

2. The Organization of the Module

2.1 This module is organized into two units, as follows:

(a) Unit 1 on the use of the educational management information system for the routine administration of schools and projects. This involves the use of the data collected in the information system at the level of individual schools and development projects;

(b) Unit 2 on the use of the educational management information system for the management of the education system, for a country as a whole or for a given province, district, or subdistrict. This involves the identification and compilation of various indicators on the performance of the education system. As far as the techniques in the use of the data base package is concerned, this Unit is similar to Unit 1, except that data analysis is done at the level of province, district, or subdistrict.

2.2 It is stressed that an interactive approach could be adopted throughout this Module. This is especially important as the requirements for monitoring performance, the relevance of educational indicators constructed, and the diagnostic techniques used in analyzing student flow could change rapidly over time. Furthermore, standards, procedures, and regulations are likely to be different for different provinces and districts. Therefore, it is essential that the participants are able to adapt the systems developed in this Module to suit the specific requirements of their provinces or districts.

II. Unit 1

Routine Administration of Schools/Projects

3. Performance Objectives

3.1 On completion of this Unit, the participants should be able to:

(a) Identify data items in the Educational Management Information System which could be used to help them in the day-to-day administration of schools;

(b) Have a firm grasp of the techniques of retrieving such data items from the Information System and of analyzing the data items to provide useful management information;

(c) Understand the basic techniques in compiling information required for project management;

(d) Be able to use computer data base packages like DBASE III to perform these tasks.

4. Instructional Activities

4.1 Administration of Schools

4.1.1 The tasks of administering schools are so diverse that it is definitely beyond the scope of this Module to deal with. Moreover, the information required by the educational administrators for the effective management of schools is more than what could be provided from the usual statistical surveys of schools. Therefore, what is to be discussed in this Unit is by no means exhaustive. Nevertheless, it is

believed similar techniques could be employed in dealing with other sorts of management tasks not mentioned in this Unit.

4.1.2 At the risk of oversimplification, the tasks of administering schools performed by the central, provincial, or district educational administrators would fall broadly into two main groups:

(a) Supervisory activities which involve the routine day-to-day administration of schools to ensure that they are operated smoothly, according to a set of standards governing the number of teachers to be employed, the qualifications of teachers, the amount of subsidy paid to the schools and pupils, the facilities and equipment that should be available, the maximum or minimum size of the class. The aim is to ensure that schools are given at least the minimum resources in accordance with national or provincial standards in order to function properly.

(b) Advisory activities which involve the provision of professional guidance and advice, on a regular basis, on such matters as teaching methods, the curriculum to be adopted, and other teaching aids that could be employed. The objective is to help schools to provide the best possible education to the children, within the resources available to schools.

4.1.3 Supervisory Activities. The extent of supervisory power that the central, provincial, or district educational administrators have over schools determines the number and nature of supervisory tasks performed by the educational administrators. This in turn determines the type of data items required by them for an effective management of schools. For instance, in some countries, all school teachers are recruited centrally by the national, provincial or district education offices and allocated to schools according to a predetermined staffing standard. In the other extreme, in some countries, for some types of public-sector schools, the number of teachers and the recruitment of teachers are entirely in the hands of the school principals. In both cases, the jobs of the educational administrators would be very difficult, and the data items required would also be different, at least in the level of details required on the teaching staff of schools.

4.1.4 What are discussed in the following paragraphs represent only a very tentative idea of certain data items that could be used to help educational administrators in carrying out their supervisory duties. This is due to the limitations imposed by the statistics available to create the

data files for demonstration. However, it is hoped that this shortcoming could provide an opportunity for:

(a) the trainees to participate ACTIVELY in suggesting modifications and additions to the training materials; and

(b) the instructors to demonstrate how these additional requirements could be coped with in the computer system design.

4.1.5 There are functions which invariably would fall into the category of supervisory duties of the educational administrators. These are as follows:

(a) Whether schools are properly <u>staffed</u>?

It is necessary to ensure that schools have:

(1) The right number of teachers, by relating the number of classes or pupils in the school concerned to the number of teachers available. The usual data items required to monitor this are:

- the number of teachers available, and
- the number of teachers the school is entitled to according to the agreed teacher/class ratio or pupil/teacher ratio;

(2) Teachers of the right qualifications, by ensuring that either all or a specified proportion of teachers in the school concerned are qualified. The usual data items required to monitor this are:

- the distribution of teachers by qualifications, or to be more concise
- the proportion of qualified teachers

(3) Teachers of the right kind, by ensuring schools are staffed with teachers of the right subject-mix (which is more important at the secondary level) or of the right grade (in the case of primary education in Indonesia, it is suggested to classify teachers into Head, Class, Religion and Sport/Art teachers). For this, the data item is surely:

- the number of teachers by grade

(b) Whether schools are properly <u>equipped</u>?

This would entail the following questions to be asked:

(1) Whether schools have the required number of classrooms and special rooms (such as library, laboratories, etc.)?

(2) Whether schools have the required amount of open space and playground area for the children?

(3) Whether the conditions of classrooms, special rooms and the school building in general are satisfactory?

Since statistical information is not available on the above questions, it is therefore not proposed to go into detail concerning the data items required to monitor whether schools are properly equipped. The instructors should encourage the participants to bring their data sheets on the above subject matter to the training sessions, so that a data file on schools could be constructed during the training session to show how statistics could be compiled to provide the necessary management information to educational administrators in performing the above tasks.

(c) Whether schools are properly <u>financed</u>?

This involves comparing the amount of subsidy or financial resources available to the school concerned with the amount which the school is entitled to according to the national, provincial, or district standards. This amount would depend on the number of pupils, the number of operating classes, etc., that the school has. The data items required are:

(1) the amount of financial resources available to the school, as compared to,

(2) the amount of financial resources the school is entitled to, having regards to the number of classes and pupils in the school concerned.

No information is available on the financial resources available to the schools. Therefore, in the practical demonstration, only a rough method of calculating school entitlement will be shown.

(d) Whether schools are properly <u>enrolled</u>?

The rationale for this supervisory function reflects the concern of the educational administrators on the utilization of school resources. If schools are under-enrolled, it amounts to an underutilization of the

school building and the land, if not the teachers. It could be argued that a reduced enrollment would result in a reduction in the class size, and hence could lead to an improvement in the quality of education. Regardless of whether this argument has theoretical and empirical foundation, it is clearly not the wish of planners and administrators to see that qualitative improvements are brought about in this haphazard manner. The data items which could be used to monitor this are:

(1) the class size of the school;

(2) the ratio of Primary 1 applicants to the number of Primary 1 place available;

(3) the number and the proportion of classrooms which are vacant.

As no statistics are available on the number of vacant classrooms for designing the practical demonstrations for (3) above, this data item will be included in the practical session of this Unit.

4.1.6 Advisory Activities. What has been discussed above is related to the resource inputs and utilization of schools. The ultimate and primary concern of planners and administrators is obviously not on these factors, but rather on the quality of the teaching and learning processes in the classrooms. This quality issue in turn is related to the questions of:

(a) Whether activities in schools and classrooms are conducted in an effective manner conducive to learning;

(b) Whether the school environment promotes effective teaching and learning.

In some countries, the education ministry or the district level education officers assume a active role in advising schools on such matters as curriculum design, teaching methods, etc. In others, these are either left to the discretion of individual school heads or teachers, or largely influenced by the examination system, or other authorities responsible for selection to tertiary institutions. In either case, the central, provincial and district educational administrators would seldom want to relinquish their interest or influence, however marginal, over this qualitative aspect of school administration.

4.1.7 Most of the information required for this kind of advisory activity is qualitative in nature. For example, the educational administrators would need to have a list of

the textbooks used in the schools, the timetable adopted and possibly the examination, testing and class promotion standards enforced. In addition, some may require schools to inform them how they stream, set, or group students of different abilities and learning needs.

4.1.8 Quantitative information that is often collected is the examination scores. Occasionally, the educational administrators may conduct the so-called standardized tests in schools, in order to monitor the performance of pupils, as well as schools, on a number of selected subjects. This kind of quantitative information however is not available from the usual statistical surveys of schools. In any case, it is not available to the author in designing the practical exercises.

4.1.9 As a result, the author has to rely on some indirect statistical measures which could serve as a sort of indicator for the educational administrators in identifying schools that might require attention. For example, if a particular school has a less than average input of resources, the quality of teaching may suffer. If a school has a higher than normal rate of repetition, then one might suspect that something has gone wrong in the teaching-class process in that school. Thus, the following so-called qualitative measures are proposed to be used to help administrators in carrying out their advisory activities:

(a) the rate of repetition;

(b) the proportion of Primary 6 leavers passing the final examination

both of which are indicators of the performance of the students, and

(c) the average class size;

(d) the pupil/teacher ratio; and

(e) the proportion of unqualified teachers.

which are indirect indicators on the quality of education for the schools concerned.

4.2 Project Management

4.2.1 Project management encompasses a whole range of activities from the formulation of a project or a programme of projects, to the implementation and evaluation of the projects(s). Projects are, put in the simplest terms, the means to put into action an education policy. Thus, project

management in fact immediately follows the formulation of an education plan. As distinction between the various phases of the planning, budgeting and implementation process is often difficult to draw, it is not the purpose of this module to go into details about the various components which should constitute project management.

4.2.2 What the author would want to highlight is that for any education plan, there are bound to be different activities that have to be carried out in a coordinated manner. Yet these activities could be quite different in nature, and would most likely be implemented by different ministries, or different divisions within the education ministry, or by different regional or district education offices or other agencies. Take for example the policy to provide universal junior secondary education for the country at a certain date. In order to achieve this policy, it is necessary to:

(a) Build sufficient number of junior secondary schools to provide the required number of classrooms;

(b) Train sufficient number of teachers, or retrain some of the existing teachers to staff the new schools or additional classes in existing schools;

(c) Design the curriculum for children coming from a different "ability group" or background, and to provide for the required textbooks, ETV programmes, etc.;

(d) To draw up a system of allocating pupils to different schools or types of schools;

(e) To procure the necessary financial, physical, as well as human resources (other than teachers, e.g., administrators and researchers) for the implementation of the above.

Each of the above could be conceived as a programme of projects, and would be the responsibility of a large number of personnel in the education ministry, ministries responsible for finance and public works programmes, the local authorities, etc. In order to ensure the successful implementation of the policy on the provision of universal junior secondary education, all of the above programmes have to be carried out according to plan. Any slippage in the teacher training programme would severely affect the implementation of this policy.

4.2.3 Thus, one of the main concerns of educational planners and administrators is to ensure that all the programmes or projects are implemented according to plan. In

addition, there is also the concern of whether resources are utilized efficiently and effectively in the projects. All these amount to ensuring that the projects are effectively managed. Normally, this should be the responsibility of the so-called "project manager" of the projects. The management tasks involve:

(a) the monitoring of the timing of the project;

(b) the control over the financial spending;

(c) the supervision over the technical aspects of the projects.

Taking the example of the school building programme, the tasks of managing any one school project in the building programme include overseeing the land acquisition process which may involve the clearance or legal or illegal inhabitants of the land, the site formation work, the design of the school building if there is no standard plan, the progress of construction work, the drawing up of the list of furniture and equipment and the acquisition of these items, the setting up of the school management body, the appointment of school heads and teachers, and finally, the enrollment of pupils. Obviously, some of these tasks fall outside the jurisdiction if not as well beyond the competence of educational planners and administrators.

4.2.4 Therefore, for the purpose of this module, the whole range of activities involved in project management would not be discussed. These should be left to the "project manager" or the team of professionals and administrators from different disciplines, depending on the nature of the projects. What is important and relevant to the educational planners and administrators is:

(a) The monitoring of the progress of the projects;

(b) The initiation of any remedial actions or modifications to the original plan or design required to be taken to ensure the smooth implementation of the projects.

To do this requires the availability of information on the progress of the projects and on the problems encountered in the implementation of the projects.

4.2.5 The information required can be classified into two main types:

(a) Financial data which would be the amount budgeted for the project, the amount committed, and the amount actually spent. The data provide quickly a rough idea

about the progress of the project. Caution, however, is required in the use of such information. There may be considerable time lag in the claiming of bills by the contractors;

(b) Data on physical targets completed which are more difficult to define. For a simple project like a school building project, the data could be the number of classrooms completed, or the stages of building work done (say the school project could be broken down into several stages like land acquisition, site formation, construction of classroom block, construction of other parts of the school building, etc.). For a project on eradicating illiterates in rural areas, the results of progress would be much more difficult to assess. Thus, different kinds of projects would call for different types of data.

In addition, the above data would be viewed in a "time" dimension. A very convenient yardstick is the comparison of the planned target date with the expected date of completing the project.

4.2.6 Monitoring of School Projects. In view of the diversity in the nature of projects, it is proposed to use the monitoring of school projects as an example or illustration of some of the techniques used in the use of information for monitoring purposes. This involves:

(a) The design of a reporting procedure for the necessary information to be fed back to the educational administrators and planners. Two points need to be considered here:

(1) The data items required, which may include the following:

- the project reference which relates the school project to the budget reference number and the programme reference number;
- the project reference number which helps to identify the project in question;
- the project number;
- the location of the project;
- the target date of commencing work for the project;
- the target date of completion for the project;
- the number of classrooms available from the school project;
- the amount of money budgeted for the project;
- the name of officer/agency responsible for the project;

Most of the above items normally do not change and hence do not need to be regularly updated;

- the stage of progress of the project which may be divided into:
  - acquisition of land
  - preparation/approval of layout plan
  - cost estimate for the project
  - approval of necessary funds
  - appointment of building contractor
  - site formation & piling
  - construction of classroom block
  - construction of other parts of building
  - inspection of completed building
  - fitting out
  - furniture and equipment
  - setting up of school management body
  - appointment of school head and recruitment of teachers
  - enrollment of pupils

Some of the above stages may be undertaken concurrently;

- amount of money committed;
- amount of money spent;
- additional financial provision required for the completion of the project, if applicable;
- expected date of completion of the project;

All of the above information has to be updated at regular intervals.

(2) The flow of information from those responsible for the day-to-day management of the projects to the central, provincial, or district educational administrators has to be arranged. Usually, most of the information is made available when the project manager applies for the commitment and use of the budgeted funds. However, such kind of information may only be made available to those who control the public purse. Therefore, special arrangement may have to be made, usually in the form of questionnaire surveys, to collect updated information on the progress of the projects.

(b) The creation of the information system for storing, processing and retrieving the data collected. This can be done in the form of a project information data file, following the procedure adopted discussed in Module II:

(1) The design of the data collection form as per Figure XX below;

(2) The collection of data from the project managers by asking them to submit on a regular basis, updated returns on the progress of the projects under their control. In order to simplify the job of the project manager in completing the questionnaires, it is not necessary for the project manager to fill in data items which do not change very often. Such information items could automatically be printed on the questionnaire by extracting the necessary data items from the data base;

(3) The creation of the data base on the projects, based on information supplied by the project managers.

(c) The compilation of the relevant statistical information from the data base. Basically, the information required for the monitoring of the projects include:

(1) The amount of funds spent as compared with the amount of funds budgeted. This gives the amount of funds left for the projects. If the amount left is small compared with the stage of progress of the project, something has to be done to find out the reasons and to rectify the situation, if required;

(2) Related information is the additional financial provision estimated to be required for the completion of the project. This is an indication that urgent remedial action is required by all concerned;

(3) The expected date of completion of the project as compared with the target date of completion as a very convenient indicator of the progress of the project.

Once the data base is set up, other information stored in the data file could easily be made available. For example, if a school project is found to have been delayed, information on the stage of progress could provide indication as to where the slippage has occurred, so that the educational ad inistrators could approach the appropriate officers/agencies for remedial action.

4.2.7 Apart from helping the educational administrators in monitoring the progress of school projects, the data base could also be used for other planning activities, for example:

(a) school mapping exercises for determining the location of new schools;

(b) the planning of teacher training and deployment, as the number of new schools to be completed in a particular locality would affect the number of teachers required to be trained and deployed to that locality;

(c) the planning of pupil selection and allocation, as the number of new schools to be opened in any school year would partly determine the number of children that can be admitted in a particular district. If there is a centralized system of selecting and allocating pupils to schools, then this system has to take into account the changing distribution of school places arising from new schools completed.

Some of the uses of the school project data base will be demonstrated in Module IV on the Use of the Education Management Information System for Planning.

5. User Manual

5.1 Getting Started

5.1.1 The user manual is designed for:

(a) The instructors in demonstrating how to put into practice the various points discussed in the section on Instructor Activities, making use of the education management information system on pupils, teachers, and schools;

(b) The trainees in practicing the procedures suggested in retrieving, processing, and summarizing data from the education management information system for the routine administration of schools and projects.

While the programming steps and commands suggested would enable the participants to produce the kinds of management information required, it is suggested that the instructors and trainees should attempt to apply other techniques and to modify some of the procedures suggested in this User Manual in order to exploit to the full the potentials of the management information system.

5.1.2 The practical exercises suggested in this section are based on the data base software package DBASE III (version 1.1 or 2) and the utility program QUICKREPORT. These two packages can be run on any IBM PC or EX or its compatible, operating on PCDOS or MSDOS 2.0 or above, with at least 256 K bytes of RAM, 2 double sided floppy disk drives or 1 double sided disk drive and a hard disk.

5.1.3 It is recommended to boot up the microcomputer using the CONFIG.SYS file to reserve 20 file and 24 disk buffers (the default values are 8 and 2 respectively). The data bases on pupil stock, pupil flow, teachers, and schools are based on the ones constructed in Module II. They are stored in the Diskette "EPP Mod.v.3":

(a) Pupil stock file: PUPIL_RC.DBF
(b) Pupil flow file: FLOW_RC.DBF
(c) Teacher file: TEA_RC.DBF
(d) School master: SCHMAS.DBF

Their corresponding index files created in Module II have not been copied to this Diskette because it is planned to set up another set of index files for these four data bases. There are other files contained in this Diskette which are created when this User Manual Section is designed. All these files have been protected against accidental deletions and modifications by being converted into read only files. It is therefore necessary to make a backup copy of the Diskette (using the DOS command COPY *.*) and use the backup for the practical exercises.

5.1.4 In starting up the system, it is recommended to place the Diskette "EPP Mod.v.3" in Drive A, and start up the software (e.g., DBASE III) from Drive C or Drive B.

5.2 Administration of Schools

5.2.1 In this subsection, a number of programming steps are suggested for compiling the required management statistics. These steps make use of DBASE III commands at command level. These steps are more complicated than the ones shown in Module II, and the manipulation of multiple data bases will be demonstrated in this subsection. For ad hoc queries of the data base, these commands should be quite sufficient. However, working at dot prompt is not quite efficient if the data base is large and the processing and manipulation of the data are done repeatedly on the same data base. For example, the REPLACE command will cause the system to read through the data base once. If more than one REPLACE commands are executed together with other commands like SUM, the system has to read through the data base many times. To overcome this limitation requires the user to write his own programme.

It is not proposed, for the time being, to introduce programming in this Module. The purpose of the approach adopted here is to demonstrate how users can communicate with the microcomputer. For provincial planners and administrators who do not need to handle very large data bases, this approach should not be inappropriate.

5.2.2 Supervisory Activities. A number of functions have been identified as part of the supervisory duties of the central, provincial, or district educational administrators. The following will go through some of these for which data are available to permit the design of the practical exercises, showing how the management statistics could be compiled from the information system on pupils, teachers, and schools:

(a) Staffing of Schools. One of the jobs of the educational administrators is to identify schools which have problems in staffing, in respect of:

(1) Whether the number of teachers available is adequate based on the approved staffing standards;

(2) Whether the teachers are qualified or not;

(3) Whether the mix of the teachers is right or not (as no information is available on the number of teachers by subject, only the grade of teachers is examined).

(b) The following gives the step-by-step procedures in retrieving the required management information for the question (a)(1) above:

(1) As the information required includes that on the number of classes and pupils in the schools which are stored in the PUPIL_RC data base, and that on the number of teachers in the schools which is stored in the TEA_RC data base, it is necessary to retrieve information simultaneously from the two data bases. Accessing two data files calls for the need to "link" the two files together, using an index field common to the two files. This index field is the SCH_CODE which can uniquely identify the school and is included in both the PUPIL_RC and TEA_RC data bases.

(2) One of the approaches that can be adopted is to use the command SET RELATION TO. The procedure which can be followed is shown below. It should be noted that all DBASE III commands are written in UPPER case beginning with an asterisk (*).

After starting up DBASE III, at dot prompt:

- *SET DEFAULT TO A to tell the system to look for the files in Drive A;

- *SELECT 1 to assign a working area 1 for one data base. DBASE III system allows 10 work areas for data bases;

- *USE PUPIL_RC to open the data base PUPIL_RC in work area 1;

- As not all the fields in PUPIL_RC will be required in this exercise, and to avoid changing the data base which may be used for other purposes, it is recommended to create a copy of PUPIL_RC with only the required fields. This is done by:

  *COPY TO PUPIL2 FIELDS SKA,SKE,SE,C1,C2,C3,C4, C5,C6,EA6,ET,SCH_CODE.

  The field EA6 which stands for the enrollment aged 6 or below, is only copied. This field will be used to store the total number of classes, as it is not convenient to refer to (c1+c2+c3+c4+c5+c6) in subsequent data manipulation;

- *USE PUPIL2 ALIAS PU2
  *DISPLAY STRUCTURE, and the following should show up on the screen:

Figure I: Structure for Data Base PUPIL2

Structure for data base: A:pupil2.dbf
Number of data records: 65
Date of last update: 08/17/86

Field	Field Name	Type	Width	Dec
1	SKA	Character	2	
2	SKE	Character	2	
3	SE	Character	3	
4	C1	Numeric	2	
5	C2	Numeric	2	
6	C3	Numeric	2	
7	C4	Numeric	2	
8	C5	Numeric	2	
9	C6	Numeric	2	
10	EA6	Numeric	4	
11	ET	Numeric	4	
12	SCH_CODE	Character	12	
Total			40	

- To compute the total number of classes and store the value in EA6,
  *REPLACE ALL EA6 WITH C1+C2+C3+C4+C5+C6;

- To open the teacher file TEA_RC and assign it to work area 2,
  *SELECT 2
  *USE TEA_RC;

- *COPY TO TEA2 FIELDS SKA,SKE,SE,TT,SCH_CODE, NHT,NCT,NRT,NST,GTT so that a duplicate of TEA_RC is also created with only the fields required;

- *SELECT 2
  *USE TEA2 ALIAS TE2
  *DISPLAY STRUCTURE, and the following should appear on the screen:

Figure II: Structure of Data Base TEA2

Structure for data base: A:tea2.dbf
Number of data records: 67
Date of last update: 08/17/86

Field	Field Name	Type	Width	Dec
1	SKA	Character	2	
2	SKE	Character	2	
3	SE	Character	3	
4	TT	Numeric	3	
5	SCH_CODE	Character	12	
6	NHT	Numeric	2	
7	NCT	Numeric	2	
8	NRT	Numeric	2	
9	NST	Numeric	2	
10	GTT	Numeric	3	
Total			34	

- In order to "link" the two data bases, it is necessary to index the first on the common index field. Indexing the second is always recommended for file management of this sort:

  *SELECT 1
  *INDEX ON SCH_CODE TO PU2
  *SELECT 2
  *INDEX ON SCH_CODE TO TE2

- The two data bases can be linked by SET RELATION command. After the relation has been

set, one can display, print, transfer data items in the two data bases linked. SET RELATION is most useful when each record in one data base matches one and only one record in another data base.

```
*SET RELATION TO SCH_CODE INTO PU2
*REPLACE ALL GTT WITH PU2->ET/35
```

The above commands calculate the teacher requirements for each school, which will be stored in the field GTT in the TE2 data base, using a hypothetical pupil/teacher ratio of 35. Based on this ratio, the number of teachers required is equal to total enrollment divided by 35 (or ET in the data base PUPIL2 divided by 35).

Once the number of teachers required is calculated and is sorted in the field GTT in the TEA2 data base, also named TE2 in the USE command, schools which are understaffed can be identified by comparing the number required (GTT) with the number available (field TT in the TEA2 data base):

*DISPLAY SCH_CODE,TT,GTT FOR TT<GTT will give the following results:

Record#	sch_code	tt	gtt
18	101230502002	3	4
24	101230502008	4	5
28	101230502012	7	10
32	101230502016	5	10
35	101230504002	6	7
63	102230501039	7	8

Alternatively, the teacher requirement can be calculated using the teacher/class ratio of say 1:2. Similar procedures may be adopted to find out schools which are understaffed:

```
*REPLACE ALL GTT WITH PU2->EA6*1:2
*DISPLAY SCH_CODE,TT,GTT FOR TT<GTT
```

and the following should show up on the screen or if desired on the printer by directing the output to the line printer:

Record#	sch_code	tt	gtt
48	101230501004	9	10
52	101230501008	11	12
17	101230502001	6	7
18	101230502002	3	7
19	101230502003	5	6
20	101230502004	6	24
23	101230502007	5	7
24	101230502008	4	7
25	101230502009	3	6
26	101230502010	5	7
27	101230502011	6	8
30	101230502014	6	8
32	101230502016	5	10
35	101230504002	6	8
37	101230504004	6	7
38	101230504005	5	7
42	101230504009	6	7
43	101230504010	6	7
44	101230504011	1	5
57	102230501033	10	12
62	102230501038	10	11
63	102230501039	7	8
64	102230501040	6	7
66	102230501042	9	10

More complicated calculations may be introduced into the excercise. For instance, if the staffing standards adopted for Indonesian primary schools are used, then the REPLACE command may be used several times. It is understood that the staffing standards are as follows:

Figure III: Staffing Standards in Primaries

No. of Pupils	No. of Classes	No. of Teachers				
		Head	Class	Rel.	Sports	Total
>360	>10	1	>10	1	1	>13
101-360	6-9	1	6-9	1	1	9-12
91-100	6	1	5	1/2	1/2	7
61-90	6	1	3	1/2	1/2	5

Then the procedure that may be followed is given below:

```
*REPLACE ALL GTT WITH PU2->EA6+3 FOR
 PU2->ET>180
```

```
*REPLACE ALL GTT WITH 7 FOR
 PU2->ET>90 .AND. PU2->ET<181
*REPLACE ALL GTT WITH 5 FOR
 PU2->ET>60 .AND. PU2->ET<91
*REPLACE ALL GTT WITH 4 FOR PU2->ET<61
```

and this will give the teacher requirement for schools of different enrollment size, and to identify schools which are understaffed *DISPLAY SCH_CODE,TT,GTT FOR TT<GTT will give the following results:

Record#	sch_code	tt	gtt
47	101230501003	10	11
48	101230501004	9	11
50	101230501006	7	9
51	101230501007	7	9
52	101230501008	11	13
55	101230501011	6	7
17	101230502001	6	7
18	101230502002	3	7
19	101230502003	5	7
20	101230502004	6	7
24	101230502008	4	7
25	101230502009	3	7
27	101230502011	6	10
28	101230502012	7	9
29	101230502013	6	7
30	101230502014	6	7
32	101230502016	5	11
4	101230503005	7	9
5	101230503006	7	9
34	101230504001	7	8
35	101230504002	6	10
37	101230504004	6	9
38	101230504005	5	7
42	101230504009	6	7
43	101230504010	6	7
44	101230504011	1	4
57	102230501033	10	13
58	102230501034	10	11
61	102230501037	9	10
62	102230501038	10	12
63	102230501039	7	10
64	102230501040	6	7
65	102230501041	8	10
66	102230501042	9	11

(c) For the question (a)(2) above, one method is to examine the distribution of teachers by different qualifications. Since there are some 8 different

categories of qualifications in the TEA_RC data base, a shortcut is to look at the proportion of unqualified teachers. With the proportion calculated for each record in the TEA_RC data base, schools with an unacceptable percentage of unqualified teachers can easily be identified from the data base. The approach which may be adopted is as follows:

(1) Since all the data items required are already stored in the TEA_RC data base, no linking of data files is required;

(2) The procedure that may be adopted is as follows:

- *USE TEA_RC
  *REPLACE ALL NQT WITH NQT/NPT*100 FOR NPT>0

  to compute the percentage of unqualified teachers and stored in the field NQT (which is originally equal to NP1+NP3+NP5 in the TEA_RC data base);

- To shortlist schools with a nonzero percentage of unqualified teachers:

  *DISPLAY SCH_CODE,NP1,NP3,NP5,NQT FOR NQT>0

  and the following should appear on the screen:

Record#	sch_code	np1	np3	np5	npt	nqt
65	102230501041	0	0	7	8	88

(d) As regards (a)(3) above, it is proposed to look at just the grade of teachers in each school to see if there is a mismatch between what are available and what should be available according to the standards. The following procedure may be adopted to retrieve the management statistics required to monitor this:

(1) Since the data items required for this (which include the number of classes and enrollment, and the number of teachers abailable by grade) are stored in two different data bases (PUPIL_RC and TEA_RC), it is necessary to link the two data bases together:

```
*SELECT 1
*USE PUPIL_RC ALIAS PUPIL
*INDEX ON SCH_CODE TO PUPIL_RC
*SELECT 2
*USE TEA_RC
*INDEX ON SCH_CODE TO TEA_RC
```

```
*SET RELATION TO SCH_CODE INTO PUPIL
```

(2) To identify schools with enrollment exceeding 180 and which are not staffed with a religion teacher, one may issue the following commands:

```
*DISPLAY SCH_CODE,TT,NRT FOR NRT=0 .AND.
 PUPIL->ET>180
```

and the following should show up on the screen:

Record#	sch_code	tt	nrt
32	101230502016	5	0

(3) To find out which schools with an enrollment of 181 pupils or more, which are not staffed with sufficient numbers of religion and sports teachers, the following commands may be used:

```
*DISPLAY SCH_CODE,TT,NRT,NST FOR
 NRT+NST<2 .AND. PUPIL->ET>180
```

and the following would appear on the screen:

Record#	sch_code	tt	nrt	nst
3	101230503004	10	1	0
4	101230503005	7	1	0
5	101230503006	7	1	0
8	102230503009	9	1	0
27	101230502011	6	1	0
28	101230502012	7	1	0
32	101230502016	5	0	1
47	101230501003	10	1	0
48	101230501004	9	1	0
50	101230501006	7	1	0
52	101230501008	11	1	0
54	101230501010	10	1	0
56	102230501032	9	1	0
61	102230501037	9	1	0
63	102230501039	7	1	0
66	102230501042	9	1	0

(4) In order to find out which schools have less than the required number of class teachers, it would be required to relate staffing standards shown in Figure III above to the total number of classes and enrollment. The two variables are conveniently stored in the PUPIL2 data base. Hence, the TEA_RC and PUPIL2 data files have to be linked:

```
*SELECT 1
*USE PUPIL2 ALIAS PU2
*INDEX ON SCH_CODE TO PU2
*SELECT 2
*SET RELATION TO SCH_CODE INTO PU2
```

(5) To display schools with an enrollment of 181 pupils or more, which are staffed with insufficient numbers of class teachers, the following procedure may be adopted:

```
*DISPLAY SCH_CODE,TT,NCT,PU2->EA6 FOR
 NCT<PU2->EA6 .AND. PU2->ET>180
```

and the following records would appear on the screen:

Record#	sch_code	tt	nct	pu2->ea6
4	101230503005	7	5	6
5	101230503006	7	5	6
27	101230502011	6	4	7
28	101230502012	7	5	6
31	101230502015	10	5	7
32	101230502016	5	3	8
34	101230504001	7	3	5
35	101230504002	6	3	7
37	101230504004	6	3	6
48	101230501004	9	7	8
50	101230501006	7	5	6
51	101230501007	7	4	6
52	101230501008	11	9	10
57	102230501033	10	7	10
58	102230501034	10	7	8
62	102230501038	10	7	9
63	102230501039	7	5	7
65	102230501041	8	5	7
66	102230501042	9	7	8

(6) To find out whether the above schools are also understaffed as far as the total number of teachers is concerned, a further condition needs to be set to select only those schools which are understaffed. Apart from the FOR option, another method is to use the SET FILTER TO option. With this option, the records in the data base are filtered so that only those which meet the specified conditions will be available for display. This option can be turned off by issuing the command SET FILTER TO but without any conditions following the command.

```
*SET FILTER TO PU2->ET>180
*DISPLAY SCH_CODE,TT,NCT,PU2->EA6,PU2->ET FOR
 NCT<PU2->EA6 .AND. TT<PU2->EA6+3
```

and the following will show up on the screen:

Record#	sch_code	tt	nct	pu2->ea6	pu2->et
4	101230503005	7	5	6	235
5	101230503006	7	3	6	188
27	101230502011	6	4	7	182
28	101230502012	7	5	6	346
32	101230502016	5	3	8	352
34	101230504001	7	3	5	208
35	101230504002	6	3	7	229
37	101230504004	6	3	6	200
48	101230501004	9	7	8	249
50	101230501006	7	5	6	182
51	101230501007	7	4	6	220
52	101230501008	11	9	10	327
57	102230501033	10	7	10	269
58	102230501034	10	7	8	287
62	102230501038	10	7	9	235
63	102230501039	7	5	7	275
65	102230501041	8	5	7	229
66	102230501042	9	7	8	267

(e) The Finance of Schools. As no information is available on the amount of financial resources available to the schools for designing the practical exercise, this subsection only demonstrates a method of calculating the amount of subsidy that should be made available to schools of different size, based on the approved standards. The subsidy standards which are adopted in the practical exercises are as follows:

Figure IV: Annual Recurrent Subsidy for Primaries

Nature of Subsidy	Basis of Calculation	Amount (Rp)
(1) Operation Costs	per pupil	300
	per class	10000
(2) Administration	per class	8000
(3) Maintenance	per school	25000
(4) Employee Welfare	per headmaster (public school)	30000
	per teacher	30000
(5) School Garden	per school (public school)	24000
(6) Sports & Arts	per school (public school)	10000

(7)	Supervision/ Progress Reports	per school (public school)	5000
(8)	Data Collection	per school	5000

In the practical exercises, information in the data bases will be manipulated according to the above standards. It should be noted that following more or less the same procedures demonstrated in this subsection, different standards of calculating recurrent subsidy to schools can be used. It is suggested that the instructors should try to obtain information on any other methods of calculating recurrent subsidy, and then demonstrate how to arrive at a new set of figures based on these other methods.

(f) It may be noted from Figure IV above, information has to be retrieved from both the teacher (TEA_RC) and the pupil (PUPIL_RC) data bases. This means that the two data bases have to be linked. In addition, it may have already been discovered in the previous subsection on the staffing of schools, that the information displayed on the screen is not quite adequate in that the names of the schools are not displayed. To display school names would link to a third data base, namely the school master file (SCHMAS). The SET RELATION command does not permit the setting of more than one relationship at a time. There could be a number of ways of overcoming this restriction, for example:

(1) To design a program with a number of subroutines each to accommodate a SET RELATION command;

(2) Or to use the JOIN command to join two data files together to form a new data file. This is one of the most powerful DBASE III commands for handling multiple data bases. The JOIN command may also be used to join two data bases to form a new one for reporting purposes, as the DBASE III report generator does not support the use of more than one data base. Using the JOIN command could be quite time-consuming, as the DBASE III system will search the two data bases sequentially, comparing one record in the first data base with all records in the second data base and merging those which satisfy the selection conditions with the record in the first data base. Hence, if large data bases are involved, the JOIN command should only be used when necessary.

(g) Method (f)(2) will be adopted in this subsection and the

following gives the procedure that could be used.

(1) *USE PUPIL2 to open the pupil2 file created in the previous subsection. As not all the data fields are required in this exercise, and as it is planned to include information on the amount of recurrent subsidy required, the structure of the data file is modified using the MODIFY STRUCTURE command. The new data structure for PUPIL2 is as follows:

Figure V: Revised Structure for PUPIL2

Structure for data base: A:pupil2:dbf
Number of data records: 65
Date of last update: 08/18/86

Field	Field Name	Type	Width	Dec
1	SKA	Character	2	
2	SKE	Character	2	
3	SE	Character	3	
4	EA6	Numeric	4	
5	ET	Numeric	4	
6	SCH_CODE	Character	12	
7	SUB_PU	Numeric	10	
8	SUB_CL	Numeric	10	
9	SUB_SCH	Numeric	10	
10	SUB_TEA	Numeric	10	
11	TSUB	Numeric	10	
** Total **			78	

The new fields are in respect of:

- the subsidy for pupil (SUB_PU);
- the subsidy for class (SUB_CL);
- the subsidy for school (SUB_SCH);
- the subsidy for teachers (SUB_TEA);
- the total subsidy (TSUB).

(2) To create a new data base with the school name, one can join the SCHMAS with PUPIL2:

```
*SELECT 2
*USE SCHMAS
*JOIN WITH PUPIL2 TO SCH1 FOR
 PUPIL2->SCH_CODE = SCH_CODE
*USE SCH1
*DISPLAY STRUCTURE
```

and the following should appear on the screen:

Figure VI: Structure for SCH1

Structure for data base: A:sch1:dbf
Number of data records: 45
Date of last update: 08/18/86

Field	Field Name	Type	Width	Dec
1	ST	Character	2	
2	SS	Character	1	
3	SP	Character	2	
4	SKA	Character	2	
5	SKE	Character	2	
6	SE	Character	3	
7	SCH_CODE	Character	12	
8	NAME	Character	30	
9	ADDRESS	Character	100	
10	EA6	Numeric	4	
11	ET	Numeric	4	
12	SUB_PU	Numeric	10	
13	SUB_CL	Numeric	10	
14	SUB_SCH	Numeric	10	
15	SUB_TEA	Numeric	10	
16	TSUB	Numeric	10	
** Total **			213	

It may be noted that not all records in the two data bases are matched. Apparently, there are some errors in the codes which are probably due to manual errors during the data input stage when the pupil (PUPIL_RC) and school master (SCHMAS) files are created.

(3) To calculate the amount of recurrent subsidy based on the number of teachers, it is necessary to link SCH1 with the TEA_RC data base.

```
*SELECT 2
*USE TEA_RC INDEX TEA_RC
*SELECT 1
*SET RELATION TO SCH_CODE INTO TEA_RC
*REPLACE ALL SUB_TEA WITH TEA_RC->TT*30000
```

(4) To calculate other subsidies based on the number of classes and pupils, the following procedure may be adopted:

```
*REPLACE ALL SUB_SCH WITH
 25000+30000+24000+10000+5000+5000 FOR SS="1"
*REPLACE ALL SUB_SCH WITH 5000+5000 FOR SS="2"
*REPLACE ALL SUB_CL WITH EA6*(10000+8000)
*REPLACE ALL SUB_PU WITH ET*300
```

And to calculate the total amount of recurrent subsidy:

```
*REPLACE ALL TSUB WITH
 SUB_PU+SUB_CL+SUB_SCH+SUB_TEA
```

(5) It will soon be discovered that the average cost per pupil which is a very useful indicator has not been included in the data base. This additional requirement can be met by changing the structure of SCH1 by the MODIFY STRUCTURE command. The revised structure is shown below:

Figure VII: Revised Structure for SCH1

Structure for data base: A:sch1:dbf
Number of data records: 45
Date of last update: 08/18/86

Field	Field Name	Type	Width	Dec
1	ST	Character	2	
2	SS	Character	1	
3	SP	Character	2	
4	SKA	Character	2	
5	SKE	Character	2	
6	SE	Character	3	
7	SCH_CODE	Character	12	
8	NAME	Character	30	
9	ADDRESS	Character	100	
10	EA6	Numeric	4	
11	ET	Numeric	4	
12	SUB_PU	Numeric	10	
13	SUB_CL	Numeric	10	
14	SUB_SCH	Numeric	10	
15	SUB_TEA	Numeric	10	
16	TSUB	Numeric	10	
17	UCOST	Numeric	5	
** Total **			218	

And the average cost per pupil can be computed by:

```
*REPLACE ALL UCOST WITH TSUB/ET.
```

(6) One way of monitoring the financial resources available to schools is to identify schools which have below-average level of finances. The procedure that may be adopted is:

*AVERAGE UCOST and the screen will show the results as follows:

```
   45 records averaged
ucost
 3186
```

To display those schools whose average subsidy per pupil is less than the average of 3186 Rp, the following command may be issued:

```
*DISPLAY SCH_CODE,NAME,UCOST FOR UCOST<3186
```

and the information displayed on the screen should look something like this:

Record#	sch_code	name	ucost
2	101230502002	PEKAT	2348
3	101230502003	KWANGKO	2990
5	101230502005	SORIUTU	2812
6	101230502006	NO2 KEMPO	2288
8	101230502008	DOROPETI	2344
9	101230502009	NAPA	2791
10	101230502009	NAPA	2484
12	101230502011	KONTE	2525
13	101230502012	KESI	1505
14	101230502013	PUPAU BAJO	2609
15	101230502014	TANJU	3132
16	101230502015	TA'A	2443
17	101230502016	KADINDI	1416
19	101230503001	SDN NO.1 RANGGE	2414
20	101230503002	SDN DAHA	2474
21	101230503004	SDN SAWE	2785
22	101230503005	SDN JAMBU	2074
23	101230503006	SDN FANDA	2518
26	102230503009	SDN IMPRES SOKE	2183
27	102230503010	SDN IMPRES KUTA	2551
30	102230503013	SDN INPRES DESA HU'U	2346
31	102230503014	SDN INPRES JALA	2594
35	101230504001	SDN KILO	2218
36	101230504002	SDN LABI	2069
38	101230504004	SDN KIWU	2235
39	101230504005	SDN TAROPO	2545
41	101230504006	SD INPRES MALAJU	2995
43	101230504009	SD INPRES DESA MALAJU	2617
44	101230504010	SD INPRES PALI	2863

Alternatively, one may wish to find out schools which are poorly financed. For example:

```
*DISPLAY SCH_CODE,NAME,UCOST FOR UCOST<2500
```

and the following schools will be listed:

Record#	sch_code	name	ucost
2	101230502002	PEKAT	2348
6	101230502006	NO2 KEMPO	2288
8	101230502008	DOROPETI	2344
10	101230502009	NAPA	2484
13	101230502012	KESI	1505
16	101230502015	TA'A	2443
17	101230502016	KADINDI	1416
19	101230503001	SDN NO.1 RANGGE	2414
20	101230503002	SDN DAHA	2474
22	101230503005	SDN JAMBU	2074
26	102230503009	SDN IMPRES SOKE	2183
30	102230503013	SDN INPRES DESA HU'U	2346
35	101230504001	SDN KILO	2218
36	101230504002	SDN LABI	2069
38	101230504004	SDN KIWU	2235

(h) The Enrollment of Schools. It may be felt by some participants that the procedures outlined in the last two subsections are rather cumbersome, especially when two or more data bases have to be accessed at the same time. In this subsection, the utility program QUICKREPORT will be introduced. This program, like QUICKCODE III, is quite easy to use. The main features of this program are:

(1) It allows access to as many as 5 linked files at one time;

(2) It can easily cater for the use and display of computed fields;

(3) It permits subtotals and totals to be calculated and presented in report format for as many as 16 fields.

In short, QUICKREPORT represents an improvement over DBASE III automatic report generator. The purpose of introducing this software program here is more than serving the purposes of monitoring enrollment in schools. Participants who become familiar with this software can use it for a variety of reporting functions.

The software is not without limitation. At least for the purposes of this subsection, it is not flexible enough in selecting records to display. Data fields not included in the master data base cannot be used to extract records. This limitation excludes completely the use of computed fields, like that on the average class size in the school, for identifying schools which are to be shortlisted.

(i) What is presented below is an illustration of one application of QUICKREPORT. The exercise is to produce summary statistics based on information available in three data bases:

(1) SCHMAS - for providing information on the names of the schools;

(2) FLOW_RC - for providing information on the number of Primary 1 pupils admitted and the number planned to admit. This gives the percentage of P.1 places filled which can be used as an early indicator of the future utilization rate of the school concerned;

(3) PUPIL_RC - which will be used as the master data base in QUICKREPORT. The data base provides the basic information on the number of operating classes by grade, total enrollment, the school code, district, and subdistrict codes, and the code for type of school. The average class size can be computed from the total number of operating classes (a field yet to be created) and the total enrollment.

Using QUICKREPORT, a report file named ENR1.QR has been generated and stored in Diskette "EPP Mod.v.4." By running QUICKREPORT from either Drive C or Drive B, and placing the Diskette in Drive A, the report file can be executed to produce reports on the printer, the screen or to a disk file.

(j) The following attempt to depict the main procedural steps involved in creating the report file ENR1.QR.

(1) There are basically four steps involved in creating a report:

- selecting the master data file and its linked files;

- selecting the data fields to appear on the report from the files selected, including the creation of computed fields;

- the design of the report format using the "blackboard" provided by QUICKREPORT;

- the drawing up of the extraction criterion for selecting records to be extracted for display.

(2) Selection of the master data file and its linkup is extremely easy, as all one needs to do is to follow the instructions on the menu:

- after starting up QUICKREPORT, choose the report menu and choose create;

- then choose the data base menu to select the data base PUPIL_RC, and then the linked files FLOW_RC and SCHMAS. The selection can be performed by the so-called "list" technique which makes use of three function keys:

  [F5] to enter the selection box
  [RETURN] to make the selection
  [ESC] to finish the process;

- the linkage between the three files is established through the control menu. Two instructions have to be given:
  the name of the index file
  the look-up field which links the files.
  It is therefore necessary to index the link file using the DBASE III commands, which have already been done in previous subsections;

- the control menu should look something like the following:

Figure VIII: QUICKREPORT Control Menu

```
REPORT DATA BASE FIELD   CONTROL PRINT OPTION LAYOUT EDIT SETUP
                         ==================================
                         |   MASTER FILE   PUPIL_RC.DBF   |
                         ==================================
                         |LINK FILE     INDEX FILE  LOOKUP FIELD |
                         |SCHMAS.DBF    SCHMAS.NDX      SCH_CODE |
                         |FLOW_RC.DBF   FLOW_RC.NDX     SCH_CODE |
                         |                                       |
=========================================================================
     MENU SELECTION|     SCH_CODE from PUPIL_RC.DBF  |
=========================================================================
|@DATE     @PAGENUM      @TIME   C1     C2       C3      C4          |
| C5       C6     CT     ET           SCH_CODE  SKA     SKE         |
| SS                                                                 |
=========================================================================
Enter the fields used to connect Link files to the Master file
```

(3) The selection of fields in the three files for display follows similar techniques in selecting fields to become the look-up fields. The selection is performed under the data base menu. The following data fields have been selected:

From PUPIL_RC -	SKE	C4
	SKA	C5
	SS	C6
	C1	ET
	C2	SCH_CODE
	C3	
From SCHMAS -	NAME	
From FLOW_RC -	E1A	E1P

(4) Three computed fields are required to be created:

- One is to give the total number of operating classes which is equal to the sum of the values in fields C1,C2,C3,C4,C5 and C6. This field is named, for example, CT;

- One is to give the average class size which can be computed by dividing the total enrollment ET by the total number of operating classes CT. Let's call this field CSIZE;

- One is the percentage of Primary 1 places available which are taken up by Primary 1 pupils admitted. This can be computed by dividing E1A by E1P. Let's name this field as RATIO1.

The three computed fields may be created in the field menu. All one has to do is to name the computed fields and write the formula by simply typing operators (arithmetic and logical) and using the "list" techniques as demonstrated earlier on. The field menu should look like what is shown below:

Figure IX: QUICKREPORT Field Menu

```
REPORT  DATA BASE   FIELD   CONTROL   PRINT OPTION   LAYOUT  EDIT  SETUP
=================================================================================
                        | NAME    CT                    |
                        | DATA TYPE                     |
                        | LENGTH                        |
                        |-------------------------------|
                        | TOTAL            MINIMUM      |
                        | COUNT            MAXIMUM      |
                        | AVERAGE          -more-       |
                        |-------------------------------|
                        | FORMULA                       |
                        |===============================|

C1+C2+C3+C4+C5+C6
=================================================================================
     MENU SELECTION    |            C6 from PUPIL_RC.DBF    |
=================================================================================
|@DATE     @PAGENUM     @TIME     C1     C2     C3     C4                      |
| C5     C6     ET     SCH_CODE         SKA    SKE    SS                      |
=================================================================================
Enter formula.  Use F5 to insert a field at the cursor.
```

It may be noted that the computed field CT is shown on the field menu and the formula "C1+C2+C3+C4+C5+C6" is given just above the menu selection.

(5) The design of the report format follows similar procedure as that used in DBASE III report generator. The key [F2] will shift the screen from the menu to the blackboard, and vice versa. There are five areas in the report format, each of which serves a different purpose:

- Report Header. This will be printed at the start of the report before any data bases are open. One cannot put any data base fields into this area.

- Page Header. This area is printed at the top of every page. It is most useful for the printing of titles, page numbers, field titles, etc.;

- Report Body. This is reserved for printing information for each record, and thus is the main part of a report. Fields, titles and other characters can be entered into this part;

- Page Footer. This is printed at the end of every page. It can be used to print page totals, page numbers or any other summary information;

- Report Footer. This is printed at the end of the report, after all the data bases are closed. It can be used to print the totals for the entire report, and any other information that one would like to appear at the end of the report.

The size of the five areas may be expanded or reduced by pressing respectively the "+" and "-" keys at the right of the numeric pad on the keyboard.

The following show the report design for the report file ENR1:

Figure X: Report Format Design for ENR1

Special Report on the Enrollment Position in Schools

School Code	Name of School	Average Class Size	% of P.1 Places taken up
SCH_CODE	NAME	CSIZE	RATIO1

DRAW REPORT		PAGE	FOOTER			
@DATE	@PAGENUM	@TIME	C1	C2	C3	C4
C5	C6	CSIZE	CT	E1A	E1P	ET
NAME	RATIO1	SCH_CODE	SKA	SKE		SS

(6) The setting of the extraction criteria can easily be done in the control menu. The criteria are set up by assigning selection conditions to the values of the fields in the master data file so that any records satisfying these conditions would be extracted for display or printing. In this exercise, the selection criterion chosen is for schools located in the subdistrict "01." This condition may be changed every time the report is

displayed, so that in effect, one can select schools from a number of districts, one at a time. The following give the control menu for setting extraction criteria:

Figure XI: Control Menu for Setting Extraction Criteria

```
REPORT  DATA BASE   FIELD   CONTROL  PRINT OPTION  LAYOUT   EDIT  SETUP
=================================================================================
                          | MASTER FILE   PUPIL_RC.DBF      |
                          |---------------------------------|
                          | SORT ORDER                      |
                          | BREAK GROUPS                    |
                          | LINK FILES                      |
                          | EXTRACT CRITERIA                |
                          |---------------------------------|
                          | MISSING LINK  SKIP  RECORD      |
                          | RESET PAGE NUMBERS     N        |
                          ===================================

  SKE="01"
=================================================================================
          MENU SELECTION  |              RATIO1 from COMPUTATION
=================================================================================

 @DATE       @PAGENUM     @TIME   C1     C2     C3     C4
   C5        C6           CSIZE   CT     E1A    E1P    ET
  NAME       RATIO1      SCH_CODE        SKA    SKE    SS
=================================================================================
  Enter formula.  Use F5 to insert a field at the cursor.
```

(7) The report design has to be saved before it can be run to print the report on the screen, the printer or to an external disk file. The following report should be produced if extraction condition is set to SKE="04";

Figure XII: Sample Report from ENR1 File

Special Report on the Enrollment Situation in Schools

School Code	Name of School	Average Class Size	% of P.1 Places taken up
101230502001	SDN NOI KEMPO	21	40
101230502002	PEKAT	24	75
101230502003	KWANGKO	25	80
101230502004	SORO	9	20
101230502005	SORIUTU	28	121
101230502006	NO2 KEMPO	40	100

101230502007	BANGGO	13	40
101230502008	DOROPETI	27	15
101230502009	NAPA	22	100
101230502010	NANGAMIRO	14	40
101230502011	KONTE	26	32
101230502012	KESI	58	115
101230502013	PUPAU BAJO	38	100
101230502014	TANJU	20	62
101230502015	TA'A	35	925
101230502016	KADINDI	44	110
101230502017	CALABAI	31	60
101230502009	NAPA	23	100

Use F9 and F10 to scroll LEFT and RIGHT. Press RETURN for next screen.

5.2.3 Advisory Activities. In this subsection, we will experiment combining some of the techniques demonstrated in the previous subsections to perform the following functions:

(a) Simultaneously accessing data fields in three files (PUPIL_RC, FLOW_RC and TEA_RC). This is to be achieved using the JOIN command several times so that only one single file (which will be named SCH2) containing all the required data fields will be used;

(b) To compute a number of indicators using the REPLACE command and store these indicators in the new file SCH2. Additional fields have to be created to accommodate the indicators, using the MODIFY STRUCTURE facility in DBASE III;

(c) The records will be printed or displayed in a format to be created using the DBASE III report generator. Two new features will be added to the reports:

(1) One is the SET RELATION command, which if used before the creation and printing of the report format, allows the report to access two data bases at the same time;

(2) One is to use the FOR clause to set down extraction criteria in selectively displaying the records.

(d) The procedure that may be adopted is shown below:

(1) In the first place, a new data base has to be created, containing fields which will store values for the following indicators:

- the repetition rate;

- the proportion of P.6 leavers passing the final examination;
- the pupil-teacher ratio;
- the average class size;
- the proportion of unqualified teachers.

This new file is to be created using the PUPIL_RC data to start up. Two new commands are used in this exercise: COPY STRUCTURE and APPEND FROM.

*USE PUPIL_RC
*COPY STRUCTURE TO SCH2
*MODIFY STRUCTURE to delete fields which are no longer required, and to add the following new fields:

CSIZE - average class size
RRATE - repetition rate
PTRATIO - pupil/teacher ratio
NQRATE - % of unqualified teachers
P6RATE - % of P.6 pupils passing examination

*DISPLAY STRUCTURE, and the following should show up on the screen:

Figure XIII: Structure for SCH2

Structure for data base: A:sch2.dbf
Number of data records: 0
Date of last update: 08/18/86

Field	Field Name	Type	Width	Dec
1	SS	Character	1	
2	SKE	Character	2	
3	C1	Numeric	2	
4	C2	Numeric	2	
5	C3	Numeric	2	
6	C4	Numeric	2	
7	C5	Numeric	2	
8	C6	Numeric	2	
9	ET	Numeric	4	
10	SCH_CODE	Character	12	
11	CT	Numeric	3	
12	CSIZE	Numeric	3	1
13	RRATE	Numeric	3	1
14	PTRATIO	Numeric	2	
15	NQRATE	Numeric	3	1
16	P6PASS	Numeric	3	1
** Total **			49	

*APPEND FROM PUPIL_RC and this will copy the data from PUPIL_RC. Data for fields not present in the SCH2 will not be appended.

*INDEX ON SCH_CODE TO SCH2 to create an index file called SCH2.

*DISPLAY STATUS will give the following:

```
Currently Selected Data base:
Select area: 1, Data base in Use: A:sch2.dbf Alias: SCH2
   Master index file:  A:sch2.ndx  Key: sch_code
```

(2) The next step is to create a new file by JOINING with the data base FLOW_RC and then TEA_RC.

```
*SELECT 2
*USE FLOW_RC INDEX FLOW_RC
*SELECT 1
*JOIN WITH FLOW_RC TO SCH3 FOR
 FLOW_RC->SCH_CODE=SCH_CODE
```

A new file SCH3 is created. By modifying its structure to delete fields that are not required one will get a data base SCH3 with the following structure:

Figure XIV: Structure for SCH3

Structure for data base: A:sch3.dbf
Number of data records: 65
Date of last update: 08/18/86

Field	Field Name	Type	Width	Dec
1	C1	Numeric	2	
2	C2	Numeric	2	
3	C3	Numeric	2	
4	C4	Numeric	2	
5	C5	Numeric	2	
6	C6	Numeric	2	
7	ET	Numeric	4	
8	SCH_CODE	Character	12	
9	CT	Numeric	3	
10	CSIZE	Numeric	3	1
11	RRATE	Numeric	3	1
12	PTRATIO	Numeric	2	
13	NQRATE	Numeric	3	1
14	P6PASS	Numeric	3	1
15	GL	Numeric	3	
16	GT	Numeric	3	
17	GP	Numeric	3	
18	RTT	Numeric	3	
** Total **			58	

```
*SELECT 2
*USE TEA_RC INDEX TEA_RC
```

```
*SELECT 1
*JOIN WITH TEA_RC TO SCHSUM FOR
 TEA_RC->SCH_CODE=SCH_CODE
*USE SCHSUM
*DISPLAY STRUCTURE and the following will show up
 on the screen:
```

Figure XV: Structure for SCHSUM

Structure for data base: A:schsum.dbf
Number of data records: 65
Date of last update: 08/18/86

Field	Field Name	Type	Width	Dec
1	C1	Numeric	2	
2	C2	Numeric	2	
3	C3	Numeric	2	
4	C4	Numeric	2	
5	C5	Numeric	2	
6	C6	Numeric	2	
7	ET	Numeric	4	
8	SCH_CODE	Character	12	
9	CT	Numeric	3	
10	CSIZE	Numeric	3	1
11	RRATE	Numeric	3	1
12	PTRATIO	Numeric	2	
13	NQRATE	Numeric	3	1
14	P6PASS	Numeric	3	1
15	GL	Numeric	3	
16	GT	Numeric	3	
17	GP	Numeric	3	
18	RTT	Numeric	3	
19	YR	Numeric	4	
20	ST	Character	2	
21	SS	Character	1	
22	SP	Character	2	
23	SKA	Character	2	
24	SKE	Character	2	
25	SE	Character	3	
26	SESS	Character	1	
27	AP	Numeric	2	
28	LP	Numeric	2	
29	TP	Numeric	3	
30	AN	Numeric	2	
31	LN	Numeric	2	
32	TN	Numeric	3	
33	TM	Numeric	3	
34	TF	Numeric	3	
35	TT	Numeric	3	
36	NP1	Numeric	2	
37	NP2	Numeric	2	
38	NP3	Numeric	2	

39	NP4	Numeric	2
40	NP5	Numeric	2
41	NP6	Numeric	2
42	NP7	Numeric	2
43	NP8	Numeric	2
44	NPT	Numeric	3
45	PH	Numeric	2
46	PC	Numeric	2
47	PR	Numeric	2
48	PS	Numeric	2
49	PT	Numeric	3
50	NH	Numeric	2
51	NC	Numeric	2
52	NR	Numeric	2
53	NS	Numeric	2
54	NT	Numeric	3
55	NQT	Numeric	3
56	NHT	Numeric	2
57	NCT	Numeric	2
58	NRT	Numeric	2
59	NST	Numeric	2
60	GTT	Numeric	3
** Total **			153

(3) The third step is to compute the value for the fields CT, CSIZE, RRATE, PTRATIO, NQRATE and P6PASS.

*REPLACE ALL CT WITH C1+C2+C3+C4+C5+C6 to give the total number of operating classes;

*REPLACE ALL CSIZE WITH ET/CT to give the average class size in each school, by dividing the total enrollment (ET) by the total number of operating classes (CT);

*REPLACE ALL RRATE WITH RTT/ET*100 to give the repetition rate, by dividing the total number of repeaters (RTT) by the total enrollment (ET);

*REPLACE ALL PTRATIO WITH ET/TT to give the pupil/teacher ratio, by dividing the total enrollment (ET) by the total number of teachers (TT);

*REPLACE ALL NQRATE WITH NQT/TT to give the proportion of unqualified teachers, by dividing the number of unqualified teachers (NQT) by the total number of teachers (TT);

*REPLACE ALL P6PASS WITH GP/GL*100 FOR GL>0 to give the percentage of P.6 pupils passing the final examination, by dividing the number of P.6 leavers passing the final examination (GP) by the total number of P.6 leavers (GL). The condition GL>0 is to safeguard against any schools with no P.6 leavers to avoid numeric overflow.

(4) The fourth step is to create a report format for displaying indicators constructed above together with the schools. The DBASE III report generator will be used. In this exercise, the file SCHMAS will also be used so that the report will show the names of schools selected as well. Accessing simultaneously two data bases requires the use of the SET RELATION command before the creation of the report file and the printing of the report. The following procedure may be adopted:

```
*SELECT 2
*USE SCHMAS INDEX SCHMAS
*SELECT 1
*INDEX ON SCH_CODE TO SCHSUM
*SET RELATION TO SCH_CODE INTO SCHMAS
*CREATE REPORT ENR2
```

Then the DBASE III full screen report generator will appear on the screen. By following the instructions given, one can create a report file ENR2. Very briefly, two steps need to be taken:

- In the option menu, one has to give the title of the report, as well as other page formatting instructions;

- In the column options, one has to select the names of the fields to be included in the report, and the headings of the fields which will appear on the report. One field will occupy one column, the width of which is determined the length of the column heading or the width of the field selected.

The report layout which appears in the report generator template will look something like the diagram below:

Figure XVI: Template for ENR2

```
Options     Groups     Columns     Locate     Exit   09:42:44 pm
                                 | SCH_CODE                      |
                                 | schmas->name                  |
                                 | CSIZE                         |
                                 | RRATE                         |
                                 | PTRATIO                       |
                                 | NQRATE                        |
                                 | P6PASS                        |

----------------------------Report Format-----------------------------
 School Code   Name          Class  Rep.   P/T    % of      % of
                             Size   Rate   Ratio  Teacher   P.6
                                                    Not     Pupils
                                                   Qual.    Passing
-----------------------------------------------------------------------
XXXXXXXXXXXX   XXXXXXXXXXX    #.#    #.#    ##      #.#       #.#

-----------------------------------------------------------------------
CREATE REPORT    |<A:>|ENR2.FRM        |Opt.  1/7          |        |
   Position selection bar -.  Select - -+.  Leave menu -.
Step to any column immediately by selecting the column expression.
```

(5) The fifth step is to produce reports using the ENR2 file defined above on schools which require follow-up action, based on the barious indicators constructed above. One method of finding out the criteria of selection is to compute the mean values for the different indicators such as average class size.

*AVERAGE CSIZE,RRATE,PTRATIO,NQRATE,P6PASS and the following results should be shown on the screen:

```
      65 records averaged
  csize  rrate  ptratio  nqrate  p6pass
   28.6  18.2    26       0.2     68.7
```

Based on these mean values, a variety of reports may be produced.

```
*SELECT 1
*SET RELATION TO SCH_CODE INTO SCHMAS
*REPORT FORM ENR2 FOR CSIZE>28.6 .AND. RRATE>18.2
```

and this generates the following report:

Figure XVII: Sample Report 1 for ENR2

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Ad Hoc Report of Schools for the
Advisory Inspectorate

School Code	Name	Class Size	Rep. Rate	P/T Ratio	% of Teacher Not Qual.	% of P.6 Pupils Passing
101230501003		43.0	19.0	34	0.0	92.0
101230501004		31.0	23.0	28	0.0	97.0
101230501006		30.0	25.0	26	0.0	0.0
101230501007		37.0	34.0	31	0.0	57.0
101230501010		35.0	24.0	21	0.0	79.0
101230502006	NO2 KEMPO	40.0	22.0	27	0.0	97.0
101230502016	KADINDI	44.0	26.0	70	0.0	89.0
101230503004	SDN SAWE	34.0	22.0	20	0.0	100.0
101230503005	SDN JAMBU	39.0	20.0	34	0.0	71.0
101230503006	SDN FANDA	31.0	35.0	27	0.0	74.0
101230503007	SDN NO.2 R	30.0	23.0	16	0.0	70.0
101230504002	SDN LABI	33.0	50.0	38	0.0	89.0
101230504004	SDN KIWU	33.0	22.0	33	0.0	86.0
102230501032		33.0	23.0	22	0.0	92.0
102230501034		36.0	42.0	29	0.0	100.0
102230501037		35.0	34.0	27	0.0	87.0
102230501039		39.0	28.0	39	0.0	73.0
102230501041		33.0	40.0	29	11.0	78.0
102230503013	SDN INPRES	29.0	35.0	22	0.0	67.0
** Total **		665.0	547.0	573	11.0	1498.0

*REPORT FORM ENR2 FOR P6PASS<68.7 .AND. PTRATIO>26

and the following report will be produced:

Figure XVIII: Sample Report 2 for ENR2

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Ad Hoc Report of Schools for the
Advisory Inspectorate

School Code	Name	Class Size	Rep. Rate	P/T Ratio	% of Teacher Not Qual.	% of P.6 Pupils Passing
101230501003		43.0	19.0	34	0.0	92.0
101230501004		31.0	23.0	28	0.0	97.0
101230501008		33.0	15.0	30	0.0	100.0
101230502002	PEKAT	24.0	9.0	48	0.0	89.0
101230502006	NO2 KEMPO	40.0	22.0	27	0.0	97.0
101230502008	DOROPETI	27.0	3.8	40	0.0	70.0
101230502009	NAPA	22.0	0.0	37	0.0	95.0
101230502009	NAPA	23.0	0.0	45	0.0	95.0
101230502011	KONTE	26.0	45.0	30	0.0	91.0
101230502012	KESI	58.0	4.6	49	0.0	86.0
101230502016	KADINDI	44.0	26.0	7[illegible]	0.0	89.0
101230503005	SDN JAMBU	39.0	20.0	34	0.0	71.0
101230503006	SDN FANDA	31.0	35.0	27	0.0	74.0
101230504001	SDN KILO	42.0	7.2	30	0.0	78.0
101230504002	SDN IABI	33.0	50.0	38	0.0	89.0
101230504004	SDN KIWU	33.0	22.0	33	0.0	86.0
102230501033		27.0	35.0	27	0.0	93.0
102230501034		36.0	42.0	29	0.0	100.0
102230501037		35.0	34.0	27	0.0	87.0
102230501039		39.0	28.0	39	0.0	73.0
102230501041		33.0	40.0	29	11.0	78.0
102230501042		33.0	9.0	30	0.0	93.0
*** Total ***		752.0	490.0	781	11.0	1923.0

```
*REPORT FORM ENR2 FOR PTRATIO>26 .AND. P6PASS<68.7
.AND. RRATE>18.2
```

This gives the third sample report as follows:

Figure XIX: Sample Report 3 on ENR2

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Ad Hoc Report of Schools for the
Advisory Inspectorate

School Code	Name	Class Size	Rep. Rate	P/T Ratio	% of Teacher Not Qual.	% of P.6 Pupils Passing
101230501007		37.0	34.0	31	0.0	57.0
101230502004	SORO	8.7	28.0	29	0.0	0.0
101230504009	SD INPRES	28.0	23.0	28	0.0	7.4
101230504011	SD KECIL E	13.0	33.0	52	0.0	0.0
*** Total ***		86.7	118.0	140	0.0	64.4

5.3 Monitoring of School Projects

5.3.1 The participants should have a firm grasp of the basic techniques in using DBASE III to construct and query a data base, and produce a variety of reports and compile statistical data from single or multiple data bases. Therefore, it is not proposed to repeat these demonstrations in this subsection. Furthermore, there are no data available to construct a data base of school projects. Nevertheless, in this subsection, the construction of a sample data base on school projects is demonstrated using QUICKCODE III. The purpose is to demonstrate how a simple information system on the progress of school projects could be set up, which will contain the various data items discussed in paragraph 4.2.6 above.

5.3.2 What is presented below is the procedure which may be followed in constructing the data base. If there are participants who have not gone through Module II and hence may not be familiar with the use of QUICKCODE III, the instructors will have to refer to the teaching materials in Module II on the use of this utility program. Very briefly, users have to perform three main functions in creating the data base file and other utility programmes:

(a) Designing the data input screen using the Quickscreen mode in QUICKCODE III, and at the same time drawing up the list of fields to be included in the data base, assigning them names as well as the primary field types

for the fields named. Three primary field types are allowed at this stage:

(1) Character type which will be automatically assigned if no other field type is named. The character type can be changed to data type or logical field using the Field Mode in QUICKCODE III;

(2) Integer type, which is defined by giving the character "#" at the end of the field name in Quickscreen;

(3) Money type, which is defined by giving the character "$" at the end of the field name in Quickscreen. The money type can be changed to numeric type (with 1 decimal place) using the Field Mode in QUICKCODE III.

The following diagram gives the screen design for the school project data base (PROJ.DBF) in Quickscreen mode:

Figure XX: Data Input Format for PROJ

```
LIN:  8   COL:  31            (AUTO PILOT)    SCR:  proj  DBF:  proj
-----------------------------------------------------------------------
                School Project Quarterly Progress Report
=======================================================================
Budget Ref.   ;br    Project Ref.   ;pr         Project Number   ;pnr
Province      ;sp    District       ;ska        Subdistrict      ;ske
-----------------------------------------------------------------------
Date of Commencement  ;start     Planned complete date          ;end
Number of classrooms  ;class#    Project officer/agency         ;agent
Project budget        ;budget$
=======================================================================
Current Project Status
-----------------------------------------------------------------------
Stage of progress  (enter code)     ;prog                       ;ref
-----------------------------------------------------------------------
Amount of money committed           ;com$
Amount of money spent to date       ;spent$                   ;unspent$

Additional amount required          ;add$                     ;rbudget$

-----------------------------------------------------------------------
Revised date of completion          ;newend

-----------------------------------------------------------------------
```

It may be noted from the above screen design that there are three computed fields:

REF which will be used as the unique identifier for the project concerned and is formed by concatenating the fields on budget reference BR, project reference PR, project number PNR, province SP, district SKA, and subdistrict SKE;

UNSPENT which gives the amount of budget not yet spent and is derived from the difference between the amount budgeted BUDGET and the amount already spent SPENT;

RBUDGET which is the revised budget for the project if there is any additional financial information required. This is derived from adding the amount budgeted BUDGET to the additional financial provision required ADD.

(b) The characteristics for the various fields defined above in Quickscreen will have to be determined in the Field Mode. The computation required for the computed field will also have to be set in the Field Mode. The results are shown below:

Figure XXI: Field Mode for PROJ

#	FIELDNAME	T	LEN	F	DEFAULT	MIN.	MAX.	ERROR MESSAGE	VAL	ER
0	MQ_MODE	C	7		*NONE*	*NONE*	*NONE*	*NONE*	*	3
1	br	C	2	F	*NONE*	*NONE*	*NONE*	*NONE*	*	0
2	pr	C	2	F	*NONE*	*NONE*	*NONE*	*NONE*	*	0
3	pnr	C	3	F	*NONE*	*NONE*	*NONE*	*NONE*	*	0
4	sp	C	2	F	*NONE*	*NONE*	*NONE*	*NONE*	*	0
5	ska	C	2	F	*NONE*	*NONE*	*NONE*	*NONE*	*	0
6	ske	C	2	F	*NONE*	*NONE*	*NONE*	*NONE*	*	0
7	start	D	8	F	*NONE*	*NONE*	*NONE*	*NONE*	*	0
8	end	D	8	F	*NONE*	*NONE*	*NONE*	*NONE*	*	0
9	class	I	2	F	*NONE*	*NONE*	*NONE*	*NONE*	*	0
10	agent	C	11	F	*NONE*	*NONE*	*NONE*	*NONE*	*	0
11	budget	$	10	F	*NONE*	*NONE*	*NONE*	*NONE*	*	0
12	prog	C	2	F	*NONE*	*NONE*	*NONE*	*NONE*	*	0
13	ref	C	13	F	*NONE*	*NONE*	*NONE*	*NONE*	*	0
14	com	$	10	F	*NONE*	*NONE*	*NONE*	*NONE*	*	0
15	spent	$	10	F	*NONE*	*NONE*	*NONE*	*NONE*	*	0
16	unspent	$	10	F	*NONE*	*NONE*	*NONE*	*NONE*	*	0
17	add	$	10	F	*NONE*	*NONE*	*NONE*	*NONE*	*	0
18	rbudget	$	10	F	*NONE*	*NONE*	*NONE*	*NONE*	*	0
19	newend	D	8	F	*NONE*	*NONE*	*NONE*	*NONE*	*	0

It may be noted that the field type for the fields START, END and NEWEND have been changed from character to data type. The next step is then to define the computed fields and to tell the system which fields will

be shown or not given in the data input screen. The results are given in the diagram below:

Figure XXII: Field Mode for Computed Fields

#	FIELDNAME	T	LEN	F	SHOW	COMPUTATION	ER
0	MQ_MODE	C	7		YES	*NONE*	3
1	br	C	2	F	YES	*NONE*	0
2	pr	C	2	F	YES	*NONE*	0
3	pnr	C	3	F	YES	*NONE*	0
4	sp	C	2	F	YES	*NONE*	0
5	ska	C	2	F	YES	*NONE*	0
6	ske	C	2	F	YES	*NONE*	0
7	start	D	8	F	YES	*NONE*	0
8	end	D	8	F	YES	*NONE*	0
9	class	I	2	F	YES	*NONE*	0
10	agent	C	11	F	YES	*NONE*	0
11	budget	$	10	F	YES	*NONE*	0
12	prog	C	2	F	YES	*NONE*	0
13	ref	C	13	F	NO	br+pr+pnr+sp+ska+ske	0
14	com	$	10	F	YES	*NONE*	0
15	spent	$	10	F	YES	*NONE*	0
16	unspent	$	10	F	NO	budget-spent	0
17	add	$	10	F	YES	*NONE*	0
18	rbudget	$	10	F	NO	budget+add	0
19	newend	D	8	F	YES	*NONE*	0

(c) Finally, after all the data fields have been defined in the Field Mode, one can go back to the QUICKCODE III main menu by pressing CONTRL B to revert back to the Quickscreen and then [F1] to go back to the main menu. By pressing ESC, all the required programs may be generated by the QUICKCODE III system. A total of 11 programs have been generated and are stored in the Diskette "EPP Mod.v.4." To run these programs, one has to start up DBASE III from either Drive B or Drive C, and put the Diskette in Drive A. After starting up DBASE III,

```
*SET DEFAULT TO A
*DO PROJ
```

and an opening menu will appear, from which a number of functions such as adding records to the data base, editing records, etc., may be selected.

6. Learning Activities

6.1 What has been covered in the User Manual Section are the main techniques used in extracting and manipulation of data stored in a single or multiple data base(s). It is essential therefore that the participants devote ample time to practicing these techniques, using other combinations of commands and conditions not yet demonstrated in the User Manual Section. Most of these techniques should be adequate for users in performing ad hoc inquiries on the data bases. For those who want to pursue further DBASE III programming techniques, and those who have the need for a more efficient system of querying the data bases, they may attempt to combine the sequence of commands used at the dot prompt level into simple batch-type programmes. This will lead to a more efficient and automatic data processing system, so that more time-consuming procedures could be run unattended, and the applications could be handled by less knowledgeable users.

6.2 The learners are advised to spend more time in going through the User Manual together with the instructors. The methods of calculations are bound to be different from what are currently practised by the learners. Therefore, there should be ample opportunities for the learners to suggest alternative methods for calculating teacher entitlements in schools or for estimating the amount of subsidy required by schools. These alternatives should be studied and the learners should, following the procedures demonstrated in the User Manual Section, attempt to design the DBASE III command procedures to cater for the different methods of calculations.

III. Unit 2

Monitoring Performance of Education System

7. Performance Objectives

7.1 A variety of statistical information could be compiled from the education management information system outlined in Module II for the purposes of managing the education sector as a whole. They are quite similar to those discussed in Unit I above, except that the unit of analysis is the education system as a whole, rather than individual schools or other educational institutions, or individual programmes. It is not proposed to cover the entire spectrum of management statistics, which could embrace information on finances, information on teachers and other personnel, information on institutions including schools, research agencies, examination authorities, etc., and information on pupils. The

focus of this unit is on the construction and use of educational indicators for monitoring the performance of the education system.

7.2 On completion of this unit, the participants should be able to:

(a) Design indicators to monitor the performance of the education system;

(b) Make use of the education management information system and the data base software package DBASE III in constructing the indicators for the country as a whole, or a given province or district, or for a given type of school.

8. Instructional Activities

8.1 Uses and Limitations of Indicators

8.1.1 The main concern of planners and administrators are, at the risk of oversimplification, is to find out the following:

(a) Whether educational programmes are implemented according to plan, with the expected effectiveness;

(b) The problems encountered;

(c) The causes of the problems;

(d) The alternatives available to solve the problems and the methods and criteria that can be adopted to assess the effectiveness, costs and other implications of these alternatives, and to choose from among the alternatives available the best one for implementation.

The purpose of management statistics is to provide the necessary information which could throw light on the above. Indicators are one kind of management information which could provide planners, administrators and policymakers quickly with up-to-date summary information on the above. Based on the information, users can quickly appraise the situation, take correct measures accordingly or commission a more detailed study or research on the matter. For indicators which are compiled on a consistent basis over time, they can provide extremely useful indication of any changes over time, which could be difficult to identify from the massive amount of statistics available. These statistics are usually collected and analyzed in a disaggregated and sometimes decentralized manner. One example of the aggregated nature of indicators is public expenditure on education as a percentage of the gross national (or domestic) product which

gives a summary indication of the resources devoted to education. There are studies which make use of indicators for exploratory research on causal effect of education on economic development. A classic example is the Harbison and Myers study on the correlation between human resources and economic growth.

8.1.2 Indicators cannot possibly be used to summarize all management statistics which are available. One would not have a very thorough understanding of the phenomenon which a given education indicator purports to highlight without going into details of the statistics available. An example is the illiteracy rate. The rate gives a summary information on the size of the problem of illiteracy. But unless detailed statistics are available on the geographical distribution of illiterate populations, their age and sex distribution, etc., it is difficult to design and mount any programme to combat illiteracy, nor to assess the effectiveness of a given nonformal education programme. Therefore, indicators cannot replace the bulk of statistics that should be collated and presented to users as well.

8.2 Criteria in Monitoring Performance

8.2.1 Before one can proceed to construct a set of educational indicators to monitor the performance of the education system, the question that would naturally rise is on what basis should performance be monitored. This is a more difficult question to answer than the problem of constructing a set valid and appropriate educational indicator. Education has been conceived by many as the key factor contributing to economic growth, in maintaining national unity, in preserving the culture of a society, in redressing social injustice, and even combating crime, etc. For different people like the students, the parents, the government, and voluntary agencies like the religious bodies, they have different motives in providing education or for becoming educated. It is thus extremely difficult to lay down a set of criteria agreeable to all for assessing the performance of an education system.

8.2.2 It is not proposed to indulge in this sort of argument in this Module, as it is clearly not the purpose. What appears to be less controversial norms for planning education and monitoring its performance are two rather simple concepts:

(a) Equity;
(b) Efficiency.

However simple these concepts are, there are nonetheless a dozen different interpretations of what equity means in

practice. The argument on whether it is equity in terms of treatment or in terms of achievement is still an unsettled debate, although some have already conceded that equity cannot be achieved but approached. Efficiency could be looked at from the point of view of the internal efficiency of the education system and from the point of view of its external efficiency. The problems here are not so much with the question of interpretation, but rather are related to the difficulties in measuring efficiency.

8.2.3 Notwithstanding these conceptual problems, planners and administrators have to rely on indicators of some sort to help them perform their duties. Most of the indicators commonly in use evolve around the concepts of equity and efficiency which seems to become the basic principles in planning and implementing education policies:

(a) Indicators of equity include such estimates as the proportion of children not attending schools, disaggregated into different regions, ethnic groups or socioeconomic classes;

(b) Indicators of internal efficiency include the repetition and dropout rates, the number of pupil-years required to produce a graduate, etc.;

(c) Indicators of external efficiency include the famous internal rate of return to education, the proportion of graduates gainfully employed, etc.

8.3 Techniques in Constructing Indicators

8.3.1 There are three main approaches to the construction of educational indicators:

(a) The first one is the use of simple indices which is calculated by:

(1) taking the arithmetic mean or median for the relevant statistics or statistical distribution. One example is the mean pupil/teacher ratio or the average class size in all primary schools. If the distribution is affected by the presence of extreme values, the median would be used. An example is the median income of school leavers:

(2) taking the percentage of "population" possessing the given characteristics. Examples of this type of indicator includes percentage of population who are illiterate, the percentage of school-age population attending schools, etc.;

(3) taking the rate of change over time. This includes, for instance, the rate of increase in enrollment.

(b) The second approach is the construction of the so-called synthetic indicators. This involves more complicated procedures in aggregating a number of subsidiary indices, suitably weighted. The composite index of human resources development constructed by Harbison and Myers is one example. Another method is to construct the index based on a set of behavioral assumption. An example is the various indicators such as the input/output ratio compiled from the reconstructed cohort method which would be discussed in Module IV.

(c) The third approach is the estimation of life expectancies. The technique makes use of the life table approach to estimate the number of years children would spend in full-time education. Like the demographic measure of life expectancies, this sort of indicator provides useful summary information of the availability of education to children at a given point in time.

Not all the approaches discussed above will be covered in this Module. Examples in respect of (a) above will be cited. For (b), an illustration of the use of the reconstructed cohort method will be given in Module IV.

8.3.2 Finally, users of educational indicators should not be deceived by the sophistication and complication in the techniques used to construct indicators. Not all indicators are direct measures of the state of affair of which users wish to examine. Direct measures include most of the quantitative indicators indicators on the percentage of school-age population enrolled in schools. Many indicators which purport to measure the quality of education are, however, simply proxy indicators which are only valid if the assumption regarding the high correlation between the proxy indicators and the subject matter is valid. A notable example is the average class size which is supposedly a measure of the quality of education. However, numerous studies have confirmed that the quality of teaching is not necessarily correlated with a smaller class size. Smaller class size may permit the use of a more pupil oriented teaching method which is more conducive to the learning process. Thus reducing class size per se will not automatically bring about an improvement in the quality of education.

8.4 Types of Indicators

8.4.1 In the User Manual Section to follow, an attempt is made to construct a number of educational indicators from the education management information system set up in Module II. It is stressed that this list is by no means exhaustive. Users should bear in mind the limitations and other considerations which have been discussed in the earlier part of this Unit. From the list of indicators, one could distinguish between:

(a) an indicator which measures input into the education system, and

(b) one which measures the output.

For some time, planners and statisticians have tried to measure, apart from input and output, the process of the education system. This means the construction of indicators which can throw light on what is happening in the classroom. It appears nothing useful has come up so far. As a result, one has to rely on measures of either input or output, or measures which compare input with output, to gauge which is happening to the educational process.

9. User Manual

9.1 Getting Started

9.1.1 This user manual is designed for:

(a) The instructors in demonstrating how to compile educational indicators from the education management information system, using DBASE III, for a given province, district, or subdistrict;

(b) The learners in practising the procedures suggested for the construction of such indicators.

9.1.2 The participants should have by now gone through most of the command level functions in DBASE III for information process and retrieval. Most of the techniques applicable to the retrieval of information classified at the school level will also apply to the retrieval of information at the province, district, or subdistrict level. The additional feature in DBASE III which will be discussed is the use of the MODIFY REPORT command and the SUMMARY command, the latter of which has already been discussed in Module II.

9.1.3 The data files required for the practical exercises are stored in the Diskette "EPP Mod.v.3." The database ENR2 which combines information from the PUPIL_RC, FLOW_RC, and TEA_RC data bases, will be used in the exercises. However, in order to avoid changing the data base ENR2 which is required for Unit 1, a copy of the file, renamed as ENR3 has been prepared for this Unit.

9.1.4 It is recommended to start up DBASE III from either Drive C or Drive B, and put the Diskette "EPP Mod.v.3" in Drive A. After starting up the DBASE III system, type *SET DEFAULT TO A at the dot prompt.

9.2 Compiling Indicators

9.2.1 Three steps have to be taken in compiling indicators from the education management information system for different provinces, districts, or subdistricts:

(a) Creating a summary file which contains the summary information of all schools grouped into sub-districts. This is achieved through the TOTAL command which has already been discussed in Module II. The procedure which may be adopted are as follows:

(1) *USE SCHSUM
*COPY TO SCHSUM1 to create a dummy datafile from which a summary file for subdistrict totals will be created;
*USE TO SCHSUM1;
*MODIFY STRUCTURE to increase the length of the numeric fields in order to avoid numeric overflow when the TOTAL command is executed;
*DISPLAY STRUCTURE will give the following:

Figure XXIII: Structure for SCHSUM1

Structure for data base: A:schsum1.dbf
Number of data records: 65
Date of last update: 08/22/86

Field	Field Name	Type	Width	Dec
1	ET	Numeric	6	
2	SCH_CODE	Character	12	
3	CT	Numeric	5	
4	CSIZE	Numeric	5	
5	RRATE	Numeric	6	1
6	PTRATIO	Numeric	5	
7	NQRATE	Numeric	7	1
8	P6PASS	Numeric	7	1
9	GL	Numeric	5	

10	GT	Numeric	5
11	GP	Numeric	5
12	RTT	Numeric	5
13	YR	Character	4
14	SS	Character	1
15	SKE	Character	2
16	SE	Character	3
17	SESS	Character	1
18	NQT	Numeric	5
19	GTT	Numeric	5
** Total **			95

It may be noted that some of the redundant fields have been deleted from the data base.

(2) The next is to create the summary file from SCHSUM1.
*INDEX ON SKE TO SSUMSKE to index the data file SCHSUM to the field which will be used to group schools with the same field value to form a single record in the summary file.

*TOTAL ON SKE TO SSUM
*USE SSUM
*REPLACE ALL CSIZE WITH ET/CT to compute the average class size for each subdistrict;

*REPLACE ALL RRATE WITH RTT/ET*100 to calculate the rate of repetition;

*REPLACE ALL PTRATIO WITH ET/GTT to give the pupil/teacher ratio;

*REPLACE ALL NQRATE WITH NQT/GTT*100 to give the percentage of teachers not qualified;

*REPLACE ALL P6PASS WITH GP/GL*100 FOR GL>0 to compute the percentage of P.6 leavers passing the final examination.

(3) Finally, one can retrieve information from the summary file, using dot prompt commands like BROWSE, DISPLAY. Alternatively, one can design a report format to present data. The following shows the latter approach by modifying the report file ENR3 which has been created by copying from the file ENR2 created in the previous Unit.

*MODIFY REPORT ENR3, and after following the instructions given on screen, one may arrive at a modified report format as per Figure XXIV below:

Figure XXIV: Screen Design for ENR3

```
Options     Groups     Columns     Locate     Exit     09:50:40 am
=================================================================
| Contents            PTRATIO                                   |
| Heading             Pupil/;Teacher;Ratio                      |
| Width               7                                         |
| Decimal place       0                                         |
| Total this column          No                                 |
=================================================================

---------------Report Format-----------------------------------------
|                                                                  |
|Subdistrict   Total   Ave. Repet.  Pupil/   % of Teachers  % of P.6|
|   Code       Enrol.  Class Rate   Teacher    not          pupils  |
|                      Size        Ratio     qualified     passing |
|-----------------------------------------------------------------
|
|     XX       ######  ###.#  ####.#  #####    #####.#       #####.# |
-------------------------------------------------------------------

MODIFY REPORT    |<A:>ENR3.FRM       |Column: 5
Position selection bar -.  Select - -+.  Prev/Next column -
                                                  PgUp/PgDn.
Enter a field or expression to display in the indicated report column.
```

To display the report using the report format ENR3, the following command may be used:

*REPORT FORM ENR3, and the following will show up on the screen:

Figure XXV: Report of SSUM Using ENR3 Format

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Selected Educational Indicators

Sub-district Code	Total Enrol.	Average Class Size	Repetition Rate	Pupil/ Teacher Ratio	% of Teachers Not Qualified	% of P.6 pupils passing
** School Status Code 1						
01	4578	30.0	23.4	25	48.1	88.8
02	3126	26.0	16.9	29	0.0	88.1
03	2518	29.0	16.9	19	0.0	79.7
04	1563	26.0	19.3	24	0.0	74.1

Following similar procedures, different reports may be generated, using DBASE III, from the education management information system.

10. Learning Activities

10.1 Microcomputer Tutorial Session. This Unit is rather short because more of the DBASE III commands have already been introduced in Unit 1 or in Module II. The participants are only required to practice modifying the previously designed report format to compile the various summary indicators for different districts. The learners would appreciate that to master the techniques of retrieving information from the data base should not be too difficult, although DBASE III language is not at all easy to learn. What is proposed for the practical session in this Unit is for the learners to go through the various steps demonstrated in this Unit.

11. Post-assessment

11.1 The learners are required to experiment compiling the following indicators from the original PUPIL_RC, FLOW_RC and TEA_RC, using the JOIN, REPLACE, TOTAL commands:

(a) The proportion of female teachers;

(b) The proportion of female pupils;

(c) The proportion of pupils who are overaged (i.e., over the age of 13 years);

(d) The teacher/class ratio;

(e) The average number of pupils per school.