

COMPUTERIZATION OF BUDGETING AND FINANCING OF PRIMARY  
SCHOOL EDUCATION BY THE NATIONAL PRIMARY EDUCATION  
COMMISSION (NPEC)

A Case Study of Niger State

BY

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APPROVAL PAGE

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ABSTRACT

The availability of reliable data on Primary Education provisions in the country had been of concern to the Federal Government. The establishment of the National Primary Education Commission (NPEC) by Decree 31 of 1989 was amongst others aimed at ameliorating that and other deficiencies in the Primary Education System.

One of the major aspects of Management of Primary Education is making funds available for Education services. But funding has been a source of concern for Governments, Schools and the public for several reasons. Funds are usually not optimately utilized and priorities at times are not well placed. Coupled with the manual method used in the budgeting and finance of the sector. It is hoped that this project will examine and provide the way computer can be used to assist the already existing manual method of budgeting in the finance unit of National Primary Education Commission (NPEC).

The method that will be used for data collection for the purpose of this study will be reviewing of documents particularly the finance unit, sufficient information such as how fund is got and allocated by NPEC will also be discussed. The charts of NPEC in terms of structure, studying written operating procedures will also be examined. The chart will include components such as divisions, departments, offices and how the Commission relate to other Primary Educational divisions in the states and Local Government levels. The document review will address salient aspects of funding of Primary Education. The various possible sources of funds issue of financial control, school based budgets and their preparation. Various components of the budget will be highlighted and factors that can hinder its effective implementation. The

Though written documents provide information on how a system or organisation like NPEC should operate but they may not include enough details to allow decision to be made which necessitates the need for oral interview with a selected staff of a NPEC and Niger State Primary School Board this will enable first hand information to be gotten which also include the opinions of the workers, suggestions can be made and give recommendations on how improvements can be made, to improve the lots of our Primary Education.

It is hoped that at the end of this project, the application of computer to increase accuracy of fund disbursement. Usage of computer in budgeting, application of computer in finance sector to replace the manual system or improving the already existing system by compactness and networking would have been covered and suggestions will be made to justify the necessity of computerising the finance sector for proper and efficient budgeting of Primary Schools Education by National Primary Education Commission (NPEC).

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CERTIFICATION

I certify that this work was carried out by Mrs. R. O. Ajisegiri in the Department of Mathematics/Statistics/Computer Science, School of Science and Science Education, Federal University of Technology Minna, Niger State.

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DEDICATION

Dedicated to my husband (Akin) who has helped to fulfil my life and represent the measure of my happiness. WITHOUT HIM I WOULD NOT HAVE BEEN WHAT I AM TODAY.

FUNMI

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## C H A P T E R O N E

## 1.0

INTRODUCTION

A computer is an electronic device, operating under the control of instructions stored in its own memory unit, which can accept and store data, perform arithmetic and logical operations on that data without human intervention, and produce output from the processing.

There are three (3) types of computer viz:

- i. Analog and Digital computers
- ii. Hybrid computers
- iii. Special-purpose and general-purpose computers

Analog - Perform computations by manipulating continuous physical variables that are representations of the quantities being subjected to computation that is, they assign numeric values by physically measuring some actual property. Analog computers derive all their data from some form of measurement. They are also useful for process control purposes. Digital computers represent data as numbers or separate units. Unlike the analog computer, which is limited to the accuracy of the measurements made. A digital computer by contrast, operates on discrete quantities within a finite number system that is it accurately represent data using as many positions and numbers as necessary for instance Adding machines and Pocket calculators. Analog measure toward their answers while digital computers count to their results.

There is also the hybrid computer which combines the best features of analog and digital computers. They have the speed of analog computers and the accuracy of digital computers. Also the digital serves as controller and provides logical operations while the analog serves as a solver of differential equations. Usually

used for special problems in which input data derived from measurements is converted into digits and processed by computer.

General - purpose and special purpose computers, are versatile, they process business data as readily as they process complex mathematical formula, they also store large amount of data and the programs necessary to process them. So also special purpose computers as the name implies are designed to handle specific problems and are not applied to other computerised activities.

It is hard to think of any aspect of our society that is not affected by some form of computerisation. The advantages of computers are:

- i. Speed of accuracy
- ii. Reliability
- iii. Large volume of work handled easily
- iv. Versatility

This project has endeavoured to explore the above advantages of the computer and thus advising the National Primary Education Commission to computerise her budget and Finance sector. Budgeted computer costs of finance of Primary Schools Education, will perform many of the less visible tasks, analyse data and retain large quantities of data which will be available to anyone with access to that system.

### 1.1 HISTORICAL REVIEW OF NPEC

In 1976 the Federal Military Government of Nigeria launched the Universal Primary Education (UPE) programme as a step towards providing a free and Compulsory Education, to every Nigerian Child. The Federal Government initiated the programme which was to be implemented by states and the Local Government Areas. But by 1979 the Federal Government reduced her share of the revenue from Federal

account 71% to 55% and this action was backed up by the 1979 constitution which granted the Federal Government the right to withdraw from direct funding of primary education. Consequently, the states and Local Governments were left to shoulder the responsibility of funding Primary Education in Nigeria.

The Economic recession in 1982, the collapse of world oil price, coupled with the continuing mismanagement by some of the Second Republic Politicians, the Local Governments could no longer run their Primary Schools well.

In spite of the fact that primary education form the foundation upon which the entire system of education rest, the Nigerian experience is that primary education continued to deteriorate. By 1984 with the return of the Military to power, primary education system was near total collapse. Teachers' salaries were not paid, in some states, salaries were being owed for up to six months, school buildings were dilapidated, pupils were taught under trees, textbooks and other forms of instructional materials were lacking, in some states, teachers were laid off to save cost. As a result, several committees and commissions were set up to look into the problems of primary education. Between 1976 and 1988, the reports of these committees were reviewed and other evidence on the state of primary education revealed that there were two main factors responsible for its collapse, and are:

- i. Inadequate funding
- ii. Poor management structure

The Federal Government having gone through all the reports of the committees saw a great need in rehabilitatng primary education in Nigeria thus leading to the establishment of National Primary Education Commission (NPEC) backed up with a decree on August 8th,

The National Primary Education Commission (NPEC) was formally inaugurated by the former President and Commander-in-Chief of the Armed Forces of the Federal Republic of Nigeria, General Ibrahim B. Babangida (RTD) on April 24th, 1989, although the commission had commenced work on January 1st, 1989. NPEC was incorporated into the 1989 constitution of Federal Republic of Nigeria. Chapter IV, part 1B section 151(i), and part one of the 3rd schedule of the same constitution.

The main recommendations were that:

- i. Primary Education in Nigeria must be tuition free.
- ii. Primary School staff must be paid promptly and
- iii. There must be a uniform management structure in the whole country for the delivery of primary education.

All the above (3) conditions meant that the Federal Government had to intervene once more in primary education in Nigeria.

However, it was agreed that the renewed Federal intervention would principally be to assist the States and Local Government Areas with funding and to ensure that there is a viable and effective management structure. It was also agreed that primary education shall continue to be based principally at the State and Local Government levels especially the latter.

After two (2) years of the existence of NPEC, government, in pursuance of taking the presidential system of government to the grass-roots decided to transfer the management of primary education to Local Government Education Authorities (LGEA) this action saw the dissolution of NPEC. By January 1991 Decree 3 was promulgated and NPEC was absorbed by the Federal Ministry of Education and Youth Development along with those functions which could not be transferred

to the LGEAs. Subsequently, the Special Programme Unit (SPU) which is under the jurisdiction of Federal Ministry of Education and Youth Development was created, to articulate such functions which could not be transferred to the Local Government Education Authorities (LGEAs).

The deterioration of primary education became manifested after the dissolution of NPEC and primary schools became "ghost" to themselves, even worst than what it used to be in the late 1970s. The LGEAs could no longer fund primary education effectively and thus after about 40 times that a committee called National Education Committee had met about the situation of primary education in Nigeria, they wrote and submitted their reports to the Federal Government and alas, NPEC was re-enacted on August 23rd 1993 and the necessary papers were signed by the Government to salvage the situation. The decree establishing NPEC also made provision for the establishment of Primary Schools Management Boards (PSMB) in all the state capitals of the Federal and the Federal Capital Territory, Abuja, Local Government Education Authorities (LGEA) were also established in all the Local Government Areas. Districts and Village Education Committees (DEC) and (VEC) respectively in Districts and Villages were not left behind. There was also the National Primary Education Fund and the primary Education interim Development Fund incorporated in the Decree.

## 1.2 RATIONALE FOR THE STUDY

As mentioned earlier, the major aspects of management of primary education is making funds available for educational services. It has been observed that though fund has always been the concern of Government and the public. They are usually inadequate, the little available is usually not optimally utilized. This

project will therefore address how that budgeting of finance in funding primary education can be computerised to also accomplish the following objectives:

- a. To improve the efficiency and effectiveness of the finance sector. By computerising this sector, the completion of the budget of about 30 states including the FCT Abuja will be done within a short time.
- b. Since computers were invented primarily to perform calculations at a speed beyond human ability and with an accuracy and consistency which people could never match, the ability to communicate with the Primary Schools Management Boards (PSMB) in each state will be faster.
- c. Another objective of this study is to handle high volume of data, calculations and complex computation that has been done manually to be automated which is time saving and from all indications free from inaccuracy.

### 1.3 SCOPE OF THE STUDY

The National Primary Education Commission (NPEC) as been above, is a big Federal Government parastatal of category "A" with a lot of responsibilities and under her, she has at least 30 Primary Schools Management Boards (PSMB) throughout the states including Federal Capital Territory (FCT), Abuja reporting to her. There are also the Local Government Education Authorities (LGEAs) under each state, the District Education Committee (DEC) and Village Education Committee (VEC) which are all NPEC's responsibilities. Hence if we are to talk about each department, section or unit the aim of this project will be defeated thus, the project will talk in details, about NPEC while the PSMB Minna

Primary School Management Boards (PSMB) Minna, Niger State is one of the partners of the Commission while the PSMB is also located in each state of the Federation including FCT, Abuja. In PSMB Minna like others, there is a Chairman, two Senior Members of staff; two Ex-officio Members to represent the Ministry of Education and Local Government in the State; five members who represent other interest groups on a part time basis and an Executive Secretary who is an Educationist with a wealth of experience.

The Primary School Management Board (PSMB), Minna like others is responsible for the followings:

- i. Management of primary schools in Niger State sees to the welfare of primary school staff in terms of organising training, tackling leave matters, retirement cases, employment, prompt payment of salaries and so on.
- ii. Disbursement of funds given to them.
- iii. Providing guidelines on the establishment of new schools and new capital projects.
- iv. Seeing to the submission of annual reports from each head of schools to acquite themselves with the problems and how to handle it or if beyond their scope refer it to the NPEC.
- v. Ensuring annual auditing of accounts.
- vi. Carrying out assignments given by the Commissioner of Education and the commission.

It is pertinent to note that, PSMBs in the Federation give their report to NPEC through the monitoring and evaluation for onward transmission to the Executive Secretary.

#### 1.4 THE MANAGEMENT STRUCTURE OF NPEC

The NPEC was to have its permanent Headquarters in Abuja. But it is temporarily housed in Kaduna. There is the Chairman that oversees all the activities of the commission through an Executive Secretary. There are four departments in the Headquarters. These departments are stipulated in the Civil Service form Decree 43 of 1988. They are Personnel Management Finance, Supplies and Planning Research and Statistics and lastly Monitoring and evaluation.

The Executive Secretary is the Chief Executive and Accounting Officer of the Commission. He is responsible for the general direction, supervision and execution of the policies, activities and programmes of the commission. The Executive Secretary is assisted by Directors who head each department. For proper accountability, there is the Public Relations and Internal Audit Unit under the office of the Executive Secretary.

The Monitoring and Evaluation department monitors and evaluates the activities of PSMBs and LGEAs against proposals, contributions to the primary education fund activities and effective utilization of resources. This department also they monitor the PSMBs and LGEAs activities, findout their problems, advice them on how to go about solving the problem and if beyong their powers refer it to the Executive Secretary.

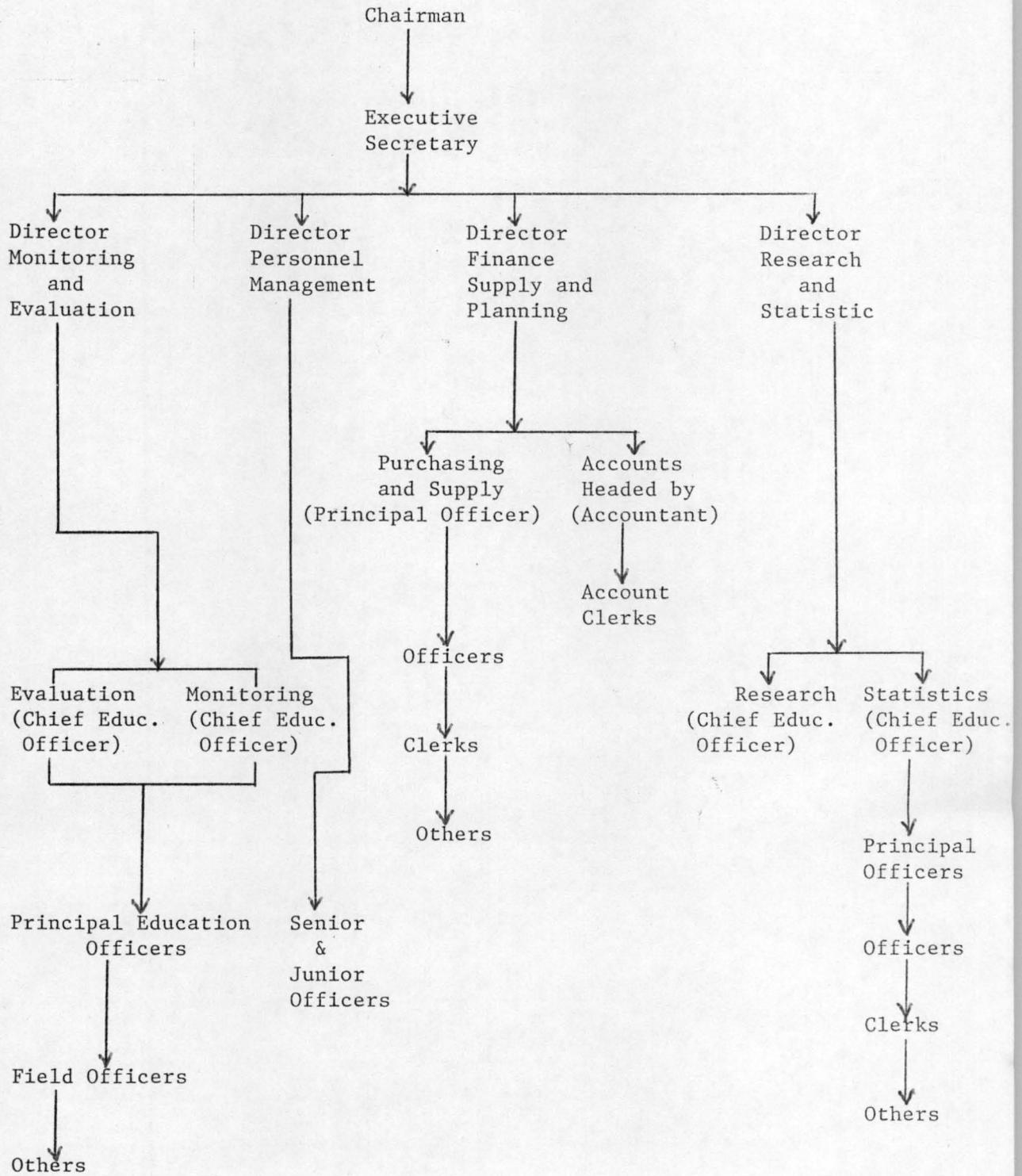
The Personnel Management department arranges for meetings at various levels. Regular meetings were held with Chairman and Executive Secretaries of Primary Schools Management Boards (PSMBs) and Local Government Education Authorities (LGEAs). These meetings serve as an avenue for the Chairman and Executive Secretaries from all states to meet, discuss matters affecting primary education

experiences and make suggestions on policy issues to the commission.

The finance, supply and planning department of the commission is incharge of planning of fund, purchasing of materials to be used by the commission, and disbursing of money. As earlier mentioned that the Executive Secretary also serves as the Accounting Officer of the commission, that is not to say that the internal auditors do not check how expenditures are made, another way to check and balance is that the Executive Secretary is accountable first to the Chairman while the Chairman briefs the Federal Government through Federal Ministry of Education how fund given is expended. The finance unit is also a part of planning and budgeting of the fund while the audit unit assist the management in ensuring the application of the control measures, and procedures that enhance the proper functioning of the commission.

There are also Zonal Offices, four in number viz: Ibadan, Bauchi, Owerri and Kaduna, there is also a Liaison office in Lagos. The Zonal offices co-ordinate the activities of PSMBs and LGEAs. Thus acting as an extension of the monitoring and evaluation department. The staff in each zone include a Chief Monitoring Officer who heads each zone. Monitoring Officers at least two or three depending on the demand, administrative and Accounts Officers.

Below is what three mnagement structure looks like:



## CHAPTER TWO

2.0 THE ROLE OF NPEC

The major role of NPEC is to improve the quality of primary education in Nigeria. The history of NPEC has included all what is needed to be known, about how it was established. The role of NPEC also includes the following:

- a. Prescribe the minimum standards for primary school in the Federation.
- b. Since the funding of primary school by the Federal Government is to disburse to NPEC, the later advise the Federal Government on the issue.
- c. On receiving the fund from the Federal Government, the commission is in charge of making the budget and allocate the funds to the body designated by each state and FCT, Abuja.
- d. The commission also gets in touch with the State Governments from time to time for a balanced and coordinated development of primary education in Nigeria. Some of the plans include the followings:
  - i. Making suggestions and proposals to the Federal Government for equal and adequate primary education opportunity in Nigeria.
  - ii. Making proposals to the Federal Government on syllabus and curriculum to adopt bearing in mind the need of the country.

The NPEC in other to effect and achieve all the above aims has to work hand in hand with other established Boards and Committees who are partners.

The first is the Primary School Management Boards established

(FTC), Abuja . The functions and constitution of the Board had been enumerated in Chapter One of this dissertation. There is also the Local Government Education Authority (LGEA) at Local Government levels throughout the country. This educational set up is made up of a Chairman who is also the Chairman of the Local Government Council, Councillor for Education, one representative of the recognised Teachers' Union in the Local Government Area, one women representative in the LGA, two representatives of District Heads, two representatives of religious organisations and one representative of Parents Teachers' Association (PTA) in the Local Government Area (LGA). The Local Government Education Authority amongst other functions does the following:

- a. Runs the day to day administration of the primary schools. Undertake capital projects and maintain the primary schools buildings and infrastructure.
- b. The posting, appointment, transfer, promotion and discipline of teaching and non-teaching staff on grade 01 - 06 in its area is decided by them.
- c. The Local Government Education Authority (LGEA) with the authority conferred on the Chairman can also make recommendations to PSMB on promotion and discipline of teaching and non teaching staff on grade level 07 and above in its jurisdiction.
- d. They also pay salaries, collect dues, and pay allowances to their staff.
- e. The estimate and submission of annual accounts and monthly returns is also made available to the PSMB for compilation and onward transmission to NPEC.

We also have the District Education Committee (DEC) which is an advisory body comprising of the District head as the Chairman,

in the district, one representative of PTA, one representative of Headmasters, one representative of women and one representative of businessmen in the District. The role of DEC is similar to that of the LGEA with the difference of having its limitation and power limited to district level.

The Village Education Committee (VEC) is another advisory body comprising of the village head as the Chairman, two representative of religious leaders in the village, one representative of Headmasters of primary schools in the village, one representative of women, two representative of youth leaders in the village and a school teacher in the village who serves as the Secretary. The function of VEC is also the total control of primary schools in the village. Here all the recommendations are submitted to the District Education Committee (DEC).

Below is the chain of the management/advisory structure of NPEC.



## 2.1 PRIMARY SCHOOL SOURCES OF FUND

Decree 31 of 1988 which established the NPEC also established the National Fund. There is a sizeable amount of the National Revenue allocated to primary education annually. The state and Local Governments also contribute to the funding of primary education. Other sources of funding primary education in Nigerian include:

- a. Parents
- b. PTA
- c. Communities
- d. Endowment funds
- e. Philanthropists
- f. Companies
- g. Taxation and levies
- h. Schools' internally generated revenue like sales of farm produce, handicrafts and so on.

These other sources of funding complement those of the government which consisted of 65% from the Federal Government. The fund was calculated based on demographical criteria for estimating the number of children of primary school age and educational planning criteria including the criterion of 40 pupils per teacher in a class.

Each subsidiary of NPEC prepare budget for the year and pass them through the appropriate channel as discussed earlier - that is village to district, district to Local Government and Local Government to State and from State it goes to NPEC headquarters through the Chairman or Monitoring teams. The NPEC disburses the fund received from the Federal Government to her subsidiaries following the above pattern.

It is pertinent to note that, the fund transactions are carried out manually right from NPEC to VEC. All the subsidiaries have a

permanent and organised finance department managed by a trained accounts person. The NPEC ensures that monies meant for primary education were used judiciously. While the PSMBs show evidence of what monies were used for.

## 2.2 JUSTIFICATION FOR COMPUTERIZATION

From the above account, a number of changes have occurred in recent years in the structure, policies and operations of many organisations as a direct result of their use of computers. And, the successful achievement of organisational goals depends on how well they are performed, thus, planning, organizing and controlling are important activities.

As structure and operations have expanded in recent years within the organisation, the need for better planning tools and techniques has become critical.

Generally speaking, the use of computer can have an impact on planning activities by:

1. Enabling Managers to devote more time on planning.

Use of the computer can free the Manager of clerical data - gathering tasks so that more attention may be given to analytical and intellectual matters.

2. Assisting in Decision Implementation when decisions have been made, the computer can assist in the development of subordinate plans that will be needed to implement these decisions. Computer based techniques to schedule project activities have been developed and are now widely used. Though the use of such techniques, the resources of an organisation can be utilized and controlled effectively.

3. Permitting Managers to give timely consideration to move

the ability to evaluate more possible alternatives (and to consider more of the internal and external variables that may have a bearing on the outcome of these alternatives). It makes it possible for Managers to do a better job of identifying and assessing the probable economic and social effects of different courses of action. The awareness of such effects, of course, influences the ultimate. In short computers can furnish managers with planning information that could not have been produced in time to be of any value.

### 2.3 FINANCIAL MANAGEMENT

Many years back, planning the disbursement and allocation of fund for various projects and/or activities of an organisation is done manually which involved a huge paper work. But today, these large information can be integrated together for effective planning.

With the growing need of information for effective planning, Government, Industrial and Educational institutions have developed such system to enhance budgeting.

The growth in the development and use of computers in the last decade has made it possible for computer - users to obtain more timely and more complete information. Thus, computer usage can enhance the efficiency of an organisation by providing information that can lead to better planning, decision making (disbursement of finance) and control of organisational activities.

Changes in job duties brought about in an organisation through the use of computers can be beneficial to both managers and employees. High - level executives have, in some cases, been able to use better and more timely information in order to resume some

of the decision making powers previously delegated to subordinates. In other cases, executives have, with a greater feeling of confidence in their ability to monitor performance through computer - produced reports, delegate additional authority to subordinates. However, the primary role of top executives lies in formulating objectives, and policies, planning and guiding over-all organisational strategy. But substantial changes in the top executive role have not occurred nor are they expected in the near future.

In a commission like NPEC where the main reason for, its establishment is controlling and proper utilization of fund, the use of computer will be very important to assist in the budget making and even, distribution of fund, to its subsidiaries, instead of carrying files and papers from one place to another. All the information needed can be copied into a diskette and later sent to the various zones for onward transmission to the PSMBs and LGEAs thus ensuring that there is at least a terminal in each zone i.e PSMBs and LGEAs. When all the above mentioned are computerised, the risk of lost documents in transit will be minimised or completely eliminated. Hence Database would be more efficient in computerising the budgeting and finance sector of NPEC.

#### 2.4 DATA BASE APPLICATION

Database is a set of programs which deal with database management activities. The different application programs can access the same Database via a set of controlling programs known as a set the Data Base Management System (DBMS).

Database is a single organised collection of structured data, stored with a minimum of duplication of data items so as to provide a consistent and controlled pool of data. This data is nothing but pieces of information put together for use, and is common to all users of the system but is independent of programs which use the

data. The independence of the database and programs using it, means that one can be changed without changing the other.

Data base are normally set up in order to meet the information needs of major parts of an organisation.

Some databases have their own computer languages associated with them which allow the user to access and retrieve data at a terminal. Other databases are only accessed via languages such as COBOL to which extra facilities has been added for this purpose.

The facilities of database has earned her recognition in the world of computer today and a such used by many organisations of reputation. These facilities includes:

1. The Data Base Management System which constructs, expands and maintains the database provides the user with the services needed. It also provides technicalities and the interface between the user and the data in the base.
2. Data redundancy is eliminated. Data redundancy occurs in file processing system when the data cannot be arrange to suit all the option program accessing the data. This result in the samedata appearing in more than one file. In an environment where there is duplication of data, problems concerning the updating and deletion of data often arises since a change in any of the duplicated data will necessitate a change in any file that contains the source data.
3. Data integrity can be maintained using Database. Data redundancy can lead to a lack of data integrity and a common sympton of this, is inconsistent information. This means that the information generated by the data processing system can no longer be trusted, if data

appear in many different files, its possible that some of these occurrences may not be properly updated.

4. Data independence can be achieved. The problem of data redundancy in a file processing system may be avoided by confining all data in one file. In this case, all the applications will access this file which means that all the program must adhere to the one available. This would be satisfactory as long as the data need not be changed. If any change occurs to the data records during the life of the file, then all programs accessing the data must be changed. Database system provides data independence in the degree to which an application program is insulated from physical or logical changes to data.
5. Data sharibility is increased. Integration of data is an important factor in its own right and may be an overriding factor in some cases for the employment of a database system, the sharing of compatible data by different applications allows the user to gain valuable information by picking data from right across the organisation. The data are no longer "owned" by particular applications but instead they are shared by all the users.
6. Data is centrally controlled. In database environment data and options on data are centrally controlled and this can lead to better management of database users.
7. Easier, logical access to data. The increasing use of telecommunication by many organisations and the conversion of many data processing mode meant that users have better access to the computer. For too often where they find that data are locked in computer form and the

file structure which tend to be monotonous for proper information generation. Data Base Management System provide a means of overcoming this barrier.

8. Database also have the facilities to add new records, delete "dead" records and amend records when new sets of data are added, it is often found that some of the required data is already stored for other purposes. The database is maintained by a "single input". This means that just as there is also no duplication of inputs one transaction will cause all the necessary changes to be made to the data. The data items in the base are 'linked' or chained to each other so that any required relationships can be changed and new relationships can be established, hence saving a great deal of time.
9. Database has function of providing security for data as follows:
  - a. Protecting data against unauthorised access.
  - b. Safeguarding data against corruption.
  - c. Providing, recovery and restart facilities after a hardware or software failure.
10. A national English language database query and retrieval system is used for query and adhoc reporting. Thus providing easy and instant access to information by retrieving the data. This system will retrieve from the database the target and actual sales for each model and display them on the screen or printer.

## 2.5 TYPES OF DATA BASE

dBase III plus, (from Ashton - Tata) is the leading database program. It has the following facilities:

1. It can create simple database application, such as keeping of names and addresses or inventory records.
2. Most accounting packages use dbase III plus.
3. Being a relational database, a database file is organized in form of a table made up of rows of records.
4. Many database files could be made in a dbase III plus.
5. dbase III plus has dbase commands (called dot commands) directly without using menu.
6. Files can be sorted physically, or index files created to present sequences without actually sorting the database in a dbase III plus.
7. There is also the facility to generate reports and mailing labels from database files.
8. A large number of built-in functions are provided and also dBase III plus offers a programming language that enables you to construct your own data applications.
9. dBase III plus is versatile in many ways; a screen design facility is provided for the custom design for input and output screens and to perform error checking and editing on input.

There is also the dBase IV which is an improvement on dbase III plus. The most improvement over dBASE III PLUS is the full relational database capabilities. SQL (Structured Query Language) that is compatible with IBM's SQL available on main frame IBM machines. Databases can be viewed through the SQL facility as relational databases. Database queries and updates can be performed using the SQL command language.

There is also the O R A C L E which is also a relational database system. This, keep information in tables. Access to a database constructed using O R A C L E is achieved using English like database query language i.e. Structured Query Language (SQL).

Using SQL, you can enter, retrieve, update, delete records and add new tables into a database. ORACLE also provides an extensive audit trail and facilities to audit database operations. It provides multiple levels of access control using combination of pass word and user privilege settings. The administrator can specify and change passwords and user privileges

#### USES

The uses of the database are too numerous to list completely but a selection does give some idea of the facilities which a data base can provide:

1. Accounting. Customers or even staff when billed or budget made which causes change, it automatically causes charges to be mended i.e. thus using the "single input" principle.
2. Spares. The database is used to control stocks of spares. It can also be used to find the location of a spare part nearest to the installation which requires it.
3. Modifications. If a modification to a particular item of equipment is needed, all installations in which it is present can be quickly identified.
4. Engineering services. The database shows which customers are served by which Engineer for instance cross referencing of records. Engineers can be allocated to cover absence or sickness or to assist

show which types of equipment the engineers are qualified to service.

Finally, the versatility of Database is perhaps one reason why it is popularly accepted.

## CHAPTER THREE

3.0 SYSTEM DEVELOPMENT

With the day to day advancement in technology especially in the world of computer, systems designers are confronted with a challenging task of creating new system and how to improve on the existing system. In any organisation system development has to follow the following computer-based information approaches as a preview to any new system development.

1. Feasibility Study
2. System Analysis
3. System Design
4. Development of the software or specification
5. Implementation/Performance and Evaluation

3.1 FEASIBILITY STUDY

The feasibility study or preliminary survey generally described as the study of the existing system in sufficient depth in order to be able to provide management for the proposed system, this focuses on an existing operation that requires improvement in the case of this study, it is very important that her budget and finance department be automated. From the feasibility study carried out, though the National Primary Education Commission (NPEC) has a number of terminals at her disposal, a main frame computer at the headquarters and each at the zonal office, each Primary School Management Board (PSMB) and even at Local Government Education Area (LGEA) has nothing like computer and even at the headquarters, the computers are mainly used for other departments' data entry and not for budgeting and finance. The finance department uses completely manual system in carrying out her day to day activities, which involves a lot of time wasting, delays, inaccuracies and gives ample space for committing fraud. In disbursing funds to her subsidiaries,

the finance staff prepare the details manually and send the fund with papers explaining what the monies are meant for, how it should be used and expect a feedback on how the monies were used considering that the expenditures were reasonable. This calls for series of meetings both at headquarters, at Primary School Management Board (PSMB) and Local Government level. For instance, all these meetings, come up almost every month which is also a way of wasting resources and time.

The pension and gratuities for primary schools teaching and non-teaching staff were done manually by the department in question (finance). There were often cases where the correct amounts were not paid, names omitted on the pay lists, cases of people paid about what they are entitled to, and so on. There was a case of a teaching staff based in Imo State and his gratuity was over paid. It was thus discovered later that it was a shoddy deal between an accounts staff in the headquarters with the particular staff at Owerri. Now the question is how often does this type of dirty situation occur and how many members of staff get involved? Thus the manual system in NPEC finance department allows for a lot of lapses. The following are some salient questions that was raised during the feasibility study.

### 3.1.1 NPEC's EXISTING EQUIPMENT

Can the computers and softwares to be purchased meet the requirement of NPEC?

The Federal Government in her bid to improve the standard of Primary Education in Nigeria has already realised the need for computerisation of all the information hence she purchased some computer systems for the commission's headquarters and four zonal offices, a network multi-user hardware system was installed at the headquarters. Sixteen user work stations were hooked on the

processor (server). The server is an IBM PS/2 model 80-311 with initial processor 80386, having 20MHZ speed, 12Mb up graded RAM memory, Hard disk capacity of 630MB and other accessories. There are also nine complete computers, IMB model 50 series with intel 80286 having 16MHZ speed 2MB of RAM memory and 60MB of Hard disk. There were also 7 dump terminals using WYSE 60 system comprising a monitor and keyboard. At the zonal offices, multi-user systems were purchased. Each system comprised the server IBM model 80 - 311 and four WYSE terminals. From the above, the computer system and terminals both at the headquarters and zonal offices can meet the needs of the finance section if she is incorporated.

### 3.1.2 INTERVIEW AND OBSERVATION

Whether the introduction of a computerized system would cause staff problems which can either be of a personal or political nature? There is no problem envisaged with the introduction of computer in the budgetting and finance of NPEC. As enumerated in the point above (3.1.1), the commission has well enough computer systems to incorporate the finance data into her present computer systems. However, the prejudice of fear in the part of the finance department can be overcome by suitable discussion and a little bit of persurassion on the part of the management.

A cross section of the staff at the headquarters were interviewed on what the computer department activities were and why the finance department is not computerised. A great deal of time was spent interviewing the users of the computer systems and a few staff of the commission. Interviews have varying degrees of structure; for a first meeting there may be no structure at all. The analyst may be getting acquainted with the user and gaining a broad understanding of the problem area. But as the project (of getting information) progresses, more structured interviews thus

How do you think a computer might benefit you? This question was answered by one of the Senior staff (GL 08/02) in the accounts department viz:

1. Reduce the time spent in processing papers.
2. Reduce frequency of errors make.
3. Makes the job more interesting.
4. Makes information easier to fund.
5. Makes the use of information easier.

There was also a response from a junior staff on the same question above thus:

1. It would make things more complicated.
2. More mistakes would be made
3. Very hard to use the automated system.
4. Its time consuming.

A director in the commission has the following to say about the present manual system in the budget and finance department:

1. The present system is tiring and time consuming.
2. Its polarised to fraud.
3. There is no consistency.
4. Lots of alterations are made almost every time.
5. Vetting of the papers by the management is becoming embarrassing as there is always alterations made either deliberately or otherwise.

Another staff of the computeer department who was asked whether it will be easy to incorporate all data coming from budget and finance department has the following to say:

1. It would be easy with the number of staff on ground.
2. The commission will need to acquire softwares for finance purpose.

3. It will make the work easier for the accounts clerk.

Another staff of the commission who is neither in computer department nor in finance department has this to say:

1. It would make the job boring.
2. There would be problem though he does not know specifically the shape the problem would take.
3. It may mean some of the accounts staff loosing their positions and jobs to machines.

The above had been the summary of the individual person interviewed. On getting to the Primary School Management Board (PSMB) Minna, the head of the accounts section is completely innocent of the fact that the commission has some terminals at the headquarters and he is convinced that if a terminal is given to their section, it would reduce the load of work, time used in travelling to summit estimate and collect fund. Also work done on paper work will be reduced.

Observation technique was also used to collect information in the NPEC. This is done so as to obtain a first hand information on the existing system. The technique gave ample opportunity to see how documents are handled, how processes are carried out and whether or not commissions policies, bills containing the rules and regulations binding the commission especially the budget and finance department are actually followed.

From the observation made, it was discovered that most of the staff in the computer department are copy-typist who do not have the proper knowledge/training of what Computer Systems are. They are only given information by the head of the unit to type in data. Most of the rules governing any computer centre were not observed. For instance, the floor is not carpeted, the diskettes not properly arranged or stored. Some of the staff take snacks and drinks in

It was also observed that the documents processed in the Computer Unit were mainly from Monitoring and Evaluation department, Personnel Management department and Research and Statistics department; printing of invitations both for personal use and official, printing popular sayings, typing (using word processor) letters, and so so. However, there is nothing on salaries or drawing out pay roll, the commission's budget, pension and gratuity monies to be disbursed to subsidiaries etc.

If a problem can be solved, it may be so complex and expensive that it is not feasible, hence the name feasibility study. The feasibility carried out must have some testing project, which should include the following.

- A. Operational feasibility: This is concerned with the workability of the proposed system. When developed and installed, generally what is considered is that, the project has to receive the support of the management and user, which may have to be with government's directives. The proposed system which is incorporating, the finance sector in the already existing computer unit has been an ignorance or oversight on the part of the management, a such proposing for it to be automated is a welcomed idea which will cost no harm, no complicated problems and will have a positive effect on the performance of the finance department.
- B. Technical feasibility: This seeks to clarify if the proposed project can be done with current equipment already purchased by the Federal Government for the commission's use. The existing technology are okay but there may be need to purchase some software to be recommended later in the course of this study. The

staff as at now in the computer unit can manage but for more efficiency and maintainance as earlier mentioned, there is a need to employ maintainance personnel.

- C. Finanical/Economical feasibility: This aspect is taken into consideration to access cost of implementing a proposed project along side with the benefit to be derived from implementing it. There is little to be said here as far as implementing the budget and finance of NPEC. This is because the most important machines has been bought and asuch little is needed to be done in terms of acquisition of hardware.

### 3.1.3 HOW TO DEVELOP THE OLD SYSTEM

Can the system be developed in a sensible amount of time given the available resources?

The case of NPEC as regards the above question has been solved, since there is a computer department already existing and all the hardwares are available. Hence the change-over period has nothing to do with the commission and also, implementation and testing had already been done after the installation.

### 3.1.4 MANAGEMENTS VIEW

The question of whether or not the management is happy that the extras will be offered by the system is a forgone issue, as the Management is also aware of the advantages attached to an automated system which justifies the introduction of the computer in terms of cost of running and maintaining the system.

### 3.1.5 COST OF IMPLEMENTING THE NEW SYSTEM

Assessing the cost and benefits in the case of automating NPEC's finance sector which has been done with the acquiring of the systems enumerated in 3.1.1 above, terminals and equipment. Thus

the only thing left which will cost the commission money is to purchase a software to be used for budgeting and finance. Another cost which may be incurred by the commission is training and re-training of staff which will be discussed later.

### 3.1.6 DATA ENTRY/TRAINING

The next question is, who will undertake the massive task of typing in the data to the system? This question often put people off computerisation when automation of a system is takening off newly. The process involved in getting the data form its point of origin to the computer in a form suitable for processing is called Data collection and Data are general expression used to describe any group of operands or factors consisting of numbers, alphabetic characters or symbols which denote any conditions, value or state. Also Data are physical representation interpreted through work orders, experimental results or analysis, costs of operation, or tax schedules. Data can originate in many forms but the computer can only accept it in a machine sensible form (i.e the language of the particular input device). Data collection starts at the source of the raw data and ends when valid data is within the computer in a form ready for processing.

To analyse a system, we must collect data. A variety of techniques are available for data collection. We have primary data collection which involves direct interaction and secondary data collection, these are collected from existing sources interviewing an individual or observing somebody at work are examples of primary data collection while examining of company/any organisation's records concerning the volume of invoices or shipment would be an example of collecting data from secondary sources.

Now back to the question of inputting the data of budget and finance department of NPEC will not be a big do, since we already

in the data will be faster with the head of finance department vetting through each page as it is being put-in.

It may however, be necessary to provide extensive training and re-training both in-house training, in-service and vendor sessions for the finance staff to overcome their fear of the system and even the staff in the computer unit. The amount of training required for various categories of personnel will depend upon the complexity of the system and the skills presently available. Vendor type of training is when the manufacturers of the system are invited to an organisation to train the staff; in-service training is when a staff is sent to an institution or training school to learn about a profession this study can be done locally or abroad. Note that the organisation caters for all the expenses of the person in training while he is made to sign a bond and paid half salary monthly as the case may be; while in-house is that training done in the organisation.

It is pertinent to ensure that all the persons involved with the new system are capable of making it an operational success. The following aids would be used as appropriate:

- a. Handbooks: These will be produced as part of/or development from, the systems specification.
- b. Courses: Either full-time or part-time courses, often run by the computer manufacturers.
- c. Lectures: General background knowledge or knowledge of specific areas could be covered by means of lecture.

### 3.1.7 MAINTENANCE

Maintenance is required because programs inevitably have errors that must be corrected when they appear. The problem of maintenance is not envisaged in the case of NPEC because the required terminals

given by the supplier companies. But since users and the computer staff may not have communicated accurately, so that certain aspects of the system must be modified as operational experience is gained, a maintenance expert and a programmer ought to be employed permanently so that as users work with the system, they will continue to learn more and should there be any question or confusing stage, there will always be somebody available to assist. As time passes by, they (staff) will be developing and ideas for change and enhancement will be made by them.

In conclusion feasibility study are designed to assist in choosing, from among a range of alternatives, rather than from two choices. The feasibility study has to contain enough detail so that an alternative can be selected for development. Hence before any type of feasibility study can be undertaken, we have to obtain a feeling for the existing system as discussed above.

### 3.2 FEASIBILITY REPORT

The feasibility report of National Primary Education Commission shows that the four major departments i.e Monitoring and Evaluation; Personnel Management; Finance, Supply and Planning, and Research and Statistics meet departmently to deliberate and draw out there budget. The departmental budget is then passed to a budget committee whose memberships are drawn from the management under the Chairmanship of the Executive Secretary.

The budget section of finance and supply then collates all the deliberations of the committee and take same to the Federal Ministry of Finance budget department to defend the budget. The approval of the Federal Ministry of Finance will be the budget accepted for the financial year. A warrant is issued by the Federal Ministry of Finance to the organisation on quarterly basis. The Authority to incur

Expenditure (AIE) is given to the organisation concerned. The AIE is an advice of how expenditure is made and the break down of how the buck of money is to be spent, for instance salary, capital expenditure, office expenses, medical and so on. The warrant is then sent to Central Bank of Nigeria citing the commission's account on the advice while the organisation gets her fund. The above stages are what is obtained in the NPEC i.e the transfer of fund from FG to the commission's account.

### 3.3 SYSTEM ANALYSIS

Feasibility study is the preliminary stage where investigation of the problem is done and all possible alternative solutions are done to look into the problem. After feasibility study, we have system analysis.

Systems analysis is the specifying, setting up, testing and evaluating of the system. The evaluation is done to see if it has achieved the desired aims and objectives that were laid down when the specifications for the system were drawn up. System analysis can also, be said to be the process of analysing particular systems to see if computerisation would be a useful, productive and more profitable way of performing the organisation's operations. In a place like the NPEC, where she co-ordinates a very large area from state to village level, computer systems are often employed to carry out the processing task of budgeting and allocation of funds with the users of the system. With more meaningful data in a much simpler form which is a way to provide a general introduction to the existing manual system.

After all the relevant data has been collected, the analysis part has to do with reason for any problem that occurs, how to solve the problem and alternative methods. The first step is enquiries to be made about the system requirements. Requirements cannot be over

looked when introducing a new system. Under the requirement we have requirement determination which is studying the existing system. When the existing system is studied, it will act as an eye opener to the system that is to be introduced. The requirement determination has the following:

1. Requirement Anticipation
2. Requirement Investigation
3. Requirement Specification

NPEC as earlier discussed, when fund is disbursed to her by the Federal Government, the Executive Secretary with the assistance of the Accountant must have gone through all the budget of each department, zonal offices and the Primary Schools Management Boards amendments or suggestions are made before sending the fund out. We should note that the meeting of how the money allocated may take weeks before its final implementation because of the paper work involved. There are salient points to be considered before money is finally disbursed this includes educational advantaged schools, statement of accounts how the last quarter's money was spent by each state right to the village educational committee level, the balance or deficit, question of transfer, leave bonus, loans, pensions etc.

#### 3.3.1 REQUIREMENT ANTICIPATION

This is the problem the analyse foresee in the new system which will be as a direct result of what is being anticipated. In the case of NPEC, the only anticipated problem is the training of staff to get acquainted to the use of computer systems. This problem can be overcome by first organising in-house training in the computer unit.

#### 3.3.2 REQUIREMENT INVESTIGATION

The manual system in operation in the budget and finance department of NPEC needn't be investigated for a length period before concluding that its time wasting, inefficient, leaves loopholes for

manovaes, inproper for documentation and a host of other disadvantages.

### 3.3.3 REQUIREMENT SPECIFICATION

The requirement specification like the requirement anticipation has to do with the stages the existing system undergoes before work is done. Since the establishment of NPEC is to uplift the high standard of primary education in Nigeria, the management of the commission are aware of this, hence the involvement of large fund and how it ought to be allocated. The school system in Nigeria is such that progressive efforts ought to be a continuous one to have any meaningful positive effect. For instance, if the primary school teachers' salaries are delayed for a month or two there will be strick action by same. If this happens, NPEC will have to be blamed because prompt payment of primary school teachers' salaries is one of her responsibilities.

In conclusion the systems analyst ought to take the following into considerations:

1. Sieve through if things are being done in the best possible way or is there an obviously better way.
2. Decide at this stage if the system is indeed needed at all.
3. When the analysis has been concluded a final report giving the system or to terminate the exercise will be given.

### 3.4 SYSTEMS DESIGN/DEVELOPMENT

Assuming the final go ahead in terms of implementing the system has been given, the system now has to be designed. First the outline of the system must be developed, then the detailed design of each subsection may follow. The goals of system design also include the following:

1. Understand the problem and the present solution.
2. Suggest improvements to present procedures.
3. Assess the feasibility of using a computer system.

4. Design the best possible system within the units of

5. Program and test the new system.
6. Implement the system.

There is also a need to build an abstract model of some information processing procedure in such a way that it can be viewed as a system. There is no specific correct model or one system and that is why we usually employ a design team so that many views and diverse experiences can be brought to bear on the analysis and design task. Probably the oldest graphic design aid is the flow chart. A flow chart consists of a series of symbols and connections among them. The manual flow chart data diagram of a typical accounts procedure in the Primary School Management Board (PSMB) and Local Government Education Area (LGEA) are found below:

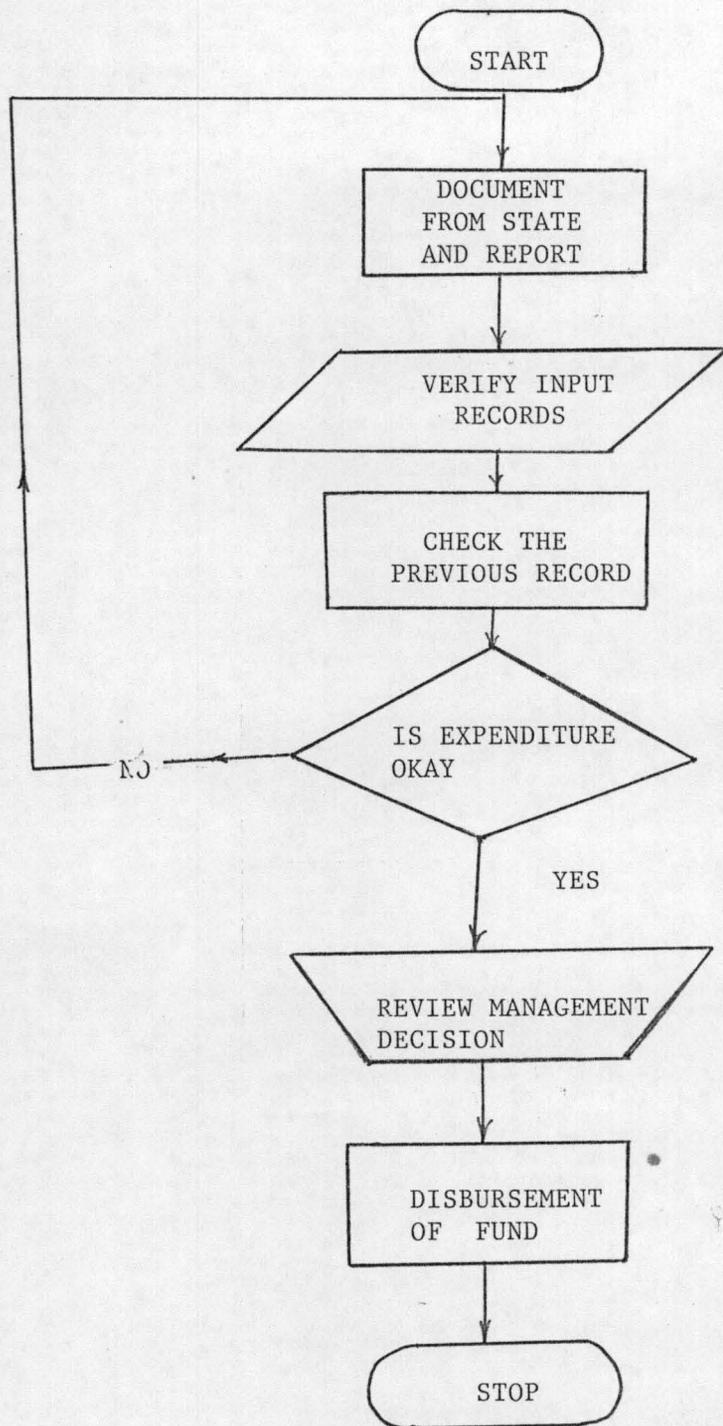


Fig A: MANUAL DATA FLOW DIAGRAM (STATE)

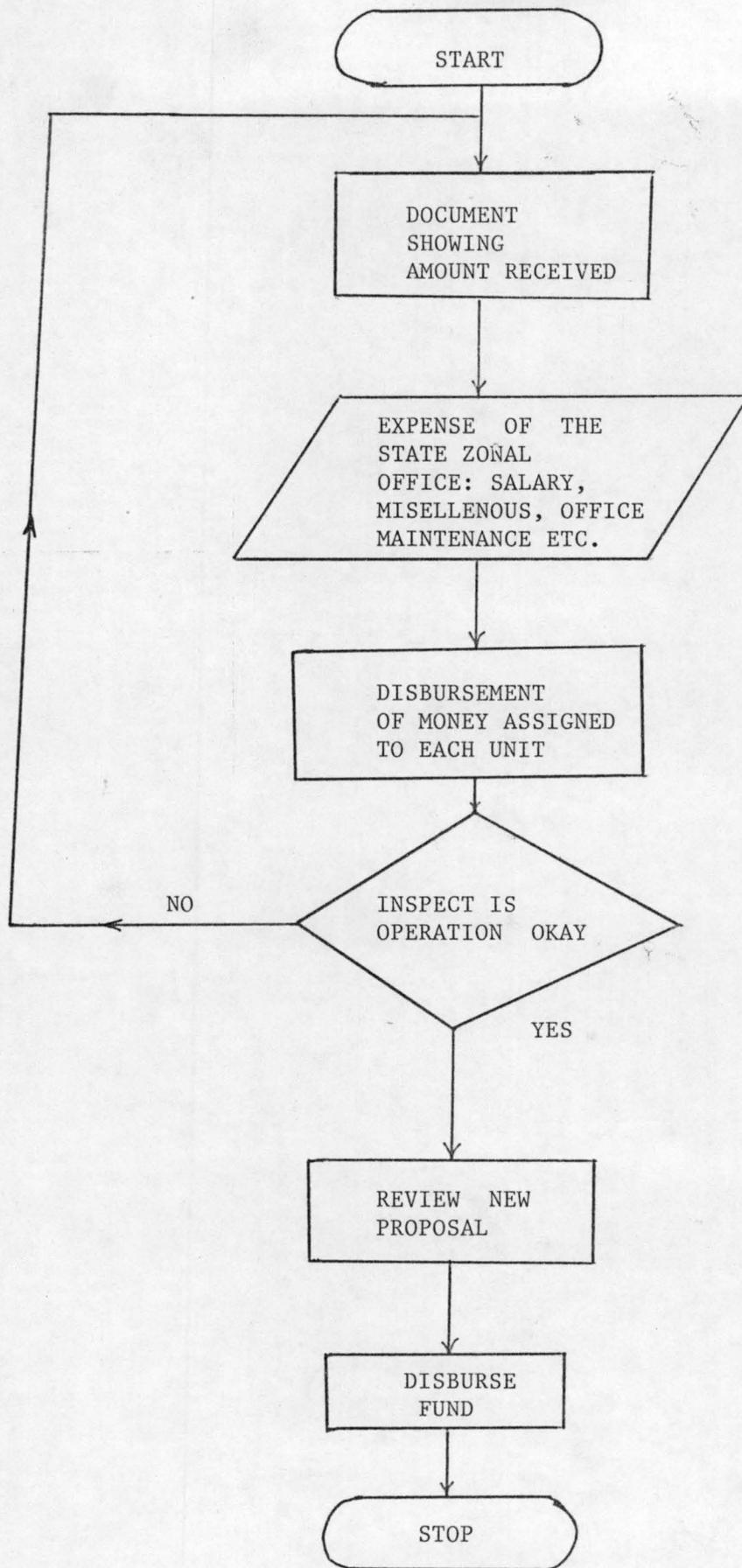


Fig. B: Local Government Manual data flow diagram

Input, Output activities, irrespective of media or format are represented by a parallelogram . However specialised symbols may be used instead for punched cards or a terminal. The process outline is a rectangle and is used for any kind of data processing; it is the symbol used when no other special one is available. This symbol can stand for data transformation, movement or logic operations.

The flow lines show the sequence among steps and the transmission of information among operations. An arrow is used to specify direction when it is not implicit in the diagram.

An open rectangle connecting it to the flow chart is used to annotate the flow chart. Out connectors are used to indicated that the flow is to be continued on another page and an in connector shows that another page contains the preceeding processing.

An interrupt symbol shows a beginning, an end, or a break in the usual line of flow. Communications links indicate the transmission of data flow from one location to another.

There are other signs that are not commonly used. For instance used mainly for documentation. Given these symbols, a wide variety of processes can be represented graphically. For the analyst, flow charts of the existing system can be of great assistance in visualizing how it operates. These charts can be used to communicate with users as well as within a design team; they are also valuable for training purposes. The use of many charts and symbols can make it difficult to read and share charts among different individuals. Thus for the purpose of this study, simple symbols in hierarchies were used.

shows the origination, processing, and final destination of the documents. It also shows the procedures employed by users. Since systems cannot function without human assistance, these charts are quite important.

In a nutshell systems design involves all the processes that takes place in a system, right from the in-put to output and its representation.

### 3.5 SYSTEM STRUCTURE LAYOUT

This unit provides guidelines and structural layout of the school management of the major subsidiaries (PSMB and LGEA) under the NPEC. In Chapter One of this project we represented structurally the major departments that made up NPEC the units under the department and supervisors. But since this project is concerned about all the units in NPEC, we shall only look into the operational structure of the Local Government Authority.

To enable the LGEA to effectively provide and utilize personnel necessary for performing its functions, each LGEA is organised into five functional departments namely Finance and Supplies, Planning, Research and Statistics; Supervision; Personnel Management and Education Services. The structure is illustrated below:

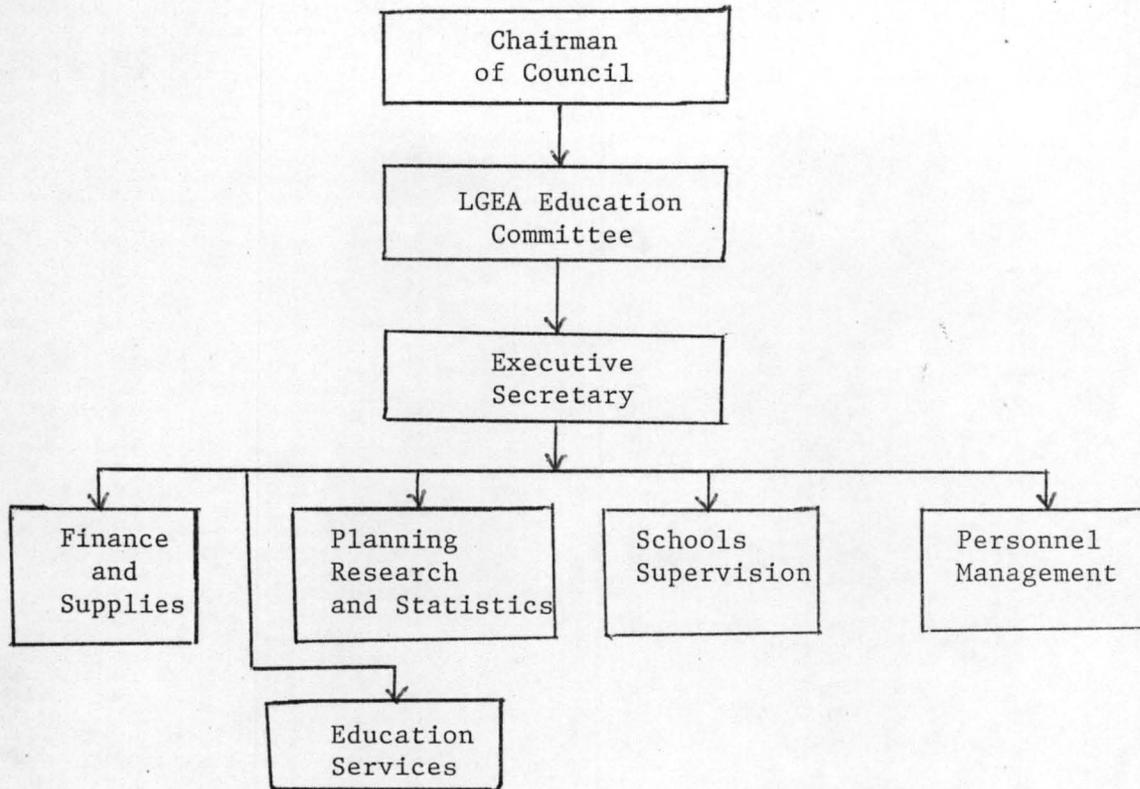


Fig. C: HOW THE LOCAL GOVERNMENT EDUCATION AUTHORITY OPERATES

The functions of the finance and supplies department are as follows:

- i. Prepares the LGEA budget, disburse the funds provided to it from the Local Government sources and assessment and provision of salaries and allowances of teaching and non-teaching staff based on the scheme of service drawn up by the Local Government Area.
- ii. Submission of annual estimates annual accounts and monthly returns to the authority. And also ensuring annual auditing of accounts.
- iii. Undertaking of capital projects and general maintenance of primary school buildings and infrastructure.

- iv. To purchase store and supply needed equipment and materials to schools and LGEA offices. They also undertake capital projects and general maintenance of primary school buildings and infrastructure.

The functions of planning, research and statistics division are as follows:

- i. To compile, on a regular basis, statistics of all aspects of educational development in the LGEA.
- ii. Analyse and study available data on the basis of these to develop plans for the consideration of the council.
- iii. To draw up physical plans for schools.
- iv. To investigate ways of improving educational standards in the LGEA.
- v. To provide both Federal and State Governments with data in respect to primary education.

Functions of the personnel management department includes:

- i. Looking into welfare matters of staff; recruitment, appointment, promotion and discipline of teaching and non-teaching staff, posting and deployment of teaching staff, including inter Local Government Area and inter State transfers; retirement and absorption of teachers.
- ii. Preparing schemes for the training and re-training of teaching and non-teaching staff.

- iii. Issuing testimonials and certificates of service to teaching and non-teaching staff, whenever necessary.
- iv. Dealing with leave matters, including annual vacation leaves.
- v. Ensuring that annual reports are rendered by Heads of school on teachers appointment to service under them, and treated promptly.

The supervision department's responsibilities includes viz:

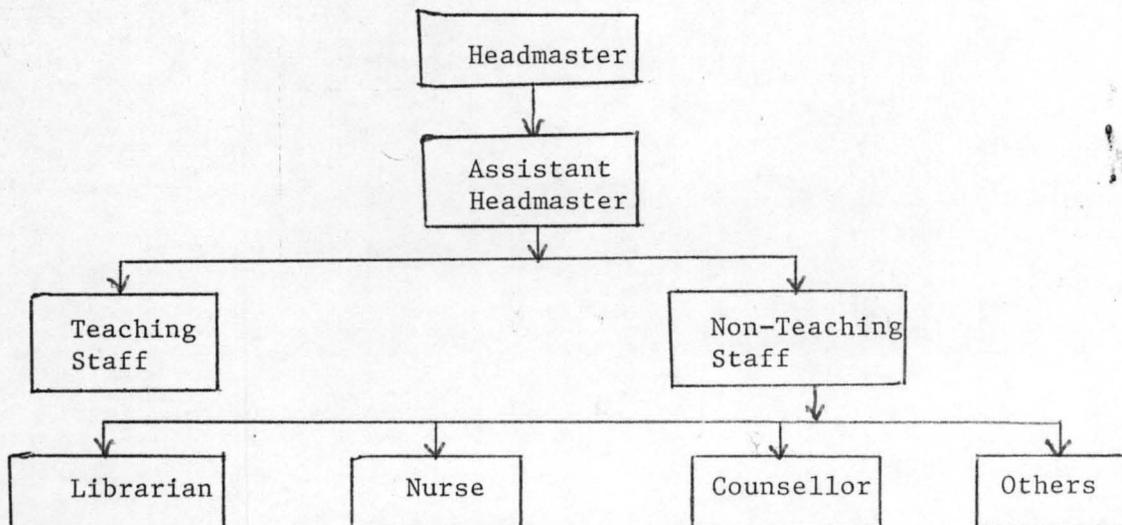
- i. Periodic visits to schools to identify the problems teachers may have in making their work effective.
- ii. Assessing the effectiveness of teachers in schools.
- iii. Stimulation, promotion and encouragement of communal participation in the running of primary schools in its area of jurisdiction.
- iv. Taking all responsibilities to ensure full enrolment and attendance in all primary schools in its area of jurisdiction.
- v. She also is responsible for the administration of the school, evaluating students learning etc.

The educational services department has responsibility to initiate and/or coordinate school activities in the following areas.

- i. Review the curriculum at often as possible and update if need be to meet the goals of attaining higher standard of primary education.
- ii. There should be guidance and counselling professional counsellor at each LGEA to help the pupils, parents and teachers.

- iii. The LGEA should have a zonal library.  
Libraries or mini-libraries should be established in individual schools.
- iv. The educational service at the LGEA should co-ordinate all tests and measurement exercises to aid effective teaching and learning as embodied in the National Policy of Education. Providing adequate learning materials and security of school facilities.
- v. The educational service should see to the maintenance of facilities and equipment.
- vi. The LGEA should zone the schools and provide a Nurse for each zone. They should liaise with the Health Centre for periodic immunization as required/necessary. Acquisition of first aid and environmental units in each LGEA.

Fig. D: STRUCTURES OF A TYPICAL SCHOOL



### 3.6 PROCESSING SPECIFICATION

The specification to computerize the budget and finance department of the NPEC will depend on the following questions:

- A. What type of data processing is right for the organisation?
- B. What central processing unit (CPU) size and speed are needed?
- C. What kind of peripheral devices are needed?
- D. What software is needed?
- E. What kind of vendor maintenance is available and what does it cost?
- F. What staffing and training will the department need?

Answering the above question will provide management with a good basis for the processing specification needed for the NPEC finance activities.

With the existing hardware in the NPEC, the purchase of the new software will have to depend on the complexity of the operations which of course will be determined by the complexity of the hardware.

A major consideration in the size and speed of the system's control processing unit (CPU). A real-time system needs a large and fast CPU, as do online systems that take data from a broad array of files. Batch processing can use smaller CPUs because the flow of data is not critical and tends to be minimal. Once the rule of thumb was that the larger the CPU, the more expensive. But recent technological improvements have rendered this rule inaccurate. Technology is improving processing and reducing the size and cost of CPUs.

The question of buying new computer system does not arise in the case of NPEC because she has her hardwares.

The type of peripheral devices an organisation wants relates to all the factors discussed already. If for example, online support is necessary, a terminal will also be necessary. The decision then becomes which type of terminal is best suited to the applications at hand. Many organisations buy all equipment from one manufacturer to ensure compatibility within a system. But recent advances have made it possible, however to mix different manufacturers' equipment into a smoothly operating system. Some smaller manufacturers have their equipment quite attractive because of the price. All these considerations come into play when people are deciding on what equipment to use.

Specification is the detailed list of the software required to support the processing of data in a system. Software for a system will depend on what is available on processing needs, on compatibility with hardware, and on ease of modification. A new system requires careful thinking about matching software. Sometimes, there is the need to hire or consult more people to develop the necessary software for a company. Management may also decide to develop software as needed rather than buy it all at once. Here, too, costs for either alternative will affect management's decision.

When an important database is kept by a computer, then it is necessary and essential to have a backup system in case the disk becomes corrupted. If this did happen, then it would confirm the worst fears of the anti-computer lobby. It may even be necessary to have a complete backup system that may be switched on to run at a moment's notice. Service is to be given adequate consideration in specification process. Most manufacturers include service in

is contracted for separately. Though users are free to shop around for service, many buy service from the manufacturer.

Training of staff is another important factor in processing specification. A privileged user of the system must be able to update the accounting procedure database when fund is available. Similarly enquiries may be made to determine who has what in terms of fund available both at the State and Local Government level. This will mean that the computer system will need a real time clock facility. It should be noted that only privileged users such as the Accountant may alter the files. Anybody else on the system may only read data from the files. In this way, the security of the system can be maintained. If it is though necessary then a system of passwords can be introduced hence budgeting would be easier when made annually or quarterly as the case may be, because it will consume little time.

Adequate training must be provided for the people who will work on the computer and management must tain enough people so that work is done efficiently. Many manufacturers offer sound training programs to their equipment users at a nominal charge. Employees are scheduled into training sessions before the computer arrives, before they assume their new duties and sometimes after assuming duty.

In a nutshell processing specification is an investigation that follows feasibility study.

## CHAPTER FOUR

4.0 SYSTEM DESIGN

The following major activities are involved in system design: Logical and Physical design, design methodology, input/output form design, and file design.

**Logical Design:** Designing a system is a two-phase process involving logical and physical design. Logical design depicts the logical flow of the system and provides the system specification. A detailed logical design lays out system specifications at a level with no further breakdown. From such a layout, a data dictionary and structural English are prepared for system implementation.

**Physical Design:** Logical design leads to physical design, which develops program software i.e the working system. The programmer uses the logical design specification to write the programs. Starting with a system specification document, a system flow chart and Data Flow Diagram (DFD) are produced.

4.1 STRUCTURED DESIGN

Structured design is the process of designing the computer programs that will be used in the system. The system design document produced by the structured design. Design phase is, in effect a blue print that the programmer follows in coding the programs.

The primary advantages of structured design are that it produces computer program:

1. that are more easily maintained.
2. that can be tested module by module in a Top-down fashion and
3. that can be more easily understood.

4.2 OUTPUT DESIGN

the user. Several activities take place in output design. First, the analyst decide on the content of the output and how easy it is to read and understood for instance, a report should not look cluttered and if, it is for a top management, should be coincide and to the point.

The layout of the output information should be so designed as to make it easy to follow. A common form layout is the Z format. The data are clustered into zones beginning in the upper left corner of the form.

There are also layout form using rules and captions. A rule is a vertical line that separates columns and a caption is a column heading. Whenever possible, "eye catches" should be provided. These are areas for special information such as date, finance charges, amount due and so on.

The second output design consideration is to identify the hardware and software and determine how they will meet the output quality requirement. The choice of a printer, for example, depends on the print quality requirement and the turn around time for producing the report.

In evaluating the overall output design, it is important to have a checklist that verifies that all the necessary information is complete and produced in a timely manner. All reports and documents should also be examined to determine if they could be made more presentable. The use of graphs and charts should also be considered as a part of the output design effort.

#### 4.3 INPUT DESIGN

The purpose of designing input is to make data entry into the computer as easy and as accurate as possible. The data entry operator should understand how fields are allocated, how each field

is to organise the source document and then decide on the media that will accommodate data entry into the system. A source document is an original user generated form such as a time card, sales invoices, or customers order form. Source data may be captured on tape, disk, diskettes, or hard disk. They can also be read directly from an input device or entered manually through a keyboard. A source document should be logically organised and easy to understand. The areas in the form should be in proper sequence and clearly identified.

There are four (4) approaches to data entry viz:

- i. Command
- ii. Menu
- iii. Formatted form and
- iv. Prompt

COMMAND: In the command approach, the user enters a special word or a phrase to trigger a response from the system for example in data base system, the user may enter the command "LIST" to list the records of a file. DELETE to erase a record from a file or COPY to copy information from a file to a temporary location in storage.

MENU: An alternative data entry is the menu. A menu is a list of options. The user simply enters an option to perform an operation.

FORMATTED FORM: The formatted form is a fill in-the-blank data entry design. A preformatted blank form is painted on the screen. The cursor blinks at the first field to be entered on the form. After entering the data, it moves automatically to the next blank.

PROMPT: The prompt is a conversational approach to data entry. The system displays one question or instruction at a time and waits for a response; for instance, the system may request the user to input

and the amount of withdrawal.

#### 4.4 SCREEN DESIGN

An input (batch) or input screen (on line) can be designed. The format of an input is an important design step and must be handled accurately by the programmer. The main point is to specify through programming what information is to be displayed, and where on the screen it should be displayed.

There is the integrity issue when inputting data. It is an important aspect of data entry design. Another important aspect of data entry is the degree to which the data in storage are accurate and secure. To ensure data integrity, we must either rely on the operator to ensure accurate data entry or on the software to detect and prevent errors. Thus the software will not allow invalid data to be entered. The operator has to re-enter the correct data before entry continues.

#### 4.5 FILE DESIGN

File and software design are two major activities that transform data into outputs. In file design, several activities are considered:

1. Grouping the data items to be stored, determining the number of data items, their format, and the potential volume of the file. Modifying the layout of fields in data files late in the implementation phase can be both costly and disruptive.
2. Determining how the files will be processed:  
Batch or on-line processing: In batch processing transactions are accumulated in batches and processed at one point in time to update the file.  
In on-line processing, transactions are entered

in to the system as quickly as they occur. In this way the files are immediately updated.

Besides file processing methods, the access method - sequential, indexed sequential, or random - must also be considered. A major factor is file activity and file volatility.

File activity refer to the percentage of actual records, processed in a single run. While file volatility refers to the properties of record changes. File records with substantial changes are highly volatile, which means that disk design would be preferable over tape.

3. Designing the checks and internal controls for accessing the files to ensure integrity and security of the data. Controls should provide assurance that the correct files are being accessed by authorised users and the data are not changed without proper authorization. Moreover, the programs that access the files must be executed based on authorization.

#### 4.5.1 SPECIAL DESIGN CONSIDERATION

Files are a shared resource. this means that, there is the need to analyse how each program will access the data and then design the file for efficiency of access and update. A significant trend is the use of integrated database rather than files. With an integrated data base, it is possible to control integrity of data, by controlling data redundancy.

#### 4.6 SOFTWARE DESIGN

This important aspect of system design involves the

preparation of programs, procedures, documentation to handle the processing activities. The objective of software design is to ensure that all the required report and other output information are produced to the user's satisfaction.

After the programs have been coded, the systems analyst or programmer goes through a structured walkthrough - a methodical review of the procedure and steps taken in designing the program(s) under review. Usually, such a walkthrough involves a project team that is handling the project. All errors or enhancements are discussed and changes agreed upon before the software is approved for final testing and implementation.

## CHAPTER FIVE

## 5.0

IMPLEMENTATION

Implementation is carried out after the design stage had been completed. Implementation is concerned with the co-ordination of the efforts of the user department and the data processing department in getting the new system into operation. In other words, implementation has to do with co-ordinating and controlling of the activities, necessary to put the new system into operation. All aspect of a system must be operationally tested prior to their use. Applications software must be certified before it can be accepted. Newly designed input forms are generally used by clerks to test their effectiveness and permit any necessary redesign. Outputs will be repeatedly refined after discussions with their intended users. Online files must be created and filled with test data to ensure their accurate storage of data. When these individual parts prove satisfactory, the components of a system can be integrated. The total system can then be tested in much the same manner that a computer program is tested. A co-ordinating committee is sometimes formed for this purpose, having as its members the managers of the departments concerned and a representative from the Data Processing department. The entire system's performance is evaluated with test data. All the system's outputs are generated with input data fed into files. The analyst responsible for the design of the new system is a very important member because of his knowledge and he checks and verifies the system's operational accuracy.

Plans for the implementation to a new system must have started earlier in the design stage. And the following points will have to be considered when implementation is being done.

## A. Training of staff

- C. System testing
- D. Master file conversion
- E. Changeover procedures.
- F. Review and maintenance

#### 5.0.1 PROGRAMMING

In chapter three Training has been covered extensively. Programming "is the process by which a set of instructions is produced for a computer to make it perform specified activity"<sup>1</sup> In programming the programmer must design programs which conform to the requirement of the organisation and also encodes the procedures detailed by the analyst in a language suitable for the specified computer and will have to liaise very closely with the analyst and the user to ensure logical correctness of programs while writing a suitable program therefore, the following will have to be taken into consideration:

- i. Reliability i.e the program can be depended upon always to do what it is suppose to do.
- ii. Maintenance: a good program must be easy to change or modify when there is need for that.
- iii. Portability i.e the program will be transferable to a different computer with a minimum of modification.
- iv. Readability: the program should be easily legible and understandable by all that reads it.
- v. Performance i.e the program causes the tasks to be done quickly and efficiently.
  - 1. A Dictionary of computers.
- vi. Storage saving i.e the program is not allowed to be unnecessarily long.

need to be followed by a good programme.

- a. Understand the problem.
- b. Plan the method solution.
- c. Develop the method using suitable methods and notations.
- d. Write well, the instructions in a programming language.
- e. Transcribing the instructions into "machine - sensible" form.
- f. Testing the subprograms separately and the program as a whole.
- g. Documenting all the work involved in producing the program.

Finally, if during testing the program an error is discovered then it is important to go back to earlier stages in order to correct the error. If the error comes from misunderstanding the problem, it will probably be better to start again from the beginning.

#### 5.0.2 SYSTEM TESTING

It is one thing to write a program when developing a system and it is another to make sure that the system works i.e being suitable with the program. There must also be co-ordination with clerical procedures involved. To this end the following has to be provided by the systems analyst during implementation:

- i. Program testing and
- ii. Procedure testing.

In program testing the systems analyst needs to supply test data designed to ensure that all possible contingencies (discussed in chapter three under process specification) have been catered for by the programmer. Expected results of the test must be worked out

before hand for comparison purposes. This preliminary test period gives the designers a chance to train the employees destined to work with the system because test data can be repeatedly processed, these individuals may perform a procedure any number of times until they have mastered that facet of the system. This training increases the overall cost of the project since the personnel must be relieved of their regular duties to develop skills related to the new system. This extra expense is more than offset by the speed with which employees operate and adapt to the system.

Why procedure testing is required is that, it will ensure that the whole system fits together as planned. This involves all procedures input to output, the clerical procedures which precede input, the actual machine processes the output and the ability of staff to handle the anticipated volume of work.

### 5.0.3 FILE CONVERSION/CHANGEOVER PROCEDURE

A file is a collection of data. A computer file is organised in such a way, that is well-defined structure to the information in the file. A computer file consists of a collection of a collection of records each of which is made up of fields and the various fields consist of groups of characters. While file, conversion is the process of changing from old system has four methods known as changeover procedures:

- i. Parallel in this type of changeover procedure, the old and new systems are run concurrently, using the same inputs. The outputs are compared and reasons for differences resolved. Outputs from the old system continue to be distributed until the new system has proved satisfactory. After which the old components gives way to the

- ii. Phased conversion is a gradual systems conversion. In this implementation, components of the new system are implemented one at a time into the old system, and the old system is phased out piece by piece.
- iii. There is the direct or crash conversion. Within this approach, an entire new system is installed. The old system is completely dismantled, and the new system becomes operational immediately. A variation of either of the two basic methods is the pilot change-over.
- iv. In pilot conversion, the change-over would involve the changing over of part of the system; either parallel or directly. One subsystem is chosen as the lead system and implemented before all others. Only when that subsystem is completely operational can conversion of the next system be considered.

#### 5.0.4 DOCUMENTATION, REVIEW AND MAINTENANCE

The design project ends with the final documentation the new system. A final report of the new system must be given and its operation, the report should include the following:

1. An over-view of the whole project i.e purpose of the system and information available.
2. Systems flow charts describing and procedure or series of steps used in the processing of data.
3. Printed spacing charts, with detailed narratives describing each of the system's output card and record layouts should detail inputs and files used to prepare any output.

4. Financial analysis of the proposed and the existing systems taking into consideration the current and future costs as well as like-whoood of a change in potential cost savings.
5. All the computer system to be used and the peripheral equipment are to be escribed.

The report should be professionally typed and bound with clear illustrations and concisely written.

Once the system has become operational it will need to be examined to see if it has met its objectives, working fine, are information complete, acceptability, accuracy, whether adjustment are needed and so on. This is very important to revent logging - i.e users recording unusual or unexpected event that affect the system and impact evaluation i.e determines how the system affect or change the areas of organisation in which they are installed and attitude survey which is data collection of ideas and opinions about system, which has to be sampled.

Maintenance is very important and could be carried out periodically, or biannually for the following reasons:

- a. To rectify problems arising in operation for instance, programs may need to be modified to deal with unforeseen circumstances.
- b. To confirm that the planned objectives are being met and to take action if they are not.
- c. To ensure that the system is able to cope with the changing requirements of the organisation.

## CHAPTER SIX

6.0 SUGGESTION, RECOMMENDATION AND CONCLUSION

The National Primary Education Commission (NPEC) in its aid to promote the standard of primary education in Nigeria has done a lot in purchasing computer system but based on the foregoing observations and findings the following recommendations are pertinent:

- A. More computer system should be purchased and installed at each Primary School Management Board (PSMB) office.
- B. Computerization of pension and gratuities scheme for teaching and non-teaching staff.
- C. Computerization of Federal States and Local Government Areas contribution on primary education.
- D. Computerization of personal emoluments of staff and all the financial activities of the commission.

In implementing the NPEC's computerization of its budget and finance department, phased conversion approach should be adopted as implementation has an already computer support which favours the case of NPEC as she already has some computer system mentioned in chapter 3 of this study. Thus implementation will be gradual and cost associated with operating two systems in parallel are minimized. Also the phased conversion system is not expensive, it does not require extra staff nor overtime working for existing staff and the risk therein is little because if the system does not work, it can easily be condemed without delaying implementation schedule of other areas. However, it should be noted that at present no PSMB has computer system hence it some are to be acquired there is need for training, employing computer experts or deploying computer specialist

from the Headquarters to each state to either train or look for a competent computer personnel.

It is obvious therefore that database IV will be most suited for use to incorporate the budget and finance department of the National Primary Education Commission (NPEC).

As a developing country, Nigeria may not be able to afford a Network system over long distances for her primary education but the aim could be borne on the mind and work towards that as time goes on, Nigeria will be able to think along that line, for more effective and sound system of primary education.

Network in a nutshell "relates to any system that represents a series of points and their interconnections, for instance an electricity supply network".<sup>1</sup> The development of Networks is due to recent advances in communications technology which make it possible to transmit data in digital form at very high speeds. Networks which serve small areas, are called Local-area networks or LANs. These are suitable for linking all the computer terminals, work stations and peripheral device in one building, or in a group of buildings in one site. There are also networks which extend over longer distances than LANs known as Wide Area Network or WANs. They may even operate nationwide or worldwide using telecommunication.

Links, microwaves and satellites. Note that a local-area network can be linked to a wide-area network through what is called a gateway connection, enabling any device on the LAN to communicate with any device on the WAN. LANs can also be connected together by gateways.

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