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**THE CITY UNIVERSITY**  
**DEPARTMENT OF INFORMATION SCIENCE**

**DESIGN OF A COMPUTER INFORMATION  
SYSTEM FOR THE ALGERIAN NATIONAL  
ARCHIVES**

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**A THESIS SUBMITTED IN PARTIAL FULFILMENT OF THE  
REQUIREMENTS FOR THE DEGREE OF DOCTOR OF PHILOSOPHY**

***VOLUME II***

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# **PART III**

## PART III

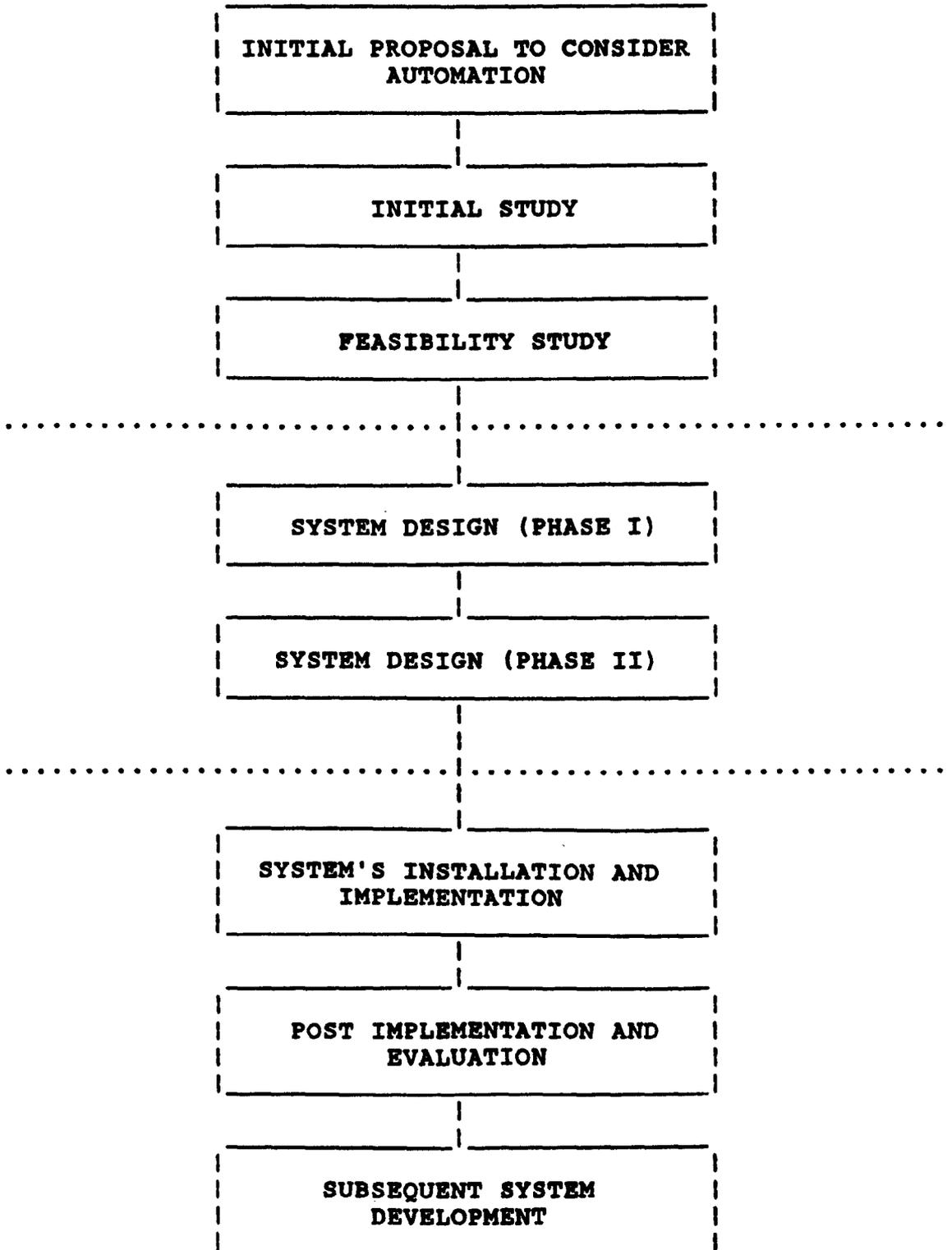
### SYSTEMS ANALYSIS AND DESIGN

Systems analysis and design refers to the process of examining a business situation with the intent of eventually improving it through better procedures and methods. A case in point is probably the substitution of a manual system by a computerised system in a library, for instance.

One should, however, bear in mind that computers are not always the universal solution to all problems. Indeed, there are many instances where computer installations have completely failed to achieve the performance standards expected of them. One reason for this might be that the investigation of data processing methods which led to the acquisition of the computer system, or to computerise a certain area of processing operations, was not properly carried out and adequately controlled.

The introduction of a computer system will often involve major changes in the organisation's information system and as a result, there may be changes in the organisation and management's decision making responsibilities. It is therefore imperative that a careful study is made, by experts, of the alternative solutions and that senior management take an active interest in the project.

Stages in Systems Analysis and Design



The objective of the last part of this project is to study the suitability of a computer information system within the context of the Algerian National Archives (ANA). This part is divided into six main chapters.

It starts with a summary concerning the conflict dividing Algeria and France on the question of the archives transferred to France just before the independence of Algeria in 1962. The legislation of the ANA, its structure and the various problems it faces are analysed.

Chapter Eight aims to determine whether the introduction of a computer system would ease the problems facing the ANA. Various data collection methods are used; including questionnaires, interviews, observation, and so forth.

Chapter Nine goes on to outline the objectives and requirements of the computer system that could replace the manual one. It proposes some of the solutions that could be adopted by the ANA to improve its present services, and accordingly meet the needs of its users.

The following chapter presents the design of a prototype automated records management system that simulates the functions to be carried out by the system to be eventually acquired by the ANA. Additionally, a description of the prototype system is also provided.

While Chapter Eleven evaluates the capabilities and limitations of the prototype system that has been designed to meet the needs of the ANA, Chapter Twelve investigates the question of implementation and the likely problems that might arise despite the fact that the system implementation has not actually taken place. Recommendations are presented where appropriate.

## CHAPTER VII

### THE ALGERIAN NATIONAL ARCHIVES

#### 7.1. INTRODUCTION

Never a problem of archives has attracted the emotion and attention of politicians as has that related to the Algerian archives transferred to France just before the independence of the country on 5th July 1962. It is believed that as much as 300 tons of documents were taken from the three regional archives centres which existed at that time (that is Oran, Algiers and Constantine), loaded onto a warship and transferred to France. These archives are presently preserved in a five storey repository especially built, in 1966, to house the archives of French colonies at Aix-en-Provence. It is estimated that the Algerian archives represent approximately 50% of the total storage capacity of the repository.

Soon after the independence, the Algerian authorities started asking their French partners for the restitution of these documents, but the latter refused to enter in any kind of negotiation. It is only in the beginning of the 1980s, with the accession of the French Socialist Party to power, that an atmosphere of understanding and mutual dialogue started to prevail and it seemed very likely that a common agreement could be reached. Nevertheless, the role played by

the press in this conflict prevented the materialisation of these hopes.

This chapter will present an account of this problem. Emphasis shall, however, be put on the reasons that prevented the attainment of such an agreement, or at least a compromise on this issue. Indeed, the Algerian as well as the French standpoints will be presented in order to give the interested reader an overview of this complex conflict.

Also, the legislation of the Algerian National Archives (ANA) and its general structure will be described. Additionally, the various problems encountered within this institution, including those relating to the availability of qualified personnel, suitable repositories, equipment, and so forth, will be examined.

## **7.2. THE ALGERO-FRENCH CONFLICT OVER ARCHIVES**

As already stated, in the following, an attempt will be made to examine the origins of the conflict and the various reasons that made the reaching of any solution a difficult task to achieve.

### **7.2.1. Nature of the Archives Transferred**

According to the first inventory published by the French National Archives under the direction of Jean Favier and entitled "Etat General des Fonds: Marine et Outre-Mer" (3rd volume), the archives repatriated to France can be broken

down into three main categories (Porte, 1981 and Larbi, 1981):

- a) Archives produced by ministries dealing mainly with algerian affairs (Ministry of Interior and Industrial Production);
- b) Archives produced by the Gouvernement General d'Algerie; and
- c) Archives kept within the regional archives which existed at that moment, that is Oran, Algiers and Constantine.

These archives have been organised in 40 series of which the most important ones are concerned with the French settling in Algeria, the conquest of Algeria, the problems of the native population, and the maintenance of public order.

### 7.2.2. Origins of the Conflict

Like numerous Third World countries, Algeria's cultural patrimony, including its archives, has been the subject of a massive transfer when the country was on the verge of acceding to its national independence. This transfer has deprived the country of documentary and historical research of cardinal importance. In fact, not only archives were taken to the metropole, but other precious objects including works of art, archaeological and audio-visual documents were transferred as well. In this part of the project, only the problem related to archives will be focused upon.

According to the last census of 1981, it is believed that 50% of the present population of Algeria was born before 1962 (Ferhani and Bisker, 1981). If the demographic previsions are correct, by the turn of the next century only 15% of this portion of Algeria's population will still be alive and just 5% will have souvenirs of the Algerian Revolution (1954-1962). These statistics indicate the reasons why Algeria is adamant to rewrite the history of the colonisation period which is considered to have been falsified. It is for this very reason that Algeria is seeking to recover its archives as soon as possible (Ferhani and Bisker, 1981).

It was in 1961, when it became clear that France had definitely lost its control over Algeria, that the initiative to transfer parts of the Algerian archival patrimony was taken. At that time, the French authorities declared that they were being transferred solely for security reasons implying, therefore, their restitution as soon as the situation settles down in Algeria. In fact, a letter of Andre Chamson on 6th March 1961 testifies that the archives were being transferred so as to microfilm them (Touili, 1981). But history shows that this was never the case.

Quoting an interview of Mr. Chamson, Touili (1981) also asserted that this initiative was taken without the personal consent of General De Gaulle. In fact, the latter remained

silent when he was consulted by his colleagues about this question. As early as 1967, Algeria requested the application of the resolutions of the 1963 Warsaw Round Table. However, the French government never accepted to answer Algeria's demands because it considered these archives to be, and still does, the documents of France's sovereignty.

The determination of Algeria to recover its archives was strengthened by the official organisation of the archives in 1971, the creation of a National Archives in 1972, the promulgation of a decree organising these archives in March 1977 and finally the allocation of a budget of 140 million Algerian Dinars (approximately 20 million pounds) to build a modern repository to house these archives. The construction of this repository was due to be finished by the end of 1988.

In January 1980, following the visit of the Algerian Minister of Foreign Affairs to France, Mr. Mohamed Seddik Benyahia, it was decided to set up six committees to discuss the various conflicts between the two countries. Of these committees, one aimed to study the restitution of the archives of the colonial period (1830-1962) to Algeria. As soon as the decision of setting up such a committee was made public, a vast movement of protestation and discontent amongst the repatriated was launched. As a result of this dissatisfaction, a letter of the then President, Valery Giscard d'Estaing, on 16th June 1980 stated that the

archives collection preserved within the repositories of the French National Archives represent an essential component of the French cultural heritage as well as an element of the state's sovereignty. Accordingly, none of these documents could be the subject of any transfer or any kind of negotiation (Lucain, 1985).

This affair underwent a sudden revival in August 1981 after the visit of Mr. Claude Cheysson, then French Minister of Foreign Affairs, to Algeria to prepare the visit of President Francois Mitterrand which was due to take place in November of the same year. During his stay in Algeria, he stated that sensible progress concerning the restitution of the Algerian archives will be made. This statement was further strengthened by that of Mr. Gaston Deferre in October of the same year when he asserted that it was normal that Algeria cared about the archives transferred in 1962 (Lucain, 1985). He also added that a common agreement should be reached very soon. Later on, Mister Cheysson declared that the archives belong to the common patrimony of both Algerians and French, which implied for certain specialists that they will be the matter of a sharing deal between the two countries. Another statement by the state secretary to the repatriated, Mr. Couriere, suggested that the problem might soon be solved when he declared that he did not think that it was abnormal that Algeria keeps trying to recover what it considers to be its patrimony (Lucain 1985 and Touili, 1986).

As in 1980, these declarations provoked yet another campaign of hostility amongst the repatriated especially amongst the group known as the "Algerianist Circle" consisting of the French who lived in Algeria during the colonial period. This campaign was also sustained by the publication of a series of articles in journals like "Le Monde", "Le Figaro", "La Minute", "La Croix", and so forth. The hostility of the press together with that of the repatriated contributed to the failure of the negotiations.

Let us, now analyse the arguments presented by both countries in this archival dispute.

### 7.2.3. The Algerian Arguments

The Algerian position vis-a-vis the archives was summarised in two papers by Touili (1981), Director of the Algerian National Centre of Historical Research and Balta (1981). These articles focused on the following points:

a) The transfer of the archives to France has been detrimental not only to the sovereignty of Algeria, but to its culture alike. Indeed, the great majority of these documents consists of archives of historical interest. Accordingly, Algerian researchers should have access, in the same way as the French, to these vital documents. Amongst the archives claimed by Algeria, the most crucial ones are those which deal with mineral resources (mainly maps), layout of the

country's boundaries, and so on. The unavailability of these documents has made the rewriting of the history of the colonial period virtually impossible. Besides, Algerian researchers have to travel to France to collect the data required for their project or simply rely on what is available in the country and what has been written by French historians such as Robert Ageron, Charles Andre Julien, etc.

Unlike what was claimed by Boyer (1981) and Delmas (1981), not just what is referred to as the "archives of sovereignty" are the object of litigation between the two countries, but also other documents, such as those dealing with historical research. Those related, for instance, to series "N" and "P" and to Echeliff's earthquake (1954) are cases in point (Touili, 1981). For details of the series, the reader is referred to Appendix 2. Reinforcing this statement, Balta (1981) wondered whether it would not be better to keep this documents in Algeria rather than France. Thus depending on whether they are granted permission for admittance, Algerian historians have no other alternatives than travelling to France in order to undertake their research.

b) From a theoretical and juridical point of view, the Algerian state which superseded to the French has the legitimate right to claim what constitutes its memory. As was rightfully pointed out "a country without its

archives and history is like a person who has lost his memory" (Touili, 1981).

Algeria's legal argument is based on recommendations and resolutions adopted by several international organisations, namely Unesco, the International Council on Archives (ICA) and the United Nations International Law Committee which laid down two fundamental principles (Touili, 1981):

- 1) The principle of territoriality which stresses that Archives have to be kept within the territory where they have been produced or restituted to it in case of a transfer; and
- 2) The principle of respect of fonds which stipulates that by their nature archives collections represent indivisible organic entities.

At a meeting of Unesco experts for the development of National Archives in Latin America, organised at Bogota, Columbia, from 29 March to 2 April 1976, it was recommended that documents constitute irreparable sources of information and have to be legally protected and that the countries concerned have the right to keep for themselves the documents originated in their own territories as a natural and cultural inheritance.

In fact Hachi (1976) lists several cases where archives have been transferred during the First and Second World Wars and then restituted to the country where they were originally produced. Treaties of Dorpat, Paris and Trianon, for instance, all comprise clauses ordering the restitution of archives to the territory where they were initially produced. By 1945, France itself recuperated about 52,800 objects solely from Germany and Austria. Another 852 were brought back from Belgium, Czechoslovakia, Italy and Switzerland.

Similarly, Algeria has been able to recover about 4,000 documents from Turkey and the restitution of other documents are in the process of being negotiated with Great Britain, Italy, Spain, the United States and Yugoslavia (Touili, 1981). So, why the French authorities do not want to respect the international law by entering in negotiation with its Algerian counterpart?

3) From a practical point of view, the Algerian authorities accuse the French of having purposely avoided to train any Algerian archivist during the colonisation period. Above all, they wonder why none of the archivists sent for training to France was ever given the opportunity to undertake his training at Aix-en-Provence, the repository which houses the archives in question.

#### 7.2.4. The French Arguments

Just like Algerians, the French also presented a number of arguments to validate their position and accordingly oppose the restitution of the archives. Below are discussed some of these major arguments:

- 1) Considering the law passed on 3rd January 1979 which underlines the inalienability of archives preserved within the French National Archives (Boyer, 1981), the French authorities stressed that it was virtually impossible to reconstitute any of these archives. To justify their argument, they went on to accuse the Algerian government of having given a short shrift to the archives left in Algeria.
- 2) They also claimed that archives transferred in 1962 represent a French ownership in the same way that those left in Algeria constitute an Algerian ownership (Delmas, 1981). They were also afraid that their restitution might trigger off the demands of the countries which were also under the French colonisation, mainly Morocco and Tunisia
- 3) The French also put forward an argument similar to that of the Algerians when they claimed that the repatriated are willing to rewrite the history of the colonial period. They also said that all that these people have about the 132 years of their presence in Algeria is the archives kept at Aix-en-Provence. They went on

arguing that these people will never be able to rewrite properly their history, that of an original mediterranean culture, because of the massive quantity of archives left in Algeria. This fact explains why the repatriated community gets irritated whenever the restitution of the archives to Algeria is in the headlines. To manifest their anger, they accused the French government of accepting to collaborate with the Algerians for the sole purpose of obtaining minor and uncertain concessions on oil and gas prices.

4) Furthermore, the repatriated are opposed to the recuperation of these archives by Algeria because they are anxious at their possible uses. Indeed, these archives consist of countless files on people and their political attitudes which might seriously endanger the lives of those still alive or the lives of their families and relatives.

5) Finally, the French archivists believe that Algeria's archival institutions are under equipped to house documents of vital importance. They argued that Algeria has neither the suitable repositories, nor the required staff capable of properly carrying out the various archival functions.

### 7.2.5. Algerian Proposals

Following the intensive diplomatic meetings between the Algerian and French authorities in the beginning of the 1980s regarding the sensitive and controversial question of archives, Algeria made the proposals herein listed:

- 1) Create a permanent joint committee consisting of experts from both countries in order to place Algeria in an equal footing to France in so far as access and consultation of archives.
- 2) Establish a restitution calendar comprising three major stages (Touili, 1981):
  - a) During this phase only classified archives, whether provided with finding aids or not, will be the subject of restitution;
  - b) The second stage of the restitution process will encompass unclassified archives; and
  - c) The restitution of archives whose communication to the general public is still legally prohibited because of archival legislations of both countries will conclude this process.
- 3) Develop the co-operation between the National Archives of the two countries in areas like museums, libraries and archaeology.

### 7.2.6. Future Prospect

Several international organisations and international conferences have supported the cause of Algeria, but their efforts have remained fruitless.

As part of its continuing effort to assist member states in resolving problems of returning archives in the territory of certain countries to the country of their origin, Unesco held a meeting, 29-31 March 1978, with a group of experts in Paris. Participants included Mohamed Bedjaoui, then Algerian Ambassador to France, Charles Kesckemeti, ICA executive and author of a preliminary study of this important question, Christian Gut, Director of Archives de Paris and author of a detailed study of archival claims presented at the 17th International Round Table on Archives held in Cagliari in 1977 (Touili, 1986).

The general conference at its 18th session had adopted a resolution which invited member states to give favourable considerations to the possibility of transferring documents from archives constituted within the territory of other countries or relating to their history, within the framework of bilateral agreements. Also the Director General was urged to consider the possibility of a detailed study of such transfers and to report on his findings. A preliminary study was conducted and a progress report submitted to the 19th General Conference; the Cagliari Round Table considered the report.

Considering the way things stand at the moment, it can be said that this conflict will never see the adoption of a solution that could be acceptable to both sides. As already mentioned, one of the main factors that led to the failure of the negotiations was the strategic role played by the media during the period October to December 1981 which suspected the French authorities of adopting a policy of package deal in order to obtain uncertain concessions. The only remaining alternative is that related to the microfilming of the documents. However, here again, there is a divergence in opinions as both countries are keen on keeping the originals. In addition to the time and money needed to accomplish such a project, and supposing that Algeria agrees to keep the microfilmed version of these documents, would the French government be ready to microfilm and reconstitute all of the archives including those of the repatriated?

The other solution resides in exchanging archives which are not of interest to both countries. For instance, Algeria would reconstitute documents related to the European civil status. In return, the French would reconstitute archives dealing solely with Algeria. The rest of the archives (needed by both countries) would then be microfilmed.

### 7.3. ALGERIAN ARCHIVAL LEGISLATION

In 1848, Algeria was divided in three main regional divisions, namely Algiers, Constantine and Oran. This decision meant the creation of three respective archival centres. However, it is only in 1861 that these services were effectively created.

Until the independence of the country in 1962 and well after it, there was no legislation governing the organisation of archives. Indeed, no archivist was appointed, following the departure of the French, in any of the then existing archival services. The result was total chaos within these institutions.

Having realised the depth of the matter, a circular creating the national archives collection was published on 3rd June 1971. This was subsequently followed by the decree 77-67 of 20th March 1977.

This decree emphasised the government's concern and quite rightly placed the ANA under the authority of the President. Indeed, this legislation reiterated and strengthened the desire of the Algerian authorities to recuperate the documents transferred to France just before the independence. The major problem, however, is to do with the fact that this legislation was never put into practice. The reasons for this are numerous. They will be partly reviewed in Section 7.5. of this study.

#### **7.4. STRUCTURE OF THE ANA**

The decree 77-67 of the 20th March 1977 defines the overall structure of the Algerian National Archives. According to Article 29 of this decree, the ANA consists of five main bodies of which a diagrammatic illustration is presented in Figure 7.1.

##### **7.4.1. National Archives Direction**

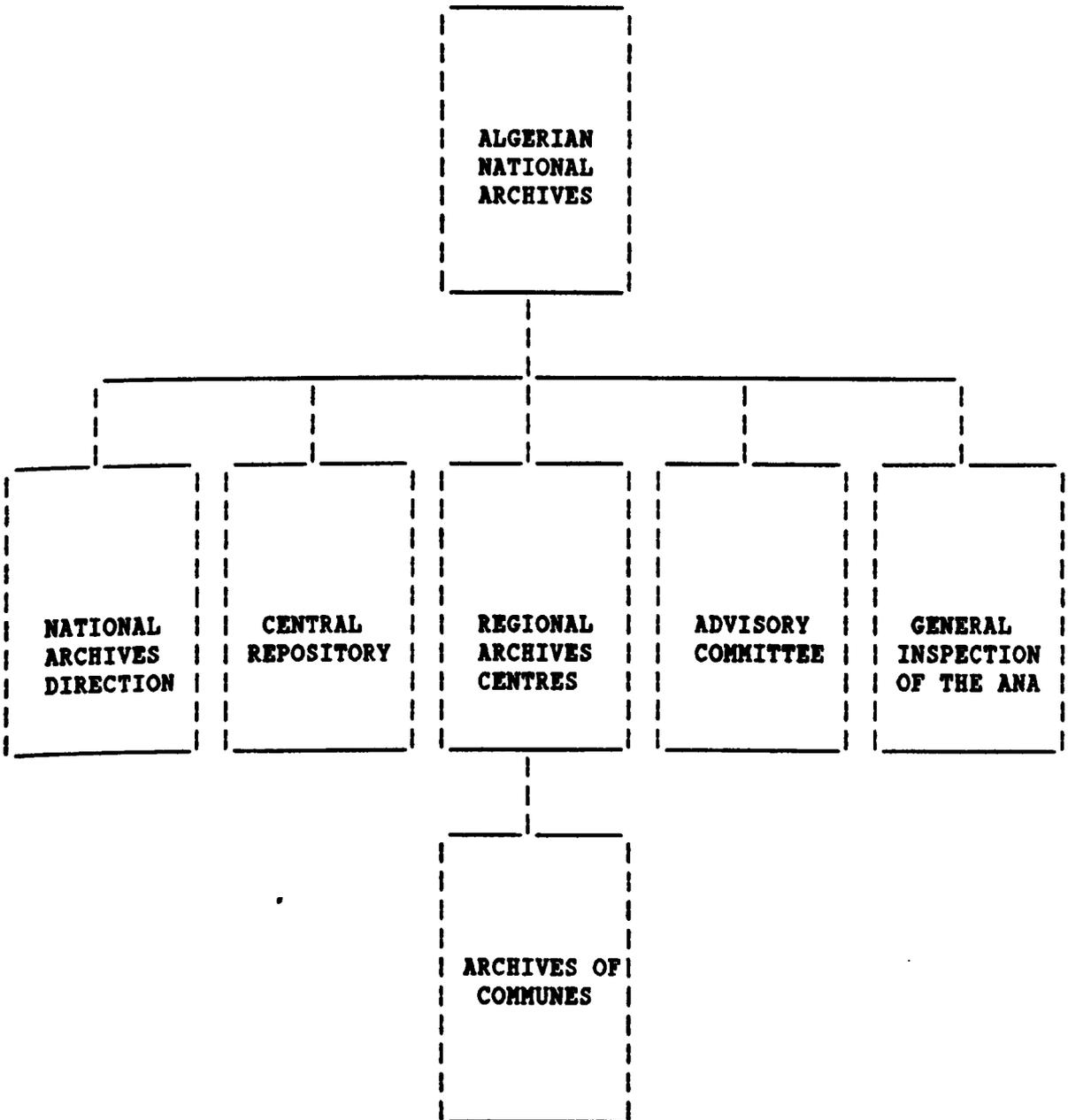
Broadly speaking, this body is concerned with the day-to-day administrative running of the organisation. Specifically, its main objective is to make arrangements for personnel training both within the institution and abroad. In addition, it publishes regular periodicals and finding aids about the documents stored within the Central Repository of the ANA (see below). It is composed of four principal departments:

- a) Department of foreign relations;
- b) Department of co-ordination and general inspection;
- c) Department of personnel and training; and
- d) Department of cultural affairs.

##### **7.4.2. Central Repository of the ANA**

This repository was primarily created to house the archives of the ANA, that is the documents with historical value transferred by ministries and state owned companies. It is

**Figure 7.1. Structure of the Algerian National Archives (ANA).**



placed under the umbrella of the Presidency and is located in the capital, Algiers.

Unlike the job of the Director of the ANA, that of the Director of the Central Repository of the ANA concerns only the management side that is making sure that the various archival functions of the repository are properly carried out.

#### 7.4.3. Regional Archives Centres

It was already stated in the previous chapter that administratively Algeria is divided into regional units (wilaya) which are subdivided into districts (daira) which are in turn subdivided into communes. The last administrative reorganisation which took place in November 1984 increased the number of regional divisions to 48.

To preserve the historical heritage of each region (wilaya), a centre directly connected to the ANA was created within every regional division. A director responsible for the centre is appointed by the ANA.

Similarly, the decree of 20th March 1977 stresses that an archival service be created within each commune. This service should be placed under the authority of the regional centre to which it belongs. The objectives of these services are similar to those of the regional centres except that they are territorially limited to the area covered by the commune.

#### **7.4.4. General Inspection of the ANA**

Although the decree 77-67 makes provision for the creation of a General Inspection of the ANA, this body exists theoretically only. In practice, it does not. Interviews with the authorities of the ANA revealed that the creation of such an inspection was never materialised.

#### **7.4.5. Advisory Committee of the ANA**

Finally, Article 4 of the decree 77-67 of 20th March 1977 stipulates that an Advisory Committee is created. This committee is supposed to consist of representatives of all ministries whose role is to decide on which documents should be destroyed and which ones should be preserved indefinitely.

Just like the General Inspection, however, such a committee existed temporarily only. According to personal interviews with some of the ANA's personnel, this committee met only once since the promulgation, in 1977, of the decree organising the ANA.

#### **7.5. LIFE CYCLE OF RECORDS WITHIN THE ANA**

The "life cycle of records" refers to the various stages through which records pass from the time they are created until their ultimate disposition. This concept enables both archivists and records managers to establish control over large quantities of institutional records and to ensure the

efficient, adequate and timely passage of office files from one stage of activity to another.

Typically, records within the ANA pass through three different stages:

1. Active use in an office environment;
2. Reduced use leading to a transfer and temporary storage in a record centre; and
3. Final disposition.

It should be noted that the last stage constitutes a "life or death" action, determining whether the record has continuing value and should therefore be retained permanently, or has no research or scientific value and should therefore be destroyed.

It should also be emphasised that not all records reach the second stage of the life cycle. Indeed, if some records are perceived not to have any research value after retention for a specific time in the office, they are systematically destroyed without having to be sent to records centre. Likewise, not all permanently valuable records pass through the second stage (ie. transfer to a records centre) before they are transferred to an archival institution for permanent archival retention.

### **7.5.1. Transfer to a Records Centre**

As soon as the use of a record in an office environment diminishes, it becomes eligible for transfer to a records centre. Arrangements can be made for the transfer of records to a centre within the appropriate geographic region of the creating office. A uniform Records Transfer Document is used nationally to provide the information needed for the transfer of records into a centre. Figure 7.2. illustrates a sample used by the National Archives Repository while Figure 7.3. presents a sample used by the regional archives offices throughout the country. Two copies of this form are prepared by the originating institution or department, one of which is used as a packing slip to accompany the records during their transfer. The second is kept by the institution and becomes its finding aid to the contents of their records.

The Records Transfer document includes the following:

- a) Code showing the number and date of transfer;
- b) Name of the creating office;
- c) Date of transfer;
- d) Volume;
- e) Classification;
- f) Code of the records;
- g) description of the records;
- h) Cover dates of the records; and
- i) Retention period.

**Figure 7.2. Sample of Records Transfer Document Used by the ANA**

رئاسة  
مجلس الوزراء  
PRESIDENCE DU CONSEIL  
ادارة الوثائق الوطنية  
DIRECTION  
DES  
ARCHIVES NATIONALES

جدول  
دفع الوثائق  
BORDEREAU  
DE  
VERSEMENT D'ARCHIVES

رقم ترتيب الدفع N° des VERSEMENTS	السنة MILLEGIME

A remplir par le service effectuant le versement خاص بالمصلحة الدائمة

Ministère :	وزارة :
Direction :	ادارة :
Sous-Direction :	نباية ادارة :
Organisme ou institution :	منظمة او مؤسسة :
Service :	مصلحة :
Nombre total des liasses et registres (n° d'ordre) :	مجموع الحزمات او الملفات (رقم الترتيب) :
Date :	تاريخ :
Signature du responsable :	امضاء المسؤول :

يجب تسليم جداول الدفع في ثلاث نسخ مرفقة الى مصلحة الوثائق الوطنية قبل تسليم الحزمات بذاتها في العمود الخاص « لتاريخ الانتهاء » يجب تعيين السنة التي تليها الوثائق ما لم يتفق بالانتماء بالنسبة لمصلحتكم ، والتي يمكن تعطيلها ان لم تكن اهمية تاريخية

- Les bordereaux de versement, dactylographiés en triple exemplaire, doivent être remis au service des Archives Nationales avant les liasses elles-mêmes.
- Dans la colonne " date d'élimination ", indiquer l'année à partir de laquelle les archives versées cesseront de présenter un caractère d'utilité pour votre service et pourront, sauf intérêt historique, être détruites.

A remplir par le Service des Archives Nationales

Classement :	الترتيب :
Fonds :	مجموعة :
Série :	سلسلة :
Local :	شعبة :
Travée :	رف :
Epi :	سائق :
Observations particulières :	ملاحظات خاصة :

أن مسؤول مصلحة الوثائق يتعهد بتسلم الملفات التالية :

- Le responsable des Archives Nationales certifie avoir pris en charge les dossiers ci-après énumérés.

**Figure 7.3. Sample of Records Transfer  
Document Used by Regional Centres**

**BORDEREAU  
DE  
VERSEMENT D'ARCHIVES**

---



**A remplir par le service effectuant le versement.**

- Service :
  
- Nombre total des liasses et registres (n° d'ordre) :
  
- Date :
  
- Signature du

Les bordereaux de versement, dactylographiés en triple exemplaire, doivent être communiqués au service des archives avant les liasses elles mêmes.  
dans la colonne «date d'élimination» indiquer l'année à partir de laquelle les archives versées cesseront de présenter un caractère d'utilité et pourront, sauf intérêt historique, être détruites.

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**A remplir par le Service des Archives.**

- Composition :
  
- Classification :
  
- Classement :
  
- Observations :

Le Chef du Service des Archives certifie avoir pris en charge les dossiers ci-après énumérés.

**Figure 7.3. Sample of Records Transfer Document  
Used by Regional Centres (Continued)**

**INTERCALAIRE** des bordereaux de versement d'archives

A remplir par le Service des Archives	N° d'ordre	NATURE ET DATES EXTREMES DES ARCHIVES	Date d'élimination

Le cas échéant, poursuivre l'énumération sur un ou plusieurs intercalaires.

On receipt of the records, checks are made to ensure that the information supplied on the form is conform to the contents of the records.

The records held within any of the records centres are made available to the originating departments or company which may request the withdrawal of some records for consultation. A Request Form is available for this purpose. This contains information such as the name of the department or company making the request, the number and date of the Records Transfer Document and the codes of the requested records. Once completed, it is put in the storage location of the record until it is returned.

Once the retention period of the records has elapsed, the records centre sends a formal notification to the originating institution to ask whether no changes have been made to the retention period. If so, action is taken by either destroying the records if they have no permanent value or otherwise transferred to an archival institution. A sample form used for this purpose is presented in Figure 7.4. However, if the creating organisation wishes to retain some of its records beyond their normal retention periods, amendments are made to the retention period.

Figure 7.4. Sample of Notification of Records Disposal.

**DIRECTION DES ARCHIVES  
WILAYA D'ALGER**

**BORDEREAU D'ELIMINATION D'ARCHIVES**

**ORGANISME:**

demande que les documents ci-dessous designes soient  
envoyes au pilon.

Nature des Documents	Dates Extremes	Nombre de Liasses	Observations

Fait a ALger, le .....

Le Directeur des Archives

### **7.5.2. Transfer to the National Archives**

When records complete their designated period of retention, they are appraised. Depending on their research and scientific value, they are either destroyed, or transferred to the ANA if they have a permanent value.

It should be noted here that in the case of Algeria, archives with historical value emanating from ministries and state owned companies are transferred to the ANA itself in Algiers, whereas those produced by the administrative departments of regional units are preserved within the premises of the respective archival regional unit. As was pointed earlier, the decree 77-67 of the 20th March 1977 stipulates that each of the 48 regional units should have a repository to house the archives of the region. Unlike the ANA's repository, the regional repositories serve both as records centres and archives centres.

### **7.6. OBSTACLES FACING THE ANA**

Despite the existence of an adequate legislation, the ANA continues to suffer from several problems. In the following, the author will attempt to discuss the most significant ones.

### **7.6.1. Shortage of Qualified Personnel**

One of the problems that is seriously hampering the efficiency of the ANA is undoubtedly the startling lack of well-trained personnel. When the French left Algeria in 1962, they left no trained archivists. Indeed, out of the 48 regional centres created in 1984, only 3 have archivists with reasonable experience. The rest of the centres are either totally neglected or have an officer with no knowledge of archives administration.

Added to that is the fact that the various departments of Information Studies in Algeria, which were set up to train the staff that is required, have regrettably failed to enrol enough students on this course. As was mentioned in the previous chapter, not only the number of students taking the course is very small, but also none of the ones that have graduated from these courses has chosen the archives option.

### **7.6.2. Lack of Adequate Repositories**

Another obstacle facing the ANA is the lack of buildings that respond to archival requirements. With the exception of the ANA, and the three regional archives created during the French colonisation, no other regional centre possesses an infrastructure capable of properly housing these documents. It is not necessary to remember that to preserve these documents, it is imperative to construct repositories that

can protect them from the various natural enemies such as the sun, humidity, heat, insects, and so forth.

As a result of the lack of adequate premises, it is often the case that various documents with permanent value are destroyed because the institution that produced them or that that is supposed to receive them has no space to house these documents.

#### **7.6.3. Lack of Financial Resources**

The lack of financial resources is another obstacle hampering the proper developments of the ANA and its various centres throughout the country. Indeed, none of the ANA's centre has the financial independence that is a necessary condition for the smooth running of these services. The ANA, for instance, was put under the authority of the President in 1977 and then became part of the Ministry of Tourism and Culture in 1983.

#### **7.6.4. Impracticality of the Archives Legislation**

Despite the promulgation of an archives legislation in 1977, archival documents continue to be given a short shrift within all administrations and at all levels. The reason for this neglect stems probably from the impracticality of the legislation itself in that many of its articles are difficult to put into practice. For instance, this legislation prohibits the destruction of any document

without the primary consent of the Advisory Committee of the ANA. How could this be achieved when such a body exists only in theory? Moreover, if the archives of a given institution were to be of permanent value, how would they be preserved when hardly none of these organisations has a suitable repository capable of housing archives of research or scientific value.

To protect this legislation, and the history of the country, it is imperative for the government to provide the ANA with the required authority, administrative independence and financial support to enable it to carry out its duties as prescribed by the legislation.

#### 7.7. CONCLUSION

This chapter was concerned with the state of the art of the Algerian National Archives (ANA). It first highlighted the origins and arguments of the archival conflict between Algeria and France. It also described the structure of the ANA and the life cycle of documents within this institution.

Furthermore, the author discussed some of the problems facing archives in Algeria. These included:

1. Lack of well-trained staff;
2. Lack of adequate repositories;
3. Lack of financial resources; and
4. Impracticality of the legislation establishing the ANA.

Considering the prevailing situation within the ANA, it is necessary for the authorities to revise their policies if the historical facts of the country are to be protected.

This can be achieved by:

- a) Increasing the salaries of archivists who are underpaid;
- b) Sending the personnel for training abroad;
- c) Obtaining help and advice from experts in other countries;
- d) Seeking the support of international organisations; and
- e) Building adequate repositories to protect the documents for the generations to come.

## CHAPTER VIII

### QUESTIONNAIRE ANALYSIS AND RESULTS

#### 8.1. INTRODUCTION

The speed and flexibility of automated processes, as in the use of computers, for instance, have proved to be invaluable assets in information processing. And in areas where manually-operated systems are slow, inflexible and often repetitive, or where selectivity constitutes an important function, the speed and flexibility of the computer and its ability to select the required pieces of information, have made the computer an extremely useful tool.

The advantages of the computer have been well-explored in the developed world where it is being used extensively for various aspects of information handling including housekeeping activities such as acquisition, cataloguing and circulation, the compilation of bibliographies, selective dissemination of information, and so forth.

The growth of the literature, the increasing volume of research work, the growing dependence of modern society on relevant information, the widespread criticisms of manual information-access capabilities and processes, coupled with visible problems such as costs, and other constraints facing present archives, library and information systems, all together have led to a dilemma.

This dilemma was best described by Rider (1945) when he said that "We seem to be fast coming to the day when, unless it is afforded the most expert of bibliographic service possible, civilisation may die of suffocation, choked in its own plethora of print".

Fortunately for the information community in general, and archivists, librarians and information scientists in particular, the technological tools are now available to relieve them from this danger.

The theoretical potential of the computer in this context has also been sufficiently well stated by many others. The computer has the capacity to store large data files, to order and maintain such files, to add, delete, alter and extend file data, to search, to create new files or subfiles from available data, to monitor loads and system performance, to generate a wide array of outputs in terms of formats, data content, arrangement, and speed of access.

A computerised database system is essentially nothing more than an automated record keeping system. As already pointed out, however, the potential advantages of a computerised system over a manual system are numerous. The following are of the utmost importance:

- a) Ability to process large quantities of data quickly and efficiently; and
- c) Ability to maintain and retrieve documents much faster than a human being.

Nonetheless computers are not the universal panacea to all ills. Likewise, an automated system is not always the answer to an organisation's information problem. They are necessary only in situations where huge quantities of data are to be processed.

Moreover, there are many computer installations that have completely failed to achieve the performance standards expected of them. The primary reason for this is that the investigation of data processing methods which led to the acquisition of the computer system, or to computerise a certain area of processing operations, was inefficiently carried out and inadequately controlled.

The introduction of a computer system will often involve major changes in the organisation's information system and as a result there may be changes in the organisation and management's decision making responsibilities. Consequently, it is imperative that a careful study is made, by experts, of the alternative solutions and that senior management take an active interest in the project.

It is in order to determine whether such a system would be of any particular benefit in the case of the Algerian National Archives and assess its feasibility that this study was primarily undertaken.

To the knowledge of the author, no publication has, so far, attempted to study the state of the art of the Algerian National Archives. More specifically, no internal report has

tackled the crucial problem of the current and future needs of Algerian archivists in terms of information technology. Indeed, such a knowledge is essential if an efficient and reliable automated system, that responds to the needs of all potential users of the ANA, is to be designed. To achieve this objective and collect the required data, the author made use of various available data collection methods.

The principal objectives of this study can be summarised as follows:

1. Obtain background data about each of the 48 regional archives;
2. Obtain facts and opinions from users about the services they have at their disposal;
3. Determine whether an automated system is necessary; and
4. Obtain data on which to base the design of a comprehensive automated information system.

In this chapter, the author discusses the methodology used to gather the necessary information as well as the various conclusions evolving from the results of this study.

## 8.2. METHODOLOGY

Various methods may be used to gather information about a given study although for a particular type of study, a specific technique may turn out to be more appropriate than

the others. However, in order to complement, balance and minimise any individual bias, a combination of five different techniques was made use of in undertaking this study. These included:

1. Mail questionnaires;
2. Interviews;
3. Working on documents;
4. Observation; and
5. Own Experience of the ANA.

#### **8.2.1. Mail Questionnaires**

Although various data collection techniques were used, this method was the basis of the whole study since it was not possible for the author to visit Algeria whenever the need arose. Indeed, financial constraints made it impossible to do so. Below is a summary of both the advantages and disadvantages of mail questionnaires.

##### **8.2.1.1. Advantages**

The use of questionnaires in research has several advantages. Of these, cost is perhaps of greater importance. The expense of, for instance, interviewing large numbers of people is considerably higher than that of distributing questionnaires to similar numbers of people. Even when using elaborate follow-up techniques to stimulate response rates,

questionnaires have few competitors when it comes to collecting large amounts of data inexpensively.

Related to the previous factor is the fact that questionnaires can facilitate the data gathering stage from an extremely large sample of people in a short period of time. With large sample sizes, printing and sending questionnaires is usually less time consuming than interviewing the subjects individually.

Another obvious convenience of the questionnaire method is that it is a useful way to establish contact. Indeed, interviewers often experience some difficulties in contacting people who are not at home during normal hours. However, a mail questionnaire can always be awaiting at home regardless of when the person returns home.

Mail questionnaires are usually found to be more convenient to complete by respondents in that they can do so as slowly or rapidly as they please. This also gives them the opportunity to look through their personal records if necessary.

Questionnaires are often used in research to avoid bias. In fact, in interview sessions, respondents may evoke answers that are to be geared towards pleasing the interviewer than expressing the truth.

What is more, well-designed questionnaires can be easily tabulated and are often suitable for machine scoring or key punching.

Another advantage of mail questionnaires over other data gathering techniques is the uniformity of presentation of questions. Indeed, while people who receive questionnaires receive the same questions with the same format and the same accompanying materials, interviewers may read the same questions with different emphasis at different time especially when several interviewers are used.

Finally, questionnaires can be used to find out problem areas that might turn out to be extremely fruitful for future investigations.

#### **8.2.1.2. Disadvantages**

Despite all the advantages listed above, questionnaires also have their drawbacks. One of the most important shortcoming of the mail questionnaire technique is the low response rate. Indeed, unless a high response rate is achieved, it is usually difficult to consider the results of the questionnaires received as highly representative of the sample being assessed. Added to that is the fact that written questions are sent to subjects which means that only shallow questions can be asked in order to overcome problems of misinterpretation rising from complex questions.

Moreover, mail questionnaires usually lack flexibility in that the respondent answers the question as he understands it and has therefore no means to elaborate if necessary.

Suggestions have also been made that many subjects are prejudicial against mail questionnaires either because they receive too many or because they believe that this method of gathering information is disreputable and unscientific.

Another drawback of this technique is connected with the question of who will effectively complete the questionnaire. Indeed, it is difficult, if not impossible, to know whether the questionnaire was completed by the intended recipient, or not.

The questionnaire method was chosen for the following reasons:

- a) Financial constraints;
- b) Geographical constraints due to Algeria's large area. Indeed, this has made it difficult to visit every single archives repository in the country; and
- c) Travelling difficulties in that it is easy travel to Algeria when necessary.

Despite these constraints, the author managed to visit Algeria in March and August 1986 as well as December 1987.

### 8.2.2. Interviews

To overcome some of the major limitations resulting from the use of questionnaires as a basis for gathering data, alternative techniques have also been considered. Throughout the discussion of questionnaires' reliability and limitations, interviewing emerged as an alternative method for data collection.

Interviews are useful in that they allow both the interviewer and interviewee to exchange ideas. In this respect, interviews are found to be more flexible than mail questionnaires since it enables the interviewer to probe deeper and get more accurate answers.

During the author's visits to Algeria in March and August 1986, and December 1987, several key interviews were conducted with senior staff of the National Archives such as the directors of the National Archives, the Central Repository of the National Archives and the Regional Archives of Algiers and Oran respectively.

Broadly speaking, interviews can be divided into two categories, namely structured and unstructured interviews. Those conducted by the author were of the first category in that the nature, format and schedule of the questions were prepared prior to the interview.

Unlike mail questionnaires where answers to questions are recorded on paper, in the case of interviews notes have to be taken down while conducting interviews. To circumvent this obstacle, the author made use of secretarial techniques such as shorthand.

Another problem that was encountered related to the difficulty to the interviews schedule. Indeed, on a number of occasions, interviews had to be re-scheduled. This caused some problems especially that the time available was extremely limited.

#### **8.2.3. Working on Documents**

While visiting Algiers regional archives centre, the author was given the opportunity to scan through the various annual reports. This proved to be of great value since answers to many of the questions that did not occur to the author were found in these reports.

The author is very grateful to the Director of Algiers Regional Archives for allowing him to read through the annual reports of the institution.

#### **8.2.4. Observation**

Besides, other techniques such as observation and searches through records and files were used. Observation is a very useful way of cross-checking with the facts obtained through questionnaires or interviews. Different methods of recording

facts ought to produce the same information, but it should be borne in mind that it is not inconceivable that staff do their work in one way, while management believe they do something different.

It should also be stressed that the art of observation is a very complex one in that it requires concentration and possibly an inherited flair to be able to identify a problem and draw useful conclusions from an on the spot investigation.

#### **8.2.5. Own Experience of the ANA**

In undertaking this study, and specifically in analysing and interpreting the results, the author made use of his own experience as a member of staff of the ANA, where he was employed, between September 1981 and September 1982.

The position included supervising and teaching final year students enrolled on the B.Sc. degree in Librarianship and Information Studies at Algiers University.

#### **8.3. QUESTIONNAIRE DESIGN**

To design a comprehensive questionnaire, the author's first task entailed becoming acquainted with the research topic. This was achieved by going through relevant literature including journals, books and reports. The author benefited enormously from this literature survey since it enabled the

identification of the key problems encountered by systems designers in this specific area. As a consequence, the objectives of the questionnaire were determined.

To complement our literature search, renowned authorities in the field of archives automation were also contacted and interviewed where possible. Acknowledgements are presented to Michael Cook, Archivist at Liverpool University, and Michael Roper, Deputy Keeper of the Public Record Office for their time. They were not only kind enough to accept my visit, but also made considerable efforts to comment on the design of the final version of the questionnaire. Copies of the letters sent to them are shown in Appendix 3.

By and large, the questionnaire was designed with the following aims in mind:

1. Find out about the present state of archives in Algeria;
2. Determine the likely needs of the potential users; and
3. Find out about the need to automate archives in Algeria and whether certain tasks ought to be given priority.

Once the final amendments were made, the questionnaire was then sent to the 48 regional archives in Algeria as well as the Central Repository of the National Archives. A copy of the cover letter together with a copy of the questionnaire both in French and English are provided in Appendix 4 and 5 respectively.

With the agreement of my supervisor, Dr. S.E. Robertson, it was decided to send only one questionnaire per Regional Archives since the answers would be almost identical if more than one questionnaire was addressed to each direction.

#### 8.4. QUESTIONNAIRE OVERVIEW

The questionnaire consisted of 27 questions. An overview will show that it can be divided into three main sections; each dealing with an aspect of the objectives listed above:

- a) Questions 1 to 11 related to the general organisation of archives centres. These included questions aimed at finding out about the staff being employed, the type of collection held in the centre, the rate of growth of the collection, and so forth.
- b) Questions 12 to 19 were mainly concerned with the type of users and their acute needs. More specifically, these questions aimed at identifying the likely factors that attract users or otherwise push them to ignore the service.
- c) Questions 20 to 27 dealt with the various advantages and disadvantages that are likely to emerge as a direct result of automation.

A copy of the questionnaire together with the introductory letter explaining the purpose of the study were addressed to the intended recipients on March 15th, 1986. However, the response to the questionnaire was extremely low. Indeed,

only 6 out of the 49 questionnaires were received, that is approximately 12%.

One reason for this low response is probably due to the fact that the Algerian administration was not allowed to release any data or information concerning its activities without formal approval issued by a governmental body at ministerial level (in our case that of the Ministry of Higher Education). Indeed out of the six questionnaires that were returned, three of these completed the questionnaire while the three others refused to complete it on the ground that the author had no formal approval form allowing him to collect such data.

To overcome this obstacle the author contacted the Ministry of Higher Education in Algeria to provide him with a letter requesting all regional archives centres to co-operate. A letter was eventually received.

Due to this extremely low response rate, two follow-up letters together with a copy of the letter from the Algerian Ministry of Higher Education and a copy of the questionnaire were sent on June 9th, and October 15th 1986 respectively, to all archives centres which did not answer the first questionnaire or requested the approval of the Ministry of Higher Education.

Follow-ups are an essential phase of any questionnaire. Their use is certainly the most potent technique yet discovered for increasing the response rate. Indeed, their

use has frequently resulted in acceptable response rates whenever mail questionnaires were involved.

### 8.5. QUESTIONNAIRE RESULTS

Because of the computer revolution and the availability of appropriate statistical packages for data analysis such as SPSS, BMDP and so on, it is customary, when large samples of data are involved, to use this software, to produce tables, graphs and charts, instead of hand tabulation. The provision of such facilities has saved potential researchers considerable time and money and made their task less tedious and cumbersome than it would have otherwise been.

However, due to the fact that the sample of people concerned by the present study is very limited (only 49 Directions of the Algerian National Archives), hand tabulation was preferred to the use of statistical packages.

Despite the fact that each of the 49 regional centres received 3 copies of the questionnaire, the response rate remained relatively low. The overall results of the study can be summarised as follows (please see Appendix 6 for full details):

- a) 12 centres answered and effectively completed the questionnaire, that is approximately 24% of the whole sample;

- b) 16 centres answered but were unable to complete the questionnaire, that is 32%. The main reason for this was that these centres did not exist at all at the time this study was undertaken. This was the case for 16 regional units out of the 17 newly created in 1984;
- c) 3 centres answered but refused to complete the questionnaire although they had initially agreed to complete it on the condition that a letter authorising the author to conduct such a study was provided; and
- d) 18 centres refused to answer even after the second follow-up was sent. This represents about 37% of our sample.

One reason that could probably explain why the response rate was low stems from the fact that most of the regional units and specifically the newly created ones have neither the suitable buildings, nor the required staff to accommodate adequately the archives they are in the process of creating.

## **8.6. QUESTIONNAIRE ANALYSIS AND DISCUSSION**

In spite of the low response rate, it was decided that it was worth continuing the project for the following reasons:

1. In addition to the 24% which completed the questionnaire, the 33% representing those who could not complete it because of the lack of such a service within their respective regional unit were at least interested and vividly encouraged this initiative.

It should be mentioned that a similar problem was encountered by Roper (1977) and Cook (1980) when the possibility of adapting PROSPEC to archival institutions outside the PRO was being contemplated. This project is known as PROSPEC-SA;

2. All of the three archives regional centres that existed before the independence of Algeria in 1962 (Algiers, Constantine and Oran) replied favourably. It should be stressed that these centres housed most of the archives presently held in other regional archives. Indeed, when the legislation regulating the Algerian National Archives was promulgated in March 1977, all archives concerning a specific regional unit were transferred to the newly created archive centre of that regional unit.

In the following, the author will attempt to present a detailed analysis of the results of the questionnaire. This analysis will be based on the answers of the 12 questionnaires received at the end of this study.

#### 8.6.1. Personnel

The results of the questionnaire have confirmed the conclusions reached in Chapter Six of this project. As already pointed out, the sector of archives continues to lack the type of qualified personnel that is capable of developing this area and give it the importance and place it

deserves to have within the cultural and historical life of the country.

As can be seen from Table 8.1., out of 107 people representing 12 archival institutions in Algeria, only 49 carry out archival duties, that is 46%.

Table 8.1. Scattering of Personnel within Archival Regional Units.

	TECHNICAL PERSONNEL	ADMINISTRATIVE PERSONNEL	TOTAL
Central Repository	16	6	22
Adrar	0	3	3
Algiers	8	3	11
Bejaia	0	1	1
Constantine	9	11	20
Guelma	0	7	7
Mascara	1	2	3
Oran	15	6	21
Oum-El-Bouaghi	0	4	4
Setif	0	8	8
Tebessa	0	6	6
Tindouf	0	1	1
<b>TOTAL</b>	<b>49</b>	<b>58</b>	<b>107</b>

The table also indicates that the majority of the technical staff is concentrated in the three main region; namely:

1. Algiers which houses both the Central Repository of the ANA and Algiers regional archives centre;
2. Constantine; and
3. Oran.

Indeed, with the exception of the regional unit of Mascara which has one technical staff, the rest are located in the archives centres of the three cities listed above. This phenomenon can be explained by the fact that until 1977, only three archival regional centres were in existence. Added to that is the fact that none of the existing departments of Archives, Librarianship in Algeria has produced specialised archivists ever since they were inaugurated, although positions for such jobs are available within each regional unit.

#### **8.6.2. Nature of Archival Collections**

The results of the questionnaire revealed that the regional archives centres in Algeria store a wide variety of documents in addition to the archives created by the administration of the regional unit.

These documents include: books, periodicals, maps and manuscripts. The details of these collections are presented in Table 8.2; which shows that most archival documents are produced in French. Out of a total of 28700 linear metres, only 1508 are written in Arabic. This corresponds to about 5% of the totality of the archives held in the 12 archives regional centres that participated in this study. This striking imbalance between the Arabic and French archival collections could be attributed to the fact that Algeria remained a French colony until 1962. Even after the

Table 8.2. Types of Documents Preserved within Archival Regional Units.

	NUMBER OF				ARCHIVES		
	BOOKS	PERIODICALS	MAPS	MANUSCRIPTS	ARABIC	FRENCH	TOTAL
Central Repository	3000	200	2722	0	-	2520	2520
Adrar	400	60	0	40	-	48	48
Algiers	5260	1000	845	0	-	2500	2500
Bejaia	-	-	-	-	-	-	-
Constantine	50000	1000	4000	50	100	9900	10000
Guelma	4000	50	-	-	-	-	-
Mascara	-	-	-	-	100	200	300
Oran	11500	1400	820	-	-	8000	8000
Oum-El-Bouaghi	50	100	-	50	-	-	-
Setif	3000	-	-	-	-	1000	1000
Tebessa	8000	-	1375	375	1300	3000	4300
Tindouf	-	-	-	-	8	24	32
<b>TOTAL</b>	<b>85210</b>	<b>3810</b>	<b>9762</b>	<b>515</b>	<b>1508</b>	<b>27192</b>	<b>28700</b>

N.B. The values of archival documents are expressed in linear metres.

independence, French remained the official language in all institutions until the late 1970s when the arabisation of educational programmes was introduced.

Constantine regional archives is the centre that has the largest collection of archives written in French, that is 34% of the total. Likewise, Tebessa regional archives is the centre that houses the majority of Arabic archives. This represents approximately 86% of the archives covered by this study.

In addition to documents in Arabic and French, the Central Repository also possesses some documents, in particular manuscripts, in Turkish. However, these have not yet been made available for consultation by the public because it is only recently that they have been returned from Turkey where they were held ever since the end of the Turkish conquest of Algeria ended by the beginning of the nineteenth century (Touili, 1986). With regards to the size of these documents, no official figures have been released as yet. Hence, its exclusion from the above table.

Table 8.2. also shows that Constantine and Oran archives regional units together accommodate 63% of the totality of archives, that is 35% and 28% respectively.

It may be surprising to notice that the Central Repository of the ANA together with Algiers archives centre house only 17% of the totality of archives. The main reason for this, as already asserted in the previous chapter, stems

from the fact that Algiers regional unit was the one that suffered most as a result of the transfer of archives to France, which took place just before the independence of Algeria in July 1962.

As far as the nature of archives stored in our sample of archives regional centres is concerned, the study indicates that these revolve mainly around the following areas:

- a) Administrative archives which encompass documents such as passports, national identity cards, etc...;
- b) Financial archives which consist of documents such as the budgets allocated to the various regional units;
- c) Agricultural archives which deal with the problem of land division between Algerians and French, in addition to irrigation; and
- d) Historical and political archives which are concerned with the Turkish conquest of Algeria as well as the French colonisation. The latter consists of documents related to the elections held between 1830 and 1962, trade unions, and so forth.

Considering the shortage of qualified staff, it was found that only 6 out of the 12 archives centres that participated in the study are engaged in the publication of the contents of their holdings. The type of publications include:

- a) Catalogues;
- b) Guides;
- c) Indices; and
- d) Finding Aids.

Finally, the study also revealed that the annual growth of the archives collection varied between 1% and 2%.

### 8.6.3. Users and Users' Attitudes towards Services

Users constitute the corner-stone of any successful information system; be it a library, an archives/records management centre or an information service. Indeed, users are a good indicator of the degree of success of any of such systems. Failing to satisfy their needs is therefore commensurate with the failure of the service as a whole. If the service is considered to be of good quality and yet fails to attract users, it is necessary to identify the likely problems and eradicate them.

Having explored the nature of the archives held in the regional centres considered in our study, it is perhaps very useful to discuss the attitude of the users towards the services they are provided with and find out whether their needs are actually satisfied.

Questions 12 to 19 were intended to assess these attitudes. A brief summary of the general findings is presented below.

First and foremost, it should be stressed that the users of archives in Algeria can be divided into four main categories. These are:

- a) Lecturers;
- b) Researchers;
- c) Students; and
- d) Personnel of the regional centre to which the archives centre belongs.

It is, however, striking to note that the number of daily users varies between 5 and 20. It is only in the case of the archives regional centre of Constantine that the number of users can reach 200 a day. It would therefore be interesting to identify the reasons behind the low use of these services.

Questions 17 and 18 of the mail questionnaire were aimed at finding out the possible reasons that can cause dissatisfaction amongst users in as far as the staff of the archives centres are concerned. These opinions confirmed those of the users interviewed in march 1986. These are presented below in decreasing order of importance:

- a) Lack of sufficient duplicating facilities;
- b) Lack of suitable finding aids;
- c) Legal inaccessibility of users to documents of sterling importance;
- d) Inadequate opening hours; and
- e) Unavailability of documents of reference.

Considering the above factors, it is therefore important for the personnel and authorities of the archives regional centres of the ANA to optimise the use of their archives by improving the quality of their services. This can be achieved by providing:

- a) Sufficient duplicating facilities;
- b) Adequate sources of information so that users are able to locate their information as quickly as possible;
- c) Adequate opening hours so that researchers and students can still use the service after their lectures or work; and
- d) Implementation of an automated system to facilitate access to information.

It is interesting to note that all 12 archives regional centres unanimously agreed that the most effective way of improving the quality of their services and thereby satisfying the needs of their users could be effectively achieved through computerisation.

The next part of this chapter examines the general attitudes and expectations of our respondents in so far as automation of archives is concerned.

#### 8.6.4. General Attitude towards Automation

It is a well-known fact that as the total amount of published information grows, the more difficult and the less efficient it becomes for it to be processed manually. Thus,

automation is usually considered as the universal solution to all problems evolving from manual systems.

Others, however, view automation as a threat to their future because their profession will be exposed as being intellectually vacuous.

What do Algerian archivists think about this issue? Do they expect a positive outcome out of it? What archival functions should be automated? All these questions as well as many others will be answered by discussing the results of questions 20 to 27 of the mail questionnaire and the interviews conducted with Hachi and Touili in 1986.

Regarding the issue of whether the implementation of a computer information system would be of any help to overcome any of the problems currently facing archives regional centres, all respondents commented that such an initiative would be most welcome in that it will improve the production of finding aids and accordingly save users considerable time.

They, however, all agree that they will undoubtedly be experiencing some major difficulties. Of most significance, perhaps, are the following:

1. Financial difficulties;
2. Technical difficulties;
3. Lack of personnel with both computer and archives background.

Most of the sampled respondents believe that finance is likely to be the most crucial obstacle and as a result believe that the implementation of a computer network system connecting major archives regional centres would be able to reduce costs and at the same time provide users with a better service.

As far as the major objectives of such an automated system are concerned, respondents believe that the automated system should be specifically targeted towards the production of:

- a) Finding aids;
- b) Indexes; and
- c) Administrative control of the holdings.

However, the production of finding aids is considered to be of most relevance at this very moment.

Finally, it should be stated that at present none of the existing archives regional centres receives archives in machine readable form. Nevertheless, this is well under way since in the last few years many institutions have heavily invested in automation. Some of the documents that will be produced will obviously be in machine readable form. If they are to survive and play the role that is expected from them, the archives centres should therefore be ready to face the technological challenge.

## 8.7. CONCLUSION

This chapter attempted to present, discuss and analyse the results of the study carried out by the author between March and October 1986. The study was aimed at finding out about the nature of archives held in the various regional archives centres in Algeria, the problems encountered, the kind of users, their attitudes towards automation and the services available to them.

Five different techniques were used to gather data. These are:

1. Mail questionnaires;
2. Interviews;
3. Working on documents;
4. Observation; and
5. Own Experience of the ANA.

Emphasis was, however, put on the mail questionnaire for reasons already explained in the methodology.

The questionnaire was addressed in March 1986 to all 48 archives regional units in addition to the Central Repository of the ANA. This was accompanied by a letter explaining the reasons for the request.

Due to a low response rate, two follow-up questionnaires were sent in June and October 1986 respectively. A letter, from the Algerian Ministry of Higher Education, formally authorising the author to conduct this study was also

included. About 63% of the sampled regional units answered, but only 24% effectively completed the questionnaire fairly consistently.

The study found out that:

1. The various archives services suffer a great deal from the absence of qualified personnel. It also showed that the majority of the technical staff that is available is concentrated in the three main regions; namely:

- a) Algiers;
- b) Constantine; and
- c) Oran.

2. The study also indicated that most of the archival documents are produced in French. Indeed, only 5% of the totality of the archives held in the 12 archives regional centres that completed the questionnaire are written in Arabic.

3. The nature of archives can be divided into four main categories:

- a) Administrative archives;
- b) Financial archives;
- c) Agricultural archives; and
- d) Historical and political archives.

4. It was also found that the archival services were not used to their optimum. Amongst the reasons that were suggested, the following are of the utmost importance:

- a) Lack of sufficient duplicating facilities;
- b) Lack of suitable finding aids;
- c) Legal inaccessibility to documents of the utmost significance;
- d) Inadequate opening hours; and
- e) Unavailability of documents of reference.

5. Finally, it is very interesting to acknowledge that all respondents consider that the development and implementation of a computer information system within their services would be of enormous help in that it will improve the production of finding aids and as a result save users considerable time.

The respondent were, however, concerned by the likely obstacles that might emerge if such an initiative was taken. These include:

1. Financial difficulties;
2. Technical difficulties; and
3. Lack of personnel with both computer and archives background.

The next chapter of this thesis will be devoted to the conception and design of an automated system for the Algerian National Archives.

In addition to the system's short and long term objectives, issues such as the hardware and software requirements of the system to be eventually implemented will also be discussed.

## CHAPTER IX

### DESIGN OF AN AUTOMATED ARCHIVAL SYSTEM FOR THE ALGERIAN NATIONAL ARCHIVES

#### 9.1. INTRODUCTION

Despite the low rate of response (24% out of the total number of the existing archives regional centres) resulting from the study carried out between March and October 1986, it has been decided to continue the research whose principal aim is to design a computer system for the ANA. As already stressed in the previous chapter, the chief reasons that encouraged the author to pursue the study are as follows:

1. The main regional centres that existed during the French colonisation, (i.e. Oran, Algiers and Constantine) all responded to the questionnaire. Indeed, until the promulgation of the decree of 20th March 1977 creating the ANA, only these three archival centres were in existence within the country.
2. The archivists who responded to the questionnaire all encouraged the development of an automated system because of the various problems they have all been facing and considered automation as one of the solutions that could at least improve the chaotic situation prevailing within the ANA.

In this chapter, the author will attempt to propose a computerised management information system for the Algerian archives. Necessary information needed to rationalise this service at both national level and regional level will be discussed. The requirements of the proposed system as well as the action programme necessary to implement it will also be described.

As an illustration of the proposed system, chapter 10 will present a prototype system using Ashton Tate's dBASE III PLUS software package.

## **9.2. NEED FOR AN AUTOMATED ARCHIVAL SYSTEM**

From our discussion in both chapter 7 and 8, it has been shown that Algeria suffers a great deal from the lack of a well-defined archival system. Basically, it was noticed that the archival institutions composing the Algerian National Archives (ANA) work with no co-ordination and lacking a plan or general policy for the management of archives.

These archival institutions are mainly characterised by the following:

1. Large volume of manual record keeping and processing;
2. Large backlogs of work because the existing personnel is overloaded;
3. Difficulty of retrieval using manual finding aids;
4. Expenditure of considerable time is spent on updating these finding aids;

5. Shortage of well-qualified archivists;
6. Lack of standardisation between the various regional archival institutions; and
7. Limited sharing of information between archival institutions.

As a result, a chaotic situation has developed in the handling of this large volume of documents. All these problems put together led to the idea of undertaking this study and accordingly suggesting an automated system capable of managing and optimising the use of these archives.

This new system would make use of the most sophisticated technological tools available to permit both effective control and use of this otherwise overwhelming volume of documents, and which would give users of every regional unit access to the centre's respective archives collection.

This proposal presents a plan for putting a single comprehensive system before the situation deteriorates further, and before splintering of efforts leads to irreversible chaos. The objective of the proposed system would be to improve greatly the capacity of the ANA to serve its different users. Indeed, these sophisticated technological facilities would contribute to form a network under a common standard so as to improve the capacities of these units to serve their customers and users.

### 9.3. PROPOSAL

Considering what was mentioned above, it is proposed that an Automated National Archival System and Network be established. It would provide a pool of all the archives, and the network would make these archives available to all those who may wish to use it. Thus, any investigator, whether he be in the headquarters of the ANA, or in any of its regional units, would have access through his nearest archives department to all the documents available for consultation.

The following steps should be taken to consolidate fragmented activities into a single national archival pool, or system or network, employing modern computer and related technology; and to facilitate the acquisition, analysis, storage and searching of these materials:

1. Identify holdings and acquisitions programmes of the major regional centres which would contribute to the pool or system in the form of tapes or other microform, produced under accepted standards;
2. Foster agreements between the various regional units on standards and/or compatible procedures for the acquisitions, analysis and coding of archives kept for research purposes;
3. Foster development in the universities of curricula for the education of archivists who would staff the operating units of the ANA system.

#### **9.4. OBJECTIVES OF THE NEW SYSTEM**

The objectives assigned to this system can be described as follows:

1. Computerise the day-to-day routine work in different areas especially those concerned with input, updating and retrieval of document that have a permanent value;
2. Introduce modern computer technology as a replacement of monotonous routine clerical work and as a tool for rationalisation of decisions thus introducing the appreciation of time to the work environment as well as introducing the appreciation of the value of manpower and its use in the management and control instead of exhausting it in clerical work;
3. Reduce paperwork in order to save space and save archives from damage by using techniques such as microfilms; and
4. Promote co-operation between the various archival institutions making up the ANA network.

##### **9.4.1. Short and Long Term Objectives**

Considering the size and the state of the ANA, it is believed that is necessary to define some short term objectives as well as some long term ones:

#### **9.4.1.1. Short Term Objectives**

1. The system should be able to describe in as much details as possible the contents of the various archival collection to form a computerised database which can be used as a means of reference to the archives held within the institution;
2. The system to be designed should allow for interactive searching;
3. The system should be able to produce standard printouts (e.g. catalogue) as well as specific printouts that might be required by the users of the system; and
4. The system should also allow for the management of the archives held within the institution, by informing the staff of the ANA whether a category of archives can be accessed, or not, etc.

#### **9.4.1.2. Long Term Objectives**

1. Use the database as the basis for the development of a comprehensive information retrieval system for archival material, sufficient in size to incorporate all documents held within the various regional repositories of the ANA;
2. In addition to the headquarters of the ANA to be located in Algiers, the ANA's database should be made available as part of a network to include other repositories. The latter should therefore be equipped with suitable computer and related equipment to enable them to serve

the functions of input and output related to their autonomous activities;

3. The system to be designed should be very easy to use. User friendliness has always been a desirable property of information systems, particularly if they are designed for a broad category of users as in the case of the ANA where it would be more interesting to let users (students and researchers) have access to the system to carry out their searches).

Because the majority of users will have little or no knowledge of computers, it is important that the system is designed as simply as possible as most of these users will not be ready to learn and remember very complicated commands; and

4. The system should also have a password-protected security system to restrict access to the database which may contain highly sensitive information. Indeed, it is of utmost importance to control access to the computer system and its various hardware and software resources so that only authorised users read a data file.

#### **9.5. OUTLINE OF THE PROPOSED SYSTEM**

In order to achieve the aforementioned objectives, the computerised system to be designed for the Algerian National Archives may take the form of a network system that consists of:

1. A central archives centre which houses the main computer facilities and which may be responsible for:

- a) Designing the computer system to achieve the objectives and aims stated above. This should be a system that can be accessed by the various regional centres scattered throughout the country, thereby allowing for decentralised input and retrieval of the respective centres;
- b) Training the personnel needed for the implementation and running of the system;
- c) Following up the implementation and application of the new computerised system at regional levels;
- d) Providing the technical support that is needed by the system's potential users;
- e) Maintaining the system; and
- f) Selecting the appropriate hardware and software to ensure systems compatibility.

2. Because the National Archives Centre will not be able to handle all the bulk of work needed to process all documents in the 48 regional units, a set of regional centres located in key areas in the country should be created.

Each of these regional centres should allow for input and retrieval of document of the geographic area they cover. Indeed, at the present moment, it is not cost effective to create an automated system in each of the 48

regional centres that have been created in 1983. As the results of the questionnaire demonstrate:

- a) Some archival regional centres exist only in theory;
- b) Some regional units have not yet created their archives centres as the documents they process are still in their first stage; and
- c) Many of the centres already in operation lack the personnel able to manage them.

3. A computer communication network to link the central computer facilities and the four smaller centres should be implemented. The data and information transfer could take place through telephone lines or micro-wave networks.

#### **9.5.1. Structure of the Proposed ANA System**

The proposed ANA system is geared to the purpose of having the existing archival services serve their users in a dynamic sense as opposed to a passive sense. Obtaining the maximum value from co-operative effort between archival institutions in the country is the main goal of the new system.

The new system will take the form of a hierarchy with multiple levels. Thus, the main centre of the ANA will be linked via a telecommunications network to a set of archival regional centres; which in turn should cover a number of

regional units (wilaya); and finally each regional unit will look after the archives of the communes (local archives) that belong to it.

#### **9.5.1.1. Local Archives Centres**

All local archives centres should be integrated into a common system served by a computer system in an archival regional centre. However, each local archives centre should be completely independent in administration, operation, and funding.

#### **9.5.1.2. Archival Regional Centres**

As already mentioned, because the ANA centre will not be able to cope with the considerable amount of documents to be dealt with, it is necessary to designate a number of regional units to ease its task.

The choice of the set of archival regional units should be based on a number of criteria of which the following are considered to be of the utmost significance:

- a) The centres must be amongst the 12 centres that responded to our questionnaire;
- b) The centres should be operational; that is already involved in the processing of their respective archival documents;
- c) The centres should have a number of staff appointed to look after the documents with archival value;

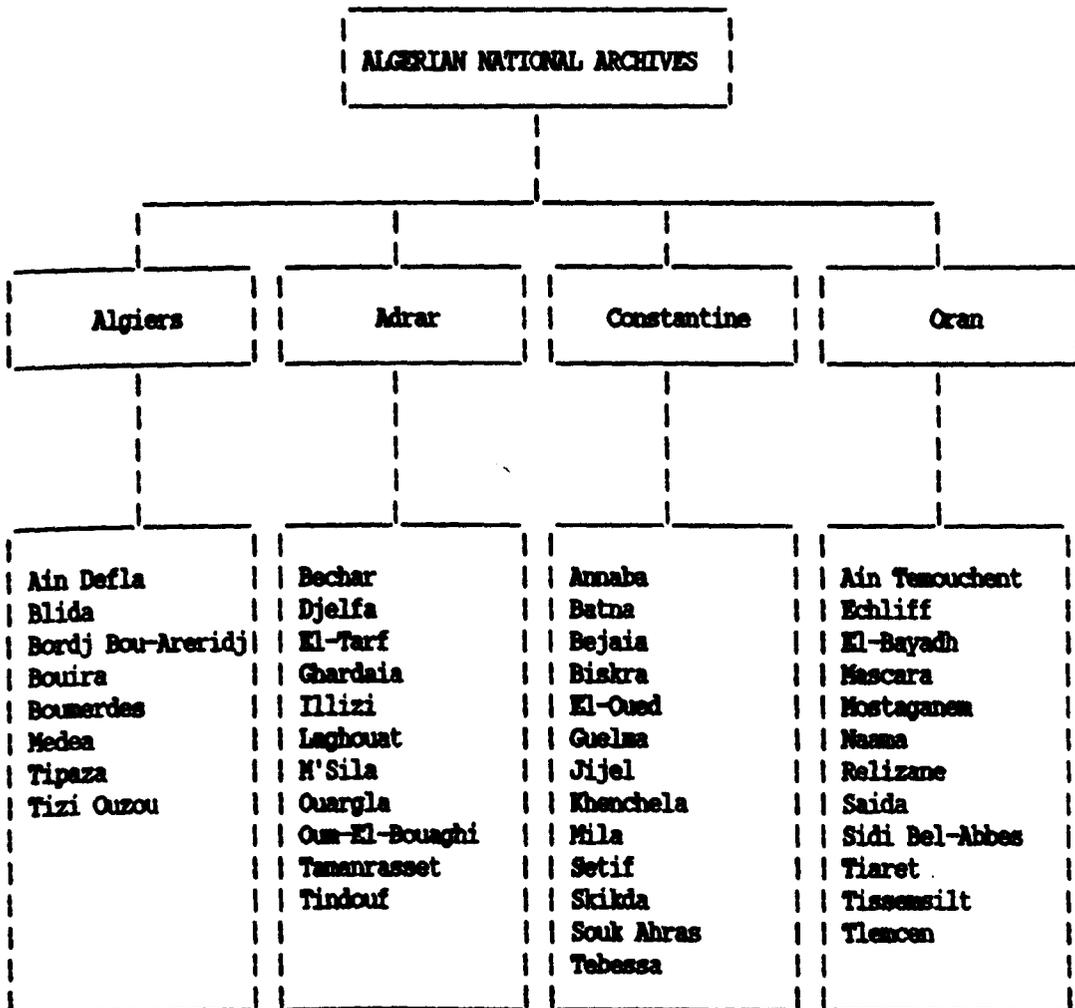
- d) The centres should have adequate repositories to house their archives;
- e) The centres should not be geographically close to another potential archival regional unit; and
- f) The centres should preferably be close to a university which provide courses in the information studies so that it can benefit from the students enrolled on such courses.

Table 9.1. Scattering of Staff and Volume of Archives (in linear metres) per Regional Unit.

	TOTAL PERSONNEL	VOLUME OF ARCHIVES		
		ARABIC	FRENCH	TOTAL
Central Repository	22	-	2520	2520
Adrar	3	-	48	48
Algiers	11	-	2500	2500
Bejaia	1	-	-	-
Constantine	20	100	9900	10000
Guelma	7	-	-	-
Mascara	3	100	200	300
Oran	21	-	8000	8000
Oum-El-Bouaghi	4	-	-	-
Setif	8	-	1000	1000
Tebessa	6	1300	3000	4300
Tindouf	1	8	24	32
<b>TOTAL</b>	<b>107</b>	<b>1508</b>	<b>27192</b>	<b>28700</b>

Table 9.1 shows the scattering of staff and volume of archives per regional unit. As was pointed out in Chapter Eight, only 12 centres responded positively to our questionnaire in addition to the ANA's main centre.

**Figure 9.1. Scattering of Archival Regional Centres  
Throughout the Country**



From the above table, it can be seen that four centres fulfil the criteria previously defined and can therefore become part of the ANA's computer information system. These regional units are:

- Algiers, in the centre;
- Constantine, in the East;
- Oran, in the West; and
- Adrar, in the South.

Each of these four regional centres will take care of the processing of archival documents of a number of regional units. Figure 9.1 shows the area and regional units that will eventually be covered by the four archival regional units.

These centres will be used as pilot centres. Once the volume of archives in other regional units has increased, qualified staff have been recruited and adequate repositories have been built, they can become eligible for the status of regional centres. Accordingly, they can be automated and become part of the network.

In addition of being responsible for the day-to-day running of the centre; each archival regional centre will serve as a focal point for local archives in the region. Automated — storage and processing facilities will be available to provide users in the area with real-time access to archives via remote terminals.

The archival regional centres should also be able to refer unusual requests for information to other regional centres throughout the country or to the national centre itself.

#### **9.5.1.3. Algerian National Archives Centre**

The national centre should provide back-up for the regional centres by automatically supplying responses to queries relayed from regional centres. It should also co-ordinate the national cataloguing activities by defining a standard to be used throughout the country. To avoid any problems arising in the future, it is important for all 48 regional units to follow a common information structure in addition to a specific regional code as defined in Appendix 7.

#### **9.5.2. Need for an Information Structure**

Before dealing with the question of systems specification, the archivist has first of all to define the information structure to be input, manipulated, indexed, sorted, searched and output by the computer. The kind of information to be included can vary from one system to another depending on the objectives assigned to the system. Thus, if the aim of the system is to describe the contents of documents, i.e. cataloguing them, then features such as the document's title, date, reference code, the physical make-up of the document, and so on, should be included. If, however, the aim is managerial rather than descriptive, then features such as the action date, action marker (whether the document

is to be reviewed, destroyed or kept for ever), the state of repair of the document, and so forth, should be mentioned. It might also be the case for an information structure to encompass features relating both to the description of the document and its management.

It is true that the computer is such a flexible tool that the conversion from one system to another is always possible. However, so much is at stake in doing so that it becomes urgent that standards be met at an early date so that the changes hopefully need only be done early in the development of this new system.

It must be stressed, however, that in producing an information structure not all fields composing a structure have to be filled when describing a given document or item. By the same token, once a system is operational, it is difficult, if not impossible, to include a feature that has been forgotten during the design stage. For instance, it would be impossible to get a printout of all the maps if we were to omit the "document type" feature in our information structure.

#### **9.5.2.1. Standardisation Steps**

At the present, every regional centre has its own code arrangements for filing and retrieving documents. It is therefore virtually impossible to computerise the present system without conceiving new standards. Indeed, to remedy

to this chaotic situation, it is of the utmost importance that a committee be installed to define specific standards for use by the various regional centres composing the ANA.

To establish the set of standards needed by the ANA's future system, the following steps should be taken into account:

1. Set up a national conference on standards of archives with representative associations and the various regional units;
2. Establishment of committees whose task is to arrive at a standards for storing archival documents in accordance with existing international standards;
3. Rationalise the differences between the proposed standards; and
4. Provide the special codes and glossaries required to file archival documents;
5. Make use of experiences of country such as Canada, Great Britain and the USA;
6. Make use of Unesco experts in this field.

#### **9.5.2.2. Definition of an Information Structure**

An in-depth analysis of the management requirements and manual catalogues of the ANA suggested that a structure consisting of the following fields should be adopted:

**1. Document reference;**

To identify the place of the document, this field should include:

- a) A code of the regional unit that stores the document. Appendix 7 presents a table showing all 48 regional units with their corresponding codes; and
- b) A code of the department that issued the document within a regional unit. It should be noted that in Algeria all regional units consist of the same departments. Appendix 8 presents a table showing the various departments making up each regional unit with their corresponding codes

**2. Document type: That is specify whether the document is a:**

Letter;

Microfiche/Microfilm;

Manuscript;

Map; or

Photograph.

**3. Description of the contents and history of the document;**

**4. Cover dates;**

**5. Action date;**

**6. Action Marker: This field should specify the action to be taken when the date of action is up. The code to use is as follows:**

- a) D = Destroy the document;
- b) R = Review the document; and
- c) P = Preserve the document if presents historical interest.

- 7. Physical description of the document;
- 8. References to publication (if any) relating to the document;
- 9. Additional descriptors;
- 10. Sorting references;
- 11. Availability;
- 12. Accession information;
- 13. Security Information;
- 14. Details regarding access and use;
- 15. Location: This field will contain the following information:
  - a) Series;
  - b) Box;
  - c) Rack
  - d) Bay; and
  - e) Shelf;
- 16. Conservation data;
- 17. Notes on copyright if any; and
- 18. Photographic copies: mention references and necessary details.

### 9.5.3. Telecommunications

Algeria has a very sophisticated public telecommunications system. This makes the possibility of developing a reliable computer archives system a practical reality. Once the system has been implemented, it will be possible for any user to access online the ANA's main database via a remote console.

### 9.5.4. Manpower of the System

The quality of service given by a conventional archives service depends quite clearly on the abilities of its staff. Their professional skills, their resourcefulness in overcoming the obstacles and solving the problems that might arise, their tact in dealing with the public all contribute to the success of an archives service. In exactly the same way, it is the skills of human beings which go to make for a successful computer-based archives system. That is why specialised professional manpower in the field of archives will be required in considerable quantity to staff the ANA system.

As already mentioned in chapter Six and Seven, professionals in these fields are in very short supply, and only four universities (Algiers, Annaba, Constantine, and Oran) have established curricula to provide specialists in these areas. It has also been mentioned that the majority, if not the

entirety, of the students enrolled for these degrees refuse to opt for the archives option.

Because staffing constitutes an important requirement in automating any service such as archives, it is of the utmost importance that a solution be found to attract and encourage students to take up this option.

## **9.6. SYSTEMS SPECIFICATION**

In this part of the thesis, the author will attempt to define both the system's hardware and software requirements.

### **9.6.1. Hardware Requirements**

To acquire the hardware necessary for the day-to-day running of the ANA system, several possibilities are available:

- a) Rental;
- b) Lease ;
- c) Buy; and
- d) Computer Bureau.

Table 9.2. details the advantages and disadvantages of these options.

Table 9.2. Options Available for Acquiring Hardware.

	RENTAL	LEASE	BUY	COMPUTER BUREAU
Overall cost.	HIGH Normally no reduction in charges as equipment ages.	MEDIUM Lease charges decline after a specified period.	LOW But high initial outlay.	HIGH System operation costs generally high.
Risk of technological obsolescence.	LOW Can normally cancel agreement at will without penalty.	MEDIUM Fairly long fixed period contract (penalty payable on early cancellation).	HIGH Probably will become technologically obsolete before 'worn out'.	LOW Bureau must keep up to date with technological advances.
Maintenance.	Included in rental charges.	Included in lease charges.	Extra charge.	Included in charges.
Excess usage.	May be extra charge if equipment used for more than specified time in one month.	No extra charge.	Not applicable.	Extra charge to cope with peaks/additional time.
Flexibility.	Computer configuration can be changed easily.	Difficult to change configuration substantially.	Might need to buy new equipment to upgrade to better system.	No problem, if bureau is large enough.
Other matters.	Rental/lease charges may be applied, in part, to later purchase.		Some advantages (eg. discounts when buying in large quantities).	Experts are always at hand to cope with problems.

Whatever computer is acquired and whatever of the above options is opted for, the one major factor that should be emphasised is that of hardware compatibility. This is particularly true if the ANA were to opt for the buy option. Indeed, extreme caution should be exercised before hardware acquisition is made.

#### **9.6.1.2. Special Requirements**

Because of the special context of ANA, the computer hardware to be acquired should also make provision for the following features:

1. Ability to handle both Arabic and Roman scripts such as the Eurab Terminal;
2. Ability to accept Arabic and Latin scripts on the same line;
3. Ability to display properly the shape of each character so as to distinguish between characters that have some similarities; and
4. Ability to display diacritic marks such as accents (acute, grave, circumflex, cedilla, and so forth).

#### **9.6.2. Software Requirements**

It is reasonable to assume that a program that is thoughtfully designed, carefully coded, and thoroughly tested, will perform its intended objectives without errors. However, this is not always the case as bugs and errors can occur and make the program behave in some way other than the

programmer intended. This often results in the fact that software projects always run behind schedule.

Poor quality software is easy to identify. If a program does not accomplish its intended objectives, is difficult to use, gives inaccurate results, fails to obey the user's commands correctly, or crashes (stops functioning altogether), it is said to be of poor quality software. In this section of the project, we shall identify some of the criteria that should characterise the software to be developed or acquired by the ANA.

#### **9.6.2.1. Reliability**

The software to be acquired by the ANA should be extremely reliable. A program can be said to be reliable if it is correct and robust. A program meets its specifications, for any valid input (commands or data), the program produces the right output. A robust program functions as well as possible in the face of such adverse conditions as invalid input and malfunctioning hardware. When difficulties arise, a robust program informs the user of the problem and suggests alternative solutions.

#### **9.6.2.2. Testability**

To ensure reliability, the program should undergo a standard test. Each test would consist of sample input for the program and the corresponding output that the program should

produce after processing. A program that has passed all the tests in the set could be pronounced correct, if not with certainty, at least with a high degree of probability.

Unfortunately, for most programs the variety of input is so great that an exhaustive set of tests is impossible to construct. One reason for concentrating so much effort on other aspects of program/software development process is the extreme difficulty of verifying the correctness of a program by means of testing.

#### 9.6.2.3. Usability

Regardless of its technical merits, the program to be purchased by the ANA should be a practical and convenient tool for achieving its assigned objectives. The proper use of the software should be reasonably obvious to someone who understands the task to be accomplished but has little or no experience with computers.

Programs with this characteristic are said to be user-friendly. The basic characteristics of a typical user-friendly system are depicted in Figure 9.2 below.

Designing user friendly programs can be very tricky, since different users may prefer different methods of interacting with the computer. Let us consider the problem of giving commands to a program. Some users, for instance, will prefer to strike a key for each command. Disadvantages of this

## Figure 9.2. Requirements of a User-Friendly System

1. The connection to an online system should be made very easy.
2. The system should be able to prompt the user to make the next step.
3. The system should use appropriate option technique such as command menu, YES/NO answers and so forth to facilitate the task of potential users.
4. In addition, the system should make provision for default options if the user is unable to perform a given task.
5. Eventually, the system should also be able to provide the user with help at any particular stage of processing or if he presses a wrong command. It must be stressed that the system should give only the information that is needed so as not confuse the end-user.
6. The potential user is to be kept informed of the various stages of processing. For instance, if he is sending a list of references to the printer and the system is indexing the file in question alphabetically before printing, it should print a message on the screen such as "WAIT PLEASE..." so that the user does not think that something has gone wrong especially if the task is lengthy. In other words, the system should systematically inform the user of the activities taking place and their respective progress.
7. In case of fatal errors, the users should be given warning messages advising them on what option to take.
8. The system should be protected against the taking place of serious operations such as the deletion of files. Indeed, it is important to check with the user once more before such an operation is executed. For instance, the system should ask for a confirmation by displaying the message "ARE YOU SURE YES/NO" whenever a user wishes to erase a file.
9. The system should make provision for possibilities allowing the user to go or return to any specific point at any point in time.
10. Finally, logging off the system should be straightforward and should be possible from any processing stage.

method include the need to remember which key corresponds to which commands and the difficulty for inexperienced typists to find and strike the appropriate key. Others, on the other hand, will probably prefer to select commands from a menu by moving an on-screen pointer with a mouse. This makes few demands on one's memory or physical dexterity, but generally speaking, moving a pointer down a menu is usually considered to be much slower than simply striking the key corresponding to the desired command.

#### 9.6.2.4. Efficiency

Moreover, the ANA should emphasise the efficiency of the software to be acquired. A program is said to be efficient when it executes as rapidly as possible and uses as little memory as possible.

Important as efficiency is, programmers are often prematurely concerned with it. They may write obscure, difficult to understand code which is marginally more efficient than a more straightforward and understandable version. Experience shows, however, that only a small portion of a program's code has a significant effect on the actual running time of the program. It is, thus, recommended that a program be designed for clarity and simplicity first. Routines that need more efficiency can be modified, in the second stage.

#### **9.6.2.5. Portability**

Another feature that should characterise the program to be bought by the ANA is portability. A program is said to be portable when it can be easily adapted to run on computer systems other than the one it was originally written for. Clearly, time and money will be saved if a program written for one system can be adapted to others instead of having to be rewritten from scratch for each new system.

The most important technique for portability is to program in high level languages, which are system independent, rather than in machine or assembly languages, which heavily hinge on the details of a particular computer system.

Another technique would be to have the program work through the operating system rather than trying to interact directly with hardware components; often the same operating system is used on systems having a variety of hardware configurations.

#### **9.6.2.6. Maintainability**

Finally, the software should allow for easy modification to correct bugs or improve performance. The programmers who maintain a program are usually not the ones who originally wrote it. For a program to be maintainable, then, its structure must be very simple and clear and its operation so well documented that it can be readily understood by persons other than its authors.

#### **9.6.2.7. Access Requirements**

Additionally, the system should allow for the following facilities in order to improve its efficiency as far as access and retrieval are concerned:

1. Data entry, updating, editing and searching should be performed on-line. Free text searching would be desirable;
2. It should be possible to amend the data of a particular record at any point;
3. Access should be carried out via visual display units (VDUs) or word processors, connected to a main computer. The system should be able to support a minimum of 10 terminals to speed up data entry;
4. The members of staff of the Algerian National Archives should be allowed and able to perform all functions and are to have access to all data; and
5. Users of the system, on the other hand, are to have access to sections 1 to 11 of the information structure only. Furthermore, they should not have permission for writing to the database.

#### **9.6.2.8. Retrieval Requirements**

1. The system should allow for free text searching. It should comply with the characteristics listed below:
  - a) Ability to use Boolean operators (and, or, and not);

- b) Ability to use contextual searching whose main purpose is to refine search statements by allowing users to specify the context in which a term must occur;
  - c) Ability to use both right hand and left hand truncation in carrying out a search;
  - d) Ability to use range searching (i.e. Greater Than, Less Than; and so forth);
  - e) Ability to provide selective dissemination of information;
  - f) Ability to use a thesaurus containing preferred terms, related terms, broader terms, narrower terms as well as a list of stop words;
  - g) Ability to store the results of searches for eventual uses; and
  - h) Ability to edit the results of searches to present them into a suitable report form.
2. The system should be able to provide the user with the results of the search he/she has performed and specify the number of items found with the respective references;
  3. The system should also be able to provide user-defined outputs;
  4. The system should also be able to provide:
    - a) Experienced and novice user mode;
    - b) Help facilities; and
    - c) Statistical facilities.

4. The system should, in the long term, allow users to cross-search all specified databases with the same commands; and
5. The thesaurus is to be common to all databases if more than one databases is stored on the system.

**a) Input Functions:** These should provide the following facilities:

1. Ability to input data both on-line using a VDU and batch processing using a word processor, or intelligent terminal with local storage facilities; and
2. The VDU screen should be formatted with appropriate prompts for each field constituting the record, thus easing the job of the operator.

**b) Output Functions:** They will consist of bulk or selective dissemination of coded materials to various regional centres and also in response to users needs. The following provisions should be made available:

1. Output should be in two main forms:
  - a) On VDU; and
  - b) On hard copy.
2. In the long term, it would be ideal to print catalogues on microfiche or microfilm for use on appropriate machines by users.

## **9.7. ACTION PLAN FOR IMPLEMENTATION OF THE PROPOSED SYSTEM**

The implementation of the proposed system depends of course on the adoption of the idea of such system by the ANA. It is too early to put a schedule for its implementation, but the following task may compose an action programme for such implementation:

1. Establishment of the archival regional units in the 48 regional units as stated by the decree of 20th March 1977 creating the Algerian National Archives;
2. Development of the new integrated system as a replacement of the old isolated system;
3. Key personnel needed for implementation and maintenance of the computerised system should be recruited and trained;
4. The computerised archival system may be developed by a software house specialised in large scale online computer systems;
5. Acquisition procedure of hardware;
6. The system may start to function after testing of new software run on the mounted hardware;
7. The first bulk of input data may be prepared according to purpose designed input forms;
8. The system may finally be run for testing and regular input to the system may start after completion of system implementation, i.e. after successful run; and

9. A Set of test data may be prepared parallel to the preparation of the first bulk of system data (Item 7). This test data is to be used for test run (Item 8).

#### 9.8. CONCLUSION

This chapter was devoted to the design of a computer information system for the Algerian National Archives. The author presented the specifications that are to be met to develop an adequate system. This included not only the hardware requirements, but also the software requirements. Also an action plan for the implementation of the new system was outlined.

A general layout of the system to be developed based on a multilevel hierarchical structure was also presented. This emphasised the need to install the system in four different cities only in addition to the ANA's main centre. These are:

1. Algiers (North);
2. Adrar (South);
3. Constantine (East); and
4. Oran (West).

This chapter also stressed the need to define an information structure that can handle all documents acquired by the ANA.

To keep in line with the recommendations of this chapter, Chapter 10 goes on to describe a prototype automated system to meet the ANA's requirements using Ashton Tate's query language dBASE III PLUS. Chapter 11, on the other hand, provides the potential reader with a full description and evaluation of this prototype system.

## CHAPTER X

### DESIGNING AND USING THE PROTOTYPE SYSTEM

The objective of this part of the study is twofold. First and foremost, design a prototype automated records management system capable of simulating the sort of functions that are supposed to be carried out by the system to be implemented at the ANA. Secondly, complement this design with a detailed description of the prototype system and how it might be used to respond to the needs of the ANA's potential users.

#### 10.1. PROTOTYPING

The idea behind prototyping is the conception of a software model that can be used as an aid to the definition of user requirements. Indeed, it is believed that an initial guess can be refined quickly and in context. Users, thus, do not have to identify requirements in complete and final detail. Accordingly, they will be aware of what is happening, and recognise the final product.

It follows that prototyping can be described as "the construction of a working version of a final product that is subsequently refined and made more efficient. The process of prototyping is iterative, nondeterministic, and user driven" (Licker, 1987).

The particular areas that prototyping addresses well are user interface in terms of screen and report design and data analysis. Areas difficult or impossible to address are conflicting requirements, system performance, and system audit and security.

#### 10.1.1. Major Benefits

Prototyping can result in three main advantages; including:

Shorter Analysis: With fewer misunderstandings, the result should be closer to perceived needs, and less time needs to be spent both in getting the details and in revising them.

System by Example: Prototypes can be built as examples from very little in the way of stated requirements. The user can pick, choose and amend from the start. The work done on one system can easily be re-used on other similar projects.

Accountability: It is clear who is responsible for the first-cut (the prototyping team), where the development stands (no long periods of silence).

#### 10.1.2. Major Drawbacks

Prototyping, also, has several disadvantages of which the following are of the utmost importance:

Limited number of users involved: There seems no way to prototype with a large number of users. Conflicts cannot be resolved by prototyping, and an attempt to do so may raise expectations and demands for a system that cannot possibly be delivered.

Confusion of prototype with system in that the user might be led to believe that the final system is nearly ready.

Unstable system: because the model is so easily amendable, there is a tendency to assume that the delivered system will be equally flexible.

### 10.1.3. Steps for Prototype Development

As already pointed out, the underlying principle of prototype is that "users can point to features they like or dislike and so indicate shortcomings in an existing and working system more easily than they can describe them in a theoretical or proposed system. Experience and use produce more meaningful comment than analysis of charts and narrative proposals" (Licker, 1987).

Stated another way, Systems prototyping is an interactive process. It may begin with only a few functions and be expanded to include others that are identified later. It may also start with what both analyst and user believe is a complete set of functions that may expand or contract through use and experience.

Typically, these are the steps in the prototyping process:

1. Identify the user's known information requirements and features needed in the system;
2. Develop a working prototype;
3. Use the prototype, noting needed enhancements and changes. These will help expand the list of known system requirements;
4. Revise the prototype based on information gained through user experience; and
5. Repeat these steps as needed to achieve a satisfactory system.

As these steps suggest, prototyping is not a trial-and-error development process. Before any actual programming or system design occurs, users and analyst meet in one or two working sessions to identify requirements. These sessions form the basis for the construction of the prototype.

Actual development of the working prototype is the responsibility of the systems analyst. The interface dialogue that allows users to interact with the system, processing routines, and output must be adequate (not necessarily complete) so that individuals can understand how to use the system to perform these functions. Messages and displays not included in the prototype can be added later when a more complete set of requirements is known.

When both users and analyst decide that sufficient information has been collected from the prototyping process, they determine how to meet the requirements they have identified. Usually one of the following four alternatives is selected:

1. The prototype is redeveloped. This alternative may mean complete reprogramming from scratch;
2. The prototype is implemented as the completed system. Performance efficiency and methods for user interaction may be sufficient to allow the system to be used as is;
3. The project is abandoned. In this case, the prototype has provided enough information to show that a system cannot be developed to meet the desired objectives within existing technology or economic or operational guidelines; and
4. Another prototyping series is begun. The information gained through the current experience may suggest an entirely different approach or contrasting features.

Each alternative is viewed as a successful result of prototyping.

#### 10.1.4. Methods for Prototype Development

With prototypes, speed of development is more important than processing efficiency. A prototype system is created quickly, often within a matter of a few days or weeks. Usually it is also relatively inexpensive to build, compared

with the cost of a conventional system, although it may not be as efficient as a system developed over a period of months.

Prototype systems can be developed using conventional programming languages and methods, although they will not contain all the features and final touches normally included in a completed system. For instance, headings, titles, and page numbers on reports may be missing. File organisations may be temporary and record structures left incomplete. Processing and input controls may be missing, and documentation of the system is usually avoided entirely at this point.

The emphasis is on trying out ideas and providing assumptions about requirements, not on system efficiency or completeness.

In some cases, segments of programs will be taken from other systems or from libraries of reusable program code. For example, online system input and editing routines often have similarities in processing structure, even though the details of the applications themselves will vary. During prototyping, analysts may link sections of reusable code with sections they write themselves to get a system up and running for evaluation.

The computer industry is actively pursuing application generators, programs that generate other programs, to support prototyping efforts. These tools automate the construction of information systems by allowing analysts to define the structure of visual displays, input records, and report formats, which in turn are processed by the application generators to produce working computer programs very quickly, usually in a matter of hours.

In some cases, such as when the system will be used only infrequently, the prototype may in fact become the final working system. Once requirements are agreed upon or designs formulated, the system may be reprogrammed to run more quickly or to have all the desired features that were initially ignored.

As stated earlier, the prototype system to be designed will be mainly confined to records management rather than documents which have a permanent research value (archives administration). This will be achieved through the conception of a database management system. Furthermore, the system to be designed will assume that only a stand alone machine is in use. Therefore, no discussion will be given to the network consideration. These have already been addressed in the previous chapter.

Although a detailed discussion of the concepts of databases and database management systems is beyond the scope of this study, a brief overview of these concepts, to help the potential user understand the principles of the software package used in this project, namely dBASE III PLUS, appears to be necessary.

## 10.2. WHAT IS A DATABASE?

By and large, a database can be defined as a centralised common collection of interrelated data for a single or numerous applications that access it. Thus, a library catalogue, an address book or telephone directory can all be considered as databases.

Most important in the understanding of databases is the fact that the maintenance of these can only be performed through a software package which is commonly known as a database management system.

## 10.3. DATABASE MANAGEMENT SYSTEMS (DBMS)

DBMS have long been used to refer to the systematic organisation and management of huge quantities of information in a large computer system.

A database management system is essentially a group of programs that connects the user to one or more collections of information. This collection of information is usually referred to as a database. Program applications for DBMS

include general ledgers, inventory control, accounts receivable, inquiry and mailing list systems, cataloguing, order, entry systems and bibliographies to list only a few.

Stated another way, DBMS can include any application where data files are created, updated, analysed and reported.

When a number of related files have to be managed, DBMS provide several features not only for creating, updating, and searching the database files, but also for minimising redundant storage across files. Further, DBMS insulate application programs from changes when alterations take place in the structure of the database records, or when new outputs or reports need to be prepared to meet new requirements.

The principal objectives of DBMS can be summarised as follows:

1. Allow application programs to be written independently of the DBMS control program, and support their being written in a high-level language (which is easier to maintain and modify to accommodate eventual changes in requirements or machine environment);
2. Create and maintain a database, through the exploitation of utility programs;
3. In case of growth or shrinkage, DBMS can enable the user to revamp the data whenever this is necessary;
4. DBMS provide data security and access safeguards; and

5. Most available DBMS can cope with system failure and generate re-start procedures.

### 10.3.1. Types of DBMS

DBMS can be divided into three main categories (Atre, 1980):

- a) Hierarchical databases;
- b) Network databases; and
- c) Relational databases.

The hierarchical and the network data models have been in use as underlying structures for data base management systems since the early 1960s, whereas the relational data model was only proposed in the early 1970s. The main difference between the three data models is the way they represent the relationships between entities.

The hierarchical data model is made up of a hierarchy of entity types involving a dominant entity and one or more subordinate entity types at the lower levels. The relationship established between a dominant and subordinate entity type is one-to-many, that is for a given dominant entity there can be many subordinate entity types. At the same time, for a given dominant entity occurrence, there can be many occurrences of a subordinate entity type.

In the network data model, the concept of dominant and subordinate is further expanded since an entity can be both dominant (owner) or subordinate (member). In addition, an entity can operate as owner and member simultaneously. In other words, a given entity can participate in an unlimited number of relationships.

In the relational data model, the entities and their relationships are represented with two-dimensional tables. The relationships are also considered as entities. Every table represents an entity and is made up of rows (tuples) or columns (attributes). Conventionally, columns are referred to as data elements while rows are referred to as data records.

Amongst the best relational models are IBM's DB2, Oracle Corporation's ORACLE, Relational Technology's INGRES, INFORMIX, Borland's PARADOX, and Ashton Tate's dBASE III PLUS.

One reason for the popularity of relational systems is their ability to easily support access either by computer programs or directly by human beings. While hierarchical and network systems were intended to be accessed by computer programs, relational systems lend themselves quite well to interactive query languages, whose commands can be typed directly into the machine by a user. Although SQL (Structured Query Language) is occasionally used to access

other types of database systems, it is primarily intended to allow easy access to data stored in relational systems.

Despite the fact that the relational model has provided database practitioners with a modelling methodology independent of the details of the physical implementation, many designers believe that the relational model does not offer a sufficiently rich conceptual model for problems that do not map onto tables in a straightforward fashion (Hull and King, 1987; and Peckam and Maryanski, 1988).

In the last decade, new database models have seen the light of the day. All of these models are characterised by the fact that they attempt to provide increased expressiveness to the modeller and incorporate a richer set of semantics into the database. Hence the name of semantic databases.

It should, however, be pointed out that this type of databases is still at a research stage. In spite of the conception of several models, so far none of these has attained the stage of commercial viability.

#### **10.4. SOFTWARE SELECTION**

The first problem that the author had to tackle was to do with which of the available tools should be used to develop the prototype system. Two different alternatives were available at the outset, namely using a suitable database system or a programming language to simulate the kind of

functions performed within a records management office. The use of the latter was, however, excluded for the following reasons:

1. The objective of the prototype system is only to demonstrate to the staff of the Algerian National Archives the main benefits that could be drawn from an automated system. As such, the speed of the system that could result from the use of a programming language, such as Pascal or C, in our case, was not deemed to be of great importance; and
2. Using a programming language to develop our prototype system would have probably taken longer than necessary. Indeed, when developing a proper application, a long time is usually spent writing the source code and then debugging it, all of which makes it very time consuming.

Unlike programming languages, using a database system can help in speeding up the development of an application. Consideration was therefore given to existing relational database systems.

However, here again, the author was confronted with the difficulty of selecting a suitable database system. This task is not as easy as one might expect. In fact, it has been made much harder since a number of potential relational database systems have been developed over the last decade. Amongst the ones that have gained wide reputation, the following could be listed:

**Table 10.1. Comparison of Relational Database Management Systems.**

	<b>DB2</b>	<b>dBASE</b>	<b>Informix</b>	<b>Ingres</b>	<b>Oracle</b>	<b>Paradox</b>
<b>User Friendliness</b>	<b>Average</b>	<b>Good</b>	<b>Average</b>	<b>Poor</b>	<b>Good</b>	<b>Good</b>
<b>Programing Power</b>	<b>Very Good</b>	<b>Very Good</b>	<b>Good</b>	<b>Good</b>	<b>Good</b>	<b>Good</b>
<b>Support of SQL Facilities</b>	<b>Yes</b>	<b>Yes</b>	<b>Yes</b>	<b>Yes</b>	<b>Yes</b>	<b>Yes</b>
<b>Portability</b>	<b>Minis and Main-frames only</b>	<b>PCs only</b>	<b>PCs, Minis and Main-frames</b>	<b>PCs, minis and Main-frames</b>	<b>PCs, Minis and Main-frames</b>	<b>PCs only</b>
<b>Networking Abilities</b>	<b>Yes</b>	<b>Yes</b>	<b>Yes</b>	<b>Yes</b>	<b>Yes</b>	<b>Yes</b>
<b>Availability at University</b>	<b>No</b>	<b>Yes</b>	<b>No</b>	<b>No</b>	<b>No</b>	<b>Yes</b>

- a) DB2,
- b) dBASE III PLUS,
- c) Informix,
- d) Ingres,
- e) Oracle, and
- f) Paradox.

To make a suitable choice amongst the above database systems, some characteristics were taken into account by the researcher. They relate to the following:

1. User friendliness;
2. Programming power;
3. Support of SQL facilities;
4. Portability from microcomputers to minicomputers and mainframes;
5. Networking abilities; and
6. Availability at City University.

As can be seen from Table 10.1., all six database systems present similar characteristics. However, Oracle would have been the best choice because of the ability to migrate applications from PCs to minis to mainframes. Although Informix and Ingres make provision for such facilities, they are believed to be nowhere near to Oracle in terms of user friendliness. The use of Oracle for the development of our prototype system was, however, hampered by the fact that this package was not available at the University.

Availability of packages turned out to be a major constraint in that only two packages were available while the application was being developed: dBASE and Paradox.

After careful analysis, final consideration was given Ashton Tate's dBASE III. The reasons determining this choice are detailed below.

#### 10.4.1. Why dBASE III PLUS?

In addition to the characteristics listed in Table 10.1, several factors determined the use of dBASE III PLUS as a means to create, maintain and manipulate the documents held within the ANA. Amongst these, the following are of paramount importance:

1. dBASE had its origins in 1974 whereas Paradox entered the market only in 1985. This factor has helped Ashton Tate become the market leaders of PC based database systems. Indeed, it was announced in October 1986 that one million copies were sold;
2. Due to its popularity amongst users, several dBASE clones have been developed over the years, including dBRIEF, dBFAST, Foxbase and Clipper to name just a few; and
3. Because a compiler is lacking in dBASE's language, several compilers have also been developed to compile dBASE application programs. It is believed that dBASE offers more functions and facilities in terms of

programming. As already pointed out, this is the result of the fact that several clones have been developed.

#### **10.4.2. dBASE III PLUS Drawbacks**

Just like any other computer package, dBASE III PLUS has its own shortcomings. The main obstacle stems probably from the fact that dBASE III PLUS often requires information stored on disk for many operations. This may slow down the processing of programs as they retrieve information from the disk drives. Obviously, the delays are more evident on a floppy-based system than on a hard-disk system.

#### **10.4.3. dBASE III PLUS System Requirements**

dBASE III PLUS was designed to run on any IBM Personal Computer or IBM clones. It requires a minimum computer memory (RAM = Random Access Memory) of 384K. Due to the fact that computer memory is used during data manipulation, more RAM will result in increased processing speed.

dBASE III PLUS requires MS-DOS or PC-DOS version 2.0 or later versions. The system should have either two 360K double-sided floppy disk drives or one 360 floppy disk drive and a hard disk drive. It should be pointed out that the maximum storage capacity of a floppy disk is about 360,000 characters. Hence, a hard disk system is highly recommended if large databases are to be processed.

## **10.5. SYSTEM DEVELOPMENT**

The development of the ANA system has undergone several stages. Below are described the various steps of this development.

### **10.5.1. Defining the System's Database Structure**

The first stage in designing a database system with dBASE III PLUS entails the definition of the database structure. To achieve its objectives, the system's master file was designed so as to encompass the following fields:

1. Class Code;
2. Departmental Reference Code;
3. Title/Description;
4. Language;
5. Document type;
6. Location;
7. Receipt No;
8. Receipt date;
9. Cover dates; which should be subdivided into:
  - a) Date from; and
  - b) Date to;
10. Action code;
11. Retention Period;
12. Action date;
13. References to publication;

14. Keywords;
15. Availability (for loan);
16. Date of last request;
17. Number of requests per year;
18. Catalogue Number; and
19. Access limitation;

In any database system, each item is stored as a record. Each record consists of a certain number of fields (in our case 19 fields). Each field is given a name that represents its contents. In dBASE III PLUS, the maximum length of a field name is 10 characters. Furthermore, field names should always begin with a letter and no spaces are allowed.

Moreover, each field must be assigned a data type. In dBASE III PLUS, a field can be any of the following five types:

- a) A character field;
- b) A numeric field;
- c) A date field;
- d) A logical field; or
- e) A memo field.

Character/text fields and memo fields are reserved for holding alphanumeric data. Numeric values are stored in numeric fields. Logical fields contain a character that represents a true or false (T/F or Y/N) while dates are stored in date fields in the form: dd/mm/yy

The final step involved, when determining the structure of a database concerns the definition of the width of each field, that is the maximum number of characters you expect to use for each field. Accordingly, the structure of our database looked as shown in Table 10.2.

Having defined the structure of the ANA's database, the next step entailed creating the actual database. In dBASE III PLUS, this can be achieved in two different ways:

Table 10.2. Structure of the ANA's Database system.

FIELD NAME	FIELD TYPE	FIELD WIDTH
CLASS_CODE	C	8
DEPT_REF	C	10
TITLE	C	50
DOCT_LANG	C	7
DOCT_TYPE	C	3
DOCT_LOCAT	C	6
RECPT_NO	C	6
RECPT-DATE	D	8
FROM_DATE	D	8
TO_DATE	D	8
ACT_CODE	C	8
ACT_DATE	D	8
RET_PERD	C	3
DOCT_REFS	C	40
KEYWORDS	C	40
AVA_LOAN	C	3
LAST_REQST	D	8
REQST_NO	C	5
CAT_NO	C	8
ACS_LIMIT	C	3

### 10.5.2. Creating the Database

1. Using the Create option from dBASE's Assistant Menu; or
2. Using dBASE's programming environment (dot prompt).

In our case, the second option was used.

### 10.5.3. Indexing the Database

Once the ANA database has been created, the next involved the creation of a series of index files. The purpose of indexing a database file (dBASE III PLUS uses the extension 'DBF' for a database file) by one or more keys is to allow random access to records of the DBF for any given value of the indexed key. An advantage of dBASE III PLUS is that when a DBF and its associated index files are opened, data entry, updating, and delete operations on that specific DBF automatically update the respective index files. It should, however, be stressed that the use of several index files considerably slows down these functions. Consequently, it is very useful to limit indexing only to those keys that need to be points of access to records of the DBF in the different programs.

In our application, some index files are created only temporarily to facilitate the production of a specific output. Indeed, these index files are deleted as soon as the task has been carried out. The ease and speed with which an index file can be created, updated and deleted in dBASE

without extensive programming effort is a useful feature in application development.

#### **10.5.4. Programming the Database**

Thereafter, the author had to program the database to facilitate the use of the ANA system. As already mentioned, one of dBASE's features is its programming power which enables the user to produce very user-friendly applications. The following is a summary of the various considerations that have been taken into account when designing this application.

##### **10.5.4.1. Design Criteria**

The system was designed with the following broad criteria in mind.

##### **General Criteria**

The system was designed so that it is user-friendly; that is it should be capable of being used by the staff of the ANA and/or clerical personnel with little knowledge of computers. Specifically the system should permit:

1. Data-entry and data updating through easily understood and well laid-out screen forms;

2. Menu-directed operations at all possible user interfaces -in other words, the system should provide menus and sub-menus, from which the potential user can select the desired functions/sub-functions;
3. Re-entry of data to be minimal in update operations through full-screen editing functions;
4. Easy recovery from errors; and
5. Validation of input data, wherever possible, to ensure correctness of entries.

In addition to user-friendly features, it was decided that the system should provide:

- a) Data security through password features for access to the system;
- b) Ease of maintenance of the systems' programs through the use of modular programming techniques and principles;
- c) Fast response in data entry, update and query operations.

### Functional Criteria

It was considered important that the automated system should perform all the functions carried out in a manual records management system. In addition to that, it was decided that the prototype system should enable the user to carry out the following functions:

1. Validating input of data using logical and computational criteria where possible;

2. Querying the database from several keys or fields, not normally easy or possible in manual systems;
3. Querying the database by combining several keywords (using boolean operators);
4. Alerting the users of exceptional conditions; and
5. Producing a variety of routine reports not normally produced in manual systems because of the labour-intensive involved in such jobs, and the difficulties in reorganising data in manual systems.

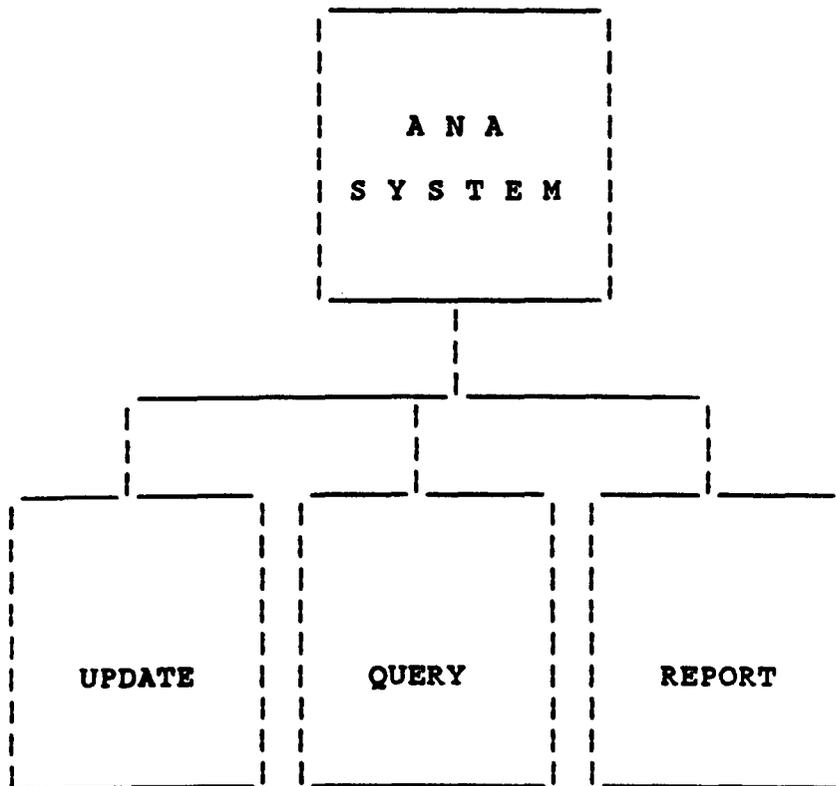
#### 10.5.4.2. Structure of the System

It was already pointed out in this chapter that when working with the dot prompt, dBASE III PLUS commands can simply be executed by instructions such as 'CREATE', 'LIST' or 'MODIFY COMMAND' followed by a return.

However, to make efficient use of dBASE III PLUS power, it is recommended that command files, or programs, are written to create menu-driven systems. The term menu-driven means that the person using the program needs only run one program. To perform a given task, the end user will simply select the appropriate option from a menu. Therefore, menu-driven systems are developed so that individuals who do not know the commands of a language can still use the computer.

When designing a custom system, it is worth taking an extra step drawing a hierarchical structure of how the programs interrelate. The structure for the ANA prototype system is presented in Figure 10.1.

Figure 10.1. Software Structure of the ANA's Prototype System.



The structural hierarchy shows that the programs is broken down into three major subsystems, each representing a single command file.

Update: This function refers to the action of changing a set of values in a file, without changing the organisation or semantics of the file. Updating may be performed in one of two ways. The first common in data processing, is when the updating process is carried out separately from the entry of

amendments. The second is when a file is displayed on an interactive device, and an operator can then modify it while able to see it. This method is more commonly known as 'file editing'.

In the general sense, updating also includes the following:

1. Addition: When a new record is added to a file, it is said to be an addition. It will be fitted into its correct position in the key sequence of a sequential or indexed file. In the case of a direct file, the record will be stored after its key has been examined and transformed in some appropriate way into an address; and
2. Deletion: When a record is removed from a file, it is said to be deleted. On direct access devices, the record is not physically removed as this might then require an average of half the file to be moved up to fill the vacant space. The record may be tagged for deletion by setting an indicator in a suitable field, and removed when the file is next reorganised. In the case of magnetic tapes, however, the deletion takes place immediately as a new file is created after each run.

Query: This refers to the retrieval of a set of values from a file or a database according to a set of retrieval criteria, leaving the contents of a file unchanged. In the case of a database, the retrieval criteria may be expressed in a query language.

A query language is the data manipulation language (DML) available to end-users. A data manipulation language, in turn, is part of a database language. It provides facilities -more powerful than those conventionally found in programming languages- for updating, storing and retrieving of records. It may, for instance, provide for specifying the retrieval of a set of records based on some arbitrarily complex set of conditions that are to be applied to the records contained in a database.

Reports: The last function of our system will have the objective of producing reports. This can imply the printing of the records of a file or database in a predetermined format. This assumes that the records making up the file have already been sorted according to a key field, before output. Usually, these types of reports are printed after selecting one option of the system's menu. One example of these reports would be to print the collection of books held in a library by author, title or subject.

Other types of reports may include the printing of the results of a search that meet certain criteria as it is the case of on line systems. Unlike the first type of reports,

here only those records that meet the search criteria are printed. One example would be to list and print all titles dealing with on line systems and archives.

Although the above figure does not give a detailed illustration of the system as a whole, it should be pointed out that each subsystem is itself subdivided into smaller units. The ANA.PRG command file is the highest in the hierarchy. The remaining programs (or command files) are lower in hierarchy and are accessed via the ANA.PRG program using the DO command. Thus, whenever, a lower level program finishes running, it returns control to the calling program.

Dividing a larger system into individual tasks like this simplifies the bigger programming job. It is much easier to reach the goal of developing a large system when the task is composed of much smaller, more easily attained goals. Breaking the system into small tasks (procedures or modules) implies that it is possible to design, develop and test each program in the system independently. In addition to that, developing lots of smaller programs helps to avoid getting entangled in large masses of programming source code.

Indeed, using procedure files streamlines an application by reducing redundancy and facilitates revising and maintaining the system. With the common routines isolated in procedures or modules, many alterations can be effected by making the change in only one place -the procedure file- rather than editing all of the programs that use a routine.

Once a library of general-purpose procedures has been developed, it is usually extremely easy to construct entirely new applications more efficiently, since many procedures may be used with very few changes in all of the system to be designed.

#### 10.5.4.3. Compiling the System

However, using the developed prototype system with dBASE III PLUS is somewhat cumbersome in that it compels the user to know how to load dBASE III PLUS and thereafter load the application program. It is found that running a program from dBASE III PLUS is extremely slow since dBASE is only an interpreter rather a proper compiler.

An interpreter is different from a compiler in that the former translates and executes each source statement in logical sequences each time the program is executed.

A compiler, on the other hand, translates a high level language, such as C, Fortran, Pascal, and dBASE III PLUS, into a machine orientated language, often the machine code.

The resulting program can only be executed when compilation is fully completed.

Because of the unavailability of a compiler within dBASE III PLUS, it was necessary to look for one capable of reading dBASE III PLUS source code. Several packages have been

developed for this purpose. Amongst these, dBFast and Clipper have achieved world-wide success.

Clipper was chosen as the package to compile our source code for the following reasons:

1. It is fully compatible with dBASE III PLUS;
2. It produces faster execution files than dBFast;
3. It is much more accepted by users than its counterpart dBFast since it has been in the market for a very long time; and
4. It has a huge program library that was used to achieve better results.

#### 10.6. USING THE PROTOTYPE SYSTEM

Having presented the general structure of the prototype system and explained the various steps that were followed to develop it; in this section, the author attempts to present a detailed description of how the system can be used. This will include the following:

1. Loading the system;
2. Overview of the system;
3. Updating the system;
4. Performing various types of queries; and
5. Printing reports.

### 10.6.1. Loading the Prototype System

The loading of the application will vary depending on whether a floppy disk or a hard disk system is being used. The procedures for loading the program from both of these are described in Appendix 9.

However, throughout this description of the ANA system, the author will assume that a hard disk system is being used instead of a floppy disk system. Hence the use of the prompt `C:\>` rather than `A:\>`

Loading the ANA's prototype system from the hard disk entails the following steps:

```
C:\>cd\ana  
or  
C:\>chdir\ana
```

The system responds with the following prompt:

```
C:\ANA>
```

Both 'cd' and 'chdir' stand for change directory. Each of them should also be followed by a carriage return key to execute the command.

Once the user has switched to the appropriate directory, the next step entails entering the following command:

```
C:\ANA>ana
```

Immediately, the system displays a password. The user is given two chances to enter the correct password. If after the second attempt, the password is still wrong, an error message is displayed and the user is returned to the operating system level.

However, if the password is entered correctly, a message welcoming the user to the system is subsequently displayed. Thereafter, the user is required to press any key and the system's main menu is shown on the screen.

### **10.6.2. Overview of the Prototype System**

If the appropriate password has been entered, a welcoming message is displayed followed by the main menu of the prototype system. The system's main menu consists of four chief components, namely:

1. A menu bar;
2. A status bar;
3. An action line; and
4. A message line.

#### **10.6.2.1. The Menu Bar**

The menu bar consists of four principal options. They are listed in a bar across the top of the screen; namely:

1. Update;
2. Query;
3. Report; and
4. Exit;

It can be noticed that each time an option is highlighted, a submenu pulls down from the main menu bar. To move across this menu bar, the user has two main options:

- a) Use the left and right arrows; and
- b) Type the first letter of the option. For example, typing the letter R brings the pull down menu for the Report option.

Similarly, to highlight the Update option, simply type U option. It can be seen that this option consists of 3 sub-options; the first being the highlighted one, that is Add a Record. To move within a particular pull down menu, the user should make use of the up and down arrows. Pressing the Return key automatically selects the currently highlighted option.

#### 10.6.2.2. The Status Bar

The objective of the Status Bar is to keep the user informed of the current status of the various optional settings. These are:

1. Time;
2. Date;
3. Free disk space; and
4. Name of directory in use.

#### **10.6.2.3. The Action Line**

Just above the Status Bar, the Action Line will display the commands that are being used.

#### **10.6.2.4. The Message line**

Beneath the Status Bar, there is a Message line. The aim of this line is to provide the user with appropriate instructions and explain the currently highlighted options.

#### **10.6.3. Updating the Prototype System**

As already stated, to move across the menu bar of the prototype system, the user can either use the keyboard's left and right arrows, or type the first letter of the option. Thus to highlight the Update option, the letter 'U' should be pressed. Subsequently the system displays 3 sub-options:

1. Add a record;
2. Delete a record; and
3. View/Edit a record.

### 10.6.3.1. Adding Records

This module adds records to the database and updates the index 'ANA.NDX. Entries are made from the screen shown in Figure 10.2 below.

In this program, the 'PICTURE' clause is extensively used in order to determine how the data is to be entered. Indeed, dBASE III PLUS distinguishes between upper and lower case characters (e.g. SMITH and smith are treated differently). So the 'PICTURE' has been used to ensure that all records are stored in upper case whether the 'CAPS LOCK' key is on or not.

Figure 10.2. ANA Entry Form.

ANA ENTRY FORM		
Class code:	Departmental reference:	
Title /Desc:		
Cover From: / /	To: / /	Language: French
Document type:	Location:	Receipt No:
Receipt date: / /	Retention period:	
Action date: / /	Action code: Destroy	
Keywords:		
Refs to publication:		
Date of last request: / /	No of requests:	
Availability: YES	Catalogue No:	Access Limit: Yes

If the record number being entered is already in the database, the program displays an error message warning the user that the record is already on file. Otherwise the database is appended.

Another feature of the ANA system is that it enables the automatic computation of some fields. Indeed, these need not be entered by the operator. A case in point is the 'Action Date' field is calculated as soon as the 'Receipt Date' and the 'Retention Period' are entered. Thus, if the operator, for instance, enters 30/09/1989 as the 'Receipt Date' and 50 as the 'Retention Period' of the document in question, the 'Action Date' is automatically updated and would consequently display: 30/09/2039.

Furthermore, the system also aims at minimising data entry and accordingly typing errors. This applies mainly to fields where the content of the entry can be determined well in advance. These include:

1. Language: The options available are:

- French (which is the default option);
- German;
- Spanish;
- Turkish; and
- Arabic.

**2. Action Code:** The options available are:

- Destroy (which is the default option);
- Preserve; and
- Review.

**3. Availability :** The options available are:

- Yes (which is the default option); and
- No.

**Access Limit:** The options available are:

- Yes (which is the default option); and
- No.

These default options are shown in bold characters in Figure 10.2. above. To be able to select another option other than the default one, the user ought to press the TAB key until the desired option is displayed. This should then be followed by ENTER/RETURN key to select the appropriate option.

Finally, it should be stressed that a record can only be accepted if the fields that are considered to be the key fields have been entered. These include:

- a) Class code;
- b) Departmental reference;
- c) Title;
- d) Action code; and
- e) Keywords.

Indeed, if one of the above entries is omitted, the record is not accepted by the database. As we shall see later, these are the keys that have been selected in this application to search through our prototype system in order to delete a record, amend a record as well as querying the database.

#### 10.6.3.2. Deleting Records

To be able to delete any records on the database, the user has to select the second sub-option from the Update option which calls the routine that performs this task.

When this option has been selected, the program displays yet another series of options from which the user has to choose.

These are:

1. Department;
2. Action date;
3. Class;
4. Title; and
5. Keyword.

Thus, if the user would like to delete any record in the database, he is required to know one of the variable mentioned above. Otherwise an error message is displayed. If, for instance, the user knows the document's action date, then all documents fulfilling the search criterion are displayed in sequence. This is achieved by pressing 'N' and 'p' to move to the next and previous record respectively.

Once the required record for deletion has been located, the user needs only to choose 'delete' on the bottom of the screen to erase the record from the database.

### 10.6.3.3. Amending Records

As with the delete routine, the user is required to select from a series of options; namely:

1. Department;
2. Action date;
3. Class;
4. Title; and
5. Keyword.

As already stated, prior knowledge of one of the variable mentioned above is necessary to access the database. Each time a deletion is to be performed, the user has to select one of the above fields and enter the exact value of that field. Failure to do so will result into an error message.

This module operates in the same way as the delete module except that it only allows the editing of the contents of the record being searched for rather than deleting it. Indeed, as in the case of the delete routine, the user can move between the records fulfilling the same condition and edit them as necessary.

#### 10.6.4. Querying the Prototype System

Being able to update the database system is not usually sufficient. Indeed, from the user's point of view, the ability to query the database is a must. Ideally, a comprehensive query system should allow for the following:

1. Search for a particular record using several different keys; and
2. Search for records using boolean operators.

To move to the Query option, the user has to press the key. As soon as this is pressed, the following options are displayed on the screen:

1. Department;
2. Action date;
3. Class;
4. Title;
5. Keyword; and
6. Boolean search.

As can be seen, like the delete and edit modules, this option allows for the same searches to be carried out in addition to the boolean search. Unlike the delete and edit modules, however, the user need not know the entire details of the entry.

If, for instance, the user would like to look for all records whose title starts with the letter 'S', he only needs to enter that particular letter. Subsequently all records whose title start with the letter in question are displayed horizontally in alphabetical order.

Another feature of the Query option is its ability to handle boolean searches. When this option is selected, the system displays the following:

- a) First;
- b) And;
- c) Or; and
- d) Go.

To choose the first entry, the user should select the option labelled First. Consequently, another submenu is shown:

- 1. Department;
- 2. Action date;
- 3. Class;
- 4. Title;
- 5. Keyword; and
- 6. Not.

Once a search field has been selected, the user is requested to enter the equivalent entry. Then, the user has to choose a boolean operator and the above search options are displayed for him/her to choose from. While the search is being entered into the database system, the action line

displays the query being undertaken. It should be stressed, however, that the user is only allowed to combine up to three different key fields in one single search.

To execute the search, the user has to press the Go option, and the results of the search, if valid, are displayed on the screen. Otherwise, an error message is subsequently displayed.

One should note the inability of the present system to print the results of the searches being carried out. This can, however, be alleviated by using DOS (Disk Operating System) print facility, namely the PrtSc key. This key enables the user to print whatever appears on the screen. The sequence for printing the existing screen display is Shift-PrtSc or only Print Screen on some keyboards.

#### **10.6.5. Printing Reports from the Prototype System**

Another imperative necessity of an ideal application is its ability to print reports. In our prototype system, this option is activated by pressing the 'Report' option from the menu bar. This option makes provision for the following automatic printouts:

- 1. Class Lists Report;**
- 2. Departmental Lists Report;**
- 3. Review Schedule Report;**
- 4. Disposal Notification Report;**

5. Records Loan Report; and
6. Vacant Locations Report.

A summary of these reports including the way they are classified and their frequency is shown in Table 10.3.

**Table 10.3. Summary of the Prototype System Reports.**

Report's Title	Classification	Frequency
Class Lists Report	by Class Number	Quarterly
Departmental Lists Report	by Department	Quarterly
Review Schedule Report	by Department	Monthly
Disposal Notification Report	by Department	Monthly
Records Loan Report	by Department	Monthly
Vacant Locations Report	by Location	Monthly

To obtain any of the above printouts, the user needs only specify the report to be printed and make sure the printer is switched on. The aim and contents of each of these reports are discussed below.

#### 10.6.5.1. Class Lists Report

This report lists all records according to the class number and within each class number according to the departmental reference. It includes the following:

- a) Class number;
- b) Departmental reference;
- c) Title;
- d) Covering dates;
- e) Language;
- f) Document type;
- g) Access limitation; and
- h) Location.

This report is to be used in-house to inform the personnel of the records office about the sizes of each class number and could therefore be used for statistical purposes.

#### 10.6.5.2. Departmental Lists Report

This report should list all records according to the Departmental Reference. It consists of the fields listed below:

- a) Departmental Reference;
- b) Class number;
- c) Title;
- d) Covering dates;
- e) Document type;
- f) Action date;
- g) Action code;
- h) Access limitation; and
- i) Location.

Like its counterpart, the class lists report, this printout is to be used in-house to give an insight as to the holdings of each particular department. Equally, it could be used for the same purpose by the originating department.

#### 10.6.5.3. Review Schedule Report

It is common in a records management department to have to review documents on which a decision was not reached when they were initially transferred to the office. The present system allows the user to print such reports on request, usually every end of the month. This report is obtained by comparing the current date with the action date. If the action date is due, then the records whose action code is equal to R(eview) are automatically printed. The report is printed by department and includes the following information:

- a) Departmental reference;
- b) Class number;
- c) Covering dates;
- d) Receipt date;
- e) Retention period;
- f) Number of request; and
- g) Date of last request.

This report is then sent to the appropriate departments to take a decision on whether these records should be kept in the office for a further review. If they are no longer

needed, the records management office will decide, on the ground of research and permanent value, on whether to destroy or retain the records in question indefinitely.

If the record is to be kept indefinitely, but cannot be yet made available for consultation, the access limit, in the master file, should be changed to 'Yes' until the document is ready for loan to the public.

#### 10.6.5.4. Disposal Notification Report

This report is similar to the previous in that it is intended to the originating department. It is obtained by comparing the current date with the action date. If the action date is due, then the records whose action code is equal to D(estroy) are automatically printed. The report is printed by department and encompasses the following fields:

- a) Departmental reference;
- b) Class number
- c) Covering dates;
- d) Date of receipt;
- e) Retention period; and
- f) Location.

This report is then sent to appropriate departments to confirm the decision on whether the document should be destroyed or not. However, the originating department can decide on administrative background to review the records. If this is the case, then the action date of these document

should be changed to conform with the request of the originating department.

#### **10.6.5.5. Records Loan Report**

From time to time, the originating department may need to look at those records that are still of importance in the day-to-day running of the administration so long as no access limitation is in force. For this reason, the availability of a printout that lists the records on loan is imperative.

This report is obtained by checking the field: Availability (for loan). All records whose Availability for loan is equal to N(o) are printed since this would mean that the record(s) in question is/are on loan to the originating department.

It follows that this report is printed by departmental reference and incorporates the following variables:

- b) Departmental reference;
- b) Class Number;
- c) Title;
- d) Covering dates;
- e) Language;
- f) Date of last request;
- g) Access limitation; and
- h) Location.

As soon as these records are returned to the records management office, the field 'availability for loan' is again changed to 'Yes'.

#### 10.6.5.6. Vacant Locations Report

Another useful feature of the prototype system is its ability to produce a Vacant Location Report. This report is obtained by comparing the current date with the action date. If the action date is due, and the action code is equal to (D)estroy or (P)reserve; then the report is printed in ascending order of the Location. This report is classified according to the location number and gives the following information:

- a) Location;
- b) Departmental reference;
- c) Title;
- d) Covering dates; and
- e) Catalogue Number.

It should be noted that this report is mainly used in-house to inform the personnel of the records office of the locations that are empty and ready to receive new documents for storage.

## 10.7. CONCLUSION

This chapter was mainly concerned with the design of a prototype records management system for the Algerian National Archives (ANA). The design is an emulation of the systems design already presented in Chapter IX of this thesis.

This chapter started with a definition of prototyping, its use, methods, advantages and disadvantages. In addition, a definition of databases and the various types available in the market was provided. Next, the reasons that made the author select dBASE III PLUS as the package to be used to design the system were elucidated. Moreover, the advantages, disadvantages as well as dBASE III PLUS systems requirements were highlighted. Thereafter, a general structure of the prototype system in addition to the system's file design were presented.

With regard to the design of the program, the system followed the basic principles of top-down design. As already pointed out, this programming technique, also known as modular programming, refers to the idea of breaking individual functions into separate programming problems. This approach means easier programming, because only one function need be addressed at one time.

This method also results into a hierarchy of functions where the top of the functional hierarchy of the system calls the functions immediately lower to it until the lowest level of the functions is reached.

Having developed and tested the program, the prototype system was finally compiled using Clipper Libraries to create an execution file commonly known as an '.EXE' file so as to run the application from DOS.

The next part of this chapter shed light onto this system and explained how one could make use of it for the purpose of records management. Some of the shortcomings of the system were also addressed.

In this section, the author presented an overview of the prototype system that is supposed to replace the present manual records management system at the Algerian National Archives (ANA).

First of all, an overall description of the system was provided. This was then followed by a detailed discussion of the various options available and the ways and means of using these options to reach maximum efficiency.

## CHAPTER XI

### SYSTEM EVALUATION

#### 11.1. INTRODUCTION

It was stated in the beginning of Chapter Ten that the outcome of a new prototype system can be of four different natures:

1. The prototype is redeveloped from scratch;
2. The prototype is implemented as the completed system;
3. The prototype is abandoned; or
4. Another prototyping series is started.

To be able to make a verdict on the outcome of the proposed prototype system, one has, first, to assess its capabilities and limitations. Evaluation constitutes a crucial step in the system development cycle in that it is the stage where the system's operational capabilities are put to the test. It is the basis for accepting a system, and its completion represents one of the more significant milestones. It is thus important for the developing team to review the system periodically so that unforeseen problems are solved at an earlier stage. However, in our particular case, this was not possible because only one trip was organised in the course of the period December/January 1989/90 to assess the functionality of our prototype system.

The following is a brief account of the methodology used to evaluate the prototype system as well as a record of the impression, suggestions and recommendation of the staff of the ANA.

## 11.2. Testing Prototypes

It was already emphasised in the previous chapter that prototyping is an iterative process whose main goal is to refine the system being developed. Hence the need to use group discussions. This form of testing should help users point to features they like or dislike and so indicate shortcomings in an existing and working system.

It is proven that reading through a narrative description of a system or even looking at illustrations of what it can do, does not usually excite users. On the other hand, users can not wait to see a prototype. They do not merely receive specifications, they also get a system. The entire project becomes real when they can sit in front of a workstation and operate the application or watch a demonstration of the system. The application is no longer abstract, but working and real (Licker, 1987).

Using group discussions to evaluate a prototype system may thus help the analyst learn a great deal more about the system's information requirements that will influence the final design.

### 11.3. Methodology

Considering the size of the Algerian National Archives (ANA), which as we saw in previous chapters consisted of 48 regional units, it would have been ideal to demonstrate the prototype system to the staff of all regional units for a comprehensive feedback. However, several factors prevented the author from doing so. Of the utmost importance are:

1. Non availability of microcomputers within the various regional units;
2. Difficulty to transport a microcomputer throughout the country as large as Algeria;
3. Time constraints; and
4. Financial constraints.

Instead, the system's demonstration was limited to the staff of three regional units; namely Algiers, constantine and Oran. Table 11.1 presents a breakdown of the participants in this evaluation stage.

Table 11.1. Evaluation of the prototype System:  
Breakdown of the Participants.

	Administrative Staff	Technical Staff
Algiers Regional Unit	3	7
Constantine Regional Unit	2	5
Oran Regional Unit	2	9

All participants were reminded of the importance of this evaluation stage. To make them feel comfortable, they were encouraged to make all kinds of suggestions that would improve the prototype system.

For each of the three centres, three different sessions were organised. To enable the staff to practise, get acquainted and criticise the prototype system constructively, it was decided to allow two days between each session:

#### Session 1:

The author explained how the system could be operated. To ensure impartiality in the construction of the test data, the personnel taking part in the experiment was asked, at the end of this first session, to design and construct the test data to be used in the second session. It was hoped that this would help test for every possible eventuality. The staff was also asked to prepare manual outputs of the searches they wanted to perform in order to compare them with those of the computer.

It was also important for the personnel taking part in the experiment to have some knowledge of English. Hence, the difficulty to allow all staff to participate in the study.

### Session 2:

The staff selected for the experiment was given the chance to use the prototype system. This included entering data, amending it and producing various outputs. Each user was given the chance to enter ten different records and carry out all the operations performed by the system.

### Session 3:

During this session, the author had the opportunity to discuss with the staff, in the form of a group discussion, some of the problems that were encountered and those that could eventually arise if such a system were to be implemented within their respective archives centres.

### 11.4. Results

As already mentioned, at the end of the last session (third session), the users who had taken part in the experiment were given the time and the chance to comment on their personal points of view. The general impression was that of satisfaction. Nevertheless, several problem areas were highlighted in addition to recommendations as to how the system might be improved to achieve better results. The comments made during the third session in the case of the three institutions can be divided into two main categories:

1. Those related to the prototype system; and
2. Those related to the changes that are to take place in the office as a result of automation.

#### 11.4.1. ANA's Personnel Views on the Prototype System

In this section, the author will attempt to summarise the impressions of the personnel, that participated in the experiment, in so far as the prototype system is concerned. Basically, these opinions relate to the following categories:

- System's security;
- System's input screen;
- Editing facilities;
- Query facilities;
- Report facilities;
- System's speed.

#### System's Security:

As the prototype system stands at the present moment, it is vulnerable and prone to unauthorised access. Because of this, the staff of the ANA made the following comments so as to improve the system's security:

1. By and large, they unanimously stressed the need to:
  - a) Modify the password routine so that each user has his/her own password; and

b) That provision should be made to enable frequent alterations of passwords, thus resulting in better security.

2. In the same line of thinking, some of the staff of the ANA recommended that more security is needed at file level. This, they suggested, could be made possible by means of providing a password at the file update level.

They suggested that security should be made specifically tight at the records deletion level. To alleviate such problems, they emphasised the addition of a warning message informing the potential users of the danger of carrying out such an operation. If the user is still adamant to delete a given record, he/she should be prompted to a password to confirm the deletion of the record in question.

### System's Input Screen

As a general rule, the staff of the ANA were all satisfied with the system's input screen in that they found it very easy to use. However, many of them recommended amendments to its general layout.

Some recommended the addition of a field, of about 200 words, to be called 'summary' which as its name implies would provide the potential user with a summary of the document.

Others suggested the provision of a keyword field capable of accommodating more keywords; thus making it possible to carry out more efficient searches than is possible at the present moment.

Although the first option can be very important when producing analytical finding aids, the second was considered by the majority to be more attractive for the retrieval of information.

With regards to the prototype's input screen, some users highlighted its inability to take Arabic characters. They believe that if a computer system, that respond to the long term needs of the ANA, were to be installed, it would be essential for it to accept the Arabic script. The reason is that more and more documents, archives of the future, are being produced in Arabic.

Although necessary, this solution has its own problems given the fact that Algeria is a country where Arabic is used in conjunction with French. Various solutions to this shortcoming, in our prototype system, are possible. They are briefly discussed below.

1. One solution would be to transliterate into Roman script those fields that are necessary to query when searching through the database. In our case, only two fields will need to be transliterated, that is the 'TITLE' and 'KEYWORDS' fields. The rest needing no transliteration as they involve codes and dates.

However, opting for this solution would create all sorts of problems when attempting to retrieve a given item. Indeed, two different people may transliterate the same word differently. Hence, without prior knowledge of how the title or keyword was transliterated when entered into the system, one would find it extremely difficult to retrieve a specific document from the database.

2. The second solution, but the more expensive one, would be to acquire or perhaps develop a system capable of searching simultaneously through documents entered both in Arabic and Roman scripts. Although to the knowledge of the author, no such system is commercially available at the present moment, it is believed that this is perfectly possible from a technological point of view.
3. The last solution, and probably the most feasible one, would be for the present prototype system to include two title fields; one in Arabic script and the other in Roman script. This will ease the tasks of potential users by relieving them from the necessity of having to transliterate arabic titles into French, as suggested in the first solution.

As for the keyword field, one could stick to the Roman script and develop a thesaurus of all keywords used in the indexing stage with their equivalent in Arabic. Thus, when a user attempts to search for a document and is only aware of the arabic keyword(s), he/she would find

first the equivalent of that keyword(s) in French and then carry out the search.

#### Editing Facilities:

Users taking part in the study were also concerned about the application's editing facilities, especially its inability to delete a group of records at a time.

Similarly, many of these users noted that they would like also to see the system incorporate a record recovery facility whereby records that have been deleted by mistake could be recovered by the system if necessary.

#### Query Facilities:

Regarding the prototype's query facilities, the personnel of the ANA complained about the limitation of the number of keywords that could be combined when using a boolean search. As already mentioned, the number of keywords was limited to three (3) because of programming time.

#### Report Facilities:

Some users also suggested that they should be given the opportunity to generate ad-hoc reports that may be required, but cannot be predetermined in advance.

Another pitfall of the present system resides in its inability to print the results of the queries being carried out. As stated in the previous chapter, the alternative would be to use DOS's print facility, namely the PrtSc key. This key enables the user to print the contents of the screen. The sequence for printing the existing screen display is Shift-PrtSc or only Print Screen on some keyboards.

### System's Speed

Generally speaking, all users of the ANA pointed out to the slow speed with which the prototype system executes the various commands. Some users asked whether it would be possible to redevelop the system to make it somewhat faster and be sent a copy for further testing.

Although such a task is very time consuming, an attempt was made to fulfill the wishes of the staff who have participated in this evaluation. This is discussed in Section 11.5 below.

#### 11.4.2. Likely Effects of the Prototype System on the ANA

In the second section of the results of our experiment, the author will discuss the effects and the fears that the prototype system will eventually cause. These problems can fall into several different categories:

### Job Security and Status:

Many of the personnel taking part in the study admitted that the new system might put them out of their job, because the computer will perform routines that are done manually and so reduce the need for human intervention.

### Career Prospects:

Others, especially managers, highlighted that the new system will damage their career prospects by reducing opportunities for promotion.

### Social Change in the Office:

Other fears included the fact that the new system might disrupt the already established 'social system' within the office. Individuals who are used to working together might be separated into different groups. By the same token, individuals who are used to working on their own might be compelled to join a group.

Moreover, office staff used to moving around and mixing with other people in the course of their daily work might be faced with the prospect of having to work much more in isolation at a keyboard, unable to work around the office as much.

### Loss of Departmental Status:

Another significant point expressed by the various managers and directors of the three regional units was to do with the loss of the departmental status. As mentioned in Chapter Seven and Eight, each regional unit has its own department for records management. The staff in charge of these departments fear that the introduction of the prototype system will give control to other departments part of the regional unit.

### 11.5. PROTOTYPE SYSTEM REDEVELOPMENT

To comply with the demand of the staff taking part in this evaluation, the system was redeveloped using a high level programming language, namely Turbo Pascal.

The Pascal programming language was introduced in 1971, by Professor Niklaus Wirth of the Technical University of Zurich, Switzerland. It is named after the seventeenth century French philosopher and mathematician Blaise Pascal.

There are versions of Pascal available for nearly every computer system in existence today. One of the most popular implementations of Pascal is the one known as Turbo Pascal. Its popularity is based on its performance, its ease of use, and its ability to run on almost on every PC currently available.

It should be stressed, however, that no alterations or additions have been introduced to the version developed under dBASE III PLUS and Clipper, except that the prototype system is now considerably faster. A copy of this new versions was addressed to all three regional units that took part in this evaluation stage.

#### 11.6. CONCLUSION

In this chapter, an evaluation of the system was presented. This is a summary of the suggestions and recommendations, made by the staff of three archival regional units (ie. Algiers, constantine and Oran), as to how to improve the prototype system. As already stated, these improvements can be divided into six main categories:

- 1) Those relating to the system's security;
- 2) Those relating to the system's input screen;
- 3) Those relating to the editing facilities of the prototype system, in particular its deletion facilities;
- 4) Those relating to the system's query facilities;
- 5) Those relating to the system's report facilities; and
- 6) Those relating to the system's speed.

Some of the personnel's fears relating to the introduction of the prototype system were also discussed. These concerned mainly:

1. Job security and status;
2. Career prospects;
3. Social changes in the office; and
4. Loss of departmental status.

It has already been stressed that prototyping is a dynamic process that involves constant interaction between the analyst(s) and programmer(s), on the one hand, and the system's potential users, on the other. Therefore, in an ideal world, the recommendations voiced by the personnel of the three regional units about the prototype system should have been carried out and the system be presented to them again until they are completely satisfied with the prototype system. Only then would installation automatically follow.

Although the prototype system was rewritten in Turbo Pascal to speed it up, it has been decided to stop the development of the system at this stage because of the lack of time and the amount of travelling necessary to get a feedback.

To continue on the systems analysis and design steps, the next chapter will consider the various problems that are to be taken into account in the implementation and maintenance stages.

## CHAPTER XII

### SYSTEM IMPLEMENTATION AND MAINTENANCE

Having designed the system, evaluated it and assuming that it has been tailored to satisfy the requirements of the potential users, the next step would be to implement the system so that it becomes operational within the organisation that has acquired it.

Unlike most of the activities which have taken place prior to implementation, those involved in starting up the new system usually have a major impact on current operations. Without careful control throughout, an organisation introducing an automated system could be running the risk of facing serious problems that can prove very costly to overcome. Any arising conflict should therefore receive top management attention at a very early stage.

In this chapter, our attention will be focused on the areas of system implementation and maintenance. Indeed, a well designed system will never function smoothly if it is not properly implemented and maintained. Thus the various areas that the ANA should look into before implementing the new system will be discussed.

It must be stressed, however, that because the installation of the prototype system has not actually taken place for reasons detailed earlier in this project, the author will mainly discuss the options that are on offer in as far as

implementation and maintenance are concerned. Although some recommendations will be made where appropriate, it is believed that final decisions regarding these two stages can only be made by a special committee once the system has been developed or acquired.

## 12.1. SYSTEM IMPLEMENTATION

Despite the fact that the author was unable to take this project beyond the design and evaluation stages, the subsequent steps in the system development life cycle will continue to be discussed. For this reason, the author will assume the following:

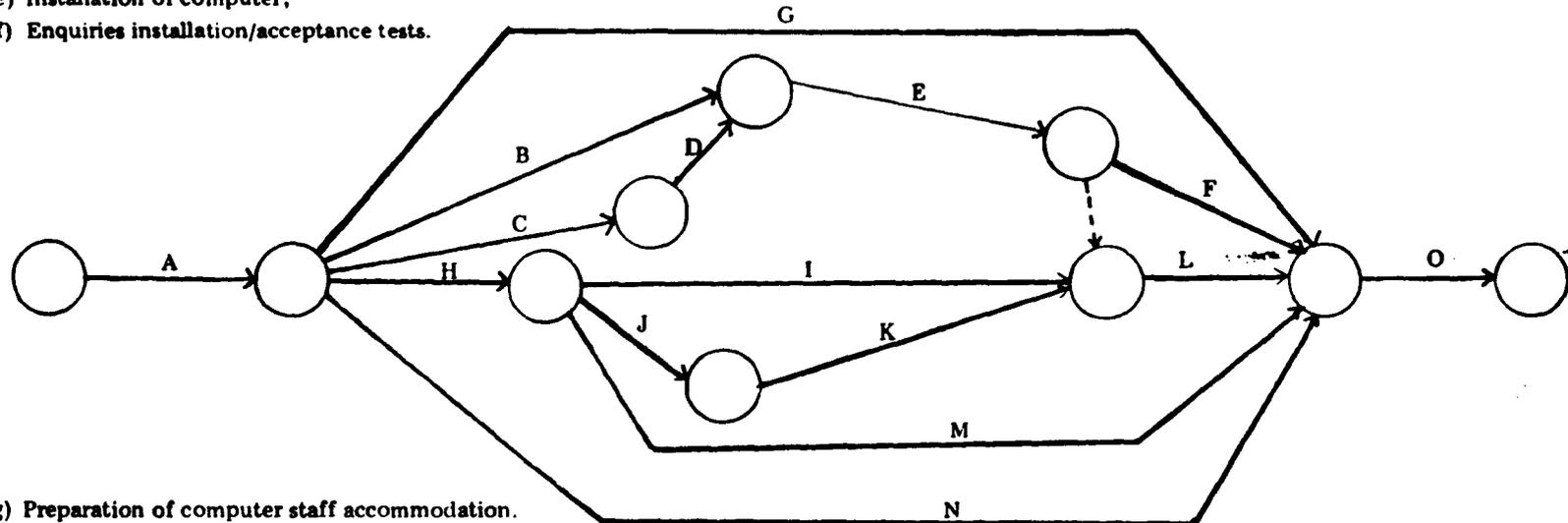
1. That the prototype system described in Chapter 10 responds specifically to the needs of the ANA; and
2. That the computer necessary to run this application has been acquired.

On the basis of these assumptions, the author will attempt to discuss and analyse the various steps that are to be taken to ensure a smooth change-over. A diagrammatic illustration of these implementation steps is shown in Figure 12.1. Special attention will, however, be given to the following:

1. Staff training;
2. File conversion; and
3. System change-over.

**Activity**

- (a) Systems investigation/outline design, leading to the ordering of a computer.
- (b) Selection, planning and preparation of site for the computer.
- (c) Ordering of computer - legal aspects, delivery dates, financing, etc.
- (d) Preparation for delivery of computer.
- (e) Installation of computer;
- (f) Enquiries installation/acceptance tests.



- (g) Preparation of computer staff accommodation.
- (h) Detailed systems design/documentation.
- (i) Creation of new files.
- (j) Specification of programs.
- (k) Writing of programs.
- (l) Testing of programs/application.
- (m) Ordering of designed stationery.
- (n) Selection and training of all computer department staff and the briefing/training of relevant new department staff.
- (o) Changeover to the new system.

Figure 12.1. Implementation Stages.

It would be erroneous to assume that the implementation stages prior to file conversion, such as acquiring the computer, are of no significant importance. Indeed, they are, but they are carried out mostly by the team in charge of the study. The stages beginning with file conversion, will, however, require a great deal of participation from the staff of the ANA. Hence, the importance of staff training.

#### 12.1.1. Staff Selection and Training

Chapters Five and Six of this project stressed the scarcity of computer experts in the Arab world, in general, and in Algeria, in particular. It is, therefore, recommended that extreme cautions be exercised when recruiting staff and training it. The staff's quality will inevitably determine the future of the system that is purchased.

It is very important during the planning of the systems implementation for the team in charge to estimate staffing requirements. These are likely to vary between one sub-stage of implementation and another.

Some of the existing personnel of the ANA may have to be retrained to use computers, other user department staff may have to alter their manual procedures to accommodate the use of computers. Moreover, computer experts will have to be recruited to cope with the technical aspects of the system.

When recruiting personnel, it is advisable, where possible, to recruit as many as feasible from within the organisation. This policy will help maintain good staff relations and reduce suspicion of the 'new methods'. This would be particularly helpful if some of them have had computer experience in other installations.

It is also advisable that a special committee be established to plan and organise the whole programme of recruitment and training.

Various methods of training are available:

1. Lectures on general, or specific, aspects of the system. The use of films, video, tape recordings, slides and overhead projectors will be particularly helpful;
2. Discussion meetings as a follow-up to lectures to allow staff to ask questions and sort out possible problem areas;
3. Structural courses on the use of data processing equipment;
4. Visits to well-established automated archival system to see how these systems operate and arouse interest and keen anticipation. Visits to automated archival institutions in the UK, USA and Canada, for instance, would be extremely fruitful;
5. Publication of an internal magazine within each regional unit as a means to explain the new system in outline, especially that the system to be implemented will be

- used not only by the archives department, but also by the rest of the departments part of the regional unit;
6. Distribution of users guide to help the staff learn the system; and
  7. Demonstration sessions for potential users to get acquainted with the system.

The persons responsible for the training should take care over the preparation of the courses and material used. It is imperative that interest is aroused and maintained, and so both courses and material must be well written, well presented to make considerable impact on the members of staff. Using pictures, graphs, histograms, and so on will certainly help achieve this goal.

#### 12.1.2. File Conversion

File change-over represents a major part of the systems implementation in that it usually implies the conversion of manual records into a medium used by the computer. This itself may involve the transcription of records onto specially designed forms before they are keyed onto the appropriate computer medium. Once the file has been created, extensive checking for accuracy is essential to avoid problems when the system becomes fully operational.

From the above description, it can be seen that file conversion can be very tedious and time consuming. Because of the volume of data that will have to be entered into the

new system of the ANA, the problem of errors is a very serious one. Without careful checking and adequate data validation etc., errors on the new master file might turn out to be numerous and expensive to correct.

The team in charge of file conversion must establish:

1. The volume of manually prepared finding aids to be converted into machine readable form;
2. Whether all of the data to be converted are maintained centrally; and
3. Whether each record is easily accessible; and
4. Whether the existing forms are suitable for data capture.

In this instance, it is advisable to use forms that imitate the computer's input screen to ease the job of the users. An illustrative example of a data capture form to go with our prototype system is presented in Figure 12.2.

As a general rule, conversion consists of the following stages:

- a) Ensuring that the original record files are up to date;
- b) Recording the old data on specially designed input forms;
- c) Transcribing the completed input forms onto the computer media; and



d) Using special programs to read the transcribed data and produce the required files into an appropriate form. The contents of the print-outs must then be checked against the data input forms (and if need be against the original file itself).

The establishment of a set of complete and valid record files, such as those in demand by of the ANA, is crucial to a successful start of operational running. To minimise the possibility of errors arising in the file conversion stage and cope with the bottlenecks, it is suggested that one of the following solutions be adopted:

- a) Provision of additional staff;
- b) Use of a computer bureau; or
- c) Conversion of one file at a time instead of all files at once.

The last solution seems to be more desirable in the case of the ANA. Indeed, from the author's experience within the organisation, there are files that are constantly consulted by the ANA's users (e.g. elections during the French colonisation). It is, therefore, recommended that these files be given first priority.

### 12.1.3. System Change-over

Once the files necessary for the commencement of operational running are ready, and the system has been fully tested the change-over can be made. Change-over may take three different forms:

#### Direct Change-over

In this case, the old system is completely replaced by the new system in one single move. Such a solution may be unavoidable in situations where the two systems are substantially different, where the new system is a real-time system, or where extra staff to oversee parallel running is unobtainable.

While this method is comparatively cheap, it is very risky because system or program corrections are difficult if the system is to remain operational. If such a situation were to arise in the case of the ANA, it would be advisable to introduce the new system application by application, allowing long periods between each stage so that all problems are cleared up before the entire system becomes fully operational.

#### Parallel Running

This refers to the situation where both the old and the new system are running in parallel for a period of time, both processing current data and enabling cross checking to be

made. This method provides a degree of safety should there be a problem with the new system. However, if there are differences between the two systems, cross-checking may become difficult or impossible.

Some of the disadvantages of this method include:

- a) Need to employ more staff to cope with both systems;
- b) Possible indication of lack of confidence in the new system; and
- c) Delay in the actual implementation of the new system.

If this method were to be adopted by the ANA, the following precautions should be taken:

- a) Limit on the duration of parallel running;
- b) Determine which data should be cross-checked (all of it, or on a sample basis); and
- c) Provide clear instructions on how errors and major problems in the new system should be dealt with.

### Pilot Running

This is the cheapest method of system change-over. It is fairly cheaper and easier to control than parallel running, and provides a greater degree of safety than does a direct change-over. Two types of pilot operations are possible.

Retrospective parallel running, on the one hand, refers to a situation where the new system operates on data already processed by the old system. The existing results are available for cross-checking and the system can be tested without the problems of staffing and disruption that may be experienced in parallel running.

Restricted data running, on the other hand, refers to the case where a complete logical part of the whole file is chosen and run as a unit on the new system. If that proves to be working perfectly well, the remaining parts are then transferred.

It is believed that the last option is the most cost-effective solution as it offers major benefits when compared to the other alternatives. Nevertheless, it is advisable to set up a special committee whose objectives would include the careful analysis and the proposition of the most suitable option.

#### 12.1.3.1. Ensuring a Smooth Change-over

It is advisable for the management of the ANA to take necessary measures to ensure a smooth and efficient change-over. Amongst these, the following perhaps deserve special consideration:

1. Who is responsible for the co-ordination of the change-over, and how should it be best achieved;

2. What would be the means of communication during the change-over period;
3. What is the best method of controlling errors and what is the amount of system change or program modification one can allow;
4. How will the change affect the staff and how can they be best trained to fit within the new system; and
5. What method to use to monitor and evaluate the results of the systems change-over.

## 12.2. SYSTEM MAINTENANCE

Once the team in charge of the implementation stage has ensured that the system is fully operational and working satisfactorily, the job of the team is considered to be finished. It is important, however, that the system is reviewed periodically so that any unforeseen problems may be solved and that the system is achieving and will continue to achieve the desired results. Indeed, in most systems, there is constant need to maintain and improve applications and to keep up to date with technological developments and changing user requirements.

A general appraisal of the whole computer project, and indeed of any subsequent re-appraisals should include the following areas:

1. Computer department staff and organisation;
2. Suitability of equipment (advances in technology);

3. Operating procedures which might required as a result of alteration in source data/management requirements;
4. Familiarity with the system will cause users to specify added features which would prove useful, and identify existing features which cause present difficulties or are of marginal utility. This is particularly true when a manual system such as the ANA is automated for the first time; and
5. Cost/benefit analysis of the system.

System maintenance involves:

1. Upgrading the system to adapt it to developments in user's methods of operations as and when they occur. The system can remain static without becoming obsolete. New processing requirements, changing volumes of processing, new methods of organisation and operation etc., all together make changes a necessity. Systems can be amended to keep them functional; and
2. Correcting errors as and when they are found.

To ensure effective maintenance, the team in charge should consist of the following:

1. A representative from the analysis and programming group; ideally a senior analyst;
2. A representative from the computer operations group; and
3. A representative from each major user of the system.

This team should be given certain responsibilities, including:

1. Approve all significant changes to the system;
2. Establish priorities for maintenance tasks;
3. Approve and monitor all disaster plans;
4. Ensure that the communication channels between the various groups interfacing with the system are operating properly; and
5. Perform an annual review and evaluation, as well as projections for subsequent years.

It should be made clear, however, that a basic assumption for effective maintenance is the soundness of original design, adequacy of documentation, and effectiveness of the installation (implementation). It is therefore totally unreasonable to expect a maintenance team to salvage a poor system.

### 12.3. CONCLUSION

This chapter was mainly concerned with the steps that the ANA should take to ensure a reasonable systems implementation and maintenance.

It was seen that implementation constituted a key stage in the system development life cycle. This was due to the fact that implementation requested the full participation of all members of the ANA so that a safe change-over to the

automated system is ensured. Areas of sensitive importance were discussed. These included:

1. Staff training;
2. File conversion; and
3. System change-over.

Likewise, it was demonstrated that a well-designed and implemented system can fail in an operational environment unless proper control is exercised to ensure that the system functions according to standards and objectives and is properly maintained.

Indeed, the normal operation of a system after implementation still requires control and planning to ensure that the operation of the system continues along the designed route. Stated another way, systematic maintenance is the only solution and remedy for problems that may be encountered when dealing with any system.

## CHAPTER XIII

### CONCLUSIONS AND RECOMMENDATIONS

Most developing countries possess historically rich archive collections of inestimable value. However, very few governments, in these countries, recognise the vital importance of archives for both economic and social development. As a result, it is common to find that such institutions are usually not provided with sufficient funds and do not have suitable buildings to store safely the nation's history for the benefit of the generations to come.

Above all, archival institutions in Third World countries lack qualified and sufficient personnel. Added to these problems is that archival legislations are almost inexistent in many of these countries and when they do exist, they are usually ignored.

By and large, the present study attempted to discuss and analyse the state of the art of the Algerian National Archives and accordingly suggest a suitable automated system capable of responding to the specific needs of the various users. What follows is a detailed account of the main conclusions reached by this study.

### 13.1. SUMMARY AND CONCLUSIONS

While Chapter One defined the specific objectives and general outline of this thesis, Chapter Two focused on the concept of archives. It tried to determine the differences separating archives from other concepts such as manuscripts and records management. The main functions of an archives office were briefly discussed together with the likely implications of information technology on this very same functions. Special emphasis was, however, put on the problems evolving from the advent of machine readable archives. Appropriate solutions were also discussed.

Chapter Three of this thesis was devoted to the subject of computers. The main reasons that have encouraged the introduction of computer systems amongst archivists, information scientists and librarians were examined. The main advantages and drawbacks of computerisation were also considered.

The next chapter, Chapter 4, concentrated on the effects of computerisation on archives. It was obvious from the discussion of automated archival systems developed throughout the world that the questions of information retrieval, the analysis of user's needs or interactive access to data in archives offices have been getting short shrift. These are subjects which have been considerably developed in the information world and it seems that

archivists should start taking these issues into account when planning new automated systems.

Chapter Five of this project contained some of the various obstacles that impede the development of a suitable information and scientific infrastructure in the Arab world. Various aspects relating to the prevailing situation in this area of the globe were analysed. The following were found to be of paramount importance:

1. Economic constraints;
2. Socio-political constraints;
3. Demographic and Cultural constraints;
4. Lack of adequate staff and manpower; and
5. Lack of adequate information infrastructure.

From the analysis of the above constraints, it was concluded that all Arab countries urgently needed to explore every available means in order to keep abreast of the various scientific and technological developments. Recommendations were made so as to narrow the technological gap between these countries and the developed world.

Chapter Five also evaluated the various technological problems that are facing the development of appropriate hardware and software for the handling of arabic script. Besides, some major breakthroughs in these areas were described.

Chapter Six highlighted some of Algeria's economic, political, historical and cultural aspects. This chapter indicated that in spite of a relatively strong economy, Algeria still suffers from the various problems facing the rest of the Less Developed Countries. These obstacles include:

1. Shortage of qualified staff;
2. Lack of an adequate information infrastructure; and
3. Lack of a suitable information policy.

With reference to the first obstacle, it was particularly noted that Algeria is seriously suffering from the lack of well-trained personnel despite the availability of several universities dispensing courses in Archives, Libraries and Information Studies. Most of these courses are, however, deserted by students mainly because of the lack of a status specific to the professions of Archivists, Librarians and information scientists.

Archival institutions seem to be the worst affected by this staff shortage in that none of the students who graduated from universities has chosen to work for them (Allahoum and Tekfi, 1981).

This shortage of skilled information professionals is believed to be one of the major causes of the slow development that characterises Arab countries such as Algeria. Because of the role these professions can play in the process of development, Third World countries ought to

reconsider their policies towards these professions if economic prosperity is to be achieved.

In Chapter Seven, the author provided a detailed description of the Algerian National Archives (ANA). First and foremost, the reasons that led to the archival conflict between Algeria and France were highlighted. Additionally, the various steps taken by Algeria to recover its cultural heritage were discussed. Furthermore, the author pointed out some of the problems facing archives in Algeria, especially:

1. The lack of well-trained staff;
2. The lack of adequate repositories;
3. The lack of financial resources; and
4. The impracticality of the legislation establishing the Algerian National Archives.

Considering the prevailing situation within the ANA, it is believed necessary for the authorities to revise their policies if the historical facts of the country are to be protected.

It is recommended that the following steps should be taken if archives are to be given the place they deserve:

- a) Increase the salaries of archivists who tend to be underpaid;
- b) Send the personnel for training abroad;
- c) Obtain help and advice from experts in other countries;

- d) Seek the support of international organisations; and
- e) Build adequate repositories to protect the documents for the generations to come.

Chapter Eight of this project was a summary of the results of the study carried out by the author between March and October 1986. This study was aimed at finding out the nature of the archives held within the various regional archives centres, the problems encountered, the nature of existing archival documents, the users and their attitudes towards the present services, and the eventual automation of archives.

The study was limited to the heads of departments of archives of the 48 regional units in addition to the Central Repository of the ANA. A combination of five different data collection techniques was used; namely:

1. Mail questionnaires;
2. Interviews;
3. Working on documents;
4. Observation; and
5. Author's own Experience of the ANA.

The results of the study revealed that:

1. Archival institutions suffer enormously from the lack of technical staff;
2. The personnel that is available is concentrated in three main regional units: Algiers, Constantine and Oran;

3. The study also indicated that most of the archival documents are produced in French. Indeed, only 5% of the totality of the archives held in the 12 archives regional centres are written in Arabic;
4. Existing archive documents can be divided into four main categories:
  - a) Administrative archives;
  - b) Financial archives;
  - c) Agricultural archives; and
  - d) Historical and political archives.
5. The study also indicated that the potential of the various archival services was not fully exploited. The main reasons for this low use are:
  - a) Lack of sufficient duplicating facilities;
  - b) Lack of suitable finding aids;
  - c) Inaccessibility of users to significant documents;
  - d) Inadequate opening hours; and
  - e) The unavailability of documents of reference.
6. All respondents considered the development and implementation of a computer information system within their services to be definitely a step forward in that it will enable and ease the production of a variety of finding aids.

However, most respondents noted that some major problems might arise if they were to consider automation. Amongst the problems they mentioned, the following are considered to be the most important:

1. Financial difficulties;
2. Technical difficulties; and
3. Lack of personnel with both computer and archives background.

Because the importance of an automated national system as a key to knowledge and as a tool for archives research was stressed by the various respondents, Chapter Nine of this thesis was devoted to the conception and design of an automated system for the Algerian National Archives.

In addition to presenting the short and long term objectives of the system to be implemented, issues such as the hardware and software requirements of the system, and action programme for implementation were also discussed.

Chapter Ten presented a prototype automated archival system confined to records management. The system was written in dBASE III PLUS, a database management system developed by Ashton Tate. To produce an execution file, the source code was compiled using yet another package known as Clipper.

The system can carry out most of the function needed in a records management environment. Its main menu consists of three options:

1. Update;
2. Query; and
3. Report.

To prevent unauthorised people from using the system, data security through password features for access to the system is provided.

The system is user-friendly in that any member of staff of the ANA and/or clerical personnel with little knowledge of computers can operate the system. The system enables the following operations:

1. Data-entry and data updating through easily understood screen forms;
2. Menu-directed operations at all possible user interfaces from which the potential user can select any desired option;
3. Re-entry of data was made minimal in update operations through full-screen editing functions; and
4. Validation of input data using logical and computational criteria can be applied to some of the fields.

In addition to the user-friendly features, it was decided that the system should allow users to:

1. Query the database from several keys or fields (e.g. action date, title, keyword, etc...);
2. Alert users of exceptional conditions;

3. Produce a variety of routine reports whose production, in manual systems, is usually very time consuming because of the labour-intensive involved in such jobs, and the difficulties involved in reorganising data in manual systems. Our system can produce six different reports. These are:

1. Class lists report;
2. Departmental lists report;
3. Review schedule report;
4. Disposal Notification report;
5. Records loan report; and
6. Vacant locations report.

Chapter Eleven presented an evaluation of the system discussed in the previous chapter. It consisted of a series of suggestions and recommendations made by the staff of three regional units (i.e. Algiers, constantine and Oran), as to how to improve the prototype system.

Emphasis was put on the slow speed with which our prototype system operates. For this reason a new similar system using, this time, Turbo Pascal was developed.

Some of the personnel's fears regarding the introduction of an automated system were also discussed.

Finally, although the author has been unable to carry out this project to its last stages, Chapter Twelve presented the reader with the necessary steps that the ANA should observe to ensure a smooth systems implementation and maintenance.

Despite the fact that some recommendations were made where possible, it was suggested that once a system has been acquired, it was vital to appoint a committee to take charge of the various problems that may rise during implementation.

### 13.2. Recommendations

It is strongly recommended that the ANA establishes and implements an automated system capable of responding to the needs of its potential users be they students or researchers. To achieve the first objective, the ANA should:

1. Establish an Information Retrieval Group that could help to plan, create, implement and maintain the national system. Amongst the tasks of this group, the following are of paramount importance:

- a) Supervise the development of a suitable information storage and retrieval system for the 48 regional centres composing the ANA;

- b) To that end, standards for data handling should be developed so as to facilitate the tasks of the operators at input stage; and

- c) This group should also be able to provide highly professional training to the personnel recruited by these centres.
2. Make all possible efforts to establish a computing group probably under the supervision of ALESCO (the Arab League Educational Scientific and Cultural Organisation) because of the factors common to these countries (language, culture, history and religion). This will help share the experiences of various countries as far as automation of archives is concerned;
  3. Equip itself with the technology that will enable it to perform the functions required from it efficiently;
  4. Seek the help of international organisations such as UNESCO, ALESCO and ARBICA as well as the help of experts in the developed world, particularly the United States, Canada and Great Britain where automated archival systems have been in existence for over a decade; and
  5. The ANA should also strive hard to promote the profession of archivist in the country. This can be made possible by:
    - a) Increasing the funding of the ANA and the various archival regional units to enable these institutions to acquire the technology they need to promote their services;

- b) Providing a training of very high calibre to employees by sending them to countries where archives administration and automation are a long tradition;
- c) Creating a national status for archivists, librarians and information scientists; and
- d) Stimulating archivists by increasing their salaries.

### **13.3. Recommendations for Further Work**

1. Develop a data structure that is capable of responding to the needs of the ANA together with its 48 regional units;
2. Carry out an even deeper study of the state of the ANA;
3. Implement the recommendations presented in the evaluation (please see Chapter XI) and accordingly develop for the ANA the application that is required;
4. Carry out the study to its last stages; including the implementation and post-implementation phases; and
5. Study the users behaviour and the effects that may result.

**APPENDIX 1**

**DEPARTMENT OF LIBRARIANSHIP AND  
INFORMATION SCIENCE  
ALGIERS UNIVERSITY**

**SYLLABUS**

**SEMESTER 1**

<b>TITLES OF MODULES</b>	<b>No OF HOURS</b>
<b>Expression (Arabe)</b>	<b>45</b>
<b>Expression (Francais)</b>	<b>45</b>
<b>Histoire des Grandes Civilisations</b>	<b>52.5</b>
<b>Histoire de la Philosophie Antique et Musulmane</b>	<b>52.5</b>
<b>Histoire et Typologie des Organismes Documentaires (bibliotheques)</b>	<b>30</b>
<b>Catalogage I</b>	<b>75</b>
<b>Sociologie Generale</b>	<b>60</b>
<b>Langue Etrangere</b>	<b>60</b>
<b>6 Visites d'Organismes Documentaires (Archives, Bibliotheques et Centres de Documentation)</b>	

**SEMESTER 2**

TITLES OF MODULES	No OF HOURS
Histoire des Grandes Civilisations	60
Histoire de la Philosophie Moderne et Contemporaine	60
Organisation des Organismes Documentaires (Archives)	75
Catalogage II	60
Litterature Mondiale	60
Psychologie	60
Langue Etrangere	60
6 Visites d'Organismes Documentaires (Archives, Bibliothèques et Centres de Documentation)	

**SEMESTER 3**

TITLES OF MODULES	No OF HOURS
Histoire du Maghreb I et II	52.5
Mathematiques	60
Catalogage III	60
Construction et Aménagement des Organismes Documentaires	30
Bibliologie Historique	60
Introduction aux Methodes Bibliographiques et Bibliographie Generale	90
Langue Etrangere	60
Stage de 10 demi-journées au niveau de la Bibliothèque de l'Institut (simulation des différentes fonctions documentaires)	

**SEMESTER 4**

TITLES OF MODULES	No OF HOURS
Histoire du Maghreb III et IV	52.5
Statistiques	30
Catalogage IV	60
Methodologie des Sciences Sociales	30
Bibliologie Contemporaine	60
Theorie de l'Information	60
Bibliographie des Sciences Humaines	60
Langue Etrangere	60
Stage de 10 demi-journess au niveau de la Bibliotheque de l'Institut (simulation des differentes fonctions documentaires)	

**SEMESTER 5**

TITLES OF MODULES	No OF HOURS
Introduction a l'Analyse Economique et Macro- Economique	75
Langages Documentaires I	45
Archivistique	45
Introduction a l'Informatique	30
Introduction aux Methodes Documentaires	60
Bibliographie des Sciences Exactes	60
Linguistique Generale	60
Langue Etrangere	60
Stage de 10 Demi-journees dans un Organisme Documentaire (Archives, Bibliotheques ou Centre de Documentation)	

**SEMESTER 6**

<b>TITLES OF MODULES</b>	<b>No OF HOURS</b>
<b>Exercices de Recherches Bibliographiques et Documentaires</b>	<b>30</b>
<b>Linguistique et Documentation</b>	<b>45</b>
<b>Economie de l'Entreprise</b>	<b>60</b>
<b>Bibliographie du Maghreb</b>	<b>30</b>
<b>Animation Culturelle</b>	<b>30</b>
<b>Techniques Archivistiques</b>	<b>45</b>
<b>Litterature de la Jeunesse</b>	<b>30</b>
<b>Langages Documentaires II</b>	<b>45</b>
<b>Exercices de Classification I</b>	<b>30</b>
<b>Langue Etrangere</b>	<b>60</b>
<b>Stage de 10 Demi-journees dans un Organisme Documentaire (Archives, Bibliotheques ou Centre de Documentation) autre que celui choisi en S5</b>	

**SEMESTER 7**

TITLES OF MODULES	No OF HOURS
Recherches Bibliographiques	22.5
Reseaux et Systemes d'Information	30
Technologie de la Documentation	30
Histoire du Livre Arabe	45
Exercices d'Analyse Documentaire	30
Exercices de Classification II	30
Automatisation	30
Catalogage V	60
Seminaire Memoire	
Stage de 10 Demi-journees dans un Organisme Documentaire (Archives, Bibliothèques ou Centre de Documentation) autre que celui choisi en S5 et S6	

**SEMESTER 8**

TITLES OF MODULES	No OF HOURS
Informatique et Recherche Documentaire	45
Gestion	45
Paleographie: Arabe ou Ottomane	45
Stage de 6 mois (une demi-journee par semaine) dans un Organisme Documentaire (Archives, Bibliothèques ou Centre de Documentation) autre que celui choisit en S5, S6 et S7	
Memoire de Fin de Licence	

## APPENDIX 2

### CLASSIFICATION USED IN REGIONAL ARCHIVES

**Series A: Lois et Decrets**

**Series B: Administration Generale de l'Algerie**

**Series C: Personnel du Departement**

**Series D: Distinctions Honorifiques**

**Series E: Elections**

1E: Elections Senatoriales

2E: Elections Legislatives

3E: Elections aux Assemblees Algeriennes

4E: Elections aux Assemblees Departementales

5E: Elections aux Municipalites et Centres Municipaux

6E: Elections aux Djemaa de Douars

**Series F: Police-Hygiene**

1F: Surete Generale

2F: Police Administrative

3F: Hygiene Publique

**Series G: Population, Etat Civil**

1G: Recensements Quinquenaux - Mouvements de la  
Population

2G: Etat Civil - Naturalisations - Etrangers

GG: Tables decennales (1830-1882)

**Series H: Agriculture, Commerce, Industrie**

1H: Agriculture

2H: Commerce

3H: Industrie

4H: Ravitaillement

**Series I: Affaires Musulmanes**

1I: Administration

- Bureaux Arabes Departementaux (1837-1867)

- Bureaux Arabes Militaires (1856)

- Bureaux Arabes des Territoires de Commandement  
(1849-1903)

- Circonscriptions Cantonnales (1871-1873)

- Communes Mixtes

2I: Tableaux d'Organisation des Populations Musulmanes (1875-1935)

3I: Emigration (Syrie, Maghreb, Metropole)

4I: Questions Politiques

10I: Situation Economiques des Musulmans (depuis 1908)

**Series K: Administration et Comptabilite Departementales**

K: Arretes et Textes Prefectoraux (non inseres au niveau du recueils des Actes Administratifs)

1K: Papiers Provenant des Cabinets Prefectoraux

2K: Papiers Provenat des Secretariats Generaux

3K: Sous-Prefectures (dossiers provenant des Archives de Sous Prefectures conservees aux Archives Departementales

4K: Comptabilite

5K: Batiments Departementaux et Services du Logement

6K: Conseil General

7K: Tribunal Administratif

4KK: Registres et Comptabilite

**Series L: Administration et Comptabilite Communales**

1L: Budget et Comptabilite

2L: Ecoles

3L: Travaux et Batiments

4L: Travaux Effectues au titre du T.I.C.

10L: Archives de Communes Supprimees

**Series M: Colonisation**

1M: Enquete de 1846 sur la Propriete dans la Mitidja et les Issers

2M: Titres de Propriete

3M: Demandes de concessions

4M: Dossiers de Creation des Centres de colonisation

5M: Enquetes relatives a la Colonisation

1MM: Registres de l'enquete de 1846

5MM: Registres du Service Departemental de la Colonisation

**Series N: Propriete Indigene**

N: Textes Generaux

1N: Dossiers de la Commission de Transactions et de Partages (1851-1867)

2N: Senatus-Consulte (1863)

3N: Cantonnements des Tribus (1858)

- 4N: Propriete Fonciere (application de la loi de 1873)
- 4NN: Registres Concernant l'Application de la Loi de 1873
- 5N: Propriete Fonciere (application des lois de 1887 et 1897)
- 6N: Sequestre

**Series O: Finances**

- 10: Contributions Directes
- 20: Contributions Diverses
- 200: Registres et Quittanciers des Contributions Diverses
- 30: Enregistrement
- 300: Registres d'Actes Civils, Actes Judiciaires, Actes sous seing prive anterieurs a 1850
- 40: Douanes
- 50: Eaux et Forets

**Series P: Domaine**

- 1P: Domaine de l'Algerie et des Territoires du Sud
- 2P: Domaine Departemental
- 3P: Domaine Communal
- 4P: Domaine Public Maritime
- 5P: Commission de Liquidation des Indemnites d'expropriation anterieures au 1er Janvier 1845

**Series Q: Affaires Militaires**

- Q: Affaires Generales
- QQ: Registres de Recrutement
- 1Q: Guerre de 1914-1918
- 2Q: Guerre de 1939-1945

**Series R: Travaux Publics**

- 1R: Voierie et Vicinalite
- 2R: Transports Publics
- 3R: Hydraulique
- 4R: Chutes d'Eau et Ressources d'energies (electricite, gaz, etc...)
- 5R: Ports
- 6R: Mines et Carrieres. Explosifs
- 7R: Automobiles

**Series S: Instruction Publique - Arts et Sciences**

- 1S: Bourses
- 2S: Enseignement Secondaire et Superieur
- 3S: Enseignement Primaire et Technique
- 4S: Ecoles Coraniques et Medersa
- 5S: Arts et Lettres

**Series T: Justice**

- 1T: Justice Ordinaire
- 2T: Justice d'exception

**Series U: Cultes**

- 1U: Culte Catholique
- 2U: Culte Musulman (personnel, edifices, zaouias, confreries, pelerinage)
- 3U: Culte Israelite
- 4U: Culte Protestant

**Series V: Etablissements de Bienfaisance et Assistance Publique**

- 1V: Hopitaux
- 2V: Enfants Assistes
- 3V: Assistance et Secours

**Series X: Etablissements de Repression**

- 1X: Service Penitentiaire
- 2X: Divers

**Series Z: Affaires Diverses**

- 1Z: Archives Administratives Diverses
- 2Z: Archives Privees

### APPENDIX 3

#### SAMPLE LETTERS

17th January 1986

Mr. M. Cook,  
University Archivist,  
Liverpool University,  
P.O Box 147,  
Liverpool L69 3BX.

Dear Mr. Cook,

I am again writing to you in connection with my research project on the "Design of a Computer Information System for the Algerian National Archives" which is a centralised institution consisting of 48 regional centres.

In order to gather the information needed to carry out this research, a questionnaire was set up. I am, however, doubtful about its exhaustivity and therefore asking you kindly for some guidance. I hope that you will be able to indicate ways of improving it. Please indicate on the questionnaire those questions you believe are poorly worded, ambiguous, or unanswerable. Specify changes that you think would correct any problems you discover and do feel free to write in questions you believe are relevant to this study.

Thank you very much for your unforgettable and helpful participation and look forward to hearing from you very soon.

Yours Sincerely

Chaffai TEKFI

17th January 1986

Mr. M. Roper,  
Deputy Keeper,  
Public Record Office,  
Kew, Richmond,  
Surrey TW9 4DU.

Dear Mr. Roper,

I am again writing to you in connection with my research project on the "Design of a Computer Information System for the Algerian National Archives" which is a centralised institution consisting of 48 regional centres.

In order to gather the information needed to carry out this research, a questionnaire was set up. I am, however, doubtful about its exhaustivity and therefore asking you kindly for some guidance. I hope that you will be able to indicate ways of improving it. Please indicate on the questionnaire those questions you believe are poorly worded, ambiguous, or unanswerable. Specify changes that you think would correct any problems you discover and do feel free to write in questions you believe are relevant to this study.

Thank you very much for your unforgettable and helpful participation and look forward to hearing from you very soon.

Yours Sincerely

Chaffai TEKFI

## APPENDIX 4

### SAMPLE OF THE COVER LETTER

Monsieur,

J'ai l'honneur de venir tres respectueusement solliciter de votre haute bienveillance pour vous demander, s'il vous est possible, de bien vouloir completer le questionnaire ci-joint.

Je porte a votre connaissance que je suis un etudiant preparant mon Doctorat en Angleterre (filier: Bibliotheconomie). Le theme de ma recherche s'intitule "MISE EN PLACE D'UN SYSTEME D'INFORMATION AUTOMATISE AU SEIN DES ARCHIVES NATIONALES ALGERIENNES".

Comme son titre l'indique, cette etude a pour objectif fondamental de concevoir un syteme d'information capable de repondre aux besoins et exigences de cette institution et ce a une epoque ou l'ecriture de l'Histoire de notre Revolution constitue un des principaux objectifs de la nation Algerienne.

Etant donne l'impossibilite de rendre visite a toutes les Directions d'Archives concernees par cette enquete et les limites du facteur temps, et afin de reunir toutes les informations necessaires pour la realisation de ce projet, il a ete juge plus pratique d'elaborer un questionnaire.

Il est tres important de remarquer que sans votre veritable participation, cette etude ne pourrait atteindre les resultats escomptes et le systeme qui en decoulerait serait automatiquement voue a l'echec. Il est, en effet, impossible de concevoir un systeme fonctionnel tout en faisant abstraction des besoins reels de ses utilisateurs potentiels. Pour cela, vos reponses et eventuels commentaires sur le contenu du present questionnaire seraient tres apprecies.

Il est a noter, enfin, que toutes vos reponses seront traitees de maniere strictement confidentielle, et qu'un rapport final vous sera transmis des que possible.

En vous remerciant pour votre precieuse collaboration, je vous prie d'agreer, Monsieur, le respect de ma plus haute et fraternelle consideration.

Le Directeur de These

Dr. S.E. ROBERTSON

L'Etudiant

C. TEKFI

Londres, le 13 Octobre 1986

SAMPLE OF FOLLOW-UP LETTER

Monsieur,

J'ai l'honneur de venir tres respectueusement solliciter de votre haute bienveillance pour vous demander de bien vouloir completer le questionnaire ci-joint.

Je porte a votre connaissance que je vous ai deja adresse ce meme questionnaire en date du 2 Mars et du 9 Juin 1986. Neanmoins, ces derniers sont demeures sans reponse jusqu'a ce jour.

Ce questionnaire s'inscrit dans le cadre d'un projet actuellement en cours a l'universite ci-dessus citee. Il a pour unique objectif de rassembler quelques informations pour la conception d'un sytème d'information automatise capable de repondre aux besoins et exigences des Archives Nationales Algeriennes.

Etant donne l'impossibilite de rendre visite a toutes les Directions d'Archives concernees par cette enquete et les limites du facteur temps, j'ai ete contraint d'elaborer un questionnaire pour collecter le maximum d'information possible.

Veillez trouver ci-joint une copie de l'Attestation de Recherche delivree par le Ministere de l'Enseignement Superieur m'autorisant a collecter la documentation en question.

Dans l'espoir de voir ce questionnaire reserve une suite favorable, je vous prie d'agreer, Monsieur, mes salutations distinguees.

CHAFFAI TEKFI

## APPENDIX 5

### QUESTIONNAIRE

#### MISE EN PLACE D'UN SYSTEME D'INFORMATION AUTOMATISE AU SEIN DES ARCHIVES NATIONALES ALGERIENNES.

Ce questionnaire est destine au personnel de la Direction des Archives Nationales, y compris les Directions d'Archives des differentes Wilayate exerçant sous sa tutelle.

Priere de bien vouloir renvoyer ce questionnaire a l'adresse ci-dessous citee:

Chaffai TEKFI,  
Department of Information Science,  
The City University,  
London EC1V 0HB.  
ENGLAND

Veillez indiquer vos responses en mettant une croix a cote de ou des alternatives que vous jugez appropriees.

#### A) ORGANISATION DES ARCHIVES

1) Direction des Archives de la Wilaya de:.....

2) Date de creation de la Direction:.....

3) Quel est le nombre d'employes composant le service?

- Personnel technique:.....

- Personnel administratif:.....

4) Disposez-vous d'une bibliotheque?

OUI |  |

NON |  |

5) Si oui, quel est le nombre de:

Livres:.....

Periodiques:.....

Cartes:.....

Manuscripts:.....

6) Quel est le volume total de la collection d'archives (en metres lineaires)?

.....  
.....  
.....

7) Quelle est la repartition des archives conservees dans votre depot par langue d'origine?

Langue	Volume en metres lineaires
Arabe	
Francais	
Autres langues (specifier s.v.p)	

8) Quel est, en moyenne, le taux de croissance annuelle du fonds?

.....  
.....  
.....

9) Quelle est la nature des archives conservees (veuillez citer les principales series s.v.p.)?

.....  
.....  
.....  
.....  
.....  
.....

10) Produisez-vous des publications regulieres?

OUI |  
NON |

11) Si oui, quelles sortes de publications?

- Etat sommaire des fonds |
- Inventaire analytique |
- Index |
- Autre (veuillez specifier s.v.p) |

.....  
.....  
.....

**B) UTILISATEURS, ATTITUDES DES UTILISATEURS ET EVALUATION DU SERVICE**

12) Quel est le nombre moyen de lecteurs que vous recevez quotidiennement

.....  
.....

13) Quelle est la nature de ces lecteurs?

- Enseignants |
- Etudiants |
- Personnel de l'organisation de tutelle |
- Autre (veuillez specifier s.v.p.) |

.....  
.....  
.....

14) Si l'interet de vos utilisateurs tend a se concentrer sur des domaines de recherche distincts, quels sont alors ces principaux domaines? (veuillez commenter s.v.p.)

.....  
.....  
.....  
.....  
.....

15) Quel est le temps moyen qu'il vous faut pour mettre un document a la disposition du lecteur?

.....  
.....

16) Quels sont, selon vous, les facteurs ou elements qui ralentissent le processus d'extraction des documents (commentez s.v.p.)?

.....  
.....  
.....  
.....  
.....

17) Parmi les facteurs ci-dessous cites, quels sont ceux qui attirent l'attention de vos utilisateurs?

- L'indisponibilite des Archives dans les autres depots
- L'indisponibilite des archives dans les depots environnants
- La rapidite d'acces a l'information
- La maniere dont sont concus les instruments de recherche
- Autre (veuillez specifier s.v.p.)

.....  
.....

18) Parmi les facteurs ci-dessous cites, quels sont ceux qui contribuent le plus a l'insatisfaction de vos lecteurs?

- L'indisponibilite des references de base
- Inaccessibilite de toutes les archives de valeur scientifique
- La vitesse d'acces a l'information est generalement longue
- La maniere dont sont concus les outils de recherche ne repond pas exactement aux besoins des lecteurs
- Les horaires d'ouverture
- L'insuffisance des moyens reprographiques
- L'absence d'instruments de recherche, catalogues et index dans le cas de certaines categories d'archives
- Autre (veuillez specifier s.v.p.)
- .....
- .....

19) Quelles sont, selon vous, les principaux facteurs qui pousseraient vos utilisateurs a se passer de vos services?

- L'inaccessibilite de certaines archives
- Les horaires d'ouverture
- L'utilisateur potentiel est inconscient de l'existence du service
- Les utilisateurs disposent d'autres sources d'information
- Absence de moyens de reproduction adequats
- Manque d'instruments de recherche appropries
- La vitesse d'extraction d'un document donne
- Autre (veuillez specifier s.v.p.)
- .....
- .....
- .....

20) Quels sont les principaux elements qui pourraient contribuer a l'amelioration de vos services et par consequent a la croissance du nombre de lecteurs?

- L'amelioration des moyens de reproduction disponibles
- Ouverture tardive du service
- Elaboration d'instruments de recherche, index, et catalogues detaillés de facon a faciliter l'acces a l'information
- Automatisation du service afin de permettre l'acces rapide a l'information
- Autre (veuillez specifier s.v.p.)
- .....
- .....

**C) AUTOMATISATION DU SERVICE**

21) Pensez-vous que la mise en place d'un systeme d'information automatise puisse remedier aux problemes eventuellement rencontres au sein d'un depot d'archives (Commentez s.v.p)?

.....

.....

.....

.....

.....

.....

.....

22) Si un jour vous decidiez d'automatiser votre service, quel genre de difficultes penseriez-vous rencontrer?

- Difficultes financieres
- Recrutement du personnel requis
- Autre (veuillez specifier s.v.p.)
- .....
- .....
- .....
- .....

23) Selon vous, quels seraient les principaux objectifs d'un tel systeme?

- Control administratif du fonds
- Production d'instruments de recherche
- Production d'index
- Autre (veuillez specifier s.v.p.)
- .....
- .....
- .....

24) Si vous etiez contraint d'automatiser seulement quelques fonctions de votre service, quelles fonctions devraient alors beneficier de cette priorite?

- Acquisitions
- Indexation
- Production d'instruments de recherche, index,..etc
- Autre (veuillez specifier s.v.p.)
- .....
- .....

25) De la meme facon, quelles series ou classes devraient etre traitees en priorite (commentez s.v.p.)?

.....

.....

.....

.....

.....

.....

26) Pensez-vous que la mise en place d'un reseau liant toutes les directions d'archives (DCAN et Archives de Wilaya) serait desirable?

OUI |  |

NON |  |

27) Pourquoi (commenter s.v.p.)?.....  
.....  
.....  
.....  
.....  
.....

\*\*\*\*\*  
\* MERCI INFINIMENT POUR VOTRE PRECIEUSE COLLABORATION \*  
\*\*\*\*\*

**QUESTIONNAIRE**

**DESIGN OF A COMPUTER INFORMATION SYSTEM FOR THE ALGERIAN NATIONAL ARCHIVES.**

This questionnaire is intended for the Central Direction of the Algerian National Archives as well as the 48 regional centres under its supervision.

Could you, please, return this questionnaire to the following address:

Chaffai TEKFI,  
Department of Information Science,  
The City University,  
London EC1V 0HB  
ENGLAND

Please indicate your response by ticking the appropriate alternative or alternatives if necessary.

**A) ORGANISATION OF ARCHIVES COLLECTION AND SERVICES PROVIDED**

1) Direction of Archives of the Region of:.....

2) Date of creation of the archives:.....

3) Number of staff employed?

- Professional staff:.....

- Non-professional staff:.....

4) Does the records office have a library?

YES |  |

NO |  |

5) If yes, what is the number of:

Books.....

Periodicals.....

Maps.....

Manuscripts.....

6) What is the total volume of the archives collection (in linear metres)?

.....  
.....

7) What is the breakdown of the archives collection by language of origin?

Language	Volume in linear metres
Arabic	
French	
Other languages (please specify)	

8) What is the average annual rate of growth of the archives collection?

.....  
.....  
.....

9) What is the nature of the archives held in the system (please list some of the main series)?

.....  
.....  
.....  
.....  
.....  
.....

10) Does the institution produce any regular publications?

YES   
NO

11) If yes, which kind of publications?

- Catalogues
- Guides
- Indexes
- Finding Aids
- Other (please specify below)

.....  
.....  
.....

**B) USERS, USERS' ATTITUDES AND ASSESSMENT OF SERVICES**

12) What is on average the number of researchers you receive per day?

.....  
.....

13) What is the nature of your users:

- Lecturers
- students
- Personnel of the organisation
- other (please specify below)

.....  
.....  
.....

14) If the interest of your users is concentrated on a specific type of researches, then what are their major areas of interest? (Please comment)

.....  
.....  
.....  
.....

15) How long does it take, on average, to locate a particular document?

.....

16) What are the components that take too much time in the search process?

.....  
.....  
.....  
.....  
.....

17) What are the possible reasons that can cause dissatisfaction amongst yours users?

- The unavailability of the required documents
- The documents they are interested in are legally inaccessible
- Length of time necessary to carry out the search
- The way in which information is presented to them
- The opening hours
- Lack of duplicating facilities
- Lack of well designed finding aids, catalogues and indexes
- Other (please specify below)

.....  
.....

18) What are, in your opinion, the possible reasons that would put off potential users from using your service?

- Some archives are legally inaccessible
  - The opening hours
  - The potential users are unaware of the service
  - The users have other sources of information
  - Lack of duplicating facilities
  - Lack of finding aids, catalogues and indexes
  - Length of time necessary to carry out a search
  - Other (please specify below)
- .....
- .....
- .....
- .....

19) What are the additional services required by your potential users?

- Sufficient duplicating facilities
  - Adequate sources of information
  - Late opening
  - Use of an automated system to facilitate access to information
  - Other (please specify below)
- .....
- .....
- .....
- .....

**FUTURE AUTOMATION**

20) Do you think that the implementation of a computer information system would help you to overcome any of the problems you are currently facing (Please comment)?

.....  
.....  
.....  
.....  
.....

21) Supposing that you were about to automate, what are in your opinion the major difficulties that you would be likely to experience?

- Financial difficulties
- Technical difficulties
- Personnel difficulties
- Other (please specify below)

.....  
.....  
.....

22) According to you, what should be the major objectives of such an automated system?

- Administrative control of the holdings
- Production of finding aids
- Production of indexes
- Other (please specify below)

.....  
.....  
.....

23) Which functions of the record office, you think, should be given priority?

- Acquisition |  |
- Indexing |  |
- Production of finding aids, catalogues, etc |  |
- Other (please specify below) |  |

.....

.....

.....

24) Similarly, which series or classes should be given first priority (please comment)?

.....

.....

.....

.....

.....

25) Do you think that the implementation of a computer network system linking all of the 48 records offices throughout the country is desirable?

- YES |  |
- NO |  |

26) Why (please comment)?.....

.....

.....

.....

.....

27) Does the records office receive any archives in machine readable form?

- YES |  |
- NO |  |

**APPENDIX 6**

**RESPONSE TO QUESTIONNAIRE**

<b>REGIONAL UNIT</b>	<b>ANSWER TO QUESTIONNAIRE</b>	<b>AVAILABILITY OF AN ARCHIVAL SERVICE</b>
<b>Central Archives</b>	<b>YES</b>	<b>YES</b>
<b>Adrar</b>	<b>YES</b>	<b>YES</b>
<b>Echeliff</b>	<b>REFUSED</b>	<b>YES</b>
<b>Laghouat</b>	<b>NO</b>	<b>?</b>
<b>Oum El Bouaghi</b>	<b>YES</b>	<b>YES</b>
<b>Batna</b>	<b>NO</b>	<b>YES</b>
<b>Bejaia</b>	<b>YES</b>	<b>YES</b>
<b>Biskra</b>	<b>NO</b>	<b>?</b>
<b>Bechar</b>	<b>NO</b>	<b>?</b>
<b>Blida</b>	<b>NO</b>	<b>?</b>
<b>Bouira</b>	<b>NO</b>	<b>?</b>
<b>Tamenrasset</b>	<b>NO</b>	<b>?</b>
<b>Tebessa</b>	<b>NO</b>	<b>?</b>
<b>Tlemcen</b>	<b>NO</b>	<b>YES</b>
<b>Tiaret</b>	<b>YES</b>	<b>NO</b>
<b>Tizi Ouzou</b>	<b>NO</b>	<b>?</b>
<b>Alger</b>	<b>YES</b>	<b>YES</b>
<b>Djelfa</b>	<b>NO</b>	<b>?</b>
<b>Djijell</b>	<b>NO</b>	<b>?</b>
<b>Setif</b>	<b>YES</b>	<b>NO</b>
<b>Saida</b>	<b>REFUSED</b>	<b>YES</b>
<b>Skikda</b>	<b>NO</b>	<b>?</b>
<b>Sidi Bel-Abbes</b>	<b>REFUSED</b>	<b>YES</b>
<b>Annaba</b>	<b>NO</b>	<b>YES</b>
<b>Guelma</b>	<b>YES</b>	<b>YES</b>
<b>Constantine</b>	<b>YES</b>	<b>YES</b>
<b>Medea</b>	<b>NO</b>	<b>NO</b>
<b>Mostaganem</b>	<b>NO</b>	<b>YES</b>
<b>M'sila</b>	<b>NO</b>	<b>NO</b>
<b>Mascara</b>	<b>YES</b>	<b>YES</b>
<b>Ouargla</b>	<b>NO</b>	<b>NO</b>
<b>Oran</b>	<b>YES</b>	<b>YES</b>

REGIONAL UNIT	ANSWER TO QUESTIONNAIRE	AVAILABILITY OF AN ARCHIVAL SERVICE
El-Bayadh	YES	NO
Illizi	YES	NO
Bordj Bou-Arerdj	YES	NO
Boumerdes	YES	NO
El-Tarf	YES	NO
Tindouf	YES	YES
Tissemsilt	YES	NO
El-Oued	YES	NO
Khenchela	YES	NO
Souk Ahras	YES	NO
Tipaza	YES	NO
Mila	YES	NO
Ain Defla	YES	NO
Naama	YES	NO
Ain Temouchent	YES	NO
Ghardaia	YES	NO
Relizane	YES	NO

APPENDIX 7

LIST OF ARCHIVES CENTRES

<u>NAME</u>	<u>CODE</u>
Adrar	ADR
Ain Defla	AID
Ain Temouchent	AIT
Alger	ALG
Annaba	ANN
Batna	BAT
Bechar	BEC
Bejaia	BEJ
Biskra	BIS
Blida	BLI
Bordj Bou-Areredj	BBA
Bouira	BOUI
Boumerdes	BOUM
Constantine	CON
Djelfa	DJE
Echeliff	ECH
El-Bayadh	ELB
El-Oued	ELO
El-Tarf	ELT
Ghardaia	GHA
Guelma	GUE
Illizi	ILL
Jijel	JIJ
Khenchela	KHE
Laghouat	LAG
Mascara	MAS
Medea	MED
Mila	MIL
Mostaganem	MOS
M'sila	MSI
Naama	NAA
Oran	ORA
Ouargla	OUA
Oum El Bouaghi	OEB
Relizane	REL
Saida	SAI
Setif	SET
Sidi Bel-Abbes	SBA
Skikda	SKI
Souk Ahras	SAH
Tamenrasset	TAM
Tebessa	TEB
Tiaret	TIA

**Tindouf**  
**Tipaza**  
**Tissensilt**  
**Tizi Ouzou**  
**Tlemcen**

**TIN**  
**TIP**  
**TIS**  
**TIO**  
**TLE**

## APPENDIX 8

### LIST OF DIRECTIONS AND SERVICES WITHIN EACH REGIONAL UNIT (WILAYA)

Name of Direction/Service	Code
Assemblée Populaire de la Wilaya	APW
Cabinet du Wali	CWA
Secrétariat Général	SGN
Direction de l' Action Culturelle, du Tourisme et de la Jeunesse et des Sports	DAC
Direction de l'Agriculture	DAG
Direction des Archives	DAR
Direction de la Coordination Financière	DCF
Direction du Commerce et des Prix	DCP
Direction de l'Éducation	DED
Direction de la Fonction Publique	DFP
Direction de l'Hydraulique	DHY
Direction des Infrastructures de Base	DIB
Direction de l'Industrie et de l'Énergie	DIE
Direction de l'Information	DIF
Direction de la Planification	DPL
Direction des Postes et Télécommunications	DPT
Direction de la Réglementation	DRE
Direction de la Santé	DST
Direction du Travail, de la Formation Professionnelle et des Moudjahidine	DTF
Direction de l'Urbanisme, de la Construction et de l'Habitat	DUC
Direction des Transmissions	DTM
Direction des Transports et de la Pêche	DTP
Service du Budget et des Opérations Financières	SBF
Service du Logement	SLO
Service du Matériel et de l'Équipement Mobilier et Immobilier	SME
Services des Personnels	SPE
Service de Police	SPO
Sous-Direction des Affaires Administratives et Locales	SAA
Sous-Direction de l'Administration Générale et des Collectivités Locales	SAG
Sous-Direction des Équipements et Investissements Locaux	SEI
Sous-Direction des Entreprises Locales	SEL
Sous-Direction de la Réglementation et de l'Administration Locale	SRA
Sous-Direction de la Réglementation Générale	SRG

## APPENDIX 9

### INSTALLING AND LOADING THE ANA SYSTEM

#### Loading the ANA system from the Floppy Disk

1. Switch Machine on;
2. Insert DOS in drive A;
3. Type the date and time (if you want), or press the RETURN key twice get to the Dos Prompt (A>);
4. Take Dos out of drive A;
5. Insert the ANA system disk in drive A;
6. Type ANA followed by ENTER

#### Loading the ANA System from the Hard Disk

This assumes that a directory called 'ANA' has already been created on the hard disk. In case this has not been created as yet, the steps described below should be followed to achieve this objective:

1. Enter the following command at the DOS (Disk Operating System) prompt:

```
C:\>md ana <CR>
```

or

```
C:\>mkdir ana <CR>
```

Both 'md' and 'mkdir' stand for make directory. Each of them should also be followed by pressing a carriage return key to execute the command.

2. Copy the content of the floppy disk onto the hard disk. This can be achieved again by inserting the floppy disk in drive A and entering the following command at the operating system level:

```
C:\>copy a:*. * <CR>
```

Basically, this command requires the system to copy all files no matter what the extension might be from drive A to drive C.

3. Change to the appropriate directory on your hard disk by entering the command below at the operating system level:

```
C:\>cd ana <CR>
```

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