How to Use the Data Dictionary in the System Development Life Cycle

Data Management Centre

September 1987

HOW TO USE THE DATA DICTIONARY

IN THE

SYSTEM DEVELOPMENT LIFE CYCLE

1.	INTRODUCTION	10 min.
2.	PROJECT INITIATION	15 min.
3.	FEASIBILITY	10 min.
4.	ANALYSIS	5 min.
5.	DESIGN	5 min.
6.	DEVELOPMENT	5 min.
7.	IMPLEMENTATION	5 min.
8.	POST IMPLEMENTATION AND EVALUATION	5 min.
9.	CORPORATE DATA MODELLING	25 min.
10.	WRAP-UP/SUMMATION	5 min.
		90 min.

1. INTRODUCTION

HOW TO USE A DATA DICTIONARY

IN THE

SYSTEM DEVELOPMENT LIFE CYCLE

- "HOW TO USE A DATA DICTIONARY IN THE SYSTEM DEVELOPMENT LIFE CYCLE"

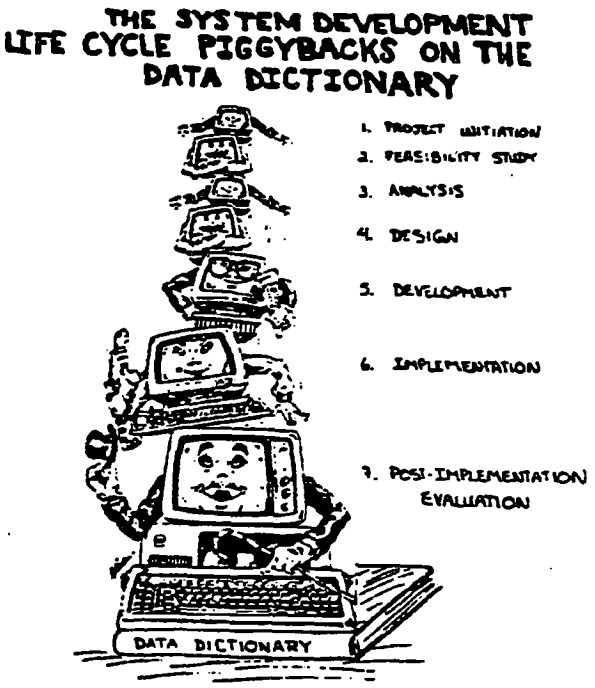
- Some of you have used a Data Dictionary in 1 or 2 of the phases of the system development life cycle, but few of us have used it in all phases of the system development life cycle

- Even if you do not foresee yourself participating directly in all of the phases, it is helpful to understand how the information you put into the Data Dictionary will be used in subsequent phases

- This knowledge will clarify how information should be organized and what should be input to the Data Dictionary

- By the same token, it is useful to know what might have been put into the dictionary in previous phases as it will assist you in the current phase

2. INTRODUCTION



"THE SYSTEM DEVELOPMENT LIFE CYCLE
PIGGY-BACKS ON THE DATA DICTIONARY"

- Each phase has a particular set of information which can be put into the Data Dictionary

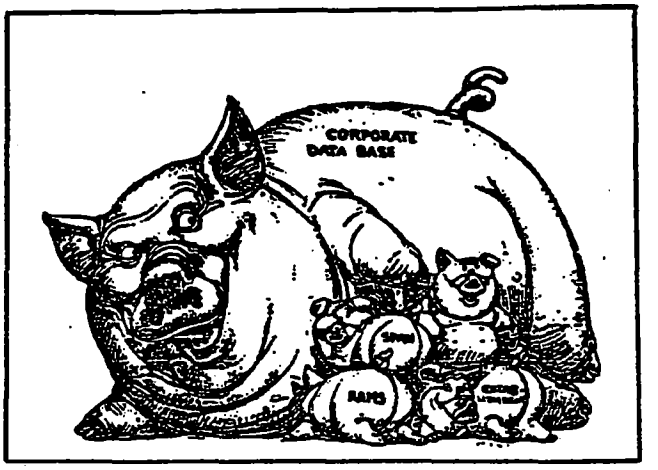
- The use of this information may be <u>immediate</u>, an integral part of the current phase OR
- Used in the next phase OR
- The information may be used <u>historically</u> for analysis and reporting OR
- The information put into the dictionary may be <u>used for all 3 purposes</u>

  1. immediate use
  2. next phase use
  3. historical purposes

- In DRIE, the primary use of the dictionary to date has been the creation of database files and userviews, but the dictionary has a far greater capacity to assist each SDLC phase directly

- This presentation will examine each phase in isolation for its potential DD use

3. INTRODUCTION



- The corporate data base is a reflection of the fact that data is a corporate resource consuming a large percentage of the corporate budget, therefore data must be shared across organizational boundaries

- The Data Dictionary assists DRIE's management in managing data as a corporate resource. Thus it can be viewed as a database in support of IMB's business.

- As pointed out in the previous presentation, "The Tangible Benefits of a Data Dictionary", management will continue to promote the use of the Data Dictionary throughout the SDLC because it reduces the cost of system development and maintenance and it increases accountability

- Data Dictionary dependency is the only way DRIE can manage the corporate data base

4. INTRODUCTION

DRIE EDP ENVIRONMENT

- The DRIE environment is one which depends upon consultants to perform much of the work throughout the SDLC

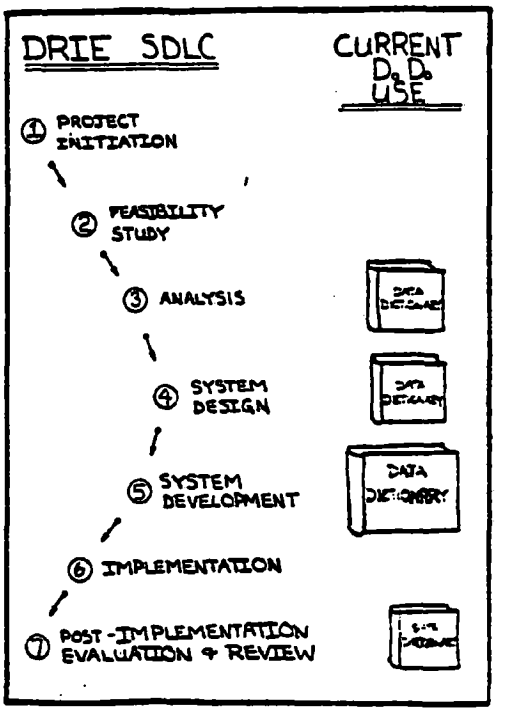
- The use of the Data Dictionary in the SDLC helps promote consistency and quality and reduces the cost of development and maintenance

- The information stored in the Data Dictionary throughout the SDLC is extremely important in a consulting environment which can frequently have changes in staff and consulting firms between phases

- In addition, the information in the Data Dictionary is frequently the only information which is kept current or remains reliable when the system later undergoes enhancements. The original design is rarely accurate 6 months after the system is up

- The increasing accountability of the EDP environment and the increasing power of the auditors means that the entire SDLC is under scrutiny and the Data Dictionary is one of the primary tools of documenting the process

5. INTRODUCTION



- The primary, current use of the DRIE Data Dictionary, in the SDLC, is for impact analysis during application development

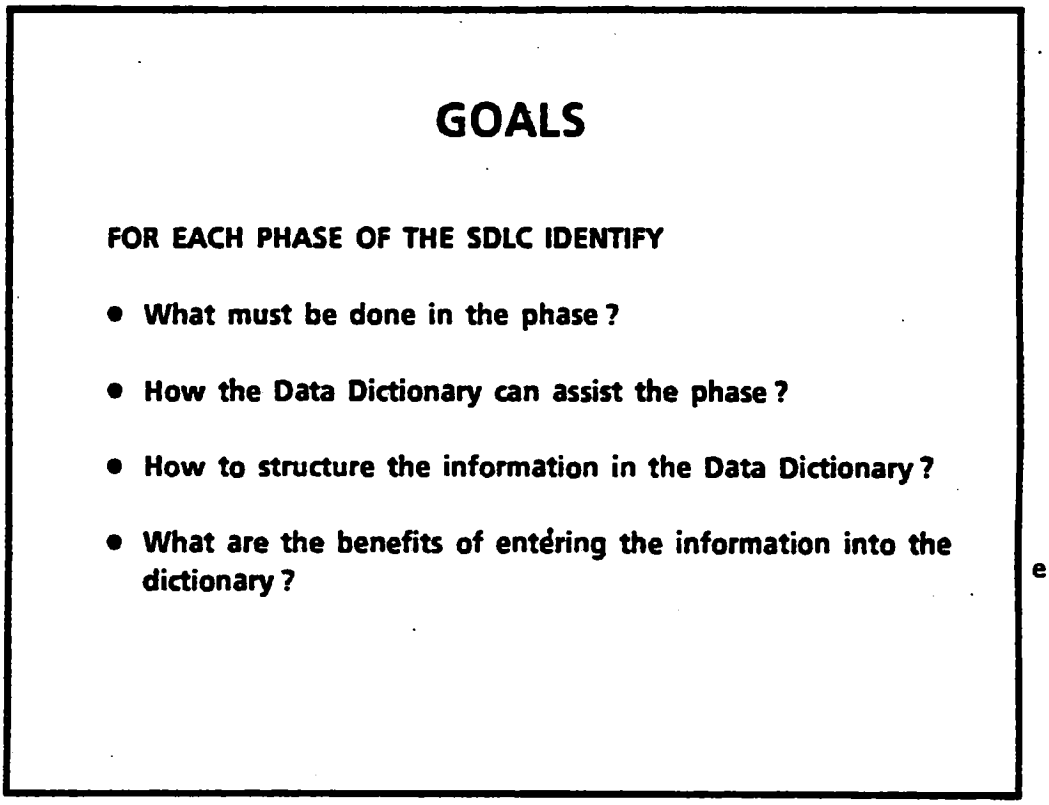
- Some people are using the dictionary to facilitate the analysis and design phases, and more recently, the post-implementation evaluation and review

- Few people are aware that DMC has implemented DATAMANAGER in a manner which will adequately support all phases

Major Objective of Presentation

- Create awareness that the DD can assist all 7 phases; and

- The next time you are involved in the SDLC, you can approach DMC to find out how the DD can assist you



- The goals of this presentation are to identify (for each phase):

1. What is meant by the phase (within the DRIE methodology)

3. How to structure the information acquired during the phase in order to enhance its usage later

4. Identify the diverse uses of this information and who benefits from it

APPROACH

- Standard SDLC phases
  - Project initiation
  - Feasibility study
  - Analysis
  - Design
  - Development
  - Implementation
  - Post-implementation, evaluation and review
- Corporate Data Modelling
- Wrap-up and questions

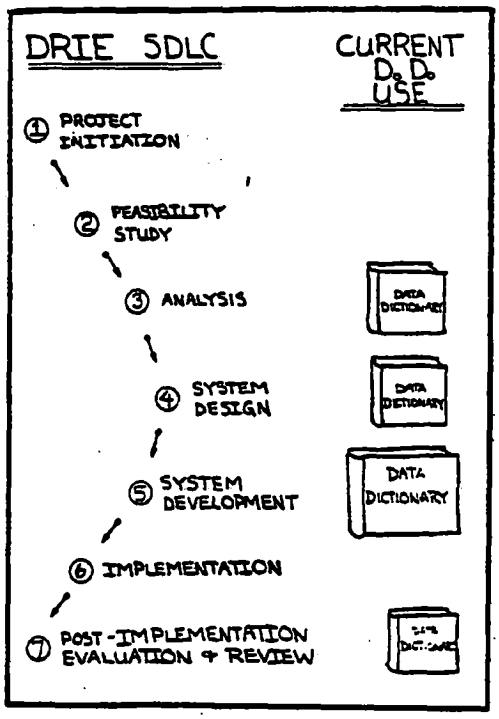
- We will cover each phase of the SDLC separately with a special mention of corporate data modelling

Corporate Data Modelling - A relatively new tool to system development and the use of it can cross the standard boundaries of the system development life cycle phases

- Corporate Data Modelling will be covered after the standard 7 SDLC phases

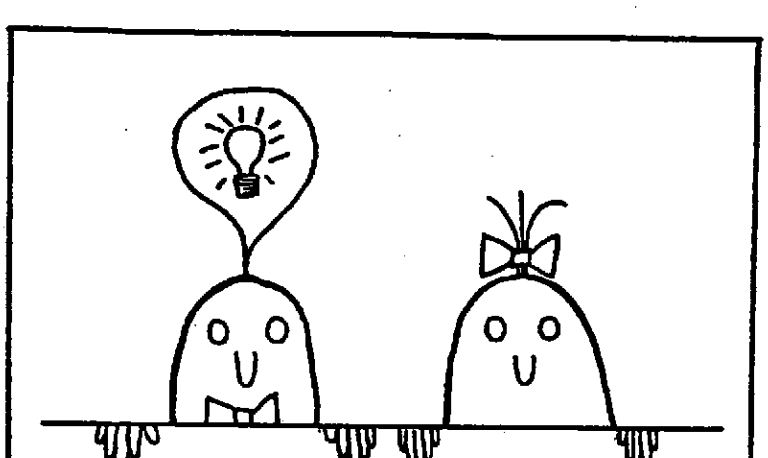
- It is hoped that this presentation will get you started in the direction of utilizing the Data Dictionary more throughout the SDLC and create a better understanding of what can be done with the Data Dictionary in DRIE

0. PROJECT INITIATION



- The first SDLC phase is the Project Initiation phase

1. PROJECT INITIATION



PROJECT INITIATION

- The project initiation - the idea originates in this phase or as part of the Strategic Information System Planning

- These two have their own project in mind, which you will see see later

PROJECT INITIATION

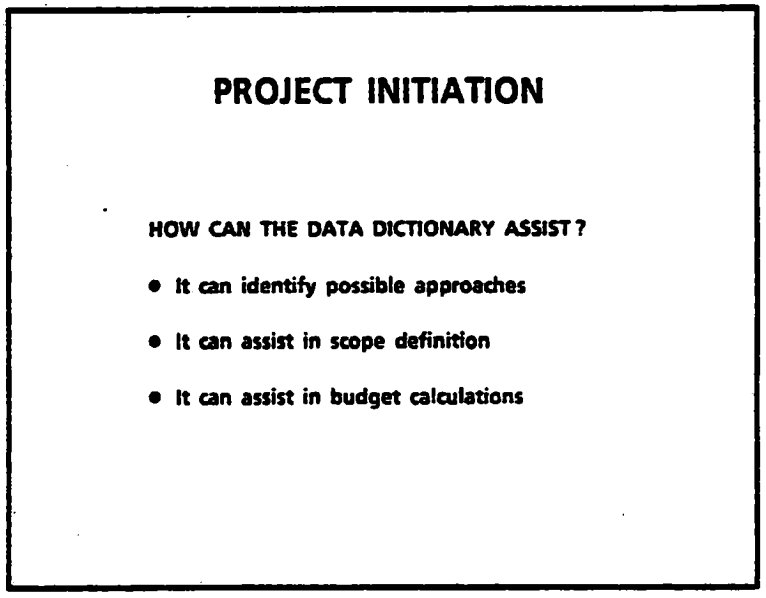
WHAT MUST BE DONE?

- **Problem is defined**
- **General approach is outlined**
- **Scope is outlined**
- **Expected benefits are outlined**
- **Resource plan and budget for the next phase is established**
- **Obtain acceptance**

- Lets establish what must be done in the Project Initiation phase at DRIE

- It is important to note that the Project Initiation Report is most frequently produced by the user area

3. PROJECT INITIATION



1. Identify Possible Approaches

   - The Data Dictionary can identify possible approaches by indicating what subject db's exist, what other systems process similar information
     - This may indicate enhancements to an existing system as an approach
     - This of course is only true if the business functions have been entered and the systems and sub-systems documented in the Data Dictionary
     - It can identify the development process that was used for existing systems and thus identify which options should be explored for possible solution for the new project

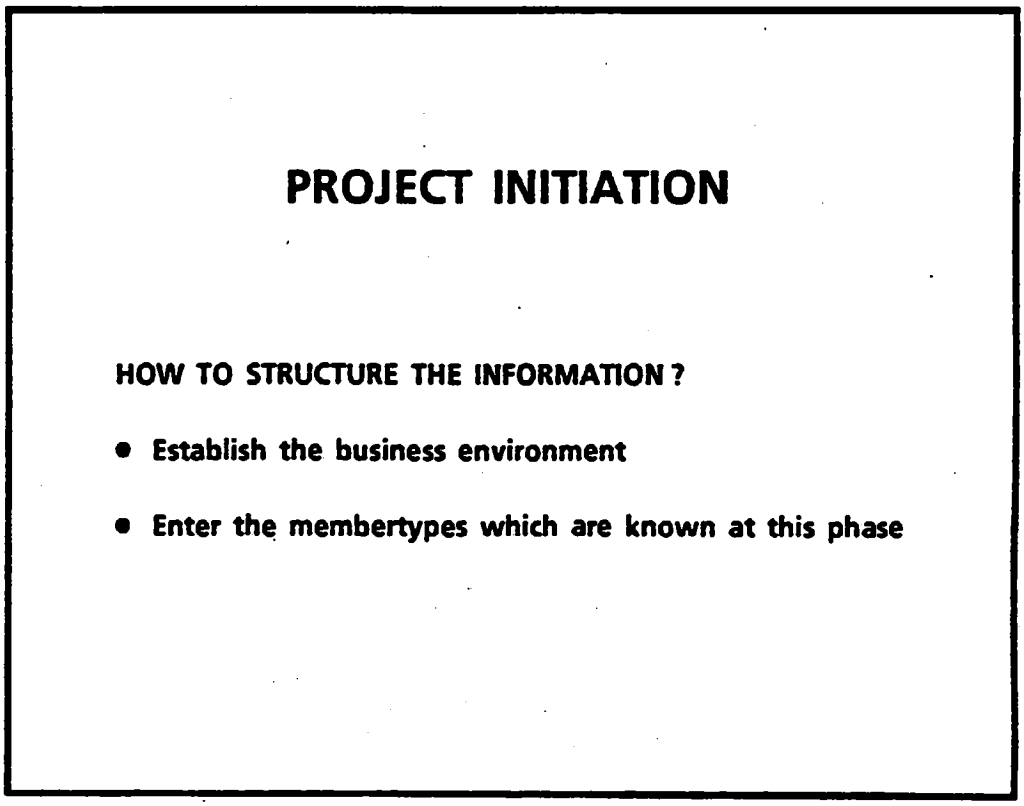
2. Scope Definition

   - It can help define the working boundaries and explain the relationship to other projects if these projects have been entered into the dictionary

3. Budget Calculation

   - If the cost of each phase is documented as an activity in the project, this information can be used for budget calculations and resource projections for the new project

NOTE - During the project initiation, it is primarily the information from other projects which can be of use, assuming it was previously put into the dictionary



- How should the information from the project initiation be structured in order to assist later projects?

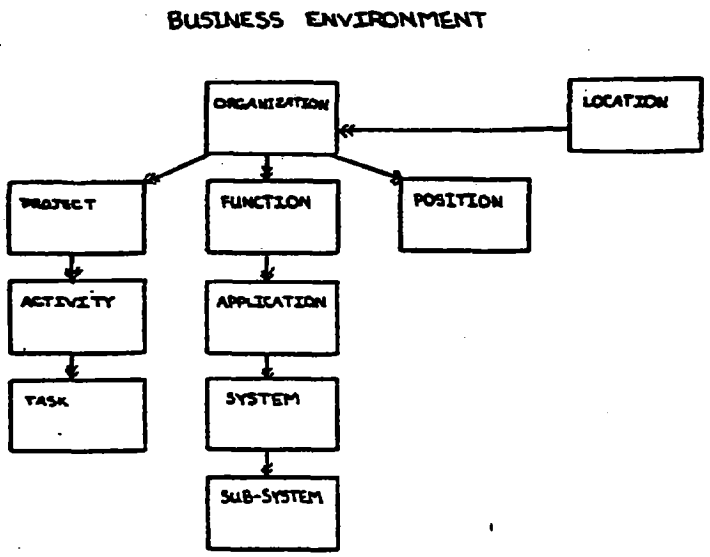
1. Establish the business environment that is originating this Project Initiation Document

2. Enter the membertypes in a manner which will serve as a foundation to collect information for subsequent phases

   and

   to serve as information support for other projects

5. PROJECT INITIATION

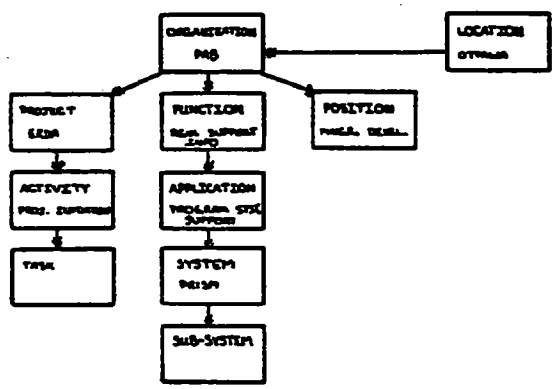


This is a sample structure:

- The Project is one of many in the Organization
- The Organization is one of many in a Location
- The Project was initiated to meet the needs of one of the Functions
- The Function may have many Applications supporting it
- The Application may currently be supported by a System and Sub-System
- The Project may be composed of many Activities. The SDLC can let each phase represent 1 Activity in the project
- If a further level of information is desired, the Tasks for each Activity can be entered

6. PROJECT INITIATION

BUSINESS ENVIRONMENT FOR
PROJECT INITIATION PHASE OF ERDA (DESA) DEVELOPMENT



Using ERDA's as an example, this is what would be put in during Project Initiation:

1. Enter the Organization initiating the Project - Program Affairs Branch

2. Enter the Location of the organization - Ottawa; make it broad so that it is informative, eg, 8th floor is not significant, the fact that Ottawa is HDQ is significant (the floor may change with re-organization)

3. Enter the Position of the project initiator manager of the program development and operations; make the position functional so that it remains identifiable after organizational restructuring

4. Enter the Business Function that the project is supposed to support to - Regional Program Support

5. Enter the Application currently supporting the Function - to provide information system support to ERDA's

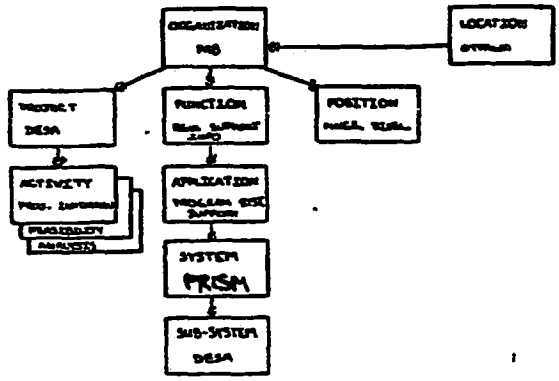
6. Enter the System or Sub-System which are supporting the application; at the time of project initiation it was only PRISM

7. Enter the Project being initiated - at that time it was the ERDA development project

8. Enter the first Activity in the project - the Project Initiation phase

7. PROJECT INITIATION

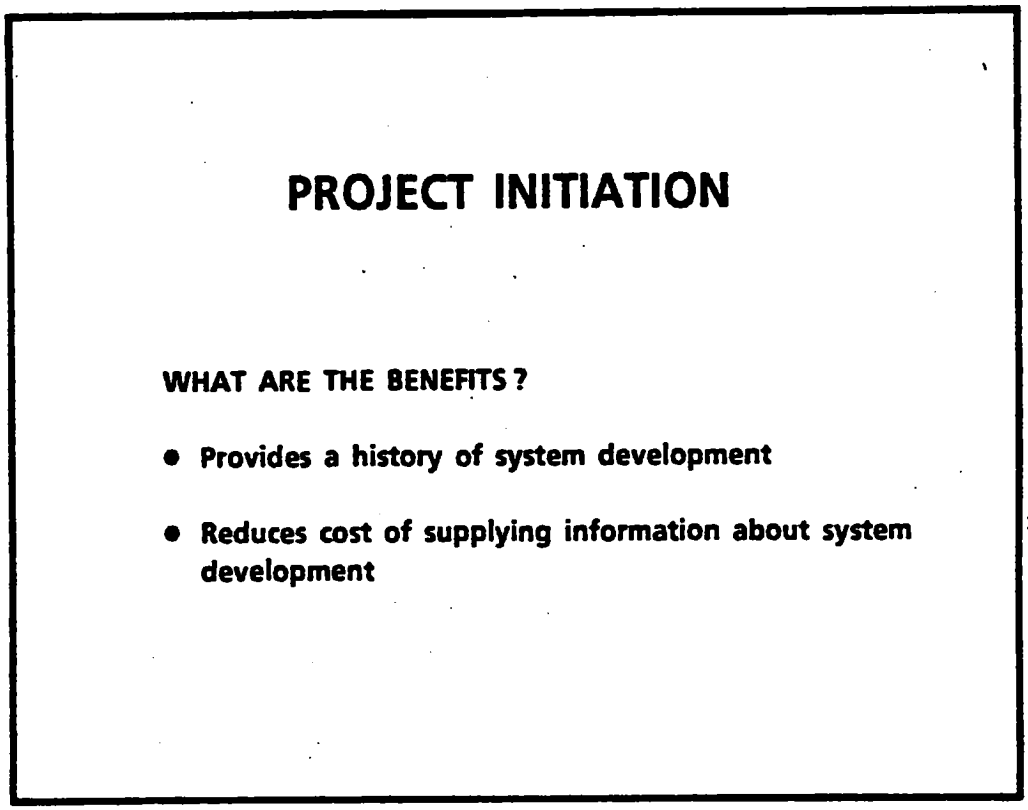
BUSINESS ENVIRONMENT FOR
ANALYSIS PHASE OF ERDA (DESA) DEVELOPMENT



- The business environment can change slightly throughout the SDLC and the entries in the Data Dictionary should be altered accordingly

- Example - during the analysis, the project became known as DESA instead of ERDA. This change is important for future retrieval of the information

- Note three phases have been added to the project:
  - Project Initiation
  - Feasibility Study
  - Analysis



What are the benefits of putting Project Initiation information into the DD?

1. Provide a history of system development across the department:

   - what phases were used
   - what was the cost of each
   - what methods and tools were used in each phase
   - what is the typical escalation in predicted cost from Project Initiation to Implementation

2. Auditors, Long Range System Plans and IMB Managers are more and more frequently requested to provide information about existing systems:

   - what organizations use the information
   - what business functions do they support
   - what options were considered
   - who were the originators of the system

NOTE: Without DD support in this area, a lot of time must be expended in accumulating this information

PROJECT INITIATION

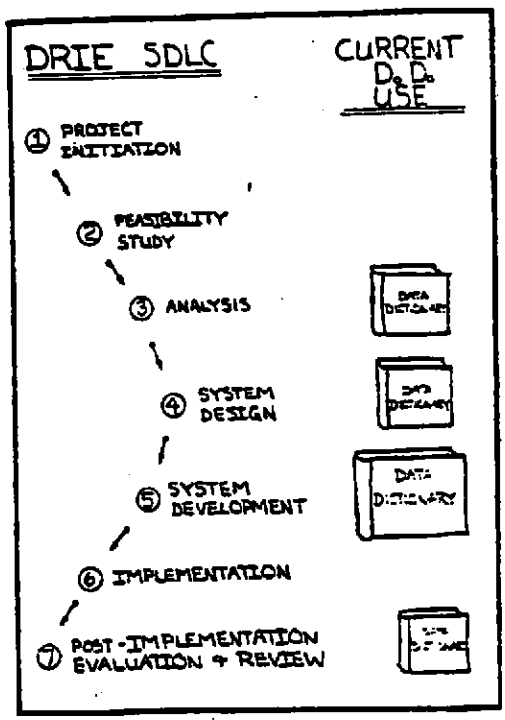
SUMMATION

- **Who primarily benefits?**
  - **IMB managers**
  - **User management**
  - **DRIE corporation**
- **What is the cost?**
  - **Minimal, very few entities**
- **When should it be done?**
  - **As soon as the project initiation document is written**
- **Who should do it?**
  - **The IMB representative**

- A key point to remember at this point is that <u>a system has life after the development project is completed</u>

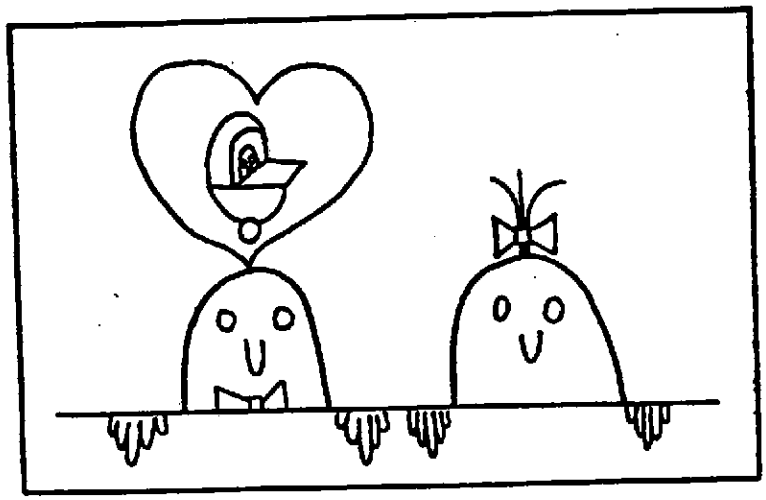
- Information entered at this point is very relevant to IMB and User Management

0. FEASIBILITY STUDY



The second phase in the SDLC is the Feasibility Study

1. FEASIBILITY STUDY



FEASIBILITY STUDY

- Feasibility study
  - is the project feasible?
  - discuss alternatives

FEASIBILITY STUDY

WHAT MUST BE DONE?

- Expand problem definition
- Describe the business functions and functional requirements
- Evaluate existing systems
- Describe alternative solutions
- Evaluate alternative solutions
- Describe the conceptual design of the recommended solution
- Develop a resource plan and budget for the next phase
- Obtain acceptance

- the Feasibility Study report is usually done by someone from the IMB branch or a consultant procurred by the IMB branch

FEASIBILITY STUDY

HOW CAN THE DATA DICTIONARY ASSIST?

- It can assist in the describing of the business functions and determining the functional requirements
- It can assist in evaluating existing systems
- It can assist in budget calculations
- It can assist in producing a high level Entity/Relationship model

1. Business Functions - A lot of branches and organizations within DRIE have overlapping Business Functions and goals

   - The basic business functions rarely change from one financial assistance program to the next
   - If these are entered in the Data Dictionary, they could serve as a foundation to expedite new feasibility studies

2. Evaluate Existing System - The Data Dictionary should contain information on existing systems to help describe and evaluate the existing systems

   - The Data Dictionary can be used to do impact analysis to assess the impact on existing systems
   - The DD should contain hardware, software, security and recovery information for all systems

3. Budget - If the dictionary contains historical information on the costs of each phase, it can assist in system development budget calculations

4. E/R Model - DESIGNMANAGER can assist in producing a high level E/R model when linked to charting package

FEASIBILITY STUDY

HOW TO STRUCTURE THE INFORMATION ?

- Describe the functions and sub - functions which support the business functions of the organization
- Describe the DFD's, data flows, data stores and processes

1. The functions and sub-functions could prove very beneficial to DRIE if entered into the Data Dictionary

   - as stated earlier, there is a lot of overlap and the Data Dictionary could reduce the time required to describe functions previously described

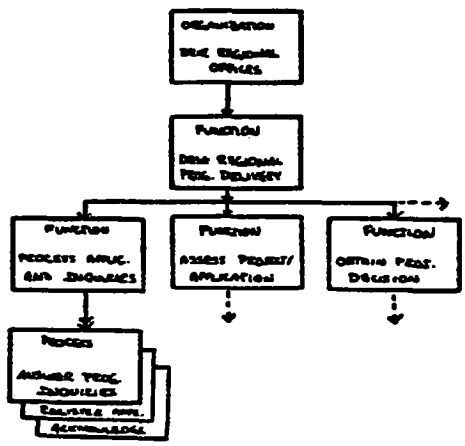
   - also, the DD would provide consistency of terminology and interpretation

2. Putting the DFD's into the Data Dictionary will become much more advantageous to the system developer when DATA MANAGER is linked to a product which could actually produce the DFD's

   - also, the degree of overlap will assist other system development projects

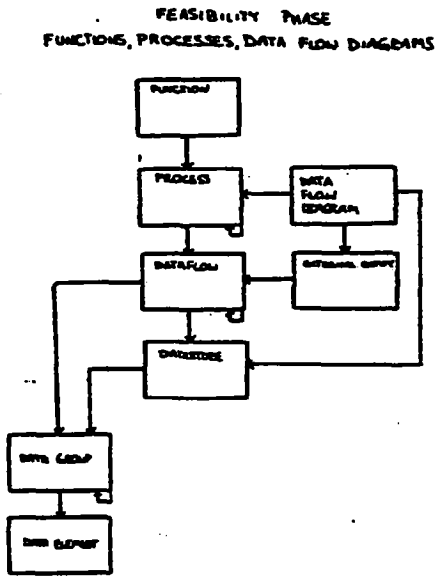
5. FEASIBILITY STUDY

DESA FEASIBILITY PHASE.
FUNCTIONS, SUB-FUNCTIONS, PROCESSES

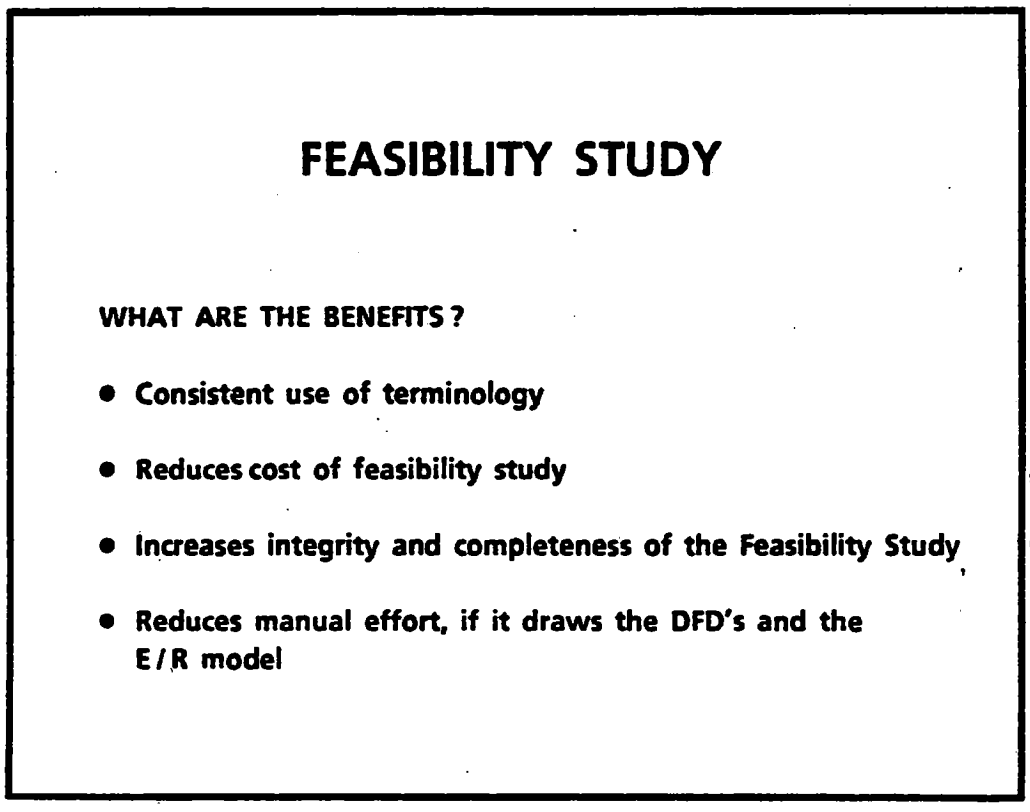


- notice that many of the functions and processes are applicable to several areas

6. FEASIBILITY STUDY



- the DFD's connect to the functions via the business processes



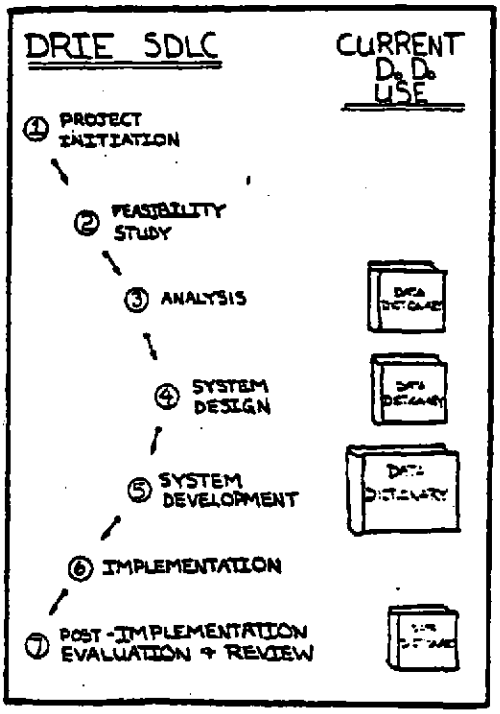
1. Consistency of terminology - people refer to establishment - number right from the start

2. Reduces cost - This is only true if the central body of information for functions and processes are vetted for quality and maintained (common format is needed)

3. Increases integrity ad completeness - the dictionary cross checks references, ensures completeness

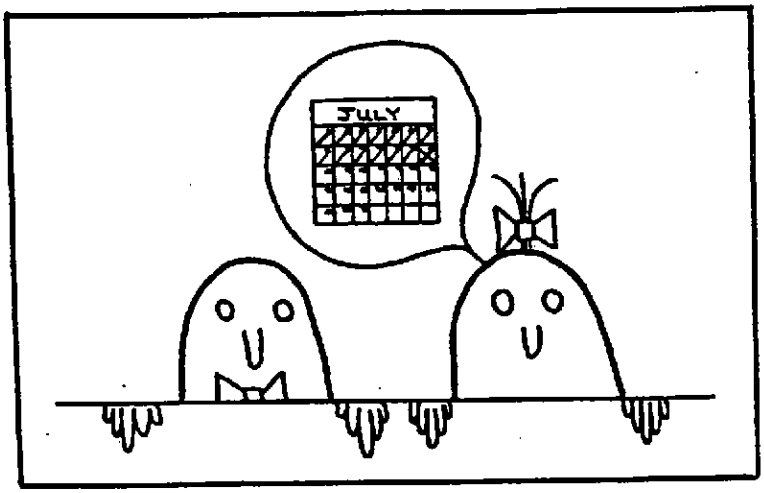
4. Draws DFD's and E/R model - great help especially when changes are made

0. ANALYSIS



The third phase in the SDLC is the Analysis phase

1. ANALYSIS



ANALYSIS

- After the feasibility comes the analysis

- You can see the analysis that these two are performing

ANALYSIS

WHAT MUST BE DONE?

- **Specify the detailed processes and information requirements (DFD's)**
- **Integrate requirements with overall system specification framework**
- **Develop a logical data model**
- **Start prototype construction**
- **Revise cost/benefit analysis**
- **Develop a resource plan/budget for next phase**
- **Obtain acceptance**

ANALYSIS

HOW CAN THE DATA DICTIONARY ASSIST?

- **It can assist in budget calculations**
- **It can assist in producing a high level Entity / Relationship model**
- **It can assist in prototype construction**
- **It can assist in obtaining user acceptance**

2. E/R Model

   - in simple terms, this is a mapping of all the elements and their relationships

3. It can assist in prototype construction by providing a pool of well defined data elements

4. User Acceptance - Some companies have provided online user access to the process descriptions and the users put their comments on the processes directly

   The increased level of participation has increased the ease of obtaining user acceptance and the degree of accuracy

ANALYSIS

TO STRUCTURE THE INFORMATION ?

- Put in the DFD's
- Enter the functional dependencies

1. DFD's - put in the DFD's as indicated in the Feasibility Study

2. If you intend to produce E/R model, enter the key relationships (functional dependencies), eg., Proj-loc is dependent on Proj-#; Estab-address is dependent on Estab-number

ANALYSIS

WHAT ARE THE BENEFITS ?

- **Consistent use of terminology**
- **Reduces cost of Analysis**
- **Increases integrity and completeness of the Analysis**
- **Reduces manual effort, if it draws the DFD's and the E/R model**

- these are the same as for the Feasibility

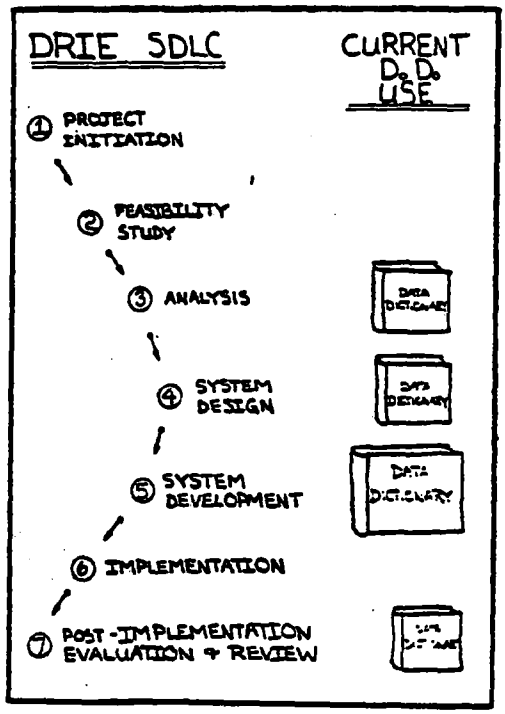
ANALYSIS

DRIE PERSONNEL EXPERIENCE

- **Analysis process was expedited because new systems were able to use existing data element definitions**
- **The Analyst Text placed on the data elements proved helpful in all subsequent phases**
- **The Data Dictionary increased the consistency, integrity and quality of the analysis document**

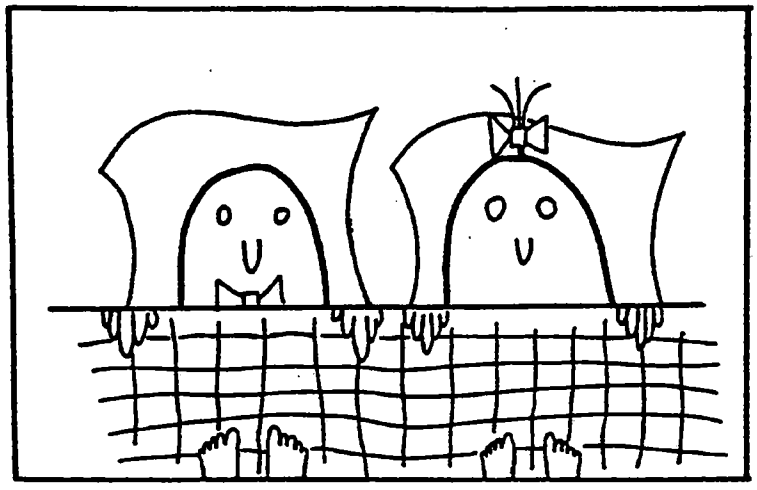
- it is felt that the full benefit of putting the DFD's into the Data Dictionary will not be attained until DATAMANAGER is connected to a product which will actually generate the DFD's or DATAMANAGER does it

0. DESIGN



The fourth phase in the SDLC is the System Design phase

1. DESIGN



DESIGN

DESIGN

WHAT MUST BE DONE?

- Detailed Program Specifications
- Detailed Inputs (source documents / screens)
- Detailed Outputs (reports / data stores)
- Detailed System Interface
- Detailed Conversion Specification
- Detailed Audit Control, Security Specs
- Detailed Hardware, Environment Specifications
- Develop a resource plan / budget for next phase
- Obtain acceptance

DESIGN

HOW CAN THE DATA DICTIONARY ASSIST?

- It can assist in the production of the design document
- It can perform quality checking on the data cross referencing
- It can help define system interfaces
- It can assist conversion specifications
- It can assist in budget calculating
- It can assist in producing the E/R model
- It can assist in obtaining user acceptance

1. Design Document - By putting in the programs, screens, reports, files, groups and data elements the Data Dictionary forces discipline, structure and standards across the design team

2. Quality Checking - The dictionary can reduce redundancy identify loose ends, such as data elements input, but not output

3. The System Interfaces are more easily defined when the other systems are defined and documented in the Data Dictionary

4. Conversion - The information in the dictionary about the existing system can be used to do impact analysis and collect information about the usage of certain fields

DESIGN

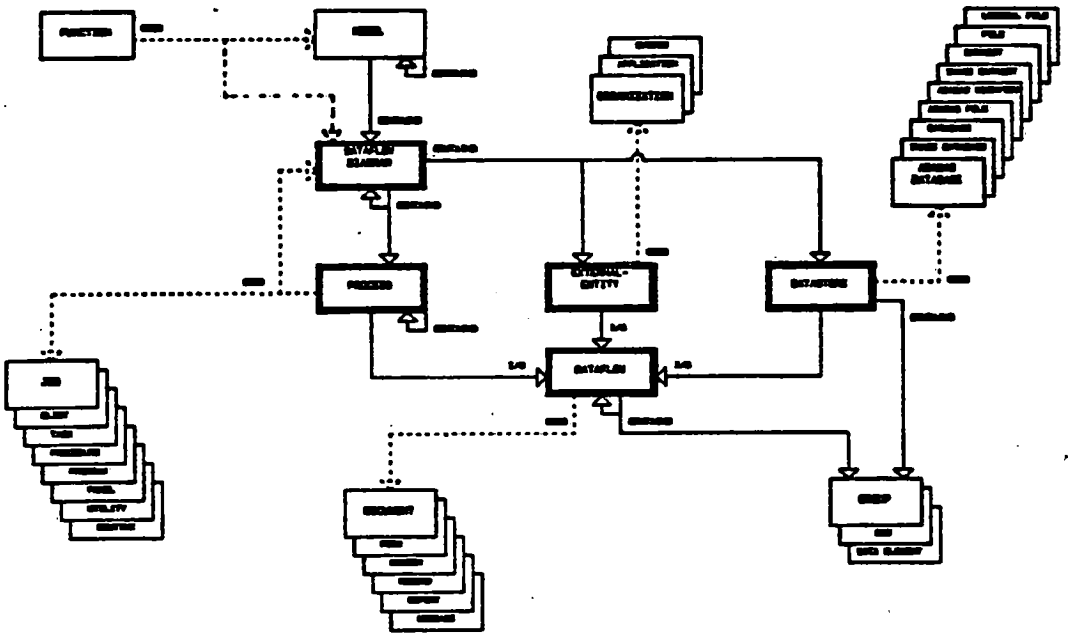
HOW TO STRUCTURE THE INFORMATION ?

- This is largely dependent on the type of system

- the permutations and combinations are numerous

5. DESIGN

STRUCTURED ANALYSIS AND DESIGN ENVIRONMENT



- DFD's
- Jobs, Clists, Tasks, Procedures, Programs, Panels, Utilities, Routines
- Documents, Forms, Screens, Reports, Records, Messages
- Groups, Data Elements
- Databases, Files

DESIGN

WHAT ARE THE BENEFITS ?

- **Consistent use of terminology**
- **Reduces the cost of the design**
- **Increases the quality of specifications**
- **Increases the quality of communication**
- **Reduces the manual effort required to draw the E/R model**

- Basically the benefits are the same as for analysis

DESIGN

DRIE PERSONNEL EXPERIENCE

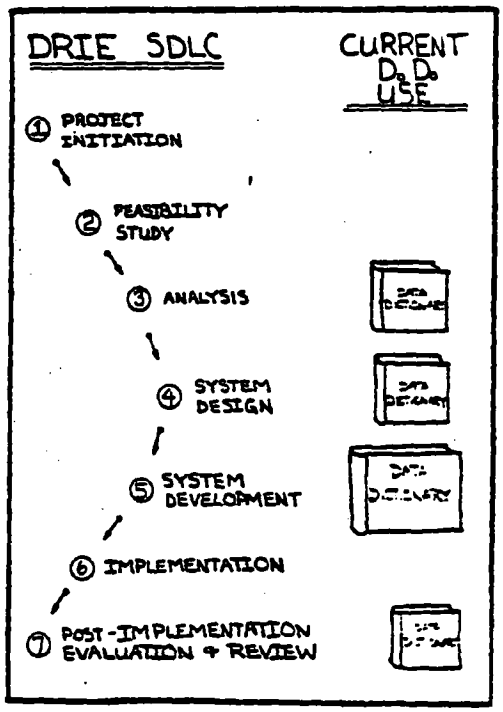
- The design process is expedited because new systems can use existing information
- The system designers were able to design the system interfaces much more easily and accurately
- The Data Dictionary increased the consistency, integrity and quality of the design document (cross checking, communication, redundancy, standards)

- It is felt that when a design involves more than one designer, the Data Dictionary is of tremendous assistance regardless of whether it is a manual Data Dictionary or a fully automated Data Dictionary

- Especially when communication must be accurate and the design originator is no longer on site

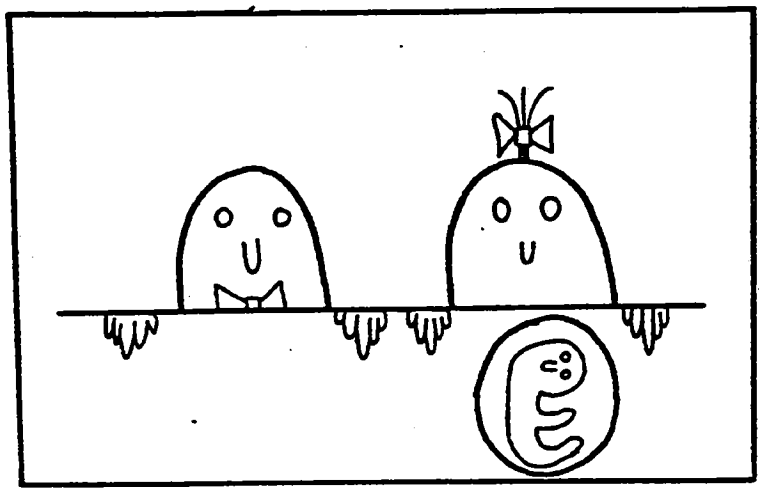
- Continuity of personnel is always a problem in an environment which is heavily dependent on consultants

0. DEVELOPMENT



The fifth phase in the SDLC is the System Development phase

1. DEVELOPMENT



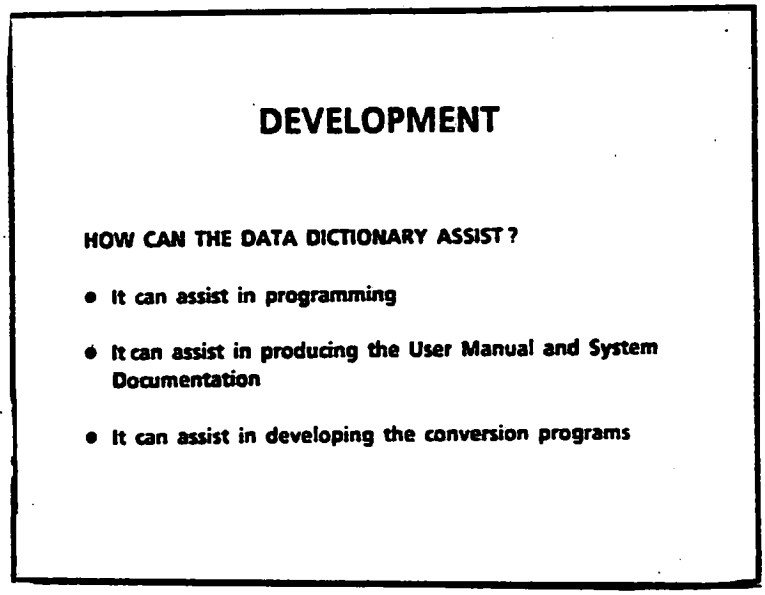
DEVELOPMENT

DEVELOPMENT

WHAT MUST BE DONE ?

- **Programming**
- **Module testing, integration testing**
- **User Manual**
- **Conversion programs**

3. DEVELOPMENT



1. Assist in programming

   - imperative to have a central authority
   - dictionary operates as the ideal place to make changes, everyone must keep up to date and this is much easier if the information is always in the Data Dictionary
   - easy access to data elements, analyst text, definitions, attributes, NATURAL Alias
   - increases programmer productivity
   - greater quality of system
   - less mistakes made in communication, information readily available, programmers get the broader picture, and a better understanding of what their job is

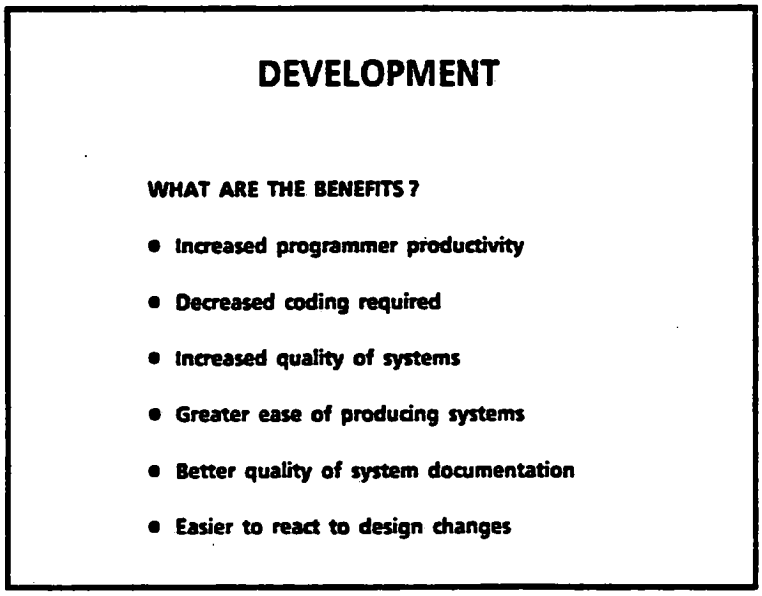
2. Assist in producing user manual and system documentation; much of the required information such as data entry requirements, procedures, source documents have already been incorporated into the Data Dictionary

3. The conversion programming is made easier because the old definitions, files and programs provide a good foundation and source of information for the conversion programmers

DEVELOPMENT

HOW TO STRUCTURE THE INFORMATION?

- **This should have been established in design and during this phase the entities like CLISTS, Procedures, Utilities and Jobs must be added**



1. Increased programming productivity

   - this is true regardless of whether the system is a micro, mini or mainframe
   - having the necessary information readily available and improving communication are 2 of the primary reasons

2. Decreased coding - COBOL file defs, edit routines, ADABAS loader definitions

3. Increased quality of system - standards are more easily maintained, information is readily available, easier to make sure everybody receives identical instructions, communication is improved

4. Greater ease of Producing System Documentation - everyone hates this, but the dictionary should provide 95% of required contents of the program documentation folder (layouts, program descriptions, charts, etc.)

5. Better quality of system documentation - because it is standardized and easier for people to produce; the dictionary does the cross checking and forces the completeness of the effort

6. Easier to react to design changes - when users want to change a screen, add a field, it is easier to determine the extent and ramifications of the change. Impact analysis is easier, quicker and more thorough

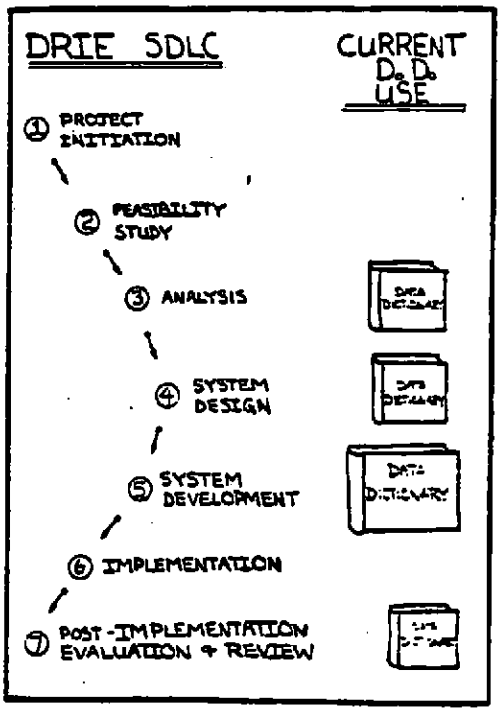
DEVELOPMENT

DRIE PERSONNEL EXPERIENCE

- DRIE has insisted on the use of the Data Dictionary during the development of most major systems. It is felt that as a result of this policy, the systems produced have been significantly better in quality and reliability
- DRIE feels that the use of the Data Dictionary in development facilitates the work of the data base administration area and promotes the sharing of data
- DRIE IMB management generally agrees that the system documentation is more easily produced and of higher quality when the Data Dictionary is used in development

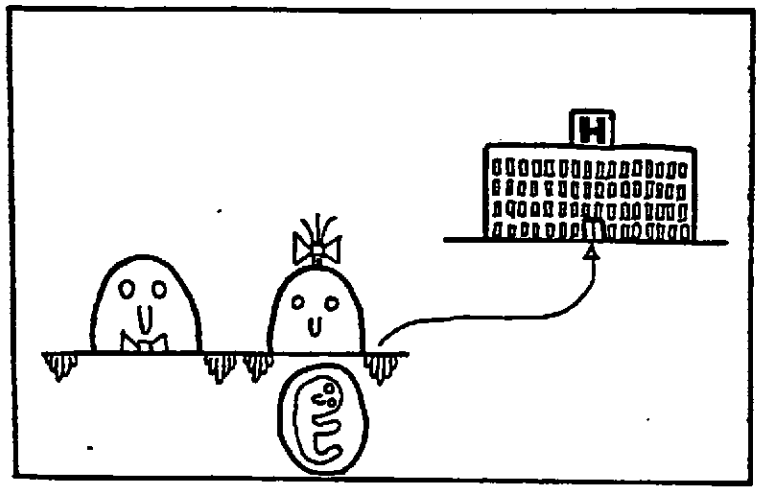
1. The systems which have used the Data Dictionary extensively in development have had fewer problems in implementation and DMC discovered that the standards were more closely adhered to
2. The data base administration area is better able to manage their data base when the loader definitions are generated directly from the dictionary.
   - There are fewer data elements to manage when the development teams realize that certain data already exists and does not have to be created
3. The program documentation folders are more complete when the Data Dictionary was used extensively during development

0. IMPLEMENTATION



The sixth phase in the SDLC is the Implementation phase

1. IMPLEMENTATION



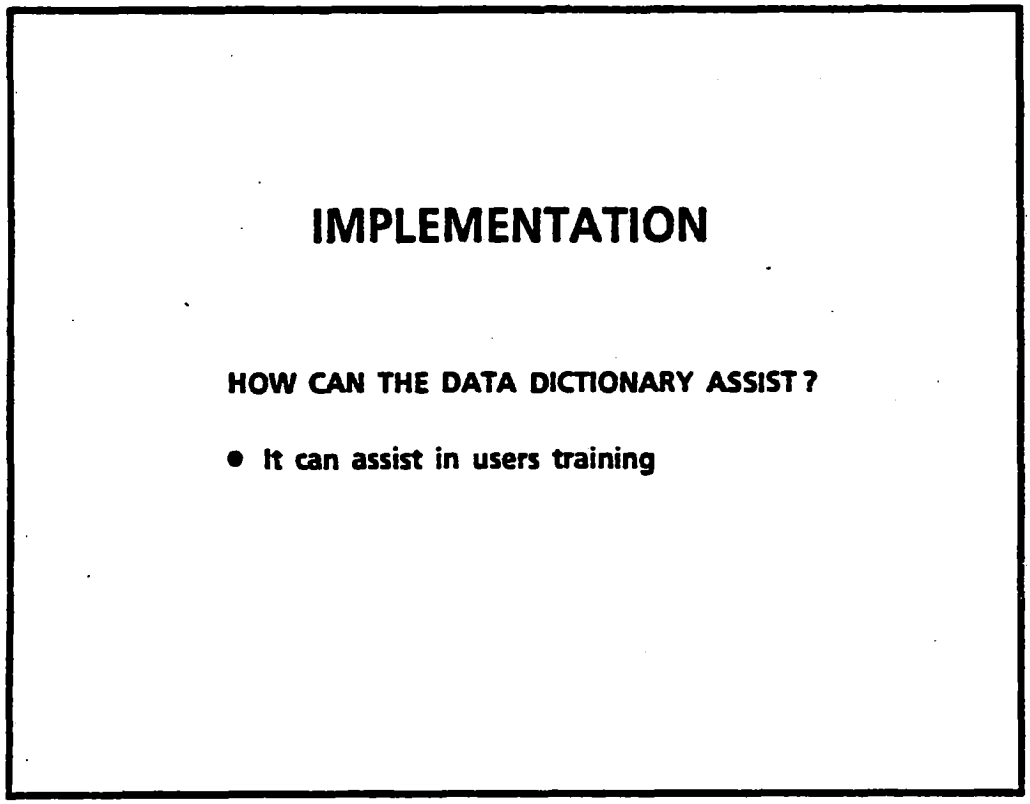
IMPLEMENTATION

At last we reach the Implementation phase

IMPLEMENTATION

WHAT MUST BE DONE?

- Install hardware and equipment
- Conduct acceptance tests
- Conduct user training
- Convert to new system
- Obtain acceptors' sign-off



1. - It can assist in user training by providing a Data Dictionary

   - This clarifies the meaning of data elements and determines the source of the data

   - It can help place the system processes in context by relating them to the business functions

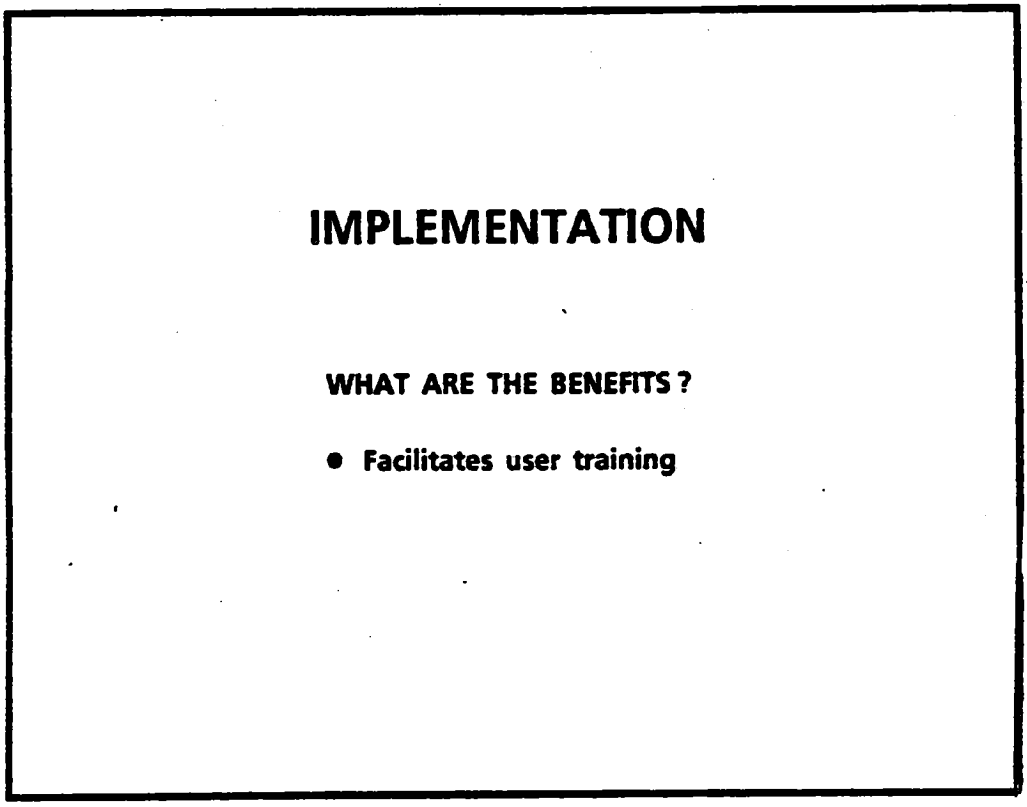
   - It can provide an overview of what reports are available

IMPLEMENTATION

HOW TO STRUCTURE THE INFORMATION?

- **The basic structure having been established, the new input forms can be added to the Data Dictionary to assist the user in forms control**

- This could greatly assist the user in forms control so that in the future when a data element must be expanded in size, the number of forms affected by the change could be easily ascertained



- This was elaborated in a previous slide

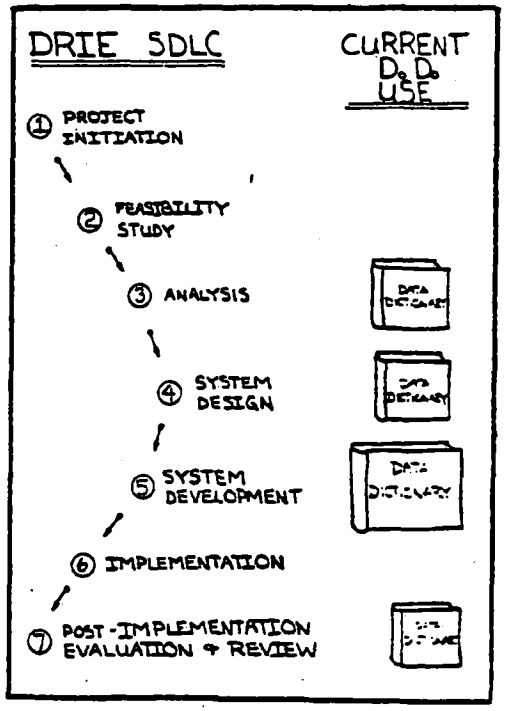
IMPLEMENTATION

DRIE PERSONNEL EXPERIENCE

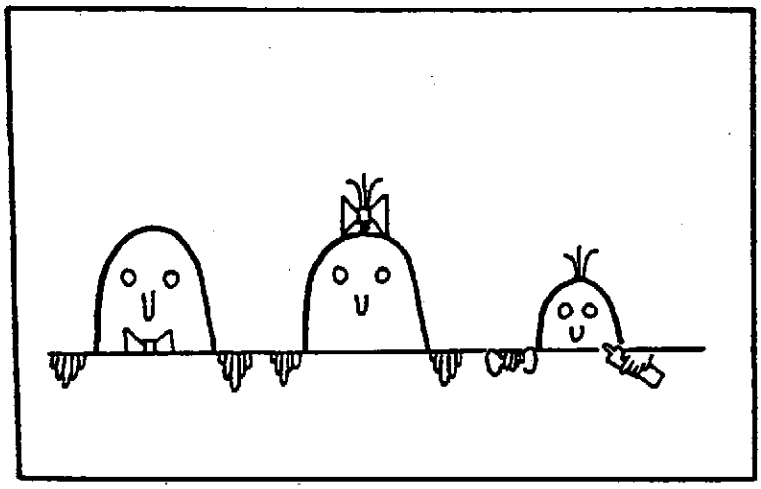
- The Data Dictionary has been used extensively in user training at DRIE with great success

- In past, only the element definitions have been used in training at DRIE
- Other organizations outside DRIE have been using the analyst text and providing online Data Dictionary access to the users
- Some Data Dictionaries provide an interface to a forms/screen management package which permits the data entry clerk to directly access Data Dictionary information

0. POST-IMPLEMENTATION AND EVALUATION



The seventh and last phase of the SDLC is the Post Implementation, Evaluation and Review phase



POST-IMPLEMENTATION AND EVALUATION

POST - IMPLEMENTATION AND EVALUATION

WHAT MUST BE DONE ?

- **Evaluate the system development and implementation processes**
- **Evaluate the performance of the system**

POST - IMPLEMENTATION AND EVALUATION

HOW CAN THE DATA DICTIONARY ASSIST ?

- **It can assist in identifying the original performance security goals**
- **It can assist in identifying the functions that the system was addressing**
- **It can assist in identifying what the original cost and resource targets were**

1. Original Performance Goals

   - much of the original system specification information should have been recorded in the Data Dictionary

   - since the people responsible for doing the evaluation are, of necessity, unfamiliar with the system, it is imperative that there be a reliable, well documented source of system information

   - the dictionary is the ideal source

POST - IMPLEMENTATION AND EVALUATION

HOW TO STRUCTURE THE INFORMATION ?

- **The only new information which is usually inputted into the Data Dictionary during this phase is the information about the phase itself**

POST - IMPLEMENTATION AND EVALUATION

WHAT ARE THE BENEFITS ?

- Improves the quality of the evaluation process
- Improves the productivity of the auditor / evaluator

1. The quality of the evaluation process is improved because the evaluator has a reliable body of information about the system to serve as a foundation for collecting more information

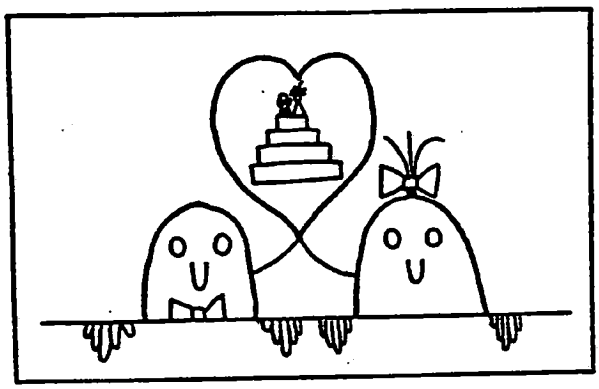
2. The auditor or evaluator is more productive because less time is required to collect the necessary information

POST - IMPLEMENTATION AND EVALUATION

DRIE PERSONNEL EXPERIENCE

- The Data Dictionary has been used extensively by the team responsible for establishing the PRISM evaluation criteria

1. CORPORATE DATA MODELLING



CORPORATE DATA MODELLING

We have now covered the standard 7 phase SDLC

- Now we will do Corporate Data Modelling

- In true 80's style, these two are busy establishing their functional dependencies and their relationship

- You might ask, "Why mention Corporate Data Modelling in this presentation?"

- There are 3 primary reasons. These are:

  1. The new DRIE reference manuals make many references to the modelling processes
     (eg., SDLC Manual, Change Control)

  2. To clarify the distinction between:
     - Corporate Data Modelling and
     - Application Data Modelling
     - Both terms are used indiscriminately in conversation, which results in confusion

  3. To indicate how the Data Dictionary can assist the modelling process throughout all the phases of the SDLC

CORPORATE DATA MODELLING

WHAT IS THE PURPOSE?

- **To produce a physical data base design which will satisfy user requirements while maintaining flexibility**

The technique is to ensure that:

- the database design is based on the business requirements and functions
- the logical database is identified before the physical database is implemented

NOTE: In many cases, only a small part of the logical database may be implemented as the physical database

CORPORATE DATA MODELLING

WHAT IS IT?

- **A process which integrates the information system planning process with the business, programs, plans and priorities of the organization**

This is done in order to ensure that planned information systems will be able to adequately support the business

- without corporate data modelling, systems spring up all over like wildfire

- systems are developed in response to urgent local needs and no thought is given to the corporate view
  - how can the information be shared
  - how can the information be integrated

- Corporate Data Modelling looks at the overall corporate picture

- it establishes development priorities from a corporate strategy perspective

CORPORATE DATA MODELLING

WHAT DOES IT IDENTIFY ?

- The goals of the organization
- The functions of the organization
- The information requirements of the organization
- The required databases of the organization
- The required systems of the organization

- By taking this approach, the resultant systems should serve the user community better and the corporation as a whole

- The business is analyzed from the top down and it is, therefore, easier to determine how the pieces fit together

CORPORATE DATA MODELLING

WHAT DOES IT PRODUCE ?

- **It can produce a multi-year plan for the development of all the databases and systems needed to meet the requirements of the organization**

- The LRSP planned corporate system development plan and the corporate migration strategy permits an orderly progress to teh optimum system configuration

- Without this plan, the squeakiest wheel gets the resources and this is not necessarily to the greatest good of the corporation

CORPORATE DATA MODELLING

WHAT IS THE PROCESS?

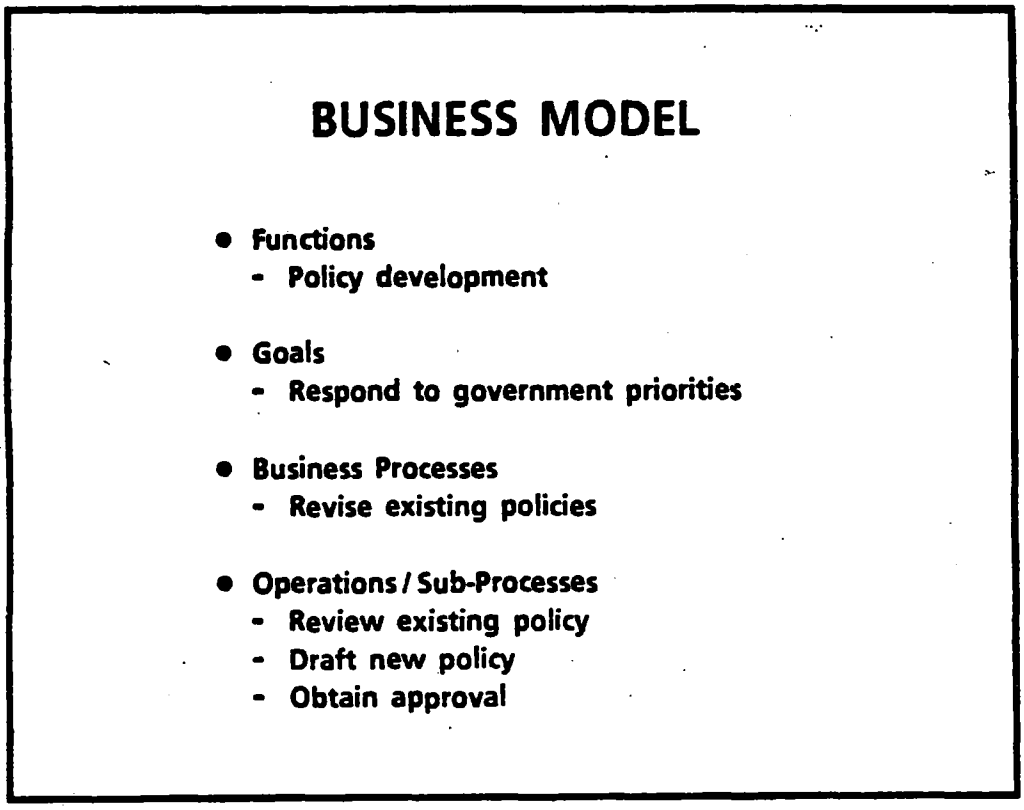
- **Produce a Business Model**
- **Produce an Information Model**
- **Produce the Database Architecture**
- **Produce the Application System Architecture**

- We will go through these briefly, just to create a flavour for the overall process

BUSINESS MODEL

- Describes the FUNCTIONS of the organization
- Lists and describes the GOALS of each function
- Lists the BUSINESS PROCESSES required to support each function
- Lists the OPERATIONS which make up the PROCESS

- Note that most functions of an organization will remain despite re-organization



- This is an extract of a business model, the first output of the corporate data modelling process

INFORMATION MODEL

- Lists the information types required to support the functions, processes and operations of the organization
- Maps the data groupings with the relationships
- Assigns priorities for system development

The information model is the second output from the corporate data modelling process

1. This provides a global view of all the information needed by the organization

2. Maps the total information requirements

3. Depicts the data groupings and the links between them required by the organization

DATABASE ARCHITECTURE

- Specifies the optimal set of SUBJECT AREA DATABASES required to serve the organization
- Defines the databases in terms of the data groupings and relationships of the INFORMATION MODEL

The DB architecture is the third output from the corporate data modelling process

1. Corporate database is comprised of all the subject databases

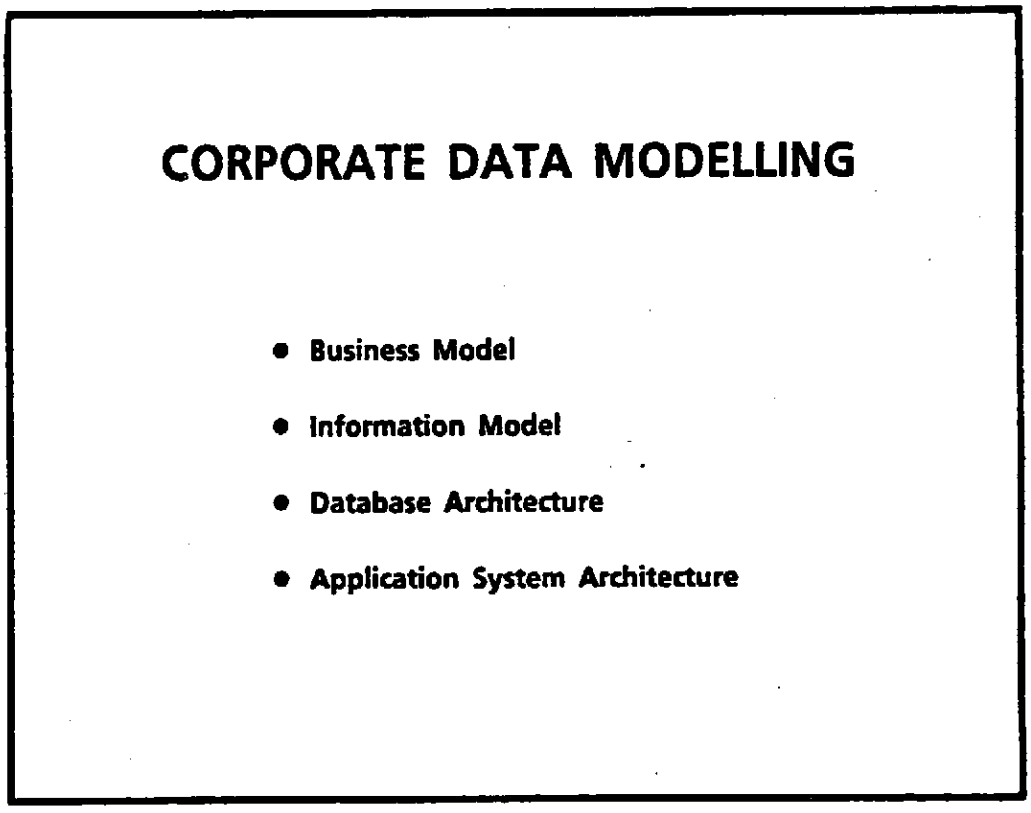
   A subject database contains all of the data relating to one major subject of concern

2. The database architecture provides the framework for the design of shared databases

APPLICATION SYSTEM ARCHITECTURE

- Specifies the computer systems required to support the organization and its business
- Each system is related to the outlined processes and operations

The last output from the modelling process is the application system architechture

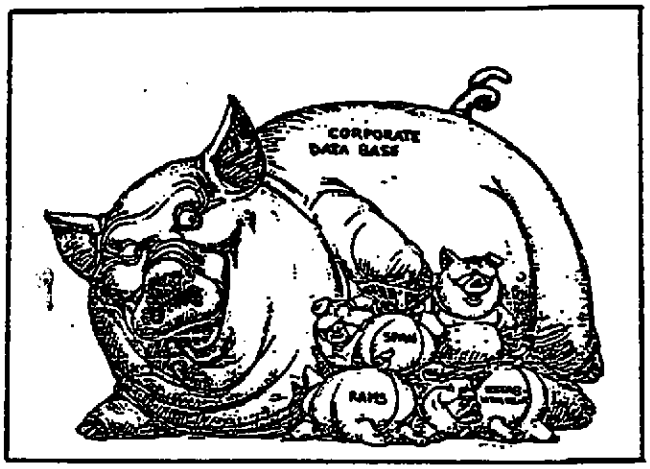


To summarize, these are the outputs from the corporate data modelling process

- Ideally, this process is done a Branch at a time and then the results are integrated

- While the results are being integrated, the development of the application with the highest priority can commence

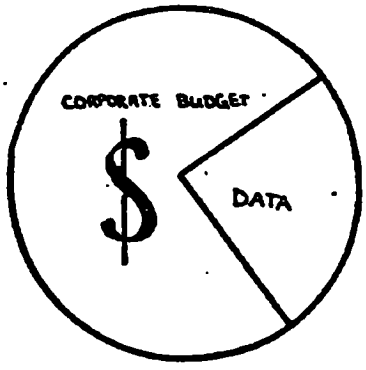
13. CORPORATE DATA MODELLING



- The corporate database permits DRIE to treat data as a corporate resource, thus data is shared and data is managed

14. CORPORATE DATA MODELLING

DATA IS A CORPORATE RESOURCE



- the corporate database reduces the cost of data to the organization as a whole

- eliminates redundancy in data and procedures

- increases the integrity if it is updated in fewer places

- reduces the cost of maintenance if it is entered/stored/maintained in fewer places

15. CORPORATE DATA MODELLING

- DMC has been juggling the needs of the numerous users of the corporate data base for a long time

- DMC is currently working on DRIE's corporate data model

- when this information gets put into DESIGNMANAGER, the application system developers will be able to use much of the existing information as a foundation for application data modelling

APPLICATION DATA MODELLING

WHAT IS IT ?

- It produces an Entity / Relationship (E / R) Model

Application Data Modelling

- This is the detail modelling of a specific application
- In simple terms, this is a mapping of all the elements and their relationships

An Entity/Relationship model is a diagram of the:

- entities (eg., person, place or thing)
- relationships (eg, 1 to 1, 1 to many, many to many)
- functional dependencies
  (primary key relationship: eg., project location is dependent on Project Number)

Application Data Modelling is the type of Modelling used in the SDLC

APPLICATION DATA MODELLING

WHAT IS THE PURPOSE?

- **The Entity / Relationship Model is used to generate the physical file in 3rd Normal Form (3NF)**

- Thus the elements and their relationships are used to design the files

- Normalization (as in 3rd Normal Form) is the removal of successive layers of data redundancy or potential update problems

- The next question is: How do we use application data modelling in the SDLC?

SDLC APPLICATION DATA MODELLING

FEASIBILITY STUDY

- High level Entity / Relationship Model
- Structure data into groups
- Enter functional dependencies (key relationship)

- The first phase that you can use it in is the feasibility study

- The E/R model at this point is usually data group oriented

- The E/R model can express relations in a picture that the users can use to verify

- This picture or model simulates reality and allows changes or corrections to be made early in the game when they are less expensive

SDLC APPLICATION DATA MODELLING

ANALYSIS OR DESIGN

- Low level Entity / Relationship model
- Define the structure of the groups (in terms of data elements)
- Enter the functional dependencies

DESIGN MANAGER

- Enter data elements from data stores of DFD's
- Enter the functional dependencies
- Generate the physical file

In analysis, you can bring the model to a lower level of detail

DESIGNMANAGER

- DESIGNMANAGER will generate the flat ADABAS files which will be in 3NF

- in the future, DMC hopes to link DESIGNMANAGER to a product which will draw the E/R model

SDLC APPLICATION DATA MODELLING

WHO DOES IT?

Future - DMC and the application development teams

Now - application development teams

- in the future, when the corporate data model is in place, DMC would like to provide the expertise and ½ of the labour to assist the application system development teams

- at present DMC can provide the expertise

- the new DRIE "SDLC Manual" and the new "Change Control Manual" both make reference to a modelling exercise at specific points in time

SDLC APPLICATION DATA MODELLING

BENEFITS ?

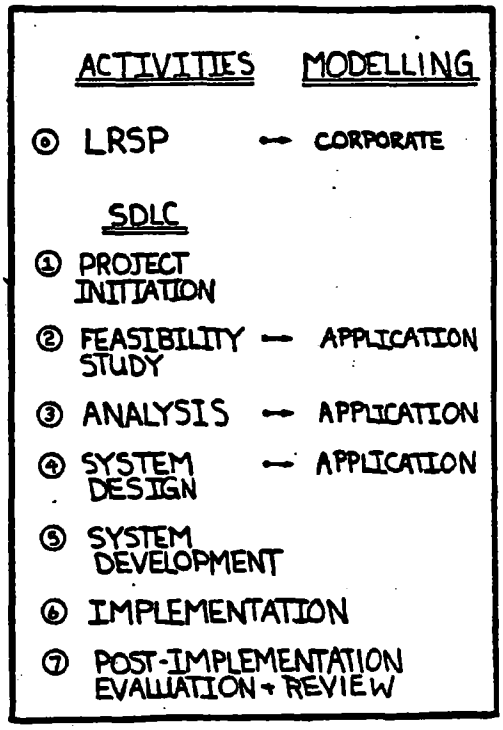
- **Assists in file design**
- **Assists in maintaining the integrity of the corporate database**
- **Identification of potential data base problems as early as possible in the SDLC**
- **Reduces data redundancy and increases data integrity by removing potential update problems**

I have covered data modelling here because it can be used in the:

- Feasibility Study
- Analysis Phase
- Design Phase

In addition, the new DRIE SDLC manual expects data modelling to be done in the future

22. APPLICATION DATA MODELLING



This slide summarizes when corporate data modelling is used and when application data modelling is used

1. SUMMATION

WHAT TO PUT INTO THE DATA DICTIONARY

PHASE	ENTITIES
• Project Initiation	Organization, location, function, position, project, activity, task, application, system, sub-system
• Feasibility Study	Business functions (sub-functions)
• Analysis	Processes, data groups / elements, data flows, data stores, external entities
• Design	Data elements, files, programs, screens, reports, documents, panels

Important Objective of This Presentation

- remember the DD can be used in each of the SDLC phases

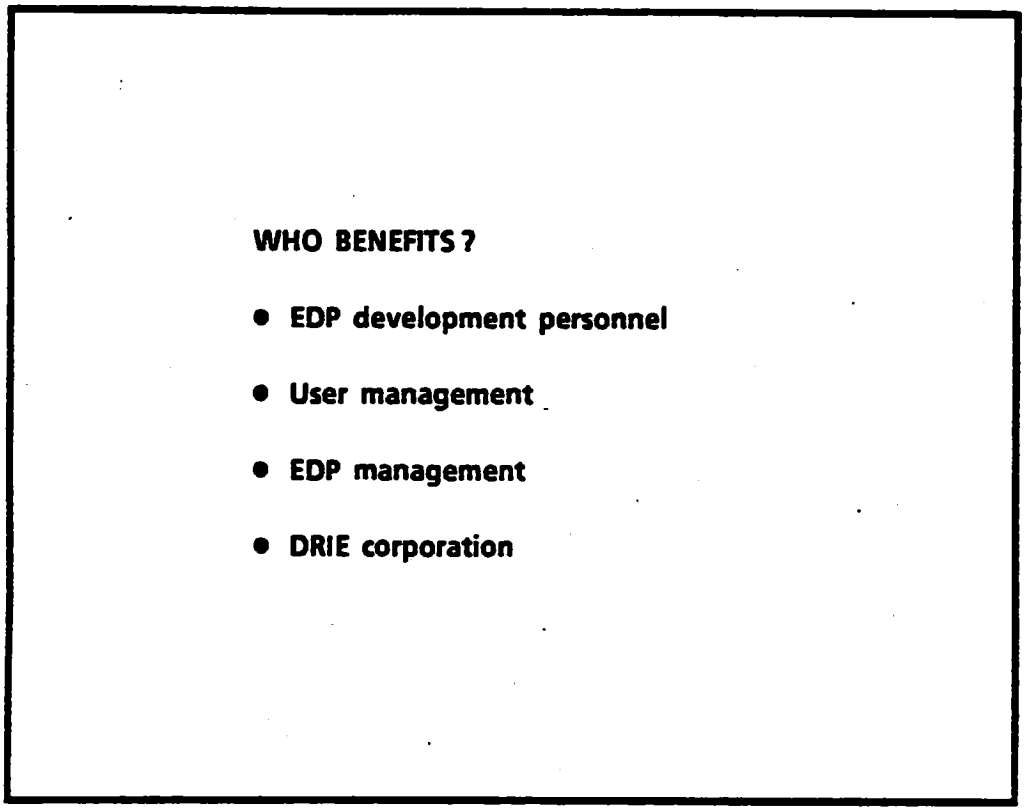
- using the DD in the SDLC benefits:
  - the EDP individual
  - the corporation
  - management (EDP and User)

- the DD can expedite the SDLC

WHAT TO PUT INTO THE DATA DICTIONARY

PHASE	ENTITIES
• Development	Modules, jobs, CLISTS, procedures
• Implementation	Input forms
• Post-Implementation and Evaluation	Last activity of project

3. SUMMATION



2. - It is important for people to realize that some of the information put into the Data Dictionary is not directly for their end use, but perhaps for historical use

   - People need to develop a better understanding of the end uses of the information

   - The Data Dictionary is a database containing information about information

2. - In a corporate data base environment, it is crucial that people understand that their data must be shared

   - Information about the data and the SDLC should be readily available

   - EDP management and user management should be able to put their hands on system phase costs, schedules, resource requirements and other related data quickly

   - People must learn to make the dictionary work for them in addition to understanding how the dictionary serves the need of the corporation