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AUTHOR Fitterman, Lawrence Jeffrey
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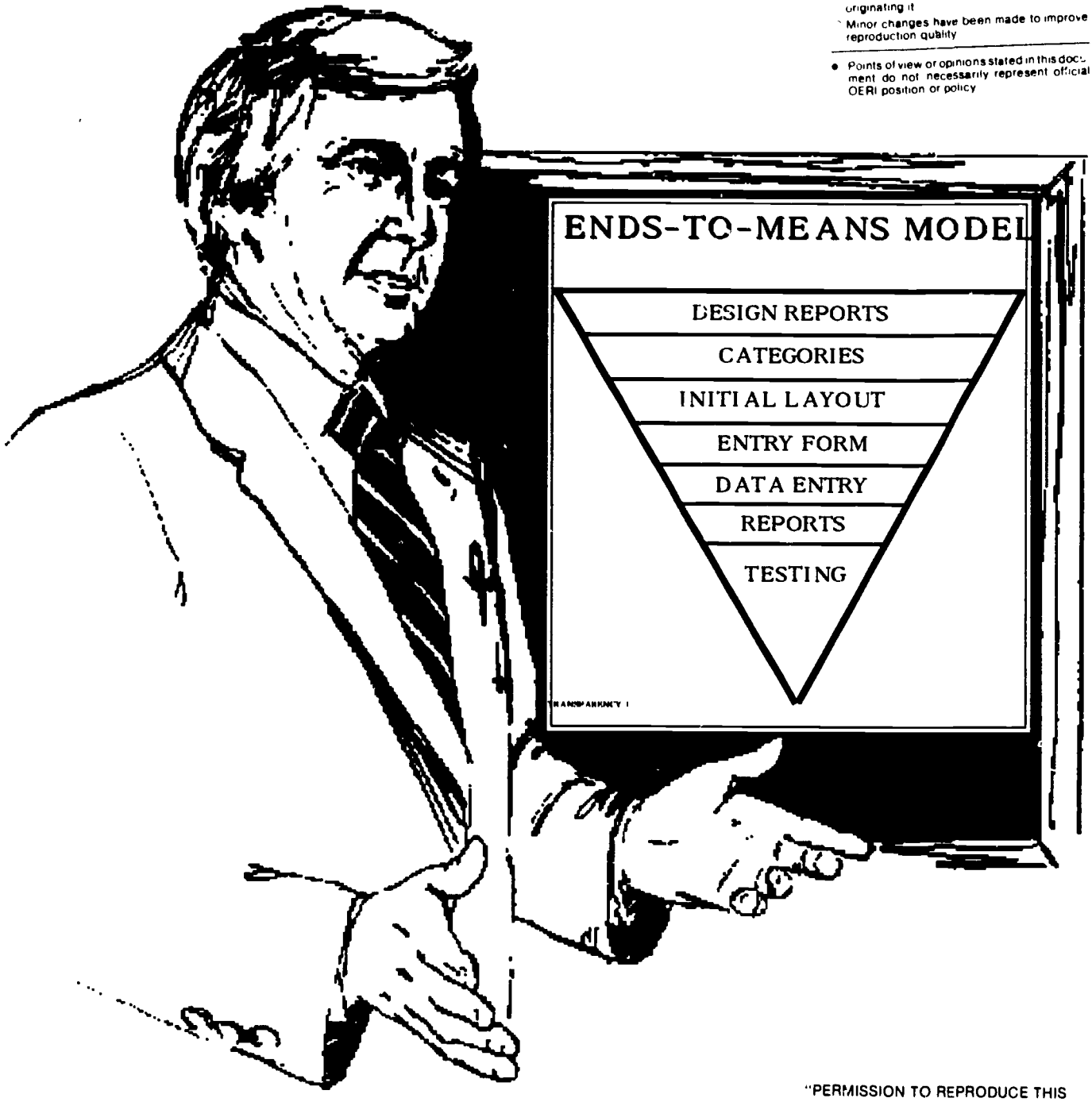
ABSTRACT

This paper demonstrates the importance of effective planning when using database application programs in exceptional education programs, to more efficiently track students' performance, keep vital information, and create desired reports. The described approach, called the ends-to-means model, calls for developing the database by designing the formats of the desired reports first. Then, all of the categories of information from each type of report are combined into a list; the most logical sequence of information for data entry is determined; a data entry form is designed; and sample reports are created to test the process. A prototype of a database design is provided, including a rationale, examples of database applications, and time considerations in creating the databse. The bulk of the paper is made up of visuals and transparencies used in presenting the paper to large groups. (JDD)



ENDS-TO-MEANS MODEL

INTRODUCTION

This article accurately demonstrates, through examples, the importance of correct planning (**ENDS-TO-MEANS MODEL**) when using database application programs to more efficiently track students' performance, keep vital information and create desired reports.

The article is divided into two major components. The first provides the explanation of the unique, but simple **ENDS-TO-MEANS MODEL** of designing databases. The second component is an example of an actual database design.

ENDS-TO-MEANS MODEL

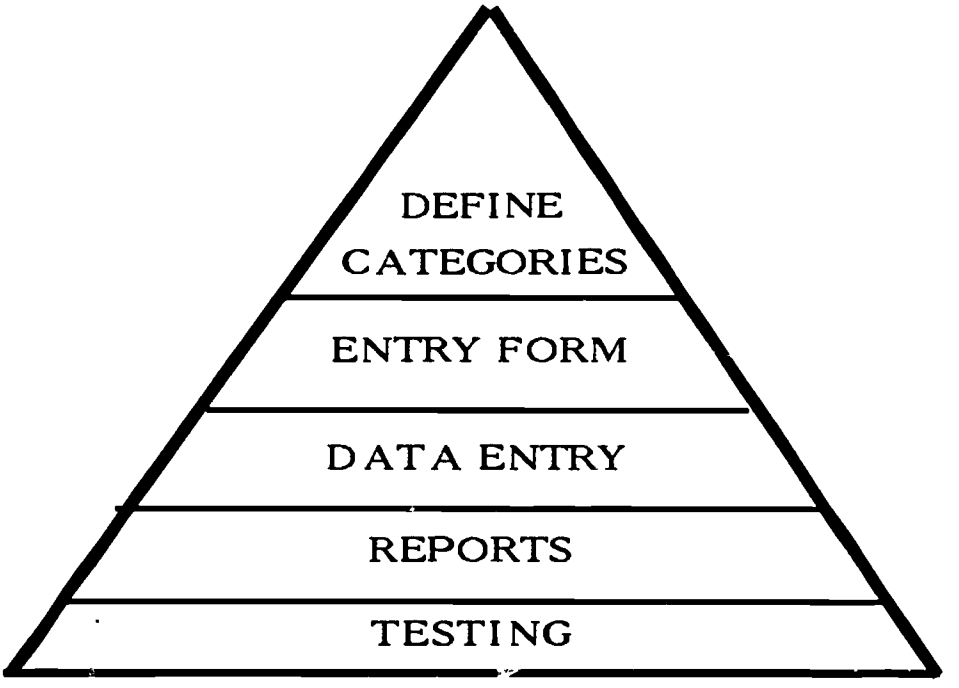
The teaching of exceptional students entails a great amount of record keeping. We as educators keep records of test data, scheduling, individual educational plans, Full Time Equivalency (F.T.E.), curriculum modifications, etc. The need to simplify this record keeping, through accurate design, is a must for job survival and efficiency.

CONVENTIONAL MODELS versus ENDS-TO-MEANS MODELS

Conventional models use a normal top-down pyramid approach in the creation of end products. This approach requires decisions as to the means necessary to produce the desired ends. For example, if we were to design a database to file vital information on many different students, we would categorize the necessary information into groupings. These groupings (**fields or categories**) could be name, address, city, state, zip code, age, sex, mental age, chronological age, etc. Next, we would design the form for entering the data related to the desired categorical fields. Our subsequent step would be to start entering the data into the form. On completion of the entering the data, we would finally design our desired reports. The report(s) would include the necessary fields (**categories**) to present the data in the most meaningful way.

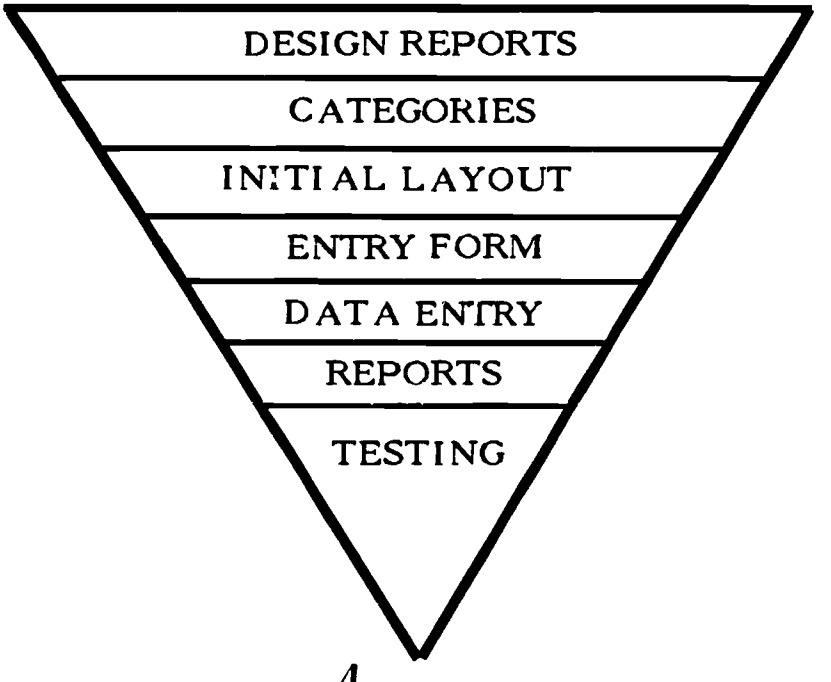
This is the point at which most database designs fall apart. Upon creating the report(s), the designer notices that they have left out a vital field, such as parental contact. With paper and pencil databases this missing field upsets the integrity of the entry form and report design(s). The entry form and report(s) must be retyped and the extra data must be entered. Computerized databases are not as frustrating. They do require either appending or inserting a new field into the data entry form and in some cases redesigning the report format. What we lose using this conventional method is the valuable time of the designer and data entry operator.

CONVENTIONAL MODELS



The **ENDS-TO-MEANS MODEL** is a reverse pyramid approach to database design. The **ENDS-TO-MEANS MODEL** approaches the designing of the database in the inverse from the conventional model. The following describes the seven steps necessary to use this simple but fundamental model.

ENDS-TO-MEANS MODEL



DESIGNING REPORTS - STEP ONE

We get a better idea of the required vital fields (**categories**) if we initially design the report format(s) (**ends**). Usually, the report format(s) is either existing or are set forth in federal, state, local, or inter/intra-office guidelines. Designing the report format(s) initially greatly limits the chances for omitting vital fields. The reports may be designed with paper and pencil or a wordprocessor. The final reports should be listed in order of importance.

CATEGORIES - STEP TWO

We are now ready to list all of the categories (**fields**) from each report and then to combine the categories for all the reports into a list. The subsequent step is to delete all the duplicate fields from the combined list. The final categorical list contains all the fields necessary to produce the report(s) (**ends**).

INITIAL LAYOUT - STEP THREE

At this point we need to list all of the categories in order of priority and most logical sequence for data entry. To prioritize, go back to **STEP ONE.** Your federal, state and local reports will help dictate the order of priority.

ENTRY FORM - STEP FOUR

We are now ready to use our complete list of categories by entering them into our application program. This entry form is designed according to the program's documentation/rules of use.

DATA ENTRY - STEP FIVE

Data entry is the most time consuming portion of the design process. Because time is our most precious asset, we must enter only sample data at this time. The sample data should be meaningful to get the most out of the TESTING portion of the design process. The number of sample data records entered depends on how extensive you want the testing section of the design process to be. Usually twenty five entries are adequate.

REPORTS - STEP SIX

In this step we convert the paper and pencil reports from **STEP ONE.** The creation of the report formats should be created according to the application program's documentation/rules of use. The report should follow closely possible the reports set forth by the federal, state, and local governing agencies.

TESTING - STEP SEVEN

Finally, we are ready to put to the test all of our planning throughout the design process. Each report is executed within the application program and validation of the sample data is checked by the output of the reports. If the reports produce the desired results (**ends**), we are ready for the next step of deleting all the sample data and returning to **DATA ENTRY - STEP FIVE** with our actual data.

AN EXAMPLE OF A DATABASE DESIGN FOR EXCEPTIONAL EDUCATION

The example of an original database design is divided into four main sections: **RATIONALE, USAGE, TIME CONDSIDERATIONS,** and the **CONCLUSION**. The section on **RATIONALE** discusses the reasoning behind the time saving necessity of developing an educational database. The section on **USAGE** discusses how the database can be used to generate pertinent, time saving reports. The third section on **TIME CONSIDERATIONS** is broken down into five subsections: Form Design and Entry, Collection of Data, Entering of Data, Error Correction, and Initial Usage. Each subsection will be defined and represented in the form of an hour timeline. The last section, **CONCLUSION**, reinforces the rationale behind the uses of educational computerized databases and the **ENDS-TO-MEANS** model of database design.

RATIONALE:

The teaching of exceptional students entails a great amount of record keeping such as recording of test data, scheduling, individual education plans, and curriculum modification. The need to simplify this record keeping is a must for job survival. The first step is select a program known as a database to help with this organizational task. A database is a collection of information organized and presented to serve a specific purpose.

The main part of a database is known as the file. The next step, therefore, is to organize the data that is important to file. This is designated as "S.L.D.". The subsets of a file are known as records. Since the "S.L.D." program has 102 students, the file has 102 records to manage.

Lastly, each record has divided into identifying fields or categories. These fields consist of the following: **(SEE VISUAL A-1)** To determine these fields, the departmental forms for each student is examined to select fields that are felt to have significance. **(SEE VISUAL A-2)**

The form is arranged so that the format covers one complete page. Fields are arranged in priority levels with vital information located at the top of the form. Each S.L.D. teacher designates a section of his or her grade book devoted to the student's information to refer to as adjustments to curriculum are made after conferring with parents and school personnel.

USAGE:

Each year teachers in Exceptional Education are required to complete individual educational plans and numerous other reports for local, state and federal governments for each student. If a teacher is responsible for twenty to thirty individual plans as well as other Department of Education reports, the database becomes an efficient system of data retrieval, replacing the clumsy method of fumbling through cumulative folders. This is just one example. Other possible applications and reports that can be generated using a database are:

1. A list of all students, alphabetically sorted, with date of birth, student number, race, sex, and hours served by S.L.D. teacher is valuable in completing reports for full time equivalency, or F.T.E., hours. This report generates the money that pays for salaries and materials needed to run an exceptional program. **(SEE VISUAL A-3)**

2. A list of all students, alphabetically sorted, with grade level, student number and S.L.D. teacher is useful in filling out a report on class rolls. **(SEE VISUAL A-4)**

3. A list of all students, alphabetically sorted, with grade level, student number and language preferred is ideal for a report on bilingual education. **(SEE VISUAL A-5)**

4. All students selected by SLD Code 2110 or 2120, name, student number and sorted by grade level can support yearly reports for the Department of Education. **(SEE VISUAL A-6)**

5. All students, alphabetically sorted, with street address, city, zip, name of parents and home telephone number is helpful in completing contact reports.

6. All regular teachers, alphabetically sorted, with subject taught, students taught, period of day and room number is used for compiling a mainstream report.

The applications of the database are seemingly limitless as formats are easily adaptable to individual need.

TIME CONSIDERATIONS:

The initial setup is the most costly in expenditure of time. Assuming prior knowledge of the particular database program selected, a time line is broken into the following five sections:

1. **Report and form design** entails the design of the written reports and the entry of the form into the format of the database program.

2. **Collection of data** refers to the manual collection of the data from the cumulative records.

3. **Entering of data** into the computer database is the actual manual entry (typing) of the information from the written collection form.

4. **Error correction** is very important because a database is only as accurate as the information stored. Error correction is accomplished by electronically searching through each record for erroneous or mistyped information.

5. **Initial usage** of the computer database tests whether all the forethought and efforts have paid off in the production of accurate, timely, and attractively prepared reports.

TIME LINE FOR DATABASE SET-UP

Report and Form Design	***** **3** hours (with good knowledge of program)
Collection of Data	******** per teacher (**5** hours) x **3**
Entering of Data	********** **8** hours (good typists)
Error Correction	***** **3** hours
Initial Usage	**********

0 5 10 15 20 25 30

HOURS

CONCLUSIONS:

Although the time for setup expends approximately 29 hours, excluding program knowledge, the effort pays off in big rewards of time saved later on. For example, application No. 1 on Page 2 would originally require one to two manual hours to prepare. After predefining a report format for the F.T.E. form (Full Time Equivalence), nor more than five minutes of time is necessary to print the same report, ready to be copied as many times as needed.

The more the database is used, the more savings will be realized. Databases make our work much easier, but one must understand that to gain these rewards, one must be willing to expend initial thought and energy.

VISUALS

ENTRY FORM * VISUAL A-1**

LAST NAME: **FIRST NAME:**
D.O.B.: **CENTRAL FILES#:** **STUDENT#:**
GRADE#: **SEX:** **RACE:** **LANGUAGE PREFERRED:**
INITIAL IEP DATE: **CURRENT IEP DATE:**

==========

INTELLIGENCE TEST: **DATE:**
DEFICITS:
STRENGTHS:

==========

PROCESS TEST: **DATE:**
DEFICITS:
STRENGTHS:

==========

ACADEMIC TEST: **DATE**
DEFICITS:
STRENGTHS:

==========

PROGRAM CODE: **HOURS SERVICED PER DAY:**
MEDICAL ALERT (Y OR N): **IF YES, LIST ALERT:**

==========

PARENT'S LAST NAME (MOTHER): **FIRST NAME:**
PARENT'S LAST NAME (FATHER): **FIRST NAME:**
STUDENT'S ADDRESS:
CITY: **STATE:** **ZIP CODE:**
TELEPHONE (BUSINESS): **PARENT (M OR F):**
TELEPHONE (HOME):

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SCHEDULE OF CLASSES

SUPERVISING TEACHER:
PERIOD 0: **RM. #:** **TEACHER:**

PERIOD 1: **RM. #:** **TEACHER:**

PERIOD 2: **RM. #:** **TEACHER:**

PERIOD 3: **RM. #:** **TEACHER:**

PERIOD 4: **RM. #:** **TEACHER:**

PERIOD 5: **RM. #:** **TEACHER:**

PERIOD 6: **RM. #:** **TEACHER:**

PERIOD 7: **RM. #:** **TEACHER:**

HM RM SECTION: **RM. #:** **TEACHER:**

F.T.E. REPORT * VISUAL A-3**

LAST	FIRST	D.O.B.	STUDENT#	RACE	SEX	HOURS
BULLARD	JOHN	05-23-67	938479	WNH	M	5
CARCIO	JAMES	08-14-66	898233	BH	M	10
DIMARCO	ROSE	01-04-68	736482	WH	F	5
ELLERMAN	JEFFREY	12-03-67	938432	BNH	M	15
RICE	KEVIN	11-21-67	387492	AA	M	20

TOTAL +++++++ 55

CLASS ROLLS * VISUAL A-4**

LAST	FIRST	GRADE	STUDENT#	SUPERVISING TEACHER
BULLARD	JOHN	11	938479	FITTERMAN
CARCIO	JAMES	12	898233	FITTERMAN
DIMARCO	ROSE	10	736482	FITTERMAN
ELLERMAN	JEFFREY	11	938432	FITTERMAN
RICE	KEVIN	11	387492	FITTERMAN

BILINGUAL REPORT * VISUAL A-5**

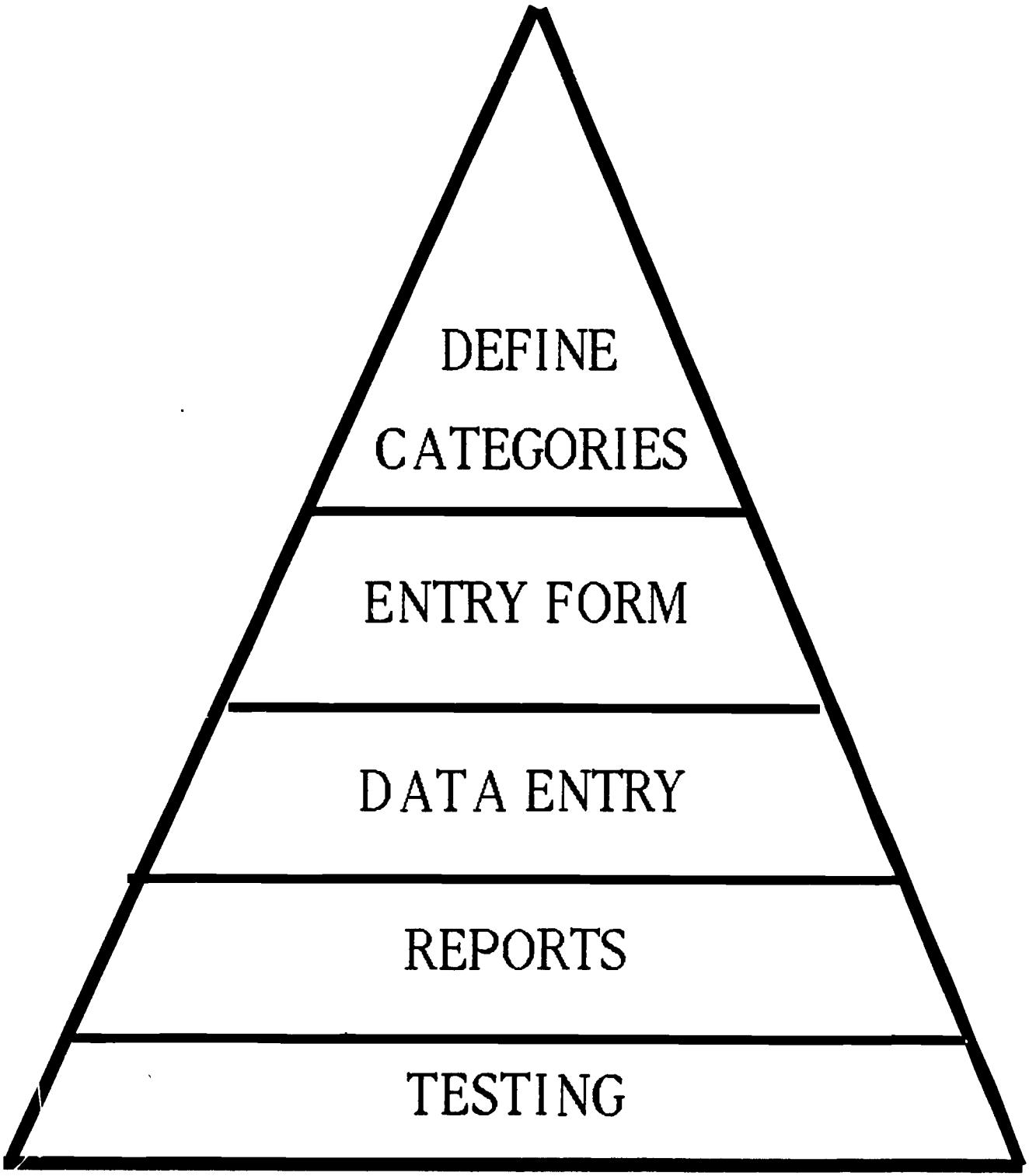
LAST	FIRST	GRADE	STUDENT#	LANGUAGE PREFERRED
BULLARD	JOHN	11	938479	ENGLISH
CARCIO	JAMES	12	898233	SPANISH
DIMARCO	ROSE	10	736482	SPANISH
ELLER	JEFFREY	11	938432	ENGLISH
RICE	KEVIN	11	387492	VIETNAMESE

D.O.E. REPORT * VISUAL A-6**

GRADE	LAST	FIRST	STUDENT#	CODE
10	DIMARCO	ROSE	736482	2110
11	BULLARD	JOHN	938479	2110
11	ELLERMAN	JEFFREY	938432	2110
11	RICE	KEVIN	387492	2120
12	CARCIO	JAMES	898233	2120

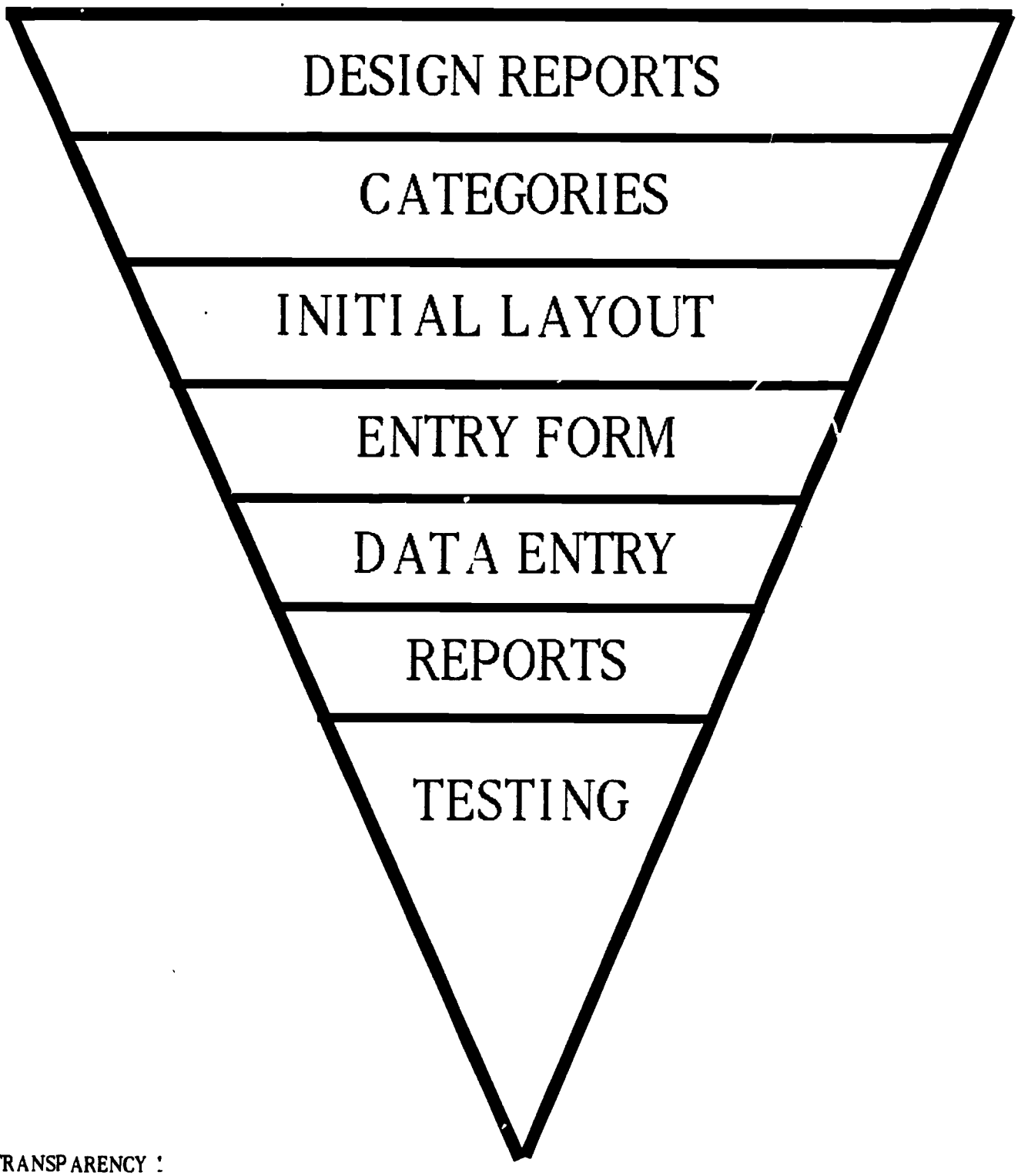
TRANSPARENCIES

CONVENTIONAL MODELS



TRANSPARENCY-0

ENDS-TO-MEANS MODEL



TRANSPARENCY 1

DESIGN REPORTS

1. LIST ALL REPORT TITLES

2. DESIGN REPORTS USING EXISTING FEDERAL, STATE AND LOCAL REPORTS WHEN POSSIBLE

ENDS-TO-MEANS MODEL
STEP ONE

TRANSPARENCY 2

CATEGORIES

1. LIST ALL CATEGORIES FOR EACH REPORT
2. LIST ALL CATEGORIES FOR ALL REPORTS
3. DELETE ALL DUPLICATE CATEGORIES
4. LIST ALL FINAL CATEGORIES

ENDS-TO-MEANS MODEL
STEP TWO

TRANSPARENCY 3

INITIAL LAYOUT

1. LIST ALL CATEGORIES IN ORDER OF IMPORTANCE

2. LIST ALL CATEGORIES IN LOGICAL SEQUENCE FOR DATA ENTRY

ENDS-TO-MEANS MODEL
STEP THREE

TRANSPARENCY 4

ENTRY FORM

1. ENTRY OF CATEGORIES INTO APPLICATION PROGRAM ACCORDING TO PROGRAM RULES

ENDS-TO-MEANS MODEL
STEP FOUR

TRANSPARENCY 5

DATA ENTRY

1. ENTERING OF SAMPLE TEST DATA INTO ENTRY FORMAT

ENDS-TO-MEANS MODEL
STEP FIVE

TRANSPARENCY 6

REPORTS

1. CREATION OF REPORT FORMATS ACCORDING TO APPLICATION PROGRAM RULES

ENDS-TO-MEANS MODEL
STEP SIX

TRANSPARENCY 7

TESTING

1. TESTING OF REPORTS AND VALIDATION OF SAMPLE DATA OUTPUT

ENDS-TO-MEANS MODEL
STEP SEVEN

TRANSPARENCY 8

DESIGN REPORTS
STEP ONE

NOTE: SEE VISUALS 3-6 ON PAGES 13-16

CATEGORIES
STEP TWO

1. List all categories for each report
2. List all categories for all reports
3. Delete all duplicate categories

F.T.E. REPORT	CLASS R. . .S	BILINGUAL REPORT
LAST	LAST	LAST
FIRST	FIRST	FIRST
D.O.B.	GRADE	GRADE
STUDENT#	STUDENT#	STUDENT#
RACE	SUP. TEACHER	LANGUAGE PREF.
SEX		
HOURS		

DOE REPORT

GRADE
LAST
FIRST
STUDENT#
CODE

4. List all final categories

LAST
FIRST
D.O.B.
STUDENT#
RACE
SEX
CODE
HOURS
SUP. TEACHER
LANGUAGE PREF.

INITIAL LAYOUT
STEP THREE

1. List all categories in order of importance

LAST
FIRST
STUDENT#
D.O.B.
SEX
RACE
CODE
HOURS
SUP. TEACHER
LANGUAGE PREF.

2. List all categories in logical sequence for data entry.

LAST:	FIRST:	STUDENT#:
D.O.B.	SEX:	RACE:
CODE:	HOURS:	
SUP. TEACHER	LANGUAGE PREF.:	

Lawrence Jeffrey Fitterman, ED.S.
Instructional Technology Specialist
Hillsborough County Public Schools
411 East Henderson Avenue, Rm #105
Tampa, Florida 33602
813-272-4555