

FIELD PAPERS

LIBERIA

Outline for a Workshop on Criterion Referenced Test Development

August 1984

IEES

Improving the
Efficiency of
Educational
Systems

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Ed Kelly

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IEES Field Papers are the products of IEES assistance in collaborating countries. They are papers, outlines, guides, or summaries produced by consultants or staff as part of the long-term IEES strategy which is collaboratively developed with each country for improving educational efficiency. Some of these papers are products of USAID-funded and IEES-administered field projects now underway. These papers are copied and disseminated in their original form because of their potential usefulness to technical staff, planners, and decisionmakers in developing nations and to agencies assisting those nations in the improvement of their educational systems.

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INTRODUCTION

The original USAID project paper for IEL I indicated the development of a set of CRT's to be used to assess the level of attainment of instructional objectives. For many reasons, some practical, some technical, this was never attempted. As a consequence, both student assessment and program evaluation activities in the IEL Project were typified by the traditional use of conventional norm referenced testing procedures. As a result, although reliable rankings of students were produced through testing, it was never possible to estimate the extent to which specific instructional objectives were being achieved.

The purpose of this workshop was to solve this problem through the creation of a set of CRT's matched explicitly to each of the learning objectives in all subject areas and across the six grade levels covered by the instructional system. It was also the purpose to devise a sampling system that would permit an assessment of IEL learning objectives without requiring thousands of children to sit for hours while they completed long, standardized, norm referenced tests.

Those familiar with the IEL instructional system will recognize immediately the enormity of this undertaking. Counting only the core (required modules), the modules total 310 (see Attachment A). Each module, in turn, focuses on one or two instructional objectives. One criterion referenced test had to be developed systematically for each of the 310 modules.

In addition to the scope of the problem, it was also the case that - until recently - the IEL project staff contained no Liberian personnel who had previous experience or formal training in the construction of valid CRT's. Thus, the problem had at least two important dimensions: conceptualization and training.

Additional problems also existed, and these summarize readily as questions:

1. How should teachers and others be trained to use the CRT's?
2. How should the tests be administered, scored, coded, analyzed, the results summarized and reported?
3. How would the development of the CRT's be financed?
4. How should the CRT battery be implemented and when should this occur?
5. What previous efforts, both in Liberia and elsewhere, might be drawn upon to ease the test development burden?

Each of these issues was addressed either before or during the workshop. Most of them now appear resolved.

The workshop was divided into three parts: training, test production, keying and revision. The mix of Instructional Supervisors, one Instructional Design staff member and the inclusion of a senior level MOE administrator was fortuitous.

The workshop opened at 1 p.m. on Wednesday, August 7th. In brief the training consisted of the following steps:

1. Presentation of the theory behind CRT's
2. Examples and discussion
3. Assigned reading
4. Discussion of readings
5. Introduction to item writing
6. Practice item writing
7. Feedback and revision
8. CRT construction simulation
9. Observation and feedback

10. CRT construction simulation with actual module
11. Observation and feedback.

To believe that a two-and-one-half day training program can yield effective and efficient item writers would be unrealistic. Good test item writers are hard to find. Not only must they have an understanding of the subject matter they confront, but they must also be able to unite it with a sophisticated set of item formats, difficulty levels, stems and foils, in order to invent item samples that are valid in terms of the instructional objectives and also fair to the learners who will have to submit to them. Throughout the workshop a guiding principle was, "When in conflict about the value of an item for the instructional system, as compared to the value of being fair to a child, always choose the child."

The training session did not produce experts in criterion referenced testing any more than it produced expert test item writers. What it did yield was a group of five or six people who had grasped the fundamentals of both criterion referenced testing and item composition. The training achieved the minimum competencies that were necessary to get the job done. Happily, the job got done, and it got done at a level of quality that far exceeded my original expectations.

The tests that resulted are by no means perfect. They were not expected to be. They represent an excellent beginning, and the writing team will be the first to support the need for careful revision and alteration as implementation of the CRT battery

demonstrates its strengths and weaknesses. Such revisions, based on empirical evidence, are absolutely essential, especially since funding of a systematic pilot testing of the CRT's was removed in the eleventh hour. The point is that the tests are finished, but the development of good tests is never finished.

At the conclusion of the second simulation, the writers were organized for test construction. Each writer selected that part of the IEL curriculum that best suited his or her academic background and interests.

Composition of the CRT's began formally on Saturday, August 10th and continued through Thursday, August 23rd. Working together helped the writers solve problems, get quick answers to questions, and support each other through a difficult, and at times, extremely boring process.

Composition of the CRT's was guided by a form and format (see VI). This was done to focus the item generation on specific objectives, and to require the establishment of a professional standard against which performance on each test could be initially judged. Essential to the development of criterion referenced tests, the standards that have been established for each CRT were put forward by the test writers and are based upon their professional judgements as to the complexity and importance of the objective to be assessed and the difficulty of the items that constitute the test. These, as all standards, are social artifacts, and they will have to be examined to determine if they are fair to the children and the instructional system.

One of the rules that guided the construction of the CRT's was that there would be at least three items written for each objective. For those modules which contained two objectives, usually one recall and one application, at least six items would be required. Establishing a standard required that the test developer state the number of items out of six, for example, that the writer believed a child who had achieved that objective ought to be able to answer correctly. Consequently, and rightly, no universal standards were established out of the forest of some dark tradition. (When, for example, and why, did people begin to believe that 70 percent correct should define passing?) In some CRT's passing is defined as 3/6, 4/6, and even 6/6.

When writers completed the draft of a test or a small set of tests, the tests were revised and edited as necessary and, on several occasions, returned the drafts to the writers for expansion, alteration, or whatever. After they were edited and revised, they were typed. The typed scripts were edited and revised once again, and then the CRT's were typed best and final.

One does not format or type tests for first, second, and even third grade children the same way one does for older learners. With beginners who can't read CRT's, must be administered orally, consequently the test takes on a different appearance. Many pictures are used, and both letters and numbers are printed large. IEL staff in Gbarnga were contacted, and they took on the responsibility of entering all the tests that required typing with a primary (large type) typewriter, graphics,

or fractional symbols. PC's do not contain character spacing that permits the typing of a fraction such as $2 \frac{1}{2}$. What the PC would have printed was 2 1/2, but this is not the format in which children are taught fractions in the IEL and to use such would have invalidated the items.

To make a complicated job even more taxing, each of the tests in the first two and many in the third grade had to be separately scripted so that they could be orally administered. This required the composition of more than 80 test scripts, each matched to a single CRT.

For each item on each test a correct answer key had to be developed, checked, edited, and colated into a test key document. For multiple choice, matching, and true/false items this is not problematic. But it becomes so when completion and fill-in items are used, as they sometimes must be due to the form of the instructional objective. For this type of item, the writers had to take great care to insure that their answer keys contained all the possible correct answers.

After all the tests were composed and had been typed best and final, and after the keys and scripts were completed, the CRT's were assembled in numerical order, and they were checked once again for technical or typographical weaknesses. Final revisions were made again.

Simultaneously with the test development process a sequence of other activities was occurring. A system was devised that would randomly assign the CRT's to test packages; that would

assign packages to classes, and that would maintain a balance in the sampling design, a balance between the total number of students tested and the possible difficulty level of each test packet.

For example, in first grade there are forty CRT's that span ten core modules in four areas: reading, language arts, mathematics, science/social studies. It was judged unfair, even though it may have occurred by chance, to permit one test package to contain four CRT's that all tested the objectives of the tenth module in each of the four subject areas. This was avoided by careful checking. It was also believed important to make sure that every class received at least one test in each of the four subject matter areas in first grade. This was also accomplished. Lastly, the assignment of packages to classes did not produce an equitable distribution of students over tests. Because there is wide variance in class sizes, some tests would have been taken by 125 students while others would have been taken by as few as 60 or as many as 230. Careful examination of class enrollments led to the construction of a balanced design in which all 310 CRT's will be employed, all packets will be taken by a comparable number of students, but no student will take more than 12 to 24 items. The assignment of the CRT's to test packages, schools, and classes is exhibited in Section VII and VIII. Sample CRT's are contained in Section X.

1. Three hundred and ten (310) criterion referenced tests together with their answer keys and, for grades 1-3, written instructions for their oral administration, have been completed according to a systematic process of test development.

2. A modified matrix sampling approach to both the packaging and the sampling of the tests and classes was designed and is in place.
3. A system for identifying and training test givers was developed.
4. Procedures for scoring the tests have been formalized in written directions (see Attachment F).
5. Procedures for coding the scored tests onto IBM coding sheets have been formalized and in written directions (See Attachment G).
6. A small group of Liberian educators have developed basic competencies in criterion referenced test construction and have received considerable guided practice in constructing them.
7. Arrangements have been initiated to have the test results analyzed within the Ministry of Education.
8. Specifications for the written report of findings have been established.

CRT Development Workshop

I. PURPOSE

- A. Develop a series of CRT's for use in monitoring the attainment of instructional objectives in the IEL system.
- B. Attain basic skills and practice in planning and composing CRT's.

II. OVERVIEW

A. Organization of workshop.

- 1. Roles
- 2. Meetings, times, and places
- 3. Confidentiality

B. -Agenda

1. Wed, Thursday and Friday training

a. Wed, p.m. Instruction in the concept of the CRT.

- 1. Reading assignment: Gronlund 1st half

b. Thursday a.m.

- 1. Review of presentation

- 2. Review of assignment

- 3. Presentation and practice on item selection and construction.

c. Thursday p.m.

- 1. Item writing practice

- 2. Assign: Gronlund second half

- d. Friday a.m.
 - 1. Review Gronlund
 - 2. Review item selection and composition
 - 3. Formating; presentation
 - 4. Overview of procedures and organization of writing assignments.
 - 5. Overview of resources for item selection.

- e. Friday p.m.
 - 1. Begin CRT generation

III. THE NATURE OF CRITERION REFERENCED TESTS (CRT's)

- A. Definition of CRT's
 - 1. Three characteristics
 - 2. Purpose: Tests & measures
 - 3. Decision focus: groups and objectives

- B. Comparison to NRT's
 - Norm vs. Criterion reference

- C. Key terms
 - 1. Criterion referenced
 - 2. Norm referenced
 - 3. Test item
 - 4. Item stem
 - 5. Distractors, foils
 - 6. Keyed response
 - 7. Content validity
 - 8. Domain; sub-domain

IV. VALIDITY

A. Validation

- 1. Content
- 2. Predictive
- 3. Construct

B. Stress Content Validation

- 1. Content representation; spread; clarity
- 2. Behavior representation; specificity

C. The test blue print or table of specifications

	content			
Behavior	-----	-----	-----	-----
	-----	-----	-----	-----
	-----	-----	-----	-----
	-----	-----	-----	-----
	-----	-----	-----	-----

vs. Instructional Objectives

D. Comments on Reliability of CRT's

V. ITEM CHARACTERISTICS

- A. Item validity re: Specifications, clarity, spread.
- B. NRT vs. CRT test items
- B. Don'ts
 - 1. No negative stems
 - 2. No big words

3. No adverbs
4. No double negatives in stems
5. No "all" or "none of the above"
6. No trick questions
7. No give aways in foils

Example: $2 + 4 = ?$

- a) 6 b) 8 c) 2 d) 24 e) 124

D. Do's

1. Be brief. Write short stems.
2. Use simple vocabulary.
3. Conform to content and behavioral requirements of instructional objectives.

E. Practicing Item Writing

Exercise No. 1

Given the following objective, compose a six item criterion referenced test:

Math "To multiply a whole numeral by a
5th given fraction."

Exercise No. 2

Given the following objective, compose a six item criterion referenced test:

Science "To describe the important characteristics
6th of fishes."

"To give examples of common fishes found in Liberia.

VI. TEST FORMAT

IMPROVED EFFICIENCY OF LEARNING PROJECT
CRITERION REFERENCED TEST

Subject: _____ Draft ()

Grade: _____ Final ()

Module Name & No. _____

Test Code: _____ Writer: _____

Statement of Objectives (PRINT)

Proposed Test Items (PRINT)

PROPOSED STANDARD:

(continue on rear)

VII. CLT NUMBER GRID

GRADE 4 MODULES BY CRT NUMBER GRID

Module	T#	Module	T#	Module	T#	Module	T#	Module	T#
R4.1.1A	01	L4.1.1A	13	M4.1.1A	25	S4.1.1A	37	SS4.1.1A	49
R4.1.1B	02	L4.1.1B	14	M4.1.1B	26	S4.1.1B	38	SS4.1.1B	50
R4.1.2A	03	L4.1.2A	15	M4.1.2A	27	S4.1.2A	39	SS4.1.2A	51
R4.1.2B	04	L4.1.2B	16	M4.1.2B	28	S4.1.2B	40	SS4.1.2B	52
R4.1.3A	05	L4.1.3A	17	M4.1.3A	29	S4.1.3A	41	SS4.1.3A	53
R4.1.3B	06	L4.1.3B	18	M4.1.3B	30	S4.1.3B	42	SS4.1.3B	54
R4.2.1A	07	L4.2.1A	19	M4.2.1A	31	S4.2.1A	43	SS4.2.1A	55
R4.2.1B	08	L4.2.1B	20	M4.2.1B	32	S4.2.1B	44	SS4.2.1B	56
R4.2.2A	09	L4.2.2A	21	M4.2.2A	33	S4.2.2A	45	SS4.2.2A	57
R4.2.2B	10	L4.2.2B	22	M4.2.2B	34	S4.2.2B	46	SS4.2.2B	58
R4.2.3A	11	L4.2.3A	23	M4.2.3A	35	S4.2.3A	47	SS4.2.3A	59
R4.2.3B	12	L4.2.3B	24	M4.2.3B	36	S4.2.3B	48	SS4.2.3B	60

VIII. EXAM PACKETS

GRADE 4 MODULES EXAMS BY PACKETS

P1	P2	P3	P4	P5	P6	P7	P8	P9	P10
01 R4.1.1A	12 R4.2.3B	02 R4.1.1B	11 R4.2.3A	03 R4.1.2A	10 R4.2.2B	04 R4.1.2B	09 R4.2.2A	05 R4.1.3A	08 R4.2.1B
07 R4.2.1A	06 R4.1.3B	24 L4.2.3B	19 L4.2.1A	23 L4.2.3A	14 L4.1.1B	22 L4.2.2B	15 L4.1.2A	21 L4.2.2A	16 L4.1.2B
20 L4.2.1B	17 L4.1.3A	13 L4.1.1A	18 L4.1.3B	25 M4.1.1A	36 M4.2.3B	26 M4.1.1B	35 M4.2.3A	27 M4.1.2A	34 M4.2.2B
28 M4.1.2B	33 M4.2.2A	29 M4.1.3A	32 M4.2.1B	31 M4.2.1A	30 M4.1.3B	48 S4.2.3B	37 S4.1.1A	47 S4.2.3A	38 S4.1.1B
46 S4.2.2B	39 S4.1.2A	45 S4.2.2A	40 S4.1.2B	44 S4.2.1B	41 S4.1.3A	42 S4.1.3B	43 S4.2.1A	49 SS4.1.1A	60 SS4.2.3B
50 SS4.1.1B	59 SS4.2.3A	51 SS4.1.2B	58 SS4.2.2B	52 SS4.1.2B	57 SS4.2.2A	53 SS4.1.3A	56 SS4.2.1B	54 SS4.1.3B	55 SS4.2.1A

IX. CRT SAMPLING DESIGN

4th Grade (43 classes)

Class No.	School No.	Name	Classes	Packet No.	N
0141	01	Lab	1	1	34
0241, 0242,	02	Dorothy Cooper	2, (50, 55)	2, 3	105
0340	03	Baryata	—* —	—	—
0441	04	Sanoyea	1	4	30
0541	05	Gboken Kollie	1	5	19
0641	06	Frelela	1	6	23
0741	07	J. S. Milton	1	7	10
0841	08	G. Dolo Boi	1	8	21
0941	09	S. S. Collins	1	9	18
1040	10	C. T. Norman	—	—	—
1141, 1142	11	Massaquoi	2 (29, 32)	10, 1	61
1240	12	Bassie Kpangbai	—	—	—
1341	13	Suakoko	1	2	58
1441	14	Macars	1	3	10
1640	16	Nyeahn	—	—	—
1741	17	E. J. Yancy	1	9	44
1841	18	Taih Memorial	1	5	32
1941	19	Walplo Memorial	1	6	32
2040	20	Fish Town	—	—	—
2141	21	J. C. Barlee	1	7	70
2241	22	Marbo	1	8	18
2341	23	S. C. Gaye	1	9	19

*Only classes with at least ten students were chosen.

4th Grade Cont'd.

Class No.	School No.	Name	Classes	Packet No.	N
2441	24	Jarwodee	1	10	31
2541	25	Tuzon	1	1	18
2641	26	Niabo	1	2	13
2741	27	M. T. Brooks	1	3	50
2841	28	Sucromu	1	4	14
2941	29	Borkeza	1	10	24
3041	30	Yella	1	1	12
3141	31	Garbo Konia	1	7	60
3241	32	Balahun	1	8	22
3341	33	Tellewoyan	1	9	24
3441, 3442,	34	Voinjama	2 (60, 60)	4, 5	120
3541	35	Lawalazu	1	6	48
3641	36	W. V. S. Tubman	1	7	25
3741, 3742	37	Kolahun	2 (50, 50)	2, 3	100
3840	38	Lutisu	---	---	---
3941	39	Fangonda	1	8	14
4040	40	Worsonga	---	---	---
4141	41	Tamba Taylor	1	9	54
4241, 4242	42	Martha Tubman	2 (68, 70)	10, 4	138
4341	43	Zorgowee	1	5	38
4441	44	Ghon-Nyanze	1	6	32
4541	45	Johnny Voker	1	1	80
4641	46	Kanplay	1	8	65
Total			43		1,586

X. SAMPLE TESTS

IMPROVED EFFICIENCY OF LEARNING CRITERION REFERENCED TEST

Code No. _____

SS4.1.1A "How Our Cities Develop"

(42) To describe the critical features of urban development.

(42) To describe some urban development projects.

DIRECTIONS: Read each question carefully. Circle the letter in front of the correct answer.

1. A city develops easily by _____.
 - a) government
 - b) people helping themselves
 - c) public works
 - d) finance ministry

2. The houses built by government for people to live in are called _____.
 - a) houses
 - b) housing
 - c) housing projects
 - d) apartments

3. Leaders of the city make laws about the city.
 - a) True
 - b) False

4. What do banks give people for development?
 - a) loans
 - b. jobs
 - c) doctors
 - d) buildings

5. Some changes in a city brings about problems.
 - a) True
 - b) False

SS4.1.1A CRT

DIRECTIONS: Read the question below and do as it says.

6. List three rural development projects carried out by city leaders.

a.

b.

c.

DIRECTIONS: Read each question carefully. Circle the letter in front of the correct answer.

7. What is the name of the head of a city?

a) chief b) superintendent c) mayor d) leader

8. The leaders make laws to keep the city clean.

a) True b) False

9. The government built schools to enable people to bring food to the market.

a) True b) False

IMPROVED EFFICIENCY OF LEARNING
CRITERION REFERENCED TEST

Code No. _____

S5.1.1A "What is Light?"

(53) To name and describe different sources of light.

(53) To name and describe how light travels.

DIRECTIONS: Read each question carefully and complete it by circling the letter of the correct answer.

1. The chief source of our light energy is _____.
a) plants b) sun c) reflection d) pulling

2. Some objects such as _____ and _____ give light when they are heated.
a) iron and rocks b) birds and animals
c) iron and water d) red and blue

3. The _____ is about 93 million miles away from earth.
a) moon b) farthest star c) sun d) planet Venus

4. Electricity is another form of _____.
a) rays b) light c) show d) flow

5. A light that bounces back is called _____.
a) green light b) clear light
c) reflected light d) white light

IMPROVED EFFICIENCY OF LEARNING
CRITERION REFERENCED TEST

Code No. _____

R6.2.2B "How to Read African Literature"

- (83) To read simplified excerpts from African literature and to answer a series of questions.

DIRECTIONS: Read this story silently. Read each question carefully. Circle the letter in front of the correct answer.

THE SORROWFUL END OF CATFISH

Long ago, Catfish and Rice Bird were good friends. One day Rice Bird said, "I saw a farmer cut a hole in a palm wine tree. He hung up a bowl to catch the wine. Let's go and steal some wine."

"That would be good," said Catfish. "But I can't fly."

"I'll lend you some of my feathers," said Rice Bird.

He gave Catfish half of his feathers, and they flew up to the palm wine tree.

They drank and they drank. Both got very drunk. In the late afternoon, the farmer came back. Rice Bird became very frightened. He knew he was too drunk to fly without all his feathers, so he pulled his feathers from Catfish and flew away.

Poor, poor Catfish. There was nothing he could do. The farmer found Catfish in his bowl of palm wine. "This Catfish will make fine soup," said the farmer.

At home the farmer drank his wine while his wife cooked Catfish.

LESSON - Sometimes our friends get us into serious trouble.

1. What happened to Catfish when the farmer came back?
- | | |
|-------------------|------------------------|
| a) He was caught. | b) He drank and drank. |
| c) He flew away. | d) He was in the bowl. |

2. What did Rice Bird give Catfish?
- a) food to eat
 - b) plam wine
 - c) half of his feathers
 - d) a bowl to eat in
3. What did the Rice Bird do when the farmer came back?
- a) He was caught.
 - b) He gave the farmer some palm wine.
 - c) He gave the farmer some food to eat.
 - d) He took back his feathers and flew away.

XI. SCORING AND CODING THE IEL CRITERION REFERENCED TESTS (CRT'S)

Scoring means deciding if an answer is right or wrong. Coding means transforming a scored answer into a numeric code in preparation for data processing. One person may perform both processes.

A. Preparation for Scoring

1. The tests must first be sorted into piles according to grade and test number. This will mean, for example, that all the CRT's for R1.2.1 (reading, grade one, test no. 06) are all in the same pile. There will be approximately 225 tests in this pile. For the entire first grade there will be forty (40) such piles. There will be ten piles each for reading, language arts, mathematics, and science/social studies.

2. Answer keys for each pile of tests should be obtained and a final check conducted to insure that there are no errors in the key.

3. Scorers should have several red or blue pencils or markers. Do NOT score in pencil or black pen.

B. Scoring the CRT's

1. Rules

- There is no partial credit. The answer is all right or all wrong.
- Answers left out are wrong.

- If more than one answer is given, the item (question) is to be scored wrong, even if one of the answers was the correct answer.
- Answers that can not be read are wrong.
- In grades 1 - 3, check (✓) and cross out (X) mean different answers. Do NOT confuse them. See the test key.
- In grades 1 - 3, especially answers that are misspelled are wrong answers UNLESS the test key says differently.
- Take frequent breaks. Scoring is very important but boring.
- Mistakes in instructions or blunders in typing, formatting, or printing which ruin an item are NOT to be held against the child. See below (2.3.1) for how to handle these special conditions.

2. Procedures

- 2.1 Read the test key carefully.
- 2.2 Score an entire test. Do NOT score question one on all tests and then begin with question two.
- 2.3 If the answer is correct, leave it alone. If the answer is wrong, place a large X mark OVER THE TEST QUESTION NUMBER. Do NOT use check marks (✓).
- 2.4 If you are not sure about an answer, check the key. If you are still not sure, ask a supervisor. Don't make your own rules.
- 2.5 Count up the number of correct answers and write this number clearly in the lower right hand corner of the last page of the test. Do NOT circle or underline this number. Do NOT write 3/5, for example. Simply write 3 in the lower right hand corner.

C. Preparation for Coding

After all the tests for a grade level and test number have been scored, they are to be coded. For this you will need your pile of scored tests, a pack of IBM coding sheets, and several sharp number two pencils with erasers.

1. Rules

- Look at the IBM coding sheet. Note that it contains 80 numbered columns from left to right. You will ALWAYS begin in column number one (1).
- Do NOT skip any columns.
- Do NOT skip any rows.
- Use only a pencil.
- Write small but neatly. If you cannot do so - and some of us can't - become a full time scorer. Let your supervisor know. Make sure you keep numbers within the little boxes on the coding sheet.

2. Procedures

- 2.1 Copy the test code number of the first test in the pile into the first eight columns of the first row on the coding sheet.
- 2.2 Code the first test question in column nine (9). If the question was answered correctly, enter a (1). If it was wrong, enter a zero (0).
- 2.3 Code the second test question into column ten (10). Again, 1 = right answer (correct), and zero (0) = wrong answer (incorrect).
 - 2.3.1 If, and only if, it is decided by a supervisor that an item (question) is to be left out because something went wrong, leave the box that corresponds to that item BLANK.
- 2.4 Continue coding the items until you come to the end of the first test.
- 2.5 Put the number of questions answered correctly (the total score) in the very next column.
- 2.6 Check to see that the number of columns you have used adds up to nine (9) plus the number of items on the test (8 for code, 1 for total score, ? for items).
- 2.7 Check to see that the total score is not greater than the number of items on the test. If so, find the mistake and fix it.

- 2.8 Start the second test in the pile in the first column of the second row. Do not worry that there are many columns to the right that are used.
- 2.9 Code the rest of the tests in your pile.
- 2.10 When you have finished your pile, count the tests carefully. Next count the number of rows that it took you to code the tests. The numbers must be equal. If not, find the error and fix it.

REMEMBER: All tests start in column one (1) on the coding sheet, and all tests from the same pile will end in the same column.

XII. TEST CODE NUMBERS

IEL CRITERION REFERENCED TESTS

Each test in the IEL Criterion Referenced Test (CRT) battery will be assigned a test code number which will be printed in the space on the test called, Code No. Each Code No. will contain exactly eight numbers. The eight numbers will represent the following.

- 1) School Name: 01 - 46. N.B. There will be no number 15 since that school has been dropped from testing due to its extremely small size. The numbers correspond to the two digit school code numbers currently in use by IEL.

- 2) Grade: 1- 6.

- 3) Class: 0 - 3. This number indicates the number of a class in a specific grade and subject. In schools where there are three classes of Reading, for example, the numbers 1, 2, 3 will each appear in different codes and will each designate a different classroom of first grade Reading. N.B.; In schools where there were no classes in a specific grade level and subject area with 10 or more students, the number zero (0) is used.

- 4) Pack No.: 01 - 10. In each grade the CRT's have been assigned to packs ranging in number of tests from four (4) in grades one and two to six (6) in grades four through six. There are ten test packs in each grade. The packs are numbered to facilitate analysis.

5) Test No.: 01 - 60. Each CRT is numbered between 1 and 60, and these numbers correspond to an exact core module in a specific grade. Charts for each grade level show the correspondence. In some grades, i.e., first and second, the test numbers end at 40 because there are only 40 core modules. In grade six they run to 60.

An Example

Consider the following example of the test code numbers necessary for the 1st Grade in the Dorothy Cooper school. Dorothy Cooper is IEL school number 02, and in first grade there are three classes containing 47, 78, and 60 children respectively (see the CRT Sampling Design) (1st Grade 56 classes)). These three classes have been assigned test packets 2, 3, and 10 as follows:

Class Size -----	Packet No. -----
47	2
78	3
60	10

The packets assess the following modules with corresponding test numbers (see: "Grade 1 Test Packages"):

Packet No. -----	Test No. -----	Module No. -----
2	03	R1.1.3
	17	L1.2.2
	30	M1.2.5
	31	S/SS1.1.1

Packet No. -----	Test No. -----	Module No. -----
3	06	R1.2.1
	11	L1.1.1
	22	M1.1.2
	36	S/SS1.2.1
10	05	R1.1.5
	18	L1.2.3
	28	M1.2.3
	37	S/SS1.2.2

In Dorothy Cooper's first grade class with 47 children the eight (8) digit code numbers will read:

02110203
02110217
02110230
02110231

for the four tests that will be administered to each of the 47 children. In sum, the test package for this class will contain at least 47 copies of each of the four tests with the numbers above. In all grades the tests will all be administered in the same order in each classroom.