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ABSTRACT

Procedures are described to conduct summative evaluations of Talents Unlimited programs. It is assumed that school counselors, administrators, or personnel minimally trained in measurement and statistics are capable of conducting the evaluation, except for doing the statistical analysis. The procedures are composed of: establishing measurable objectives; setting up the experimental design, with treatment and control groups; testing students, using combinations of criterion-referenced tests, creativity tests, and standardized achievement test batteries; analyzing results, using techniques such as t-test, Wilcoxon or analysis of variance (ANOVA), depending on pre-test, post-test conditions; and reporting results, both inferential and descriptive. Samples of some of the procedures and forms are appended. ()

ESTABLISHING THE VALIDITY OF A TALENTS UNLIMITED PROGRAM AT THE SCHOOL LEVEL

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CHAPTER I

INTRODUCTION

The purpose of this guide is to provide assistance in establishing the validity of the TU program at the school level. The procedures listed herein are usually referred to as product evaluation, that is, evaluating the outcomes of the TU program. Most of the evaluation procedures can be conducted by a school counselor, an administrator, or someone else with a minimum of training in measurement and statistics. However, other aspects of the evaluation (particularly the analysis) require someone with special training. If the procedures in this guide are followed and the TU program is successful at your school, this success can be demonstrated.

The remainder of this guide is divided into two major sections. The first describes the procedures which need to be followed to evaluate the program. The second illustrates how the results might be reported. This guide also indicates the information needed by the Talents Unlimited (TU) office in Mobile, Alabama for its evaluation as a Demonstrator/Developer. The forms to be used for this purpose are found in Appendices B and C. Your cooperation in this respect is appreciated.

CHAPTER II

PROCEDURES

The procedures outlined here should provide the framework for establishing the validity of a Talents Unlimited Program at the school level. The procedures include providing measurable objectives, setting up a cause-effect design, using valid and reliable measuring instruments, and analyzing the data properly. This chapter deals with each of those concerns.

Objectives

In order for outcome objectives to function properly, they must be measurable and the efficiency of the TU process must be established by their attainment. That is, successful accomplishment of the objectives should establish that the program is effective. Thus, the objectives become the basis for the evaluation design.

Consider the following TU program objective:

> By the end of the school year, students receiving TU instruction in the Productive Thinking talent will outperform significantly (at the .05 level) students not receiving TU instruction in this talent as indicated by the Productive Thinking Criterion Referenced Talent Test.

Basically, the objective indicates who (TU students) will do what (outperform non-TU students) when (by the end of the year), how well (significantly), and what the measure is (Productive Thinking CRT). A complete set of sample TU program objectives is provided in Appendix A.

Design

Establishing beyond a reasonable doubt that the TU treatment caused improved talent accomplishments in students requires the use of a TU treatment group and a similar comparison group which did not receive the TU treatment. This section provides recommendations on how to set up this design and the procedures outlined are intended to be appropriate for the objectives stated in the previous section.

The most effective method of setting up a treatment group/comparison group design is to assign students in a random fashion to the two groups. This can be accomplished by the following steps. First, assign numbers sequentially to an alphabetized list of potential student participants. Then, write corresponding numbers on small slips of paper and place them in a hat or box. After thoroughly shuffling the numbers, draw out one-half of them. The students whose numbers correspond to those drawn will be the TU treatment group and the balance will be the comparison group. Teachers should also be assigned on a random basis. The resulting design would be as follows:

Group	Beginning of year	During year	End of year
Experimental	Random selection	TU treatment	Posttest
Comparison	Random selection	Regular treatment	Posttest

In the event that the above procedure is not feasible, the following compromises may be made. If a number of intact classrooms are available for receiving the TU treatment, sequentially number these classes and select one-half of them in a random manner as indicated previously.

These will be the TU treatment classes and the remaining will be the comparison classes. It is best to select randomly both the TU and comparison teachers from those volunteering instead of using TU volunteers in the TU classes while using non-volunteers in the comparison classes. This would add another possible "cause" should the TU group prove to outperform the comparison group. This design would be as follows:

Group	Beginning of year	During year	End of year
Experimental	Pretest	TU treatment	Posttest
Comparison	Pretest	Regular treatment	Posttest

Keep in mind that the above designs should be used within each grade level. That is, using a TU treatment group from Grade 3 and a comparison group from Grade 2 or vice-versa would not be appropriate. Care should also be taken to avoid using special classes (e.g., EMR or gifted) as either TU treatment or comparison classes if they are not used for both.

If the above guidelines are followed, a comparison of the TU treatment classes and the comparison classes should provide a definitive test of the program objects and thus determine the effectiveness of the TU process in that school.

If a roughly comparable comparison group is not available, both a pretest and a posttest must be used with the single TU experimental group. The design would be as follows:

Pretest at beginning of year	TU treatment	Posttest at end of year

This design can not be used to establish that the TU treatment caused the change but the change can be assessed. The Joint Dissemination Review Panel will not recognize this design as evidence of efficacy.

Testing and Instrumentation

A major component of the validation process for the TU program is the testing component. The instruments that are used and the time at which the instruments are administered are important to the validity of the entire evaluation process.

A number of instruments have been field tested with TU programs. These include the TU program developed Criterion-Referenced Tests (CRTs) (at the present time there are 10 tests, one each for the decision-making, forecasting, and planning talents; three for the communication talent; and four for the productive thinking talent), Torrance Tests of Creativity (Torrance, 1966), and various standardized achievement batteries (such as the Stanford Achievement Test, Clymer Barrett, California Achievement Test, etc.). The TU CRTs are available from the TU office in Mobile. The manual includes copies of the instruments, reliability and validity data, and directions for scoring them. The other tests are available commercially.

The problem of when to give the tests is also important. Obviously, they should be given near the end of the project year to both the TU treatment group and the comparison group. If students in both groups were selected in the completely random manner indicated previously, then that

is the only time it is necessary to give the tests. However, if any deviation from the random assignment of students to treatment groups occurred, the tests must be given both before and after treatment has occurred. This means that both the TU treatment group and the comparison group must be tested at the beginning of the year and near the end of the year on the talents which were being taught. This includes all cases where intact classes were used as TU treatment and comparison groups. It is very important that the pretests be given before the students receive any instruction in a particular talent.

Thus, a variety of instruments are available for use. A set of 10 Criterion Referenced Talent Tests have been developed specifically to measure the five TU talents. They should be given both at the beginning and the end of the school year unless it was possible to assign students to groups in a completely random fashion.

Analysis

Generally, the analyses can only be done by an individual trained in statistics. This section is designed to provide guidance to such a person should he or she be available locally. The TU staff requests that regardless of who does the analyses, the TU office be provided with a copy of the original data reported by individual student. Reporting forms for this purpose are located in Appendix B. Reproduce them as needed or request multiple copies from the TU office in Mobile. Additionally, information on how the project was implemented is needed in order to use the information in a combined evaluation of the TU program. A Procedures Questionnaire is provided in Appendix C for that purpose. Please complete this questionnaire and return it to the TU office along with the individual student data.

Posttest Only Case

In the case where only a posttest is given, the two groups may be compared using an independent groups t-test (Ferguson, 1976, pp. 164-166). This first requires testing the equality of the population variances (Ferguson, 1976, pp. 177-180). Should they prove significantly different, it is recommended that the Wilcoxon procedure be used (Ferguson, 1976, pp. 387-390). The use of one of the above tests can determine if a statistically significant difference exists between the two groups and the direction of that difference.

Pretest-Posttest Case

The majority of evaluations will require that both the TU treatment group and the comparison group receive a pretest and a posttest. The analysis of this case is somewhat more complicated, particularly if the groups had preexisting differences. In this case an analysis of variance (ANOVA) procedure using a completely randomized model with repeated measures (Kirk, 1968, pp. 245-284; Lindquist, 1953, pp. 267-272) is recommended. If the two groups gained differentially, a significant group by test interaction will be observed. This can be followed up using t-tests to determine which group outperformed the other.

Summary

If the raw data are sent to the TU office, the TU evaluators will perform the analyses for you. If local assistance is available, the TU office still needs the raw student data plus the completed Procedures Questionnaire. In this case, the data can be analyzed using the procedures outlined above.

Procedures Summary

By using the sample objectives, implementing the design indicated, administering appropriate tests, and analyzing the data in the manner indicated, the efficacy of the TU program in your school can be established. Technical assistance in this regard is available from the TU office in Mobile.

CHAPTER III

REPORTING RESULTS

A clear and concise reporting of the results is needed to communicate your project's effectiveness. This chapter provides some hints on how to do this.

Two basic types of information are needed to analyze a project's effectiveness. These are inferential results which indicate the likelihood that results are also true in the whole population and descriptive results which provide evidence of the project's success with the sample. Both types of results may be reported using tables and/or figures. The basic raw data on each individual student will not be part of the printed report but should be submitted to the TU office in Mobile as they are combined with data from other TU programs from around the country for further analysis.

Three inferential analysis procedures were suggested in Chapter II. These were the t-test, Wilcoxon, and the analysis of variance procedure. The t-test and Wilcoxon procedures were suggested for the posttest only design while the analysis of variance was suggested for the pretest-posttest design. The reporting of the results from each procedure will be noted separately.

Posttest Only Design

Both the inferential and the descriptive information in the posttest only situation can be reported in one table. An example is given below:

Table 1

Summary of Experimental and Comparison Data
for Productive Thinking
Grades 1 - 3

Grade		Flexibility			Originality		
		Group			Group		
		Exp.	Comp.	t-value	Exp.	Comp.	t-value
1	Mean	16.8	7.8	7.59*	30.4	26.9	1.15
	SD	5.2	4.1		14.0	14.7	
	N	46	26		46	26	
2	Mean	19.3	10.4	4.34*	34.1	37.3	-.46
	SD	5.9	6.7		12.1	24.9	
	N	14	35		14	35	
3	Mean	14.7	12.6	1.31	36.9	24.8	3.21*
	SD	3.3	4.7		19.2	11.7	
	N	10	31		32	37	

*Experimental group significantly outperformed the comparison group at the .05 level.

Note that for each group, the mean, standard deviation (SD), and sample size (N) are provided along with the t-value. Thus, an individual can glean both the inferential and descriptive information from the table. A table should be able to stand alone, that is, be interepreted without having to refer to the narrative for further explanation. Thus, the title of the table describes what is in the table. A figure or graph could also

be used to display the data but it would not be any more informative in this case.

If the variances of the two groups are not homogeneous and the Wilcoxon procedure is used, a similar table can be used replacing the mean, SD, and t-value with the median, interquartile range, and Wilcoxon U-statistic respectively.

Pretest-Posttest Design

An analysis of variance procedure is recommended when a pretest-posttest design is used. Describing the results requires at least two tables--a standard analysis of variance summary table and a table of means and standard deviations.

The analysis of variance summary table for a oneway design with repeated measures is shown below.

Table 2

Analysis of Variance Summary Table Comparing TU and Comparison Groups on Fluency Variable

Source	SS	DF	MS	F
Between Groups	170.1	1	170.1	1.72
Between Error	9713.9	95	98.7	
Repeated Measures	267.6	1	267.6	22.44*
Groups by Measures	233.1	2	116.6	9.77*
Within Error	1132.87	95	11.9	

*Significant at .01 level.

The descriptive information can be shown in a table such as Table 3.

Table 3

Descriptive Information on Fluency Variable

		Pretest		Posttest	
Group	N	Mean	SD	Mean	SD
TU Experimental	47	26.3	7.51	33.4	7.44
Comparison	42	27.1	7.48	27.8	7.49

Note that Table 3 can be expanded to include multiple grades, multiple comparison variables, etc.

The same information can be displayed very effectively in a figure (graph).

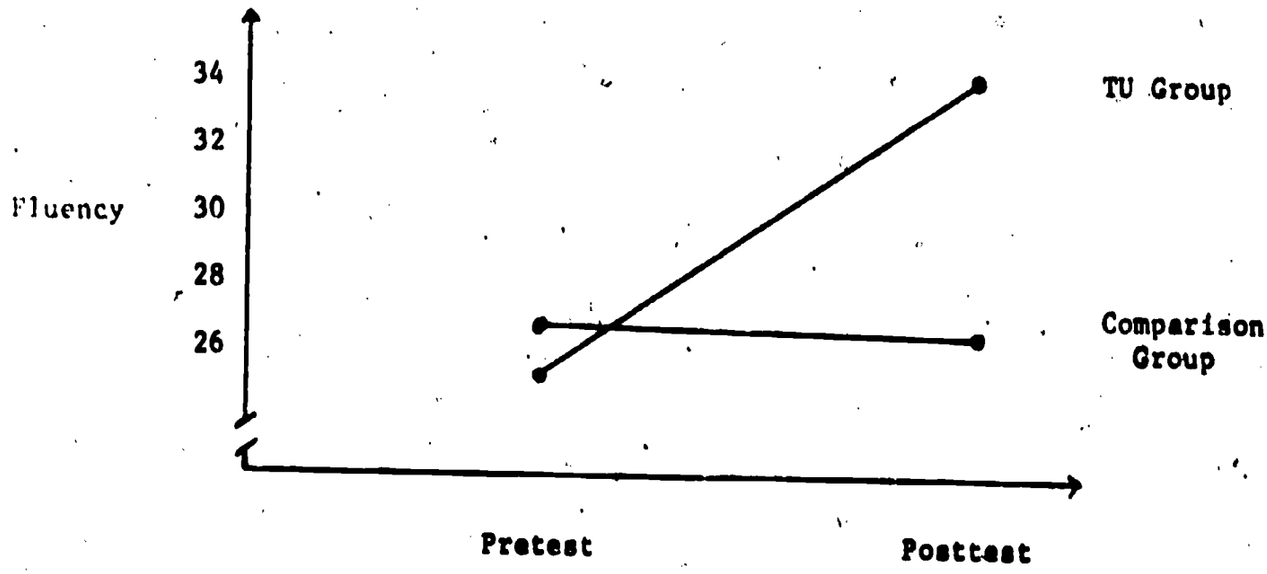

Figure 1. TU and comparison groups on variable, fluency.

Note that the entire "fluency" scale is not shown and a cutout is provided to communicate this. This type of figure is especially dramatic when the TU group outperforms the comparison group.

Reporting Results Summary

The key issue when reporting results is to provide the information needed for someone to judge the program in as short and concise a manner as possible. The illustrations in this chapter are intended only as guides. Modifications will be needed in many cases but the same ideas can be used.

CHAPTER IV

SUMMARY

The material in this guide is intended to assist project evaluators at the school level in evaluating TU programs. Obviously, it cannot answer all of the questions which might arise. Should you encounter a problem not covered in this guide, technical assistance is available from several sources:

Technical Director: Ms. Sara Walrop
Arlington School
1107 Arlington Street
Mobile, Alabama 36606
(205) 690-8055

Evaluators: Dr. James E. McLean
P. O. Box 4006
The University of Alabama
University, Alabama 35486
(205) 348-7575

Dr. Brad S. Chissom
P. O. Box Q
The University of Alabama
University, Alabama 35486
(205) 348-7575

Dr. John M. Lane
College of Education
University of South Alabama
Mobile, Alabama 36608
(205) 460-7141

An important point in regard to the evaluation is that it be planned before TU instruction begins. It is very difficult and many times impossible to design an effective evaluation after the fact. For example, pretest results cannot be obtained after students have been

exposed to the TU process. Thus, some preplanning can eliminate evaluation problems later.

REFERENCES

Ferguson, George A. Statistical analysis in psychology and education (4th ed.). New York: McGraw-Hill Book Company, 1976.

Kirk, Roger E. Experimental design: Procedures for the behavioral sciences. Belmont, Calif.: Brooks/Cole Publishing Company, 1968.

Lindquist, E. F. Design and analysis of experiments in psychology and education. Boston: Houghton-Mifflin Company, 1953.

APPENDIX A

SAMPLE TU PROGRAM OBJECTIVES

Example 1

> By the end of the school year, students receiving TU instruction in the Productive Thinking talent will outperform significantly (at the .05 level) students not receiving TU instruction in this talent as indicated by the Productive Thinking Criterion Referenced Talent Tests.

This objective is intended for the posttest only designs. It can be modified for any talent by substituting Forecasting, Decision Making, Planning, or Communications for Productive Thinking. In addition, other tests such as the Torrance Tests of Creativity may be substituted for the TU Criterion Referenced Talent Tests where appropriate or used in conjunction with the CRTs.

If a pretest-posttest design is used, the objectives need to be modified slightly to reflect this. Example 2 provides an illustration of this for the Decision Making Talent.

Example 2

> Between the beginning and the end of the school year, students receiving TU instruction in the Decision Making Talent will outgain students not receiving TU instruction significantly (at the .05 level) as indicated by the Decision Making Criterion Referenced Test.

This objective takes into account the idea of the TU students outgaining the others. Both a pretest and posttest are needed to establish if this does indeed happen.

Sometimes it is desirable to include an objective concerning

academic growth. This usually will involve one or more of the three basic skills--reading, writing, and arithmetic. Objectives for these can be done separately for each, much in the same manner as those for the talent objectives or combined into a single academic object. A posttest only single academic objective is illustrated below.

Example 3

> By the end of the school year, students receiving TU instruction will outperform significantly (at the .05 level) in the basic academic skills students not receiving TU instruction as indicated by the California Test of Basic Skills.

This objective may employ any standardized test battery. Many times it can be tested using the results of a state-wide testing program, thus eliminating the need for additional testing. In the case of non-random sampled groups, the pretest-posttest design should be used and thus, an objective similar to that illustrated in Example 2.

APPENDIX B

TALENTS UNLIMITED TEST DATA REPORT

FORM A (TU CRITERION REFERENCED TESTS)

School _____ Project Director _____

City _____ State _____

Student's Name (Optional)	Grade	Check one**		Productive Thinking		Forecasting		Decision Making		Planning		Communication	
		TU	Control	( )* Pre	( )* Post	( )* Pre	( )* Post	( )* Pre	( )* Post	( )* Pre	( )* Post	( )* Pre	( )* Post

*Insert data test was administered in parentheses.

**"TU" indicates student received Talents Unlimited treatment, "Control" indicates the student did not.

TALENTS UNLIMITED TEST DATA REPORT

FORM B (ACADEMIC AND OTHER TESTS)

School _____ Project Director _____

City _____ State _____

Name of test/Subtest															
Form/Level															
Student's Name (Optional)	Grade	Check one** TU	Control	( )* Pre	( )* Post	( )* Pre	( )* Post	( )* Pre	( )* Post	( )* Pre	( )* Post	( )* Pre	( )* Post	( )* Pre	( )* Post

*Insert date test was administered.

**"TU" indicates student received Talents Unlimited treatment, "Control" indicates the student did not.

APPENDIX C

PROCEDURES QUESTIONNAIRE

Name of adopting school _____

(Check one) _____ Elementary _____ Middle or Junior High _____ High School

Name of person filling out this questionnaire _____

Address _____
Street City State Zip Code

School Principal _____

TU Contact Person _____

1. Is your school (check one)

   ____ Public

   ____ Private

   ____ Other _____

2. How would you classify your community? (check one)

   ____ Large city (over 250,000)

   ____ Medium city (100,000 to 250,000)

   ____ Small city (less than 100,000)

   ____ Suburban (within 25 miles of city above)

   ____ Rural

3. Estimate the proportion of TU children which come from homes where the breadwinner is:

   ____ Professional/Technical

   ____ Other white collar (e.g., Clerk, Clerical, etc.)

   ____ Blue collar skill labor, etc.

   ____ Unskilled labor

   ____ Other _____

4. How were the TU students selected?

___ Randomly by student

___ Groups were selected randomly

___ Groups were assigned

___ Other (Please explain) _____

_____

5. How were control (comparison) students selected?

___ No control group

___ Randomly by student

___ Groups were selected randomly

___ Non-TU groups were assigned as control

___ Other (Please explain) _____

_____

6. What were the testing dates by month and year?

_____ Pretest (if any)

_____ Posttest

_____ Other _____