

A COMPARISON OF ACADEMIC ACHIEVEMENT
ON THE
TENNESSEE COMPREHENSIVE ASSESSMENT PROGRAM
AND THE
TERRANOVA CTBS

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A Comparison of Academic Achievement
on the
Tennessee Comprehensive Assessment Program
and the
TerraNova CTBS

A Thesis
Presented to the
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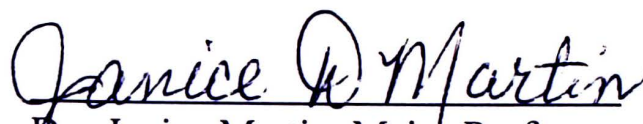
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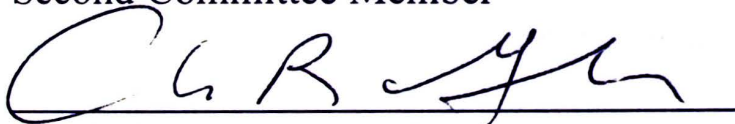
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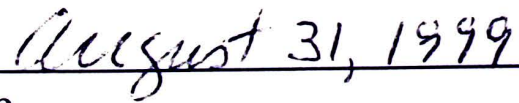
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Abstract

The current study examined the scores of elementary students on the Tennessee Comprehensive Assessment Program and the TerraNova CTBS in order to determine if differences between the two sets of scores exist. With increasing frequency standardized testing is being used in the assessment of the child, the teacher, the individual school, the school district and the state (Baker & Xu, 1995; Bobbett, French, and Achilles, 1992; CTB/McGraw-Hill, 1997b). In the past, the Tennessee Comprehensive Assessment Program (TCAP), with its high reliability and validity, was used for this purpose. The TerraNova was administered in Tennessee for the first time in the Spring of 1998, to replace the TCAP test. There is no published research comparing the TerraNova with the TCAP. The current study provides information about the similarity between the TCAP and the TerraNova and the degree of correlation between the two tests, in the areas of reading, language, mathematics, science, social studies, and spelling. Results show that there are significant differences between the TCAP and the TerraNova in all six areas.

TABLE OF CONTENTS

CHAPTER	PAGE
I. INTRODUCTION	1
Definition of Terms	2
Purpose of the Study.	2
II. REVIEW OF THE LITERATURE	4
III. METHOD.	7
Participants	7
Materials	7
Tennessee Comprehensive Assessment Program.	7
Sampling Norms.	8
Reliability.	8
Validity.	8
TerraNova CTBS	9
Sampling Norms.	10
Reliability.	10
Validity	10
Procedure.	11
Experimental Hypotheses.	12
IV. RESULTS	13
V. DISCUSSION	17
Limitations of the Study.	20

Instructional Implications	20
Implications for Further Research.	20
Recommendations.	21
REFERENCES.	24
VITA.	27

CHAPTER I

INTRODUCTION

Achievement tests play an important role in the assessment process in today's schools. With increasing frequency standardized testing is being used in the assessment of the child, the teacher, the individual school, the school district and the state. Achievement tests provide data for determining a student's growth in academic achievement. The information shared with parents and guardians helps involve them in the educational process. Assessment data also helps principals and staff to focus on individual needs and groups with common needs, and with the selection of materials and strategies to meet educational objectives (CTB/McGraw-Hill, 1997a). Test data is used by educators to determine strengths and weaknesses in the curriculum at the district level. Test data helps administrators in evaluating instructional programs and in determining teacher affect on student academic gains (Baker & Xu, 1995). Data is also used for comparing students' scores with the median national scores (Tennessee State Board of Education, 1995). Scores are often used as justification for budget allocations and placement decisions. Thus, in the selection of a particular achievement test for the above purposes it is of utmost importance that the instrument be one in which the sample population has been accurately represented, with high reliability and high validity.

The current study examined the similarities and differences between the 1997 Tennessee Comprehensive Assessment Program (TCAP) and the 1998 TerraNova CTBS (TerraNova) achievement battery. Understanding the similarities and differences between the TCAP and the TerraNova tests. Understanding between the TCAP and the TerraNova will aid the educator and administrator to

determine whether the TerraNova can be effectively utilized for the same purposes as the TCAP.

Definition of Terms

Normal curve equivalent score (NCE): A score developed for use by educators and psychologists engaged in research projects for the United States Office of Education. The NCE has a mean of 50 and a standard deviation of 21.06 (Lyman, 1991).

Tennessee Comprehensive Assessment Program (TCAP): A group administered achievement battery for grades 2 to 8 that is both criterion referenced and norm referenced. It measures mastery for reading, language, mathematics, science, social studies, spelling, and study skills.

TerraNova Assessment Series: Complete Battery Plus (TerraNova): A group administered achievement battery for grades K - 12 that is both criterion referenced and norm referenced. It measures mastery for reading, language, mathematics, science, social studies, and spelling.

Purpose of the Study

The purpose of the current study was to provide information about the similarities and differences between the TCAP and the TerraNova tests. Understanding the similarities and differences between the TCAP and the TerraNova will aid those in

the field of education to determine whether the TerraNova can be effectively utilized for the same purposes as the TCAP. It is hypothesized that there will be no significant differences between the TCAP and the TerraNova. Both batteries are norm referenced and criterion referenced. The TCAP and the TerraNova sample populations include Tennessee. Both report that the reference criteria are derived from Tennessee school curriculum objectives and grade appropriate textbooks used in the schools. Both the TCAP and the TerraNova report high reliability, and both assess the same areas: reading, language, mathematics, science, social studies and spelling. Finally, both the TCAP and the TerraNova are created by CTB/McGraw-Hill.

CHAPTER II

REVIEW OF THE LITERATURE

Research Involving the Tennessee Comprehensive Assessment Program

Little research has been compiled involving the Tennessee Comprehensive Assessment Program (TCAP). Data that has been gathered involves use of the TCAP to provide a baseline for a longitudinal study, to compare Tennessee students with the national median, and to determine student gains for administrative and academic evaluation purposes.

The state of Tennessee has in the past used the Tennessee Comprehensive Assessment Program (TCAP). The TCAP is a battery of tests produced by combining criterion referenced items developed by the State Testing and Evaluation Center with the Comprehensive Tests of Basic Skills, Fourth Edition (State Testing and Evaluation Center, 1993). The 1992 TCAP scores provided a baseline for a longitudinal study for determining overall growth in achievement and for comparing the scores obtained by Tennessee students with the median national percentiles (Tennessee State Board of Education, 1995). TCAP data has also been used in the Tennessee Value-Added Assessment System to measure district, school and teacher affects on student gains of the (Baker & Xu, 1995). TCAP data has also been used in Tennessee's district report cards (Bobbett, French, & Achilles, 1992).

The TerraNova Complete Battery Plus Form A

There is currently no published research involving the Complete Battery Plus

Form A edition of the TerraNova. During the 1997-98 academic year, Tennessee students were administered the Complete Battery Plus Form A edition of the TerraNova for the first time. The TerraNova is a new bank of test items developed by CTB McGraw-Hill to replace Forms A-H of the TCAP. The TerraNova was selected for use in Tennessee because of its greater alignment to curriculum, instruction and assessment; and its compliance with legislation requiring the use of non-redundant items each year that achievement tests are administered (Tennessee Dept. Of Education, 1998). The subjects covered on the test include reading, language arts, mathematics, science, social studies and spelling.

Similarities and Differences Between the TCAP and the TerraNova

Like the TCAP, the TerraNova produces both norm-referenced and criterion referenced score reports (CTB/McGraw-Hill, 1997b, 1997c, 1997e; State Testing Division of the Tennessee Department of Education, 1989). However, the TerraNova differs from the TCAP in several areas. First, the TerraNova provides more detailed performance level data than the TCAP. Performance levels are an evaluation of a particular student's progress in his grade. Each performance level has a description of the knowledge, skills, and abilities typically held by students in that performance level. Whereas, the TCAP reports a student's progress in his grade using the levels Below Proficient (Basic), Proficient, and Advanced as descriptors, the TerraNova reports a student's progress using five performance levels as descriptors: Step 1, Progressing, Nearing Proficiency, Proficient, and Advanced (CTB/McGraw-Hill, 1997a). In addition,

the Terra-Nova reading/language subtest uses authentic passages and articles from magazines and newspapers. In the mathematics test there are more problem-solving questions requiring greater reading comprehension; rulers are furnished for each student; and school systems may decide whether or not calculators are to be used. Questions are based on real life themes, measuring thinking skills as well as computational and mechanical skills. All items are multiple choice. Third grade students bubble their answers in test booklets. The TerraNova tests have more visuals, color, graphics, charts and photographs. The TerraNova test is also designed to have reduced interruptions with less starting and stopping time between tests due to fewer short, skill-based subtests (Tennessee Department of Education, 1998). Since there is currently no published research involving the TerraNova, the degree of correlation between the TerraNova and the TCAP tests is currently not known.

CHAPTER III

METHOD

Participants

Data were obtained from 100 randomly chosen students who attended the Clarksville-Montgomery County School System in Tennessee, and who had been administered the 1997 TCAP tests as fourth graders and the 1998 TerraNova CTBS Complete Battery Plus as fifth graders.

Materials

The current study used the Tennessee Comprehensive Assessment Program which was developed by CTB/McGraw-Hill (1990), and the TerraNova Complete Battery Plus which was also developed by CTB/McGraw-Hill (1997).

Tennessee Comprehensive Assessment Program

The TCAP (CTB/McGraw-Hill, 1990), created in 1988 is a group administered achievement battery for grades two to eight that is both criterion referenced and norm referenced. It measures mastery of the language arts and mathematics curriculum objectives for Tennessee schools as well as the following skills in the Comprehensive Tests of Basic Skills (CTBS/4): reading, language, mathematics, science, social studies, spelling and study skills (Tennessee State Board of Education, 1995; State Testing and Evaluation Center, 1993; Lankford, 1994).

TCAP scores have been used for several purposes. The 1992 TCAP testing provided baseline data for a longitudinal study to determine overall growth in

achievement, and for comparing Tennessee students' scores with the median national percentiles (Tennessee State Board of Education, 1995). TCAP scores have also been used in the Tennessee Value-Added Assessment System to measure district, school, and teacher affects on student academic gains (Baker & Xu, 1995). TCAP data has been further used in Tennessee's district report cards (Bobbett et al., 1992).

Sampling Norms. The state of Tennessee was included in the data describing the demographic characteristics of the sampling units. In Spring of 1988, the sample size was 156,000 in grades K through 12. The Fall 1988 standardization involved approximately 167,000 students. The state of Tennessee was appropriately represented in the sample population.

Reliability. Split-half coefficients using the Kuder-Richardson formula (converted to the Spearman Brown) were used to report internal consistency. The coefficients for the grade 4 students who were tested in the Spring of 1988, had the following reliability: Total Reading, $R=.88$; Total Language, $R=.86$; Total Math, $R=.85$; and Total Battery, $R=.95$. The coefficients for the grade 5 students were: Total Reading, $R=.85$; Total Language, $R=.85$; Total Math, $R=.86$; and Total Battery, $R=.94$ (State Testing Division of the Tennessee Department of Education, 1989). The high levels of correlation coefficients indicate the test's internal consistency.

Validity. The TCAP is criterion referenced and norm referenced. It is based on the grade-specific educational objectives formulated through a variety of resources including state and district curriculum guides, textbook series, norm referenced and criterion referenced assessment instruments, and instructional programs already being

used by school districts (Lankford, 1994; State Testing Division...1989).

TerraNova Assessment Series (TerraNova)

The TerraNova is a group administered achievement battery for grades K through 12 that offers norm referenced and curriculum referenced information that is tied to a common scale. It includes the following supplemental tests: Word Analysis, Vocabulary, Language Mechanics, Spelling, and Mathematics Computation. The items reflect educational objectives commonly found in state, district, and diocese curriculum guides, as well as in major textbooks, basal series, and instructional programs, and in national standards publications.

The Terra Nova Assessment Series has several components: The Comprehensive Tests of Basic Skills (CTBS) editions, Multiple Assessments, Performance Assessments, SUPERA, and Custom Component. The Comprehensive Tests of Basic Skills offers the following editions: Survey, Survey Plus, Complete Battery, Complete Battery Plus, Basic Battery, and Basic Battery Plus. The SUPERA editions offer a Spanish version of the Survey and Multiple Assessments. All offer norm referenced and curriculum referenced information, and are tied to a common scale and share a set of linking items, providing consistent and comparable information across grades (CTB/McGraw-Hill, 1997b, 1997d).

The Complete Battery Plus edition measures higher order thinking skills as well as such basic skills as spelling, language usage and mathematics computation. Tennessee is using this edition to measure concepts, processes, and skills taught in the

following subject areas: reading/language arts, mathematics, science, and social studies, ranging from grades K through 12, in Tennessee schools (Tennessee Dept. Of Education, 1998).

Sampling Norms. The state of Tennessee was included in the data describing the demographic characteristics of the sampling units. In Spring of 1996, the sample size was 100,650 in grades K through 12. The Fall 1996 standardization involved 71,366 students in grades 1 through 12. Tennessee was appropriately represented in the sample population.

Reliability The TerraNova/CTBS Complete Battery's coefficient alpha is identical to the Kuder-Richardson Formula 20. The coefficients for the grade 4 students who were tested in the Spring of 1996 had the following reliability: Reading Composite, $R=.95$; Language Composite, $R=.91$; Mathematics Composite, $R=.95$; and Total Score, $R=.97$. The coefficients for the grade 5 students were: Reading Composite, $R=.94$; Language Composite, $R=.92$; Mathematics Composite, $R=.94$; and Total Score, $R=.97$. The high levels of correlation indicate the test's internal consistency.

Validity. The TerraNova is criterion referenced, has construct validity, convergent and discriminant validity, and content validity. Validity procedures included conducting planning sessions and focus groups, analyzing current curriculum framework and major textbook series, consulting national standards; and, conducting student and teacher usability studies, sensitivity/bias reviews, and item tryouts (CTB/McGraw-Hill, 1997c). No information was found concerning how well the TerraNova matched

Clarksville-Montgomery County School System's curriculum, which is based on the Tennessee school curriculum.

Procedure

The TCAP was administered in April of 1997, to each class by one teacher and one proctor, according to specific written instructions concerning the time limit for each subtest and the oral instructions given to each class. The teacher who administered the TCAP was not the regular home classroom teacher, and the proctor was someone other than the parent of a child who was currently in the same grade. The test was administered in segments and completed over 4 days.

The Terra Nova was administered in April of 1998, to each class by one teacher and one proctor, according to specific instructions concerning time limits for each subtest and oral instructions to be given to the class. The test administrator was not the home classroom teacher, and the proctor was someone other than the parent of a child who was currently in the same grade. Total testing time was approximately 5 hours, broken into segments over 4 days.

The 1997 TCAP test scores, and the 1998 Terra Nova scores for 100 students were obtained with permission from the Research and Development department at the personnel office of the Clarksville-Montgomery County School System.. To maintain student confidentiality, no individual student was identified by name and no identifiable information was disclosed. Each set of scores was given an identification number. The

current study used the Normal curve equivalent scores (NCE).

Experimental Hypothesis

It was hypothesized that the student's achievement test scores would not differ. More specifically, there would be no significant differences in the students' scores between the 1997 TCAP and the 1998 TerraNova ($\alpha < .05$) across one or more of the six scales.

CHAPTER IV

RESULTS

SPSS, a statistical software package, was used to examine the data collected from the 1997 TCAP (Tennessee Comprehensive Assessment Program) and the 1998 TerraNova (TerraNova/CTBS Complete Battery). Statistical analysis using a correlation was performed to determine the significance of the relationship between the TCAP and the TerraNova across the following subtests: Reading, Language, Math, Science, Social Studies, Spelling, and the Battery Total. The normal curve equivalent (NCE), a standardized score, from each test was used. Results showed that overall, the TCAP and the TerraNova are highly correlated. Table 1 shows the correlation coefficients for all of the subtests and the total battery.

Significant differences between the mean of the subtests on the TCAP and the TerraNova were determined using t-tests. A summary of the results is reported in Table 2. Reading Total (RT), Language Total (LT), Math Total (MT), Science (S), Social Studies (SS), Spelling (SP), and Battery Total (BT) scores were shown to differ. However, there is no significant difference between the total battery scores. Significant differences were noted between subtests. The TerraNova Language (LT) scores were significantly higher than the TCAP Language scores ($\alpha < .05$). The TCAP science scores (S) were significantly higher than the science TerraNova scores ($\alpha < .05$). The TCAP social studies scores (SS) were significantly higher than the TerraNova social studies scores ($\alpha < .05$). The results of this investigation suggest that although there

are significant difference between the 1997 TCAP and the 1998 TerraNova scores in the areas of language, science, and social studies, the two tests are highly correlated.

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Table 1

Correlations: 1997 TCAP NCE scores and 1998 TerraNova NCE scores

<u>Scale</u>	<u>Corr</u>	<u>Sig</u>
Reading Total	.742	.000
Language Total	.714	.000*
Math Total	.742	.000
Science	.666	.000*
Social Studies	.714	.000*
Spelling	.672	.000
Battery Total	.834	.000

*p<.05

Table 2

Mean, Standard Deviations and t-values for Each Subtest

Scale	<u>TCAP 1997 n = 100</u>		<u>TerraNova 1998 n = 100</u>		<u>t-value</u>
	Mean	SD	Mean	SD	
RT	56.3200	20.438	57.0500	18.321	-.52
LT	55.6700	19.034	59.2800	19.692	-2.46*
MT	56.2000	18.308	56.6300	18.246	-.33
S	56.4000	17.613	52.2300	16.919	2.95*
SS	57.1200	17.182	54.2700	16.301	2.25*
SP	58.2900	24.421	57.9200	17.230	.20
BT	56.3700	18.630	57.6300	16.961	-1.21

*p<.05

CHAPTER V

DISCUSSION

The current study examined student scores between the 1997 Tennessee Comprehensive Assessment Program and the 1998 TerraNova CTBS. The alternate hypothesis that the 1997 Tennessee Comprehensive Assessment Program and the 1998 TerraNova CTBS differ in numerical scores was supported. An overall test score difference was obtained. Further analysis revealed that the 1998 TerraNova scores tend to be numerically lower than the 1997 TCAP scores in all areas. The results suggest that the 1997 Tennessee Comprehensive Assessment Program scores do differ from the 1998 TerraNova scores in the areas of Reading, Language, Math, Science, Social Studies, and Spelling.

Students' scores differed significantly on the Language (L) subtest. The 1998 TerraNova scores were significantly higher than the 1997 TCAP scores. The higher scores for the students on the Language subtest suggests that the items on the 1998 TerraNova may be less difficult. The higher scores may also suggest that the students learned the subject matter in the fifth grade better than they learned it in the fourth grade. Higher scores could also be accounted for if curriculum based criteria of the 1998 TerraNova is different from that of the 1997 TCAP. The Language items of the TerraNova measure several areas: an understanding of language structure to include parts of speech, syntactic structures, and grammatical structures; correct usage and

mechanics of the standard written English; and, a knowledge of sentence sense and style, to include the use of syntactic constructions, audience and purpose. The Language items on the TerraNova, however, emphasize proofreading and editing (CTB/McGraw-Hill, 1997c). The Language items on the TCAP measure similar skills; however, the TCAP does not appear to emphasize proofreading or editing. Also the TCAP does not expect students to define parts of speech (State Testing Division...1989). The Clarksville-Montgomery County School System (CMCSS) elementary school teachers may opt to assign daily morning work to their students that is termed Daily Oral Language (DOL), which emphasizes editing and proofreading (Vail & Papenfuss, 1993). Thus, it is possible that the higher Language scores on the TerraNova are due to daily DOL exercises. The higher TerraNova scores on Language may also be due to items being placed in the context of passages that are interesting to the student. The TerraNova may have more language items than the TCAP, so that if a student misses a single language item on the TerraNova it would be less weighted than a single language item missed on the TCAP test. The number of items pertaining to a specific language skill may be different between the two tests.

Students' scores were significantly different on the Science (S) subtest. The 1998 TerraNova scores were significantly lower than then 1997 TCAP scores. Both the TerraNova and the TCAP Science test measure mastery of life science, physical science, Earth and space science, and science inquiry skills which include pattern recognition, description, explanation, interpretation, recall, analysis, and synthesis of concepts.

However, the TerraNova additionally covers the relationship of science to society and technology, and the history and nature of science in some of the items. It is possible that the 1998 TerraNova Science scores are lower than the 1997 TCAP scores because the new material that was covered in the TerraNova was not taught in the classroom that year. It is also possible that the material was taught but the students did not learn it.

Students' scores were also significantly different on the Social Studies (SS) subtest. The 1998 TerraNova scores were significantly lower than the 1997 TCAP scores. Both tests measure how well students understand the interrelationships among the social studies disciplines as well as background knowledge and mastery of associated skills. However, it appears that there may be significant differences between the two tests in how those disciplines are defined. The TerraNova technical manual (CTB/McGraw-Hill, 1997c) states that the disciplines measured are history, geography, civics and government, and economics. However, the technical manual for the TCAP is unclear about defining "traditional disciplines" (State Testing Division...1989, p. 13). Thus, these tests may be measuring different constructs. In addition, to reflect the use of primary sources in the classroom, the TCAP includes quotations from men and women of historical significance. In contrast, to achieve this same purpose the TerraNova makes use of photographs, historical documents and records. It is possible that the use of graphics on the TerraNova may have been unexpected to children used to taking the TCAP, thereby causing a decrease in test scores. Negative comments about the graphics were made by several teachers in this study's school district. It is also possible that the

item contents measured some areas that were difficult for the students to learn.

Limitations of the Study

This study took place within the same school district; therefore, the results may not be applicable to all Tennessee schools. The sample population was limited to 100 students; therefore, it may not be representative of all Tennessee schools. The study was limited to two grades: fourth and fifth. The study did not control for demographic features such as race, ethnicity, and economic status; therefore, the results should not be generalized to include all children taking these tests.

Instructional Implications

The results of the current study imply that although the TCAP and the TerraNova are highly correlated, the administrator and educator must exercise caution not to attempt to determine student gains by comparing the 1997 TCAP scores with the 1998 TerraNova scores, specifically in the areas of language, science, and social studies. The results further imply that the TerraNova may be measuring different areas of a specific subject than the TCAP.

Implications for Further Research

Further studies in this area should be made with larger sample populations that

more accurately represent the Tennessee school population. Thus, the population should include all the different grades and accurately represent the demographics in the Tennessee schools. Further studies should also include a correlational study to determine the degree of the relationship between the TerraNova and the student's report card grades. Due to the importance placed upon the results of achievement tests to determine student gains in the state of Tennessee, further research is needed in the form of an equating study so that student gains for the 1997-98 school year in Tennessee are accurately determined. Because the TerraNova appears to be more norm referenced than the TCAP, it is recommended that further research be done in the area of curriculum goals, such as: Should school districts change their curriculum to match national goal objectives? It would be interesting to note teachers' attitudes concerning the issue of the state government vs. local government intervention in the areas of curriculum goal objectives and achievement testing.

Recommendations

Tennessee students may benefit academically if taught more in depth about the relationship of science to society and technology, and the history and nature of science. Other Tennessee school systems may benefit by using the DOL exercises in their 5th grade class. The Montgomery County School System should not attempt to measure student gains for the 1997-1998 school year, especially in the areas of language, science, and social studies because it is possible that the 1998 TerraNova test does not measure

the same skills as the 1997 TCAP test did. Because the TerraNova appears to have more norm referenced items than the TCAP, it is advised that those who are in charge of curriculum construction consider the differences in the tests.

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VITA

VITA

Isabel Asencio Weidman was born in New York City, New York on June 3, 1951. She attended elementary, middle and high school in the public system of New York City. She served in the U.S. Army from 1976 through 1979 in the field of communications and electronics, and was honorably discharged. She entered Austin Peay State University in August 1979 receiving a Bachelor of Science in Psychology in June 1983.

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