

RELIABILITY OF *THE PRINT TOOL*TM IN MEASURING HANDWRITING
ABILITIES IN KINDERGARTEN STUDENTS

A THESIS

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BY

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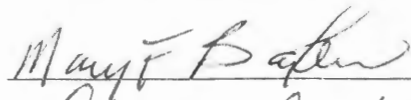
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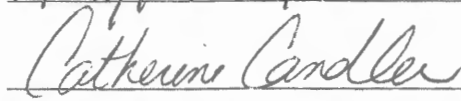
I am submitting herewith a thesis written by Morgan Broussard entitled "Reliability of *The Print Tool*TM in Measuring Handwriting Ability in Kindergarten Students." I have examined this thesis for form and content and recommend that it be accepted in partial fulfillment of the requirements for the degree of Master of Arts with a major in Occupational Therapy.



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We have read this thesis and recommend its acceptance:





Dr. Catherine Candler, Interim Director

Accepted:



Dean of the Graduate School

ABSTRACT

MORGAN BROUSSARD

RELIABILITY OF *THE PRINT TOOL™* IN MEASURING HANDWRITING ABILITIES IN KINDERGARTEN STUDENTS

DECEMBER 2010

Occupational therapists in the educational setting are concerned with the child's functional participation in school related tasks. Handwriting is the primary fine motor task that occupies 30-60% of a child's school day. As the demand for evidenced based assessment and intervention strategies continue to guide occupational therapy practice, practitioners are charged with the responsibility of using assessment tools with sound psychometric properties and to consider the strengths and weaknesses of the tools available. The research objective of this study was to determine if *The Print Tool™* is sufficiently reliable to be used to document the quality of handwriting in kindergarten students. Thirty kindergarten students were recruited from a public elementary school in south-central Louisiana. Testing and retesting was conducted during the second semester of the school year and revealed fair correlation and no significant change between scores obtained for Capitals Total ($r = .712$) and Overall Score ($r = .723$).

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CHAPTER I

BACKGROUND

One role of occupational therapists who practice in an educational setting is to assist students who demonstrate educational difficulties to engage more fully in school related tasks. Handwriting is the primary fine motor task in which school children engage, occupying 30-60% of a child's school day (Rosenblum, Goldstand, & Parush, 2006). Writing instruction typically falls within the role of the teacher, however, when problems with handwriting are identified in students, teachers often refer them to occupational therapy (Burton & Dancisak, 2000; Schoen, 2001).

Feder and Majnemer (2007) emphasized the importance of handwriting, stating it is the most immediate form of written communication and is a critical skill not only in the classroom, but also throughout adulthood. According to those investigators, children with poor handwriting are often mislabeled as unmotivated, lazy or noncompliant, which leads to problems in self-esteem. A child's handwriting ability is often considered a reflection of the child's academic abilities, regardless of quality of the content. Despite the widespread use of technology, handwriting continues to be an essential life skill and a viable academic skill (Cahill, 2009; Feder & Majnemer, 2007).

Occupational therapists in the school setting are often responsible for evaluating handwriting abilities of students when problems arise that interfere with school success. As the demand for evidenced based assessment and intervention strategies continues to guide occupational therapy practice, practitioners are charged with the responsibility of using assessment tools with sound psychometric properties and must evaluate the strengths and weaknesses of any assessment they use (AOTA, 2008; Amundson & Weil, 2001; Chu, 1997; Feder & Majnemer, 2003). While various handwriting assessment tools are available, none, other than *The Print Tool™*, are designed to measure handwriting ability among kindergarten students.

The use of standardized handwriting evaluations in the clinical setting is necessary to ensure best practice in identifying areas of difficulty and appropriate interventions (Feder & Majnemer, 2003). This practice approach also applies to the educational setting because school based occupational therapists are encouraged to use standardized assessments to guide assessment and intervention strategies. *The Print Tool™* (Olsen & Knapton, 2006) is a newly developed assessment tool that may be used to assess the handwriting abilities of kindergarten students, following instruction in letter formation. The research question guiding this project was “Is *The Print Tool™* sufficiently reliable to be used with kindergarten children?”.

Literature Review

This literature review will present a discussion of the relation between handwriting and academic success, followed by a brief overview of handwriting development. Factors that may affect handwriting abilities will be presented. Finally, a review of handwriting assessment tools used by occupational therapists will be provided.

Handwriting and Education

Handwriting is one of the first tasks taught in an educational setting. It is a tool that students may use to gather, remember, and share knowledge. When learning about a specific subject, students may explore, organize and refine their ideas through handwriting (Judkins, Dague & Cope, 2009). Children who struggle to learn to write devote a great deal of attention to letter formation that could be spent on composition and revising the content of their writing (Edwards, 2003; Medwell & Wray, 2007). Early identification of handwriting problems is important, because extra support for the struggling writer is most beneficial during the early educational years (Cahill, 2009).

Handwriting benchmarks that students must meet by the end of the kindergarten year include copying upper and lowercase letters, writing one's first and last name, writing the first names of some friends, and writing most letters and some words when dictated (Edwards, 2003). The quality of handwriting then develops quickly during first grade and plateaus by second grade. In third grade,

writing becomes a more automatic skill and is then used as a tool for academic participation (Feder & Majnemer, 2007).

Many educators fail to realize the tie between academic success and handwriting abilities because handwriting instruction is often pushed aside to make way for other areas of curriculum such as state-wide academic achievement testing (Berninger et al., 2006; Cahill, 2009; Medwell & Wray, 2007). As students progress through school, handwriting demands increase, and many children perform poorly because they have not mastered the underlying skills that facilitate success in handwriting (Chu, 1997). Such difficulties may lead to future problems related to spelling, written composition, and other aspects of academic performance (Feder & Majnemer, 2007).

Handwriting Development

Pencil grasp is an important aspect of handwriting ability. Development of pencil grasp occurs within the continuum of fine motor coordination, including primitive, transitional and mature grasp patterns. Implements such as pencils and crayons act as an extension of the hand, and the student's ability to manipulate and control those implements is directly related to the quality of one's handwriting (Feder & Majnemer, 2007; Rosenblum, Goldstand & Parush, 2006; Ziviani, 1995). Children demonstrating atypical or awkward pencil grasp patterns which negatively affect handwriting may also present with poor in-hand manipulation skills or poor graded control of finger and hand movements (Feder & Majnemer, 2007).

Development of the skills required to write is a process that emerges early in life when children begin to scribble on paper as early as ten to twelve months of age. By age two, the ability to imitate horizontal, vertical and circular marks on paper emerges; and by age three, the ability to copy a vertical line, horizontal line, and circle is present in children who are progressing normally. Between the ages of four and five, the ability to copy a cross, oblique lines, a square, and an oblique cross as well as letters and numerals is developed. Frequently, the child begins to write his own name. The ability to copy a triangle and most upper and lower case letters is present by the age of six in typically developing children (Amundson & Weil, 2001).

Occupational Therapy and Handwriting

Occupational therapists have the responsibility of identifying underlying limitations in performance skills that may affect handwriting ability, and those limitations should guide intervention (AOTA, 2008; Burton & Dancisak, 2000). An assessment of the student's handwriting should help caregivers and school personnel identify problems with a child's handwriting and provide a baseline of writing abilities (Chu, 1997). A thorough evaluation of handwriting should include observation of biomechanical and environmental factors (e.g. sitting posture, pencil grasp, writing tools, paper), the quality of writing (e.g. sizing, spacing, alignment, orientation) and other behavioral responses such as attention to task. Physical features of the environment that may affect handwriting abilities include type and positioning of the writing implement used, chair and desk height, writing

surface and paper placement, copying distance, and volume of writing assignment (Feder & Majnemer, 2007; Rosenblum, Goldstand, & Parush, 2006; Ziviani, 1995). Assessment may include examination of written work samples, parent or teacher interviews, clinical/educational file review, direct observation in the natural environment, functional evaluation of handwriting abilities, and further assessment of interfering body functions, including mental functions, neuromusculoskeletal functions, and sensory functions (AOTA, 2008; Chu, 1997; Diekema, Deitz & Amundson, 1998; Feder, Majnemer & Synnes, 2000).

Handwriting is a complex skill necessary for participation in the occupations required by educational settings, as handwriting is used in many educational endeavors. The *Occupational Therapy Practice Framework (AOTA, 2008)* identifies client factors that may affect handwriting abilities, including body functions and body structures. Body functions are those physiological and psychological functions of the body systems and include mental functions, sensory functions, and neuromusculoskeletal functions that may impact handwriting abilities. Mental functions related to handwriting include attention span, memory, sequencing, conceptualization, and generalization of learning. Sensory functions include sensory integration of visual, auditory, tactile, vestibular, and proprioceptive input. Neuromusculoskeletal functions include postural control, muscle power, muscle tone, and endurance, joint mobility and stability (AOTA, 2008; Amundson & Weil, 2001; Feder & Majnemer, 2003). Deficits in one or more of these areas have been linked to handwriting problems

(Amundson & Weil, 2001; Cahill, 2009; Cornhill & Case-Smith, 1996; Feder & Majnemer, 2007, Volman, van Schendel & Jongmans, 2006).

Handwriting Assessment

Currently, most handwriting assessments are subjective as they are often comprised of either checklists or scales that rate the legibility or quality of the writing based upon certain criteria. Such assessments are best used in conjunction with a standardized test to identify underlying barriers. A reliable, quantitative scoring system is useful in examining problems in handwriting as it may be used to monitor progress of the child and to communicate results of both assessment and intervention to the teacher or caregiver (Feder & Majnemer, 2003). Feder, Majnemer and Synnes (2000) expressed a need for more empirical evidence to support the use of handwriting assessments. They recommended further inspection of the reliability and validity of handwriting assessments in reviewing the quality of handwriting, identifying problem areas, documenting progress and communicating results to all parties involved.

A review of handwriting assessment tools frequently used by occupational therapists, including an overview of the content, scoring system, reliability, validity, strengths, and weaknesses of the tests was conducted. The tools reviewed include the *Children's Handwriting Evaluation Scale for Manuscript Writing (CHES-M)*, the *Evaluation Tool of Children's Handwriting-Manuscript (ETCH-M)*, the *Minnesota Handwriting Assessment (MHA)*, the *Test of Handwriting Skills-Revised (THS-R)* and *The Print Tool™*. These assessments

were chosen because they were developed to assess the quality of print or manuscript handwriting of children in the primary grades. Assessments included in the review are those handwriting assessments most commonly discussed in the literature related to children's handwriting. While other handwriting assessment tools are available, they were not included in this review as they address cursive formation or were not frequently mentioned in the literature. Table 1 includes a summary of the characteristics of those handwriting assessment tools reviewed.

TABLE 1. Characteristics of Handwriting Assessment Tools

	CHES-M	ETCH-M	MHA	THS-R	Print Tool
Age or Grade Range	Grades 1-2	Grades 1-2	Grades 1-2	6-19 yrs.	Grades K-4
Alphabet Writing		X		X	X
Numeral Writing		X			X
Near-Point Copying	X	X	X	X	
Far-Point Copying		X			
Dictation		X		X	X
Composition		X			
Handwriting Speed	X	X	X	X	
Percentile	X		X		
Standard			X	X	
Total legibility %		X			X
Reliability: Inter-rater <i>r</i>	ICC .85 - .93	.75 - .92 (1) ICC 63-.77 (2)	Form = .87 Size = .98	.59-1.00	NONE
Test-retest <i>r</i>	NO	.63 - .77	.60 - .89	.37 - .82	NONE
Validity Supported: Criterion-related	NO	NO	NO	NO	NO
Construct	NO	NO	NO	NO	NO
Content	NO	YES (1)	YES	YES	NO

CHES-M = Children's Handwriting Evaluation Scale-Manuscript; ETCH-M = Evaluation Tool of Children's Handwriting-Manuscript; MHA = Minnesota Handwriting Assessment; THS-R = Test of Handwriting Skills-Revised
 (1) Amundson (1995); (2) Deikema, Deitz and Amundson (1998)

The *Children's Handwriting Evaluation Scale for Manuscript Writing (CHES-M)*, developed by Phelps and Stempel (1987), was intended to be used as a diagnostic tool for the evaluation of manuscript writing with the end goal of remediating handwriting difficulties. The *CHES-M* may be administered individually or in a group and requires the student to read a stimulus sentence and copy it while simultaneously being timed. Administration procedures are provided and scoring is based on criteria related to the quality of letter formation, spacing, rhythm, and general appearance. Inter-rater reliability of the *CHES-M* is excellent with an intraclass correlation coefficient of $r = 0.93$ (grade one) and good for grade two, with an intraclass correlation coefficient of $r = 0.85$. Three raters were involved in establishing the inter-rater reliability. No test-retest reliability studies were found. While this assessment is reportedly easy to administer, one disadvantage found was that the scoring criteria are not well defined (Feder & Majnemer, 2003). Additionally, reliability has not been established for kindergarten children.

The *Evaluation Tool of Children's Handwriting-Manuscript (ETCH-M)*, (Amundson, 1995) is a criterion-referenced test that has standard administration and scoring procedures. Requiring 20-30 minutes to administer, it is used to assess manuscript writing of upper and lower case letters from memory, numeral writing from memory, near-point and far-point copying, dictation, and sentence composition of children in grades one and two. Handwriting aspects scored include rate of writing, biomechanics, and various components of legibility

including size, formation, spacing, and alignment. The author reports correlation coefficients for inter-rater reliability from .75 to .92 (Amundson, 1995). Diekema, Deitz and Amundson (1998) further investigated inter-rater reliability and found intraclass correlation coefficients of .63 to .77 with children identified with handwriting problems as participants. While Amundson (1995) reports content validity has been established by comparing the *ETCH-M* to similar handwriting tools, comprehensive validation studies are lacking (Feder & Majnemer, 2003). Advantages of the *ETCH-M* are its well-defined scoring system and its inclusion of tasks related to classroom participation. A major weakness is that normative data have not yet been collected. No studies were found in the literature regarding use of the *ETCH-M* with kindergarten children.

The *Minnesota Handwriting Assessment (MHA)*, developed by Reisman (1999), is a norm-referenced test that was designed to identify children with handwriting difficulties in grades one and two and to assess treatment efficacy. The *MHA* looks at the quality and speed of writing from a near-point sample, with scores given for legibility, form, size, alignment, and spacing. Inter-rater reliability of .87 for form and .98 for alignment and size was established using Pearson product moment correlation analysis. Correlations for test-retest reliability ranged from .60 to .89. Content validity is supported by the inclusion of legibility and features related legibility such as form, size, spacing and alignment. Form, size, spacing, and alignment are the primary qualities inspected when critiquing handwriting. While evidence regarding reliability and validity of the

MHA support its use in assessing handwriting legibility, no studies were found in the literature regarding the use of the *MHA* with kindergarten children.

The *Test of Handwriting Skills-Revised (THS-R)* (Milone, 2007), is the updated version of the original *Test of Handwriting Skills* (Gardner, 1998). It is a norm-referenced assessment that investigates manuscript or cursive handwriting abilities of children ages 6-19. Standard scores are derived from legibility criteria of handwriting samples from memory, dictation, and near-point copying of letters, words and sentences. Correlation coefficient for test-retest reliability of the overall manuscript score was .80 and ranged from .37 to .82 for individual manuscript subtests. Correlation coefficients for inter-rater reliability ranged from .59 to 1.00; however, it is important to note that less than 30% of the tests included in the inter-rater reliability study were in manuscript form. The *THS-R* reportedly provides a consistent measure of handwriting ability with relatively little examiner error. Content validity is considered strong by the author as the tasks included are thought to be an adequate representation of handwriting skills typically used by children in the educational setting, however, further studies regarding instrument validation are recommended by the author (Milone, 2007). While reliability correlation coefficients are good for the *THS-R*, validity studies have not yet been conducted among kindergarten children. This may be an appropriate assessment tool for the proposed study; however, the investigator did not have access to the *THS-R* at the time of the study.

The Print Tool™ (Olsen & Knapton, 2006) was developed as a functional approach to solving handwriting problems through evaluation of the child's current handwriting abilities, identification of need areas and remediation planning to meet those needs. While Olsen is the developer of the Handwriting Without Tears® approach to handwriting instruction and remediation, *The Print Tool™* may be used to assess handwriting abilities following any handwriting curriculum. *The Print Tool™* assesses the handwriting quality of individual capital letters, lower case letters, and numerals using eight handwriting components. The handwriting components assessed include memory, orientation, placement, size, start, sequence, control and spacing. The score sheets and remediation worksheets are designed to be used together to guide intervention planning specific to the student's needs. *The Print Tool™* may be administered by teachers or therapists and requires fifteen minutes to administer. Students in kindergarten through fourth grade are to print dictated letters and numbers on the provided worksheets and the handwriting sample is scored based upon the eight components using the provided Measuring Tool. Letters and numerals are scored individually and separate scores for each handwriting component allow for easy identification of problem areas. Additionally, an overall score and total scores in the areas of capital letters, lower case letters and numerals are calculated in percentages on an easy to read chart. Reliability and validation studies have not yet been conducted.

Statement of the Problem

Numerous handwriting assessments are commercially available; however their reliability in assessing the handwriting quality of kindergarten students has not been established. Each of the handwriting assessment tools previously mentioned varies in the components of handwriting assessed, the appropriateness of age groups, type of writing assessed (cursive or manuscript), and scoring criteria. The *Minnesota Handwriting Assessment (MHA)*, the *Evaluation Tool of Children's Handwriting-Manuscript (ETCH-M)*, and the *Test of Handwriting Skills-Revised (THS-R)* are available assessments of handwriting ability and reliability and validity have been established for use with first and second grade students; however, some components included are not considered developmentally appropriate for children in kindergarten. By including near-point copying, the memory of letter formation may not be fully assessed.

In kindergarten, speed of writing should not be assessed as the focus of handwriting instruction at this age is on the basic skills of proper formation and orientation. Speed will come with practice as the motor memory is developed, and without good formation, legibility of handwriting may be negatively affected. The *Children's Handwriting Evaluation Scale for Manuscript Writing (CHES-M)*, the *Evaluation Tool of Children's Handwriting-Manuscript (ETCH-M)*, the *Minnesota Handwriting Assessment (MHA)*, and the *Test of Handwriting Skills-Revised (THS-R)* include assessment of handwriting speed.

Regarding scoring and administration procedures, the *ETCH-M*, the *MHA* and *The Print Tool™* are rather easy to administer. They offer example assessments and walk the examiner through scoring procedures for practice. Scoring procedures for the *CHES-M* appear to be more complex than those of the other handwriting assessments reviewed. Scores obtained from *The Print Tool™* are percentage scores. While other assessments provide overall and individual subtest scores, results of *The Print Tool™* are more detailed as percentage scores of the individual handwriting components are obtained. Unlike other handwriting assessments, *The Print Tool™* is designed to be administered by teachers or other school personnel, and remediation strategies for the teacher, caregiver and student are included.

While many domains of handwriting that may be addressed, including writing from memory, near-point copying, far-point copying, speed, writing from dictation, and composition, the scope of this study is on letter and numeral formation from memory secondary to the developmental age of the participants. *The Print Tool™* may be appropriate for use with kindergarten students as it can be used for identification of handwriting difficulties, intervention planning, and documentation of changes in the quality of handwriting. Studies regarding the reliability of *The Print Tool™* in assessing handwriting abilities of kindergarten students were not found in the literature.

The Print Tool™ is the focus of the current study. An understanding of the test-retest reliability is important as it represents the stability of a test over

time when no intervention is provided, ensuring that the resulting measure is representative of the child's true ability (Diekema, Deitz & Amundson, 1998). The purpose of this study is to examine the stability of *The Print Tool*TM scores between tests to facilitate score interpretation.

Research Question

The research question that has led to this project is "Is *The Print Tool*TM sufficiently reliable to be used to measure handwriting of kindergarten children?". The researcher is interested in identifying a handwriting assessment tool that can reliably identify handwriting problems among kindergarten children.

Research Objective

The research objective of this study is to determine the test-retest reliabilities of the Capitals Total, Lowercase Total, Numbers Total and Overall Score of *The Print Tool*TM.

CHAPTER II

METHODOLOGY

The research design of this study was a non-experimental correlational design. The purpose of the study was to determine if test-retest reliability of *The Print Tool™* is sufficiently reliable to be used with kindergarten children.

Participant Recruitment

A purposive, nonprobability sample of kindergarten students was recruited from a local elementary school of south-central Louisiana. This age group was selected because the literature indicates that handwriting begins to develop in the early years, and by age six, children can write most upper and lower case letters (Amundson & Weil, 2001; Edwards, 2003). Teachers provided information regarding student eligibility based upon inclusion and exclusion criteria and data collection took place during the second semester of the school year to allow for teacher instruction in letter and numeral formation. Inclusion criteria were (a) kindergarten students between the ages of 5.5 and 6.5; (b) spoken language is the child's primary mode of communication (as opposed to sign language, picture communication, etc.); and (c) English is the primary language spoken in the home. Exclusion criteria were (a) repeaters of kindergarten; (b) students who transferred midyear from another school or district; and (c) current or previous

qualification for special education, early intervention, or occupational therapy services.

Ethical Considerations

Prior to initiation of the study, human subjects approval was secured from the Texas Woman's University institutional review board and permission to conduct the study was granted by the superintendent of the St. Landry Parish School System and the participating school's principal. Parents of the participants provided informed consent and the students provided informed assent prior to the initiation of data collection. Information regarding risks and benefits of participation, the option to withdraw at any time, and the availability of interventions in the event that handwriting problems are identified was included within the approved consent form.

Variables

The independent variable in the study is the time of test administration, which has two levels: initial test (time 1) and retest (time 2). The dependent variables are the scores obtained on *The Print Tool*TM including Capitals Total, Lowercase Total, Numbers Total and Overall Score.

Capitals Total, Lowercase Total, Numbers Total and Overall Score are operationally defined as the percentage scores the participant obtained based upon scoring criteria outlined by *The Print Tool*TM (Olsen & Knapton, 2006).

Instrument

The Print Tool™ (Olsen & Knapton, 2006) was designed to evaluate handwriting skills and provide guidance in developing a remediation plan specific to the handwriting needs of the child. *The Print Tool™* uses a functional approach to identifying and solving handwriting problems as it looks at eight components that impact the legibility of handwriting including memory, orientation, placement, size, start, sequence, control and spacing. With resulting percentage scores regarding these specific skills, problem areas are easily identified and guide the remediation or intervention plan. *The Print Tool™* is criterion referenced, and the authors report it has undergone a great deal of field testing (Olsen & Knapton, 2006); however, it is not standardized.

Assessment information is gathered through parent and teacher interview, review of handwriting samples, student observation of posture, paper placement, pencil use, bilateral hand use, and letter and numeral formation. The student worksheets are used to obtain the writing sample following specific instructions. The examiner notes variations from the norm in letter formation, including start location, sequence, and directionality of strokes, using numerals and arrows, because this information is needed for scoring. Capital letters are written from dictation in alphabetical order followed by the numerals one through nine. Lowercase letters are presented in groups of letters with similar features and the examiner is to say each letter individually. Writing from dictation allows for

assessment of memory and orientation of formation. The child must form letters from memory using the icon as a guide for sizing.

Specific guidelines regarding scoring are provided and the Measuring Tool is used to score placement, size, control and spacing. The evaluation worksheet is used to note errors related to each of the component areas and percentage scores are computed for all areas evaluated. A sample assessment is provided for practice and the manual provides in depth information regarding scoring criteria. Suggested score targets are provided for ages 6, 7, and 8 and above (Olsen & Knapton, 2006).

For the purpose of this proposed study, the following conceptual definitions were used:

Memory is the recall of letter and number formation. The act of remembering and writing letters and numbers from dictation (Olsen & Knapton, 2006).

Orientation refers to the writing of letters and numerals in the correct direction. Correct orientation represents the absence of reversals (Olsen & Knapton, 2006).

Placement refers to the alignment of letters and numbers on the baseline (Olsen & Knapton, 2006).

Size is indicative of how large or small a child chooses to write (Olsen & Knapton, 2006).

Start is where the formation of each letter begins (Olsen & Knapton, 2006).

Sequence refers to the “order and stroke direction of the letter or number parts” (Olsen & Knapton, 2006, p. 4).

Control refers to the neatness and proportionality of letters and numerals (Olsen & Knapton, 2006).

Procedures

The Print Tool™ was administered by the primary investigator, following the evaluation guidelines provided (Olsen & Knapton, 2006). Five sample assessments were administered by the primary investigator prior to initiation of data collection for practice in administering *The Print Tool™*, to ensure understanding of scoring procedures and allow for clarification of questions. The practice data was not be used in the study.

Thirty-two children met the inclusion criteria. Two male students did not complete the retesting within the fourteen day period, and were therefore excluded from the final analysis of the remaining 30 children (13 males and 17 females). *The Print Tool™* was administered on two separate occasions using a 7-14 day time interval between assessments. The study was conducted during the second semester of the school year to allow for exposure to letter and numeral formation in the classroom. Participants were seated one at a time at a desk with the primary investigator in a quiet area of the school. Testing

conditions, including environment and time were kept as constant as possible during the two testing sessions.

Testing of the students took place in one of two rooms on the school campus. Both rooms were equipped tables and chairs that allowed for appropriate seat and desk height for optimal positioning with knees, hips and ankles at 90 degrees flexion and the table top near the level of the students' elbows when seated. The rooms utilized during assessment allowed for minimal distractions and interruptions during the testing sessions.

An attempt to decrease the risk of the examiner identifying whether the protocol sheet was from the original testing or from the retesting was made by having the child's teacher code the protocol sheets and conceal the code from the examiner throughout the scoring procedures. Testing documents were returned to the teacher and were kept in a secure location until all data was collected, at which time the student worksheets were returned to the primary investigator for scoring. No more than five assessments were scored in one sitting to decrease the risk of rater fatigue or attention drift.

Shortly into initiation of the scoring procedures, it was noted that there was a significant discrepancy between the percentage scores obtained for the control criteria when compared to the other component areas assessed. Because of this discrepancy, scoring of the control criteria was eliminated from computation of the Overall Score.

CHAPTER III

RESULTS

This thesis was undertaken to determine if *The Print Tool*TM is sufficiently stable over time to be used to assess handwriting of children in kindergarten. To accomplish that, children in kindergarten completed *The Print Tool*TM twice with at least twenty-four hours between the testing times and with no more than two weeks between the testing times. This section will present summaries of the characteristics of the participants by presenting the results of descriptive statistics and also summarize several characteristics of their hand writing. In addition, the results of inferential analyses will be presented to determine the relation of the test-retest scores and to determine if the scores obtained from the two testings are significantly different. The alpha level used to make decisions about the results was .05. SPSS Student Version 17.0 was used to calculate the descriptive statistics, the correlation analyses, and the paired t-tests to determine the stability of *The Print Tool*TM.

Characteristics of Participants and Their Handwriting

Initially, 32 children were tested; however, two were not available to be re-tested, so data from a total of 30 kindergarteners (13 males and 17 females) were analyzed for the study. The participants ranged in age from 5 years, 7 months to 6 years, 6 months ($M = 6$ years, one month; $SD = 3$ months). Ethnicity

of the participants varied and was representative of the region (66% black, 27% white, and 6% other). Characteristics of the participants are shown in Table 2.

TABLE 2: Participant Characteristics

Participants	N	%
Gender		
Male	13	43
Female	17	57
Ethnicity		
White	8	27
Black	20	66
Other	2	6

Information regarding physical approach to writing was documented at the time of the assessment and revealed the participants were primarily right handed ($n = 29$). Regarding pencil grasp used, a tripod pencil grasp was used by 45% of the participants and 52% utilized a quadropod grasp. Furthermore, 43% utilized a thumb wrap around the pencil for additional stability, and 22% of the participants maintained a closed web space during the writing task. Most of the participants utilized their helping hand to secure the paper when writing (82%) and applied standard pencil pressure (82%) while resting their hand on the writing surface (78%). Table 3 presents a summary of these handwriting characteristics.

TABLE 3: Handwriting Characteristics

	<i>n</i>	%
Handedness		
Left	1	3
Right	29	97
Pencil Grasp		
Tripod	27	45
Quadropod	31	52
Other	2	3
Thumb Wrap	26	43
Closed Web Space	13	22
Pencil Pressure		
Standard	49	82
Heavy	11	18
Pencil Hand Rests on Paper		
Yes	47	78
No	13	22
Uses Helping Hand to Hold Paper		
Yes	49	82
Sometimes	10	17

Summary of Performance Variables

Descriptive statistics were used to analyze the scores obtained during test and retest using *The Print Tool™*. Capitals Total scores obtained during initial testing ($M = 91.9$, $SD = 5.695$) and retesting ($M = 91.83$, $SD = 4.624$) were fairly consistent, as were Overall Scores (Test: $M = 91.8$, $SD = 4.597$; Retest: $M = 90.63$, $SD = 4.635$). Greater variations were noted between the Lowercase Total scores obtained during initial testing ($M = 89.9$, $SD = 5.281$) and retesting ($M = 87.47$, $SD = 6.761$) as well as Numbers Total scores (Test: $M = 96.23$, $SD = 5.015$; Retest: $M = 94.3$, $SD = 5.754$). Table 4 presents the descriptive statistics of the test and retest scores of the kindergarten children on *The Print Tool™*.

TABLE 4: Descriptive Statistics for Test and Retest Scores ($n = 30$)

	<i>M</i>	<i>SD</i>	<i>Min</i>	<i>Max</i>	<i>Median</i>
Capitals Total — Test	91.90	5.695	76	99	94
Capitals Total — Retest	91.83	4.624	83	98	93
Lowercase Total — Test	89.90	5.281	80	99	91.5
Lowercase Total — Retest	87.47	6.761	68	98	89
Numbers Total — Test	96.23	5.015	83	100	98
Numbers Total — Retest	94.30	5.754	81	100	95
Overall Score — Test	91.80	4.597	80	100	93.5
Overall Score — Retest	90.63	4.635	81	98	91.5

Results of Inferential Analyses

The research question guiding this study was “Is *The Print Tool*TM sufficiently stable over time to be used to assess handwriting of kindergarten children?” To answer that question, a correlations design was required. Because the data were ratio and the assumptions for inferential, parametric statistics were met, including the assumption of linearity, the Pearson product moment correlation analysis was used to determine the magnitude and the direction of the relation between and among Capitals Total, Lowercase Total, Numbers Total and Overall Score of *The Print Tool*TM from the two administrations of the test.

The correlation between Test Capitals Total and Retest Capitals Total was $r = .712$ ($p < .01$). The correlation between Test Lowercase Total and Retest Lowercase Total was $r = .658$ ($p < .01$). The correlation between Test Numbers

Total and Retest Numbers Total was $r = .581$ ($p < .01$). The correlation between Test Overall Score and Retest Overall Score was $r = .723$ ($p < .01$). The correlation between the test and retest scores for Capitals Total and Overall Score were considered fair ($p > .70$). The Lowercase Totals correlation was considered adequate ($p > .60$) and the Numbers Total correlation was approaching adequate, ($p = .581$). Table 5 presents the results of the correlation analyses.

TABLE 5: Correlations between Test-Retest Scores of *The Print Tool*TM

Test Scores	Retest Scores			
	Capitals Total	Lowercase Total	Numbers Total	Overall Score
Capitals Total	.712*			
Lowercase Total		.658*		
Numbers Total			.581*	
Overall Score				.723*

* $n = 30$, $p < .01$ level

A paired samples t-test was calculated to analyze the mean difference scores between test and retest for Capitals Total, Lowercase Total, Numbers Total and Overall Score. The mean difference between the Capitals Total scores was .067 ($SD = 4.042$). No significant change was found ($t(29) = .090$, $p < .10$). The mean difference between the Lowercase Total scores was 2.433 ($SD = 5.157$). A significant increase in scores obtained at the time of retest was found ($t(29) = 2.584$, $p < .10$). The mean difference between the Numbers Total scores was 1.933 ($SD = 4.975$). A significant increase in scores at the time of retest was

found ($t(29) = 2.128, p < .10$). The mean difference between the Overall Scores was 1.167 ($SD = 3.435$). No significant change was found ($t(29) = 1.860, p < .10$).

CHAPTER IV

DISCUSSION

The research question this investigator set out to answer was “Is *The Print Tool™* sufficiently reliable to measure the handwriting abilities of kindergarten children?”. To answer the research question, a correlation analysis was conducted. The highest correlations were $r = .723$ ($p < .001$) for Overall Scores and $r = .712$ ($p < .001$) for Capitals Total. These correlations are considered moderate to good (Portney & Watkins, 2009). It appears the legibility of the writing produced by the kindergarten students varied between testing sessions more than one might expect. Inconsistencies in the child’s performance may be secondary to variations in attention or arousal level between sessions, variations in physical approach to writing between sessions, or increased comfort with the examiner and the testing procedures at the time of the retest session. In addition, the kindergartens are acquiring handwriting skills during this period of their development, and variation in performance is a natural part of developing a motor skill.

Of the handwriting assessments reviewed, only the *Test of Handwriting Skills-Revised (THS-R)* and *The Print Tool™* were appropriate for use with kindergarten students. The test-retest reliability of the THS-R was highly variable as it ranged from $r = .37$ to $r = .82$ (Milone, 2007). The *Evaluation Tool of*

Children's Handwriting-Manuscript (ETCH-M) is often used by occupational therapists to assess handwriting abilities, and moderate to good test-retest reliability was reported (Amundson, 1995), it is not considered an appropriate assessment for kindergarten children. The test-retest reliability of the *Minnesota Handwriting Assessment (MHA)* was reported within the good to excellent range ($r = .60$ to $.89$), but is only standardized for use with children in grades one and two (Reisman, 1999). Test-retest correlation coefficients obtained on *The Print Tool™* ($r = .581 - .723$) were similar to those of the *ETCH-M*, the *MHA* and the *THS-R*.

Qualitative data were also obtained about the methods the participants used in completing the assessment. A review of notes taken throughout the data collection period revealed common difficulties among many of the students. It was noted that the kindergarteners easily confused or mixed the case of the letter when writing either the capital or lowercase form of the letters. For the sentence "*I like you*" in the lowercase writing sample, it was noted that many students wrote a capital *L* in the word *like* after writing the capital *I*, and when asked to write the word "*you*", a few students wrote the letter y prior to the verbal cue for the spelling of the word. The kindergarten students tested often confused the direction of the curve in the formation of *J*, *j*, and *q*. Furthermore, the capital version of *D* was occasionally written in lieu of the lowercase *d*, possibly a compensation for orientation confusions of *d* and *b* often noted among kindergarten age children. When forming the letters *X*, *x*, *Y*, and *y*, it was noted

that some of the students formed the right to left diagonal line first, which is considered a start error on *The Print Tool*TM. These difficulties should be taken into consideration when assessing the handwriting abilities of kindergarten students.

Weaknesses

Handwriting is a complex task that requires the integration of information from many systems of the body, leading to variability in individual performance from day to day. Such variability may impact individual performance from session to session. An attempt was made to limit the effect of learning on performance by keeping the time interval between the test and retest sessions to 7-14 days. Weaknesses of this study include the small sample size and the homogeneous nature of the group. By not eliminating students with teacher reported handwriting problems, variability in student abilities might be greater than what would be expected among individual groups of students with or without handwriting concerns.

Elimination of the control criteria when computing the Overall Score of *The Print Tool*TM may be another weakness of this study. Assessment of control in kindergarten handwriting may not be appropriate as the development of good foundational skills in the areas of orientation, start, sequence, placement and sizing should lead to improved control with increased practice and experience. As handwriting becomes more automatic following increased exposure to writing, control should also improve.

Limitations

Caution should be taken when generalizing the results of this study to the general public. The participants in this study were from one public elementary school in south-central Louisiana, and the district has a high proportionality of families from a low socioeconomic background. Furthermore, there was not an equal balance of race among participants as most of the participants were African American (68%). A comparison of handwriting ability based upon multiple assessments was not conducted as the participants were only assessed using *The Print Tool™*.

Future research using larger samples of children with and without disabilities is needed to provide further information regarding the usefulness of *The Print Tool™* in identifying handwriting abilities among kindergarteners. Test-retest and inter-rater reliability studies in which the participants are more representative of the population of the United States are needed with kindergarten, first, second and third grade students. Additionally, future studies should investigate the effect of pencil grasp and approach to writing on handwriting ability.

Conclusion

The review of literature supports the need for a handwriting evaluation tool appropriate for assessing kindergarten children following instruction in letter and numeral formation. By identifying and remediating handwriting difficulties at an early age, future academic struggles related to handwriting difficulties may be

reduced. The study revealed that *The Print Tool™* may be a useful tool in measuring the handwriting abilities of kindergarten students. Regarding the Capitals Total score, a fair correlation was achieved between test and retest and the paired samples t-test revealed no significant change in performance between tests. Test-retest correlations were found to be adequate for the Overall Scores.

The *Occupational Therapy Practice Framework (Framework)* outlines the dynamic Occupational Therapy Process of service delivery that includes evaluation, intervention and outcomes. *The Print Tool™* is a useful tool to facilitate the Occupational Therapy Process (AOTA, 2008) as it facilitates collaboration between the occupational therapy practitioner and the client throughout evaluation procedures, intervention planning, intervention implementation, and intervention review to support participation in school related tasks. This study is relevant for occupational therapy practitioners and educators because it provides evidence to support the usefulness of *The Print Tool™* in measuring handwriting abilities of kindergarten children.

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APPENDIX A
Consent Form

**ST. LANDRY PARISH SCHOOL BOARD
Dr. Joseph A. Guillory, Director
Pupil Appraisal Center
127 Blair Street
Opelousas, LA 70570**

Dear Parents,

I am writing to request your cooperation and your child's participation in a research study I am conducting. I am a pediatric occupational therapist who has worked in the schools of St. Landry Parish for the past nine years. I am currently working on a project in order to fulfill the requirements for a Master of Arts degree in occupational therapy from Texas Woman's University.

My area of interest is handwriting. Specifically, I am studying the reliability of a newly developed handwriting assessment tool that may be used to measure the neatness and legibility of one's printing abilities. This study is designed to provide further information regarding the usefulness of this tool in measuring handwriting of kindergarten students.

I have spoken with Mr. Joubert and your child's teacher and they have agreed to participate in this study should you give your consent. I have also received approval from the St. Landry Parish School Board and Mr. Nassif to conduct this research project.

Please sign the attached permission slip if you are willing to have your child participate in the study. Once you consent, I will discuss participation with your child. If your child agrees and is selected, I will contact you to let you know that he/she is participating. In the event that your child does not want to participate, I will respect his/her decision.

Please do not hesitate to contact me at any time at the Pupil Appraisal Center, (337) 948-3646 ext. 184, for questions or comments you may have.

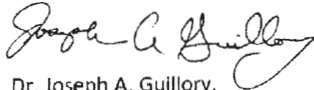
I look forward to hearing from you and hope to have the opportunity to work with your child.

Sincerely,



Morgan O. Broussard, LOTR

Approved:



Dr. Joseph A. Guillory,
Director of Special Education



Office of Research
 6700 Fannin Street
 Houston, TX 77030-2343
 713-794-2480 Fax 713-794-2288

Title: Reliability of The Print Tool™ in Measuring Handwriting Abilities in Kindergarten Students

Investigator: Morgan Broussard, LOTR.....mobroussard@gmail.com 337.739.5837
 Advisor: O. Jayne Bowman, PhD.....obowman@twu.edu 713.794.2134
 Alternate Rater: Hillary Bodron, OTS.....hbodron@twu.edu 713.515-7018

Explanation and Purpose of the Research

You are being asked to allow your child to participate in a research study for Mrs. Broussard's thesis at Texas Woman's University. The purpose of this research is to provide further information regarding the usefulness of The Print Tool™ in measuring the handwriting abilities of kindergarten students. Your permission to allow your child to participate is requested because his/she is a kindergarten student at the school in which the research will take place.

Description of the Procedures

As a participant in this study, your child will be asked to participate in an assessment of his/her handwriting abilities on two separate occasions within two weeks. Each assessment should take no longer than 15 minutes and will be conducted prior to lunch at your child's school. The researcher will explain the assessment to your child and obtain his/her assent to participate following receipt of your consent. In order to be a participant in this study, your child must be between the ages of 5 years, six months, and 6 years, six months and be in kindergarten. Other criteria that must be met for participation included English as the primary language spoken in the home and the primary mode of communication for your child (as opposed to sign language or picture communication). Your child should not participate in this study if he/she (a) transferred into this school after the first week of school, (b) is repeating kindergarten, or (c) has previously received services through and Individualized Family Service Plan (IFSP) and Individualized Education Plan (IEP).

Potential Risks

The researcher will ask your child to produce a handwriting sample during a face-to-face session. A possible risk in this study is fatigue. While the sessions are only 15 minutes each, your child may take breaks as needed. Your child will only be taken out of class during independent work periods to decrease the risk of loss of instructional time in the classroom.

Another risk in this study is loss of confidentiality. Confidentiality will be protected to the extent that is allowed by law. The assessment session will take place in a private room on your child's school campus. A code, not your child's real name, will be used on all assessment documents and the documents will be labeled with the code by the teacher, not the researcher. Only the researcher and the alternate rater, Ms. Hillary Bodron, will review the coded handwriting samples. The assessment data will be shredded within 2 years after the study is finished. The results of the study may be reported in scientific magazines or journals, but your child's name or any other identifying information will not be included.

Approved by the
 Texas Woman's University
 Institutional Review Board
 Date: *Apr 13 2010*

The researchers will try to prevent any problems that could happen because of this research. You should let the researchers know at once if there is a potential problem and they will help you. However, TWU does not provide medical services or financial assistance for injuries that might happen because you are taking part in this research.

Participation and Benefits

Your involvement in this study is completely voluntary and you or your child may withdraw from the study at any time. If you would like to know the results of this study, we will mail them to you.*

Questions regarding the Study

You will be given a copy of this signed and dated consent form to keep. If you have any questions about the research study, you should ask the researchers. Their phone numbers are at the top of this form. If you have questions about your rights as a participant in this research or the way this study has been conducted, you may contact the Texas Woman's University Office of Research and Sponsored Programs at 940-898-3378 or via e-mail at IRB@twu.edu.

Signature of Parent/Guardian

Date

Name of Child Participant

*If you would like to know the results of this study, tell us where you want them to be sent.

E-mail: _____

or

Address: _____

Student assent to participate in the study was secured by the investigator.

Student Indication of Assent

Date

Approved by the
Texas Woman's University
Institutional Review Board
Date: 1/21/10

APPENDIX B

Assent Procedure for the Child

Assent Procedures for the Child

After receiving written consent from the parents, each child will be contacted to discuss their participation in the project. They will be asked if they would be willing to provide a handwriting sample on two separate occasions to help the investigator learn more about the handwriting skills of kindergarten students.

The assessment will be described as an opportunity to show off their handwriting skills by writing capital letters, lower case letters and numbers. They will also be told that they do not have to agree to participate in the study and that if they do agree, they can ask to stop at any time. It will be explained that participation will not affect their classroom grades in any way. They will be assured that nobody will see their work outside of those involved in the project and that their names will not be listed on the writing sample. Providing the child agrees to participate, a convenient testing date will be decided upon.

APPENDIX C
Script for Child Assent

Script for Child Assent

Hello!

My name is Mrs. Morgan. You may have seen me before, because I work with some of the children at your school. I help them with coloring, writing, cutting with scissors and I even help them learn how to climb on the playground slides and swings.

Today I am here to ask you to help me. I would like to look at how you write your letters and numbers so that I can learn more about handwriting and kindergarteners. Your teacher and your parents have said it is ok to let you work with me for a little while on two different days, if you would like to do so. It will not change your school grades in any way. If you do not want to participate, you may say so.

If you would like to work with me, I will have you write your name on the permission letter your mom or dad signed. If you decide to change your mind, and no longer want to participate, you may quit at any time. Your paper will have a secret code on it so that I will not be able to tell who wrote the letters and numbers when I go back to score your writing.

Do you have any questions? Thank you for helping me with this.

APPENDIX D
Subject Data Sheets

Data Sheet for Capitals and Numbers



Data Sheet for Lowercase



APPENDIX E

*The Print Tool*TM Evaluation Form

Date of evaluation _____ - _____ - _____

Evaluation administered by _____

STUDENT INFORMATION

Name _____ Birthdate _____ - _____ - _____ Age _____ Sex _____

Parent/Guardian _____ Work Phone _____

Address _____ Home Phone _____

Cell Phone _____

Referred by _____ Referred for _____

SCHOOL INFORMATION

Grade _____ Teacher _____ School _____

Does child receive handwriting instruction? Y___ N___ Comments _____

What curriculum is used? Handwriting Without Tears® ___ Zaner-Bloser® ___ D'Nealian® ___
Other _____

Does child receive handwriting accommodations? Y___ N___

Comments _____

SCHOOL PAPERS REVIEWED

Handwriting Workbook ___ Handwriting Worksheets ___ Other Worksheets ___ Journals/Essays ___

Concerns: Mixes Up Capitals/lowercase ___ Reversals ___ Following Lines ___ Size ___ Letter Formation ___
Legibility ___ Spacing ___ Erasures ___ Speed ___

PHYSICAL APPROACH AND FINE MOTOR

Attention/Effort _____

Wears glasses? Y___ N___ Wore today? Y___ N___

Sitting Posture _____

Handedness: Left ___ Right ___ Used Both ___

Pencil Grip: Palmar ___ Tripod ___ Quadropod ___ Other _____

Comment _____

Pencil Pressure: Heavy ___ Standard ___ Light ___ Consistent: Y___ N___

Pencil Hand: Rests on paper? Yes ___ Sometimes ___ No ___

Paper Placement: Correctly placed for handedness? Yes ___ Sometimes ___ No ___

Helping Hand: Uses hand to hold paper? Yes ___ Sometimes ___ No ___

CAPITALS

Size Preference	Memory	Orientation	Placement	Size	Start	Sequence	Control
+	A		A	A	A	A	A
	B	B	B	B	B	B	B
	C	C	C	C	C	C	C
PK	D	D	D	D	D	D	D
	E	E	E	E	E	E	E
	F	F	F	F	F	F	F
	G	G	G	G	G	G	G
K	H		H	H	H	H	H
	I		I	I	I	I	I
	J	J	J	J	J	J	J
I	K	K	K	K	K	K	K
	L	L	L	L	L	L	L
	M		M	M	M	M	M
2-3	N	N	N	N	N	N	N
	O		O	O	O	O	O
	P	P	P	P	P	P	P
	Q	Q	Q	Q	Q	Q	Q
	R	R	R	R	R	R	R
	S	S	S	S	S	S	S
	T		T	T	T	T	T
	U	U*	U	U	U	U	U
	V		V	V	V	V	V
	W		W	W	W	W	W
	X		X	X	X	X	X
	Y	Y*	Y	Y	Y	Y	Y
	Z	Z	Z	Z	Z	Z	Z

	Memory	Orientation	Placement	Size	Start	Sequence	Control	Capitals Total
Total Correct								
Total Attempted	26							
Total Correct =	%	%	%	%	%	%	%	%

To Mark the Score Sheet:

Memory: Circle the letters with errors. Now mark a line from the circled letters across all categories. The line indicates that letters with Memory errors are not scored in other categories.
 All Others: Circle the letters with errors.

*U can be reversed in the D'Nealian® curriculum.
 Y can be reversed in the HWT® curriculum.

To Calculate Total Correct:

Memory: Count the number of correct letters (not circled).
 All Others: Count the number of correct letters (not circled, not grayed out, not lined through).

To Calculate Total Attempted:

Memory: 26
 Orientation: Count the number of circled letters. Add that number to the Total Correct in Orientation.
 All Others: 26 minus the number of circled letters in the Memory category.

NUMBERS

Size Preference	Memory	Orientation	Placement	Size	Start	Sequence	Control
+	1		1	1	1	1	1
	2	2	2	2	2	2	2
PK	3	3	3	3	3	3	3
	4	4	4	4	4	4	4
K	5	5	5	5	5	5	5
	6	6	6	6	6	6	6
I	7	7	7	7	7	7	7
2-3	8		8	8	8	8	8
	9	9	9	9	9	9	9

	Memory	Orientation	Placement	Size	Start	Sequence	Control	Numbers Total
Total Correct								
Total Attempted	9							

Total Correct	Total Attempted	%	%	%	%	%	%	%

To Mark the Score Sheet:
 Memory: Circle the numbers with errors. Now mark a line from the circled numbers across all categories. The line indicates that numbers with memory errors are not scored in other categories.
 All Others: Circle the numbers with errors.

To Calculate Total Correct:
 Memory: Count the number of correct numbers (not circled).
 All Others: Count the number of correct numbers (not circled, not grayed out, not lined through).

To Calculate Total Attempted:
 Memory: 9
 Orientation: Count the number of circled numbers. Add that number to the Total Correct in Orientation.
 All Others: 9 minus the number of circled numbers in the Memory category.

OVERALL SCORES

	Memory	Orientation	Placement	Size	Start	Sequence	Control	Letter Spacing	Word Spacing
CAPITAL	%	%	%	%	%	%	%	NA	NA
LOWERCASE	%	%	%	%	%	%	%	%	%
NUMBER	%	%	%	%	%	%	%	NA	NA

	Capitals Total	Lowercase Total	Numbers Total	
Total Correct				Overall Total Correct
Total Attempted				Overall Total Attempted

TO CALCULATE
 Overall Total Correct = %
 Overall Total Attempted = %
 GRAND TOTAL OVERALL SCORE = % **OVERALL SCORE**

APPENDIX F

Letter of Approval from Park Vista Elementary

**PARK VISTA
ELEMENTARY**

home of Academic Excellence

JOSEPH U. JOUBERT
Principal

HEBRARD GREENE
Assistant Principal

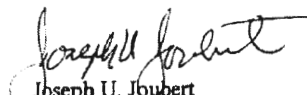
March 4, 2010

Mrs. Morgan Broussard, LOTR
313 Herliil Circle
Carencro, LA 70520

Dear Mrs. Broussard,

Thank you for considering our school, Park Vista Elementary, for your research project. We are happy to have you use our kindergarten students as participants in proposed research regarding handwriting assessment. I appreciate your assurance that the identity of our students will be protected, and you have my permission to use the kindergarten teachers for coding the test documents and reference sheets using coding labels you will provide at the time of the study.

Sincerely,


Joseph U. Joubert
Principal
Park Vista Elementary

APPENDIX G

Letter of Approval from St. Landry Parish School Board



ST. LANDRY PARISH SCHOOL BOARD

Michael D. Nassif
Superintendent

1013 East Creswell Lane
P.O. Box 310
Opelousas, LA 70571-0310
web: www.slp.k12.la.us

Phone: (337) 948-3657
Fax: (337) 948-9959
E-mail: supr@slp.k12.la.us

Huey Wyble
President
Arnaudville, LA
District 7

January 25, 2010

Kyle Boss
Vice-President
Sulzer, LA
District 8

Mrs. Morgan Broussard, LOTR
313 Herlil Circle
Carencro, LA 70520

Roger Young
Executive Committee
Favre, LA
District 11

Dear Mrs. Broussard,

Harry Frugi
Executive Committee
Eunice, LA
District 13

On behalf of St. Landry Parish School Board, I would like to offer our assistance and grant permission to you to conduct your research at Park Vista Elementary School, Opelousas, Louisiana.

Anthony Standberry
Opelousas, LA
District 1

We are looking forward to collaborating with you and sharing the results of your research to help guide effective kindergarten handwriting instruction.

Elinor N. Eaglin
Opelousas, LA
District 2

I understand that your assurance that parental consent will be obtained and that the identity of students will remain confidential and protected.

John Miller
Opelousas, LA
District 3

Yours truly,

Dillard Deville
Washington, LA
District 4

Marx "Sonny" Budden
Palmetto, LA
District 5

Michael D. Nassif, Superintendent
St. Landry Parish School Board

Ronald W. Carriere
Port Barre, LA
District 6

MDN/crd

Scott M. Richard
Opelousas, LA
District 9

Quincy Richard
Opelousas, LA
District 10

Jotie Frank
Favre, LA
District 12

APPENDIX H

Letter of Approval from Texas Woman's University Office of Research



Office of Research
6700 Fannin Street
Houston, TX 77030-2343
713-794-2480 Fax 713-794-2488

March 31, 2010

Ms. Morgan Broussard
School of Occupational Therapy
6700 Fannin Street
Houston, TX 77030

Dear Ms. Broussard:

Re: *"Reliability of The Print Tool in Measuring Handwriting Ability among Kindergarten Students"*

Your application to the IRB has been reviewed and approved.

This approval lasts for one (1) year. The study may not continue after the approval period without additional IRB review and approval for continuation. It is your responsibility to assure that this study is not conducted beyond the expiration date.

Any changes in the study or informed consent procedure must receive review and approval prior to implementation unless the change is necessary for the safety of subjects. In addition, you must inform the IRB of adverse events encountered during the study or of any new and significant information that may impact a research participant's safety or willingness to continue in your study.

Remember to provide copies of the signed informed consent to the Office of Research, IHS 10110 when the study has been completed. Include a letter providing the name(s) of the researcher(s), the faculty advisor, and the title of the study. Graduation may be blocked unless consents are returned.

Sincerely,

John Radcliffe, Chair
Institutional Review Board - Houston

Think SUCCESS  Think TWU