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ABSTRACT

The document describes System 2, a computerized system for analyzing controlled vocabulary material and for comparing the Diamond Jubilee and Century 21 shorthand systems. Background information on three other computer systems for shorthand dictation are briefly described: (1) Reese and Smith Program (University of Tennessee), (2) Kavan and Gallion System (Indiana State University), and (3) Century 21 Computer Analysis (Southwestern Publishing Company). System 2 provides a flexible computerized shorthand system which would contain an unlimited vocabulary base. Four jobstreams were developed for this purpose, each containing a specific function: (1) word base dictionary, (2) update jobstream, (3) dictionary printout jobstream, and (4) shorthand analysis jobstream. The System 2 flowchart is presented and the jobstreams are reproduced from computer printouts. (Author/EC)

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A Computerized System for the Development, Analysis, and
Comparison of Diamond Jubilee and Century 21 Shorthand
Dictation Materials

by

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U.S. DEPARTMENT OF HEALTH,
EDUCATION & WELFARE
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Historical Perspective

The analysis and verification of shorthand textbook materials by computer has been technically possible for many years. However, a search of the business education literature revealed that only recently have computer systems in shorthand been developed. This development has occurred at two state universities - University of Tennessee and Indiana State University. Furthermore, the computer was also used by SouthWestern Publishing Company in the development of Century 21 shorthand. This section will briefly summarize the known status of these systems.

REESE AND SMITH PROGRAM (University of Tennessee)

An analysis of various sources of shorthand dictation materials by computer was reported by Don Reese and Ray Smith in the January, 1972, issue of the Journal of Business Education.¹ Using excerpts of 200 actual words of material from seven different sources, various factors (i.e., syllabic intensity) were reported for each 200 word passage.

At the 1974 Brigham Young Business Education Invitational Forum, Dr. Ray Smith reported that the data base for their computer program was the first 5000 words on the Perry list with each word coded on the following variables:²

¹Don Reese and Ray Smith, "A Shorthand Misconception?", Journal of Business Education, (January, 1972, 162-163)

²E. Ray Smith, "Learning Efficiency in Shorthand Through Controlled Materials", SHORTHAND--PERSPECTIVE, OPINION, AND DIALOGUE, Research and Service Project No. 2, Alpha Omega Chapter, Delta Pi Epsilon, Brigham Young University, 83-93.

1. Number of syllables
2. Hundred groupings
3. Typing strokes
4. Shorthand strokes
5. First lesson the word could be written
6. Dale-Chall reading word list
7. Pen rises

No other data on the University of Tennessee system is known to be available nor have copies of the computer output been reviewed.

KAVAN AND GALLION SYSTEM (Indiana State University)

Two computer-based systems in the shorthand area have been designed by the authors of this paper. The first system, implemented in the fall of 1973, was developed for use by students enrolled in shorthand methods classes and workshops where students developed new-matter vocabulary controlled dictation material.

This system was based upon a Word Base Dictionary composed of the 1500 most frequently used words in written business office communications as established by Mellinger.³ The dictionary for these words contained the following variables:

1. The word image
2. The lesson number in which the word could first be written in beginning shorthand
3. The number of syllables in the word
4. The word frequency groupings in hundreds
5. The word type(s)--brief form, brief form derivatives, word endings, and word beginnings

Details of this system are reported in the March-April, 1975, issue of Creative Computing magazine.⁴

The second computerized shorthand system designated "SYSTEM II" was implemented in April, 1975. The basic design premise of SYSTEM II was to provide the designers with a

³Morris Mellinger, BASIC VOCABULARY FOR WRITTEN BUSINESS OFFICE COMMUNICATIONS, Chicago: Chicago State College Publication Series, 1970.

⁴C. Bruce Kavan and Leona M. Gallion, "Shorthand Instruction via Computer", Creative Computing, (March-April, 1975), 38-39.

system that could be used for the verification, analysis, and comparison of Diamond Jubilee and Century 21 shorthand learning materials. In addition, the system was structured to use an unlimited but flexible vocabulary base. This system, SYSTEM II, will be presented in detail in a subsequent section.

CENTURY 21 COMPUTER ANALYSIS (SouthWestern Publishing Company)

The authors and publishers of Century 21 shorthand report that their shorthand system was computer analyzed and controlled throughout its development. In the promotional material for their system⁵, they report the computer was used to:

1. process vocabulary, numerical, and phonetic data
2. tabulate frequencies of common word beginnings, word endings, and other word elements
3. measure relative impact of assigning primary and derived shorthand alphabet symbols to specific speech sounds
4. trace the pattern of dominant-direction writing inherent in commonly used general and business vocabularies
5. report (alphabetically and by frequency) words within specified frequency ranges as sources of constructing controlled practice materials
6. summarize the application of theory principles, Speedforms, high-frequency phrases, and other word categories through consecutive lesson and intermittent-lesson cycles
7. maintain lesson-by-lesson records and periodic summaries of the 1500 most-used words and words within other specified frequency ranges representing vocabulary extension

⁵"Century 21 Shorthand", Promotional material distributed September, 1974, announcing the Century 21 shorthand system.

8. verify coverage of theory principles, occurrences of Speedforms, consistent use of common phrases, and occurrences of all words in designated frequency ranges.

Details of the computer analysis used by SouthWestern Publishing Company are not available for review. Thus, no specifics can be reported on the design of their computer system.

SYSTEM II DESIGN

The purpose of SYSTEM II was to provide a flexible computerized shorthand system which would contain an unlimited word vocabulary base. To accomplish this purpose, four jobstreams were developed each containing an independent program designed for a specific function. All jobstreams access the Word Base Dictionary or vocabulary base (see exhibit A) which contains the statistical reference ranges from the various shorthand principles to the number of syllables exemplified by a particular word. As such, any word used in the analysis must first be placed onto the Word Base Dictionary. This process is accomplished by the UPDATE jobstream.

The UPDATE jobstream (see exhibit B) is designed to perform all the maintenance functions associated with the Word Base Dictionary. The Dictionary is physically resident on a magnetic disk pack at the computer installation. When any of the SYSTEM II jobstreams are executed, the disk pack is mounted onto the computer so that the statistical information may be accessed randomly by the program from the disk file. The UPDATE jobstream can be used to add, delete, or change words on the Word Base Dictionary disk file. An historical record of the changes made to the Dictionary is generated by the program in the form of an edit prooflist. This prooflist allows for the double checking of the actual word transactions to verify the validity of the statistical information for the particular word. Also, file control totals are generated by the jobstream in order to insure file integrity.

Since this disk pack containing the Word Base Dictionary must be physically handled in the mounting process, the disk is subject to possible damage and loss of information or integrity. In addition, failures due to power outages and hardware or software failures could also cause the Dictionary to be lost. In order to prevent such catastrophies, the BACKUP/RECREATE program is used to periodically backup the disk file to magnetic tape. Thus, if the Dictionary disk file is destroyed, the recreate function of the BACKUP/RECREATE program could be used to restore the Word Base Dictionary disk file and produce the appropriate control totals for file management.

The DICTIONARY PRINTOUT jobstream (see exhibit C) allows for various subsets of the shorthand dictionary to be printed from the disk file. These multiple output options provide a highly flexible information retrieval system from the Word Base Dictionary.

The SHORTHAND ANALYSIS jobstream (see exhibit D) is designed to parametrically control and analyze practice material and output appropriate selective statistical reports.

The flowchart contained in Table 1 contains a visual summary of the inner relationships of these four programs and the Word Base Dictionary.

Conclusions

An issue in the area of shorthand has been whether to use a restricted or a controlled vocabulary. Prior research⁶ has established that shorthand learning achievement may be greater when the materials used are vocabulary controlled. However, there is no conclusive evidence as to exactly what controls should be used. Further, data is needed to determine what variables affect the level of difficulty in shorthand dictation materials. SYSTEM II provides a method for the collection and analysis of both Century 21 and Gregg dictation material. Thus, SYSTEM II provides a powerful research tool not only for writing and analyzing controlled vocabulary material but also for providing comparative data on two competing shorthand systems.

⁶ Leona M. Gallion and Alberta Anderson, "Controlled Vocabulary Beginning Shorthand Dictation", Journal of Business Education, October, 1972, pp. 27-28.

Table 1

SYSTEM II FLOWCHART

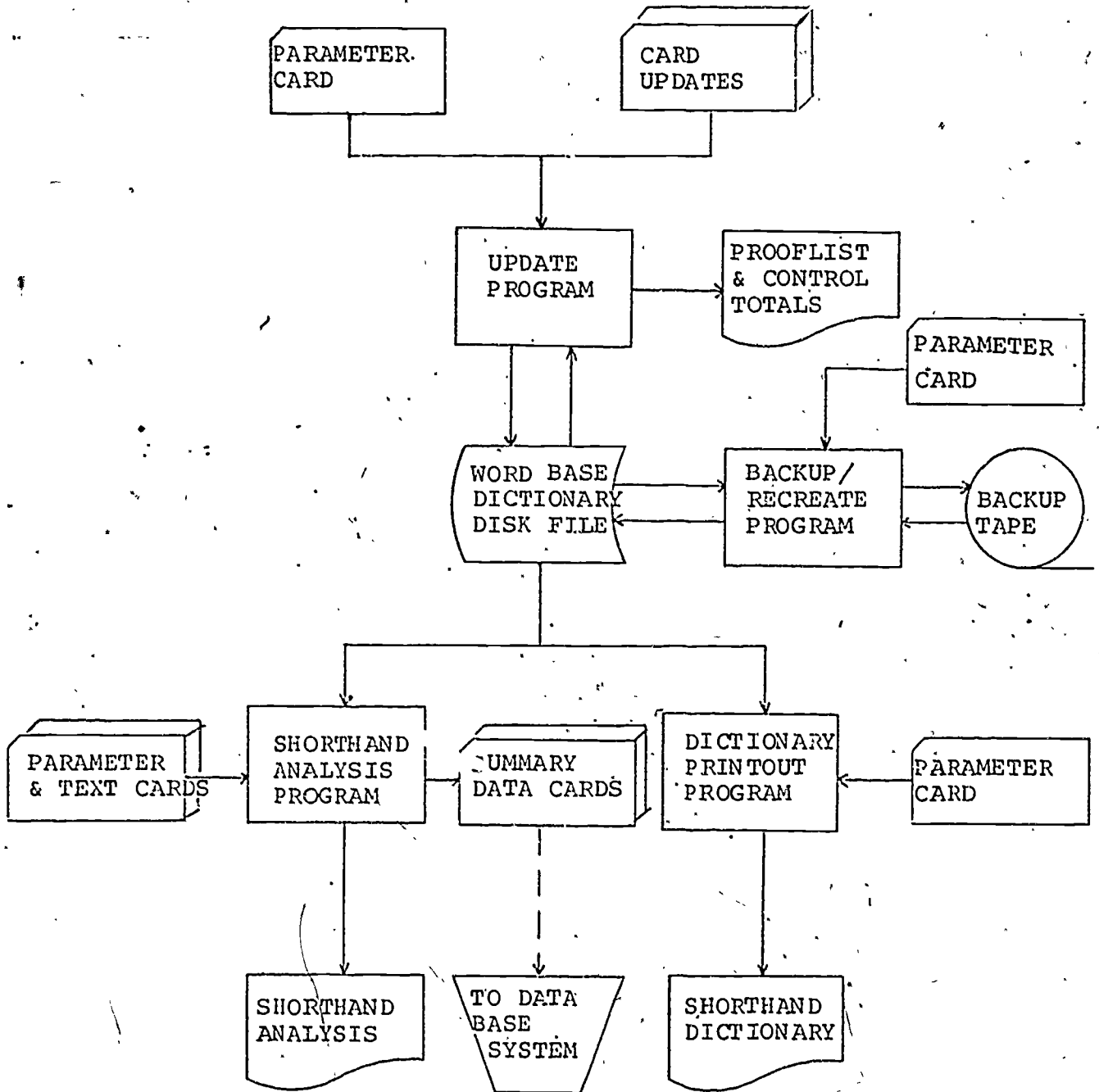


Exhibit A

WORD BASE DICTIONARY

Each entry in the Word Base Dictionary (or vocabulary base) is composed of the following elements:

1. word
2. syllable count
3. Mellinger word list position
4. Perry word list position
5. lesson word could first be written in Gregg DJ shorthand
6. lesson word could first be written in Century 21 shorthand (high school series)
7. lesson word could first be written in Century 21 shorthand (collegiate series)
8. word type for Gregg DJ shorthand
9. word type for Century 21 shorthand
10. principles used in word according to Gregg DJ shorthand
11. principles used in word according to Century 21 shorthand
12. direction of the beginning and ending Gregg DJ stroke
13. direction of the beginning and ending Century 21 stroke
14. number of strokes in word written in Gregg DJ shorthand
15. number of strokes in word written in Century 21 shorthand

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SHORTHAND DICTIONARY UPDATE
PROOF LIST

PAGE 1
DATE 04/12/76

WORD IMAGE	SY MEL PER LES LES LES MF1 MF2 MF3 MF1 MF2 MF3	P1 P2 P3 P1 P2 P3	P1 P2 P3	BS BS ES ES NS NS	
KAVAN	CT POS POS DJ ZIH ZIC DJ DJ DJ DJ DJ DJ DJ DJ DJ	98 76 54 98 76 54	15 15 01 01 01 01	01 01 01 01	01 01
	16 150 149 50 39 47 9 8 7 6 5 4				
ACE	01 120 125 01 C1 01		18 18 01 01 02 02		
AMOUNTS	02 010 018 20 16 10		19 18 01 01 05 04		
GALLICN	01 130 125 47 34 45		01 01 01 01 01 01		

ACTION/ERROR MESSAGES
HAF

SYLL CNT NOT IN RANGE
MELL CODE NOT IN RANGE
PERRY CD NOT IN RANGE
LES CD DJ NOT IN RANGE
LCD ZHNS NOT IN RANGE
LCD ZICL NOT IN RANGE
INVALID DJ WORD FORM
INVALID ZI WORD FORM

ADDED TO FILE
DELETED FROM FILE
CHANGE FOR NON EXIST

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SHORTHAND DICTIONARY
COMBINED 100

DATE 04/12/76

SYLLABLE HELLINGER-PERRY LESSON INTRO DJ FORM 21 FORM 21 PRINCIPLE BOJ 821 EDJ E21 NDJ N21

CHARACTER STROKES

WORD IMAGE	SYLLABLE COUNT	HELLINGER-PERRY POSITION	LESSON DJ	INTRO 21C	DJ 1	FORM 2	FORM 3	21 1	FORM 2	DJ 3	FORM 1	PRINCIPLE 2	PRINCIPLE 3	BOJ 821	EDJ E21	NDJ N21
ABOUT	01	0010C	03	03	01	1	1	1	1	1	1	1	1	21	01	01
ALL	01	00100	13	11	09	1	1	1	1	1	1	1	1	18	02	02
ALSO	02	00100	07	06	02	4	4	4	4	4	4	4	4	12	02	03
AM	01	00100	32	01	10	1	1	1	1	1	1	1	1	02	01	01
AN	01	00100	03	03	05	1	1	1	1	1	1	1	1	27	01	01
AND	02	00100	11	09	03	1	1	1	1	1	1	1	1	13	02	01
ANY	01	0010C	05	04	01	1	1	1	1	1	1	1	1	18	01	01
ARE	01	00100	05	01	01	1	1	1	1	1	1	1	1	01	02	01
AS	01	00100	05	01	01	1	1	1	1	1	1	1	1	01	02	01
AT	01	00100	03	06	09	1	1	1	1	1	1	1	1	09	01	01
BE	01	00100	03	06	09	1	1	1	1	1	1	1	1	01	01	01
BEN	02	00100	03	06	09	1	1	1	1	1	1	1	1	01	01	01
BUSINESS	01	0010C	05	12	09	1	1	1	1	1	1	1	1	13	01	01
BUT	01	00100	05	06	09	1	1	1	1	1	1	1	1	09	01	01
BY	01	00100	03	06	09	1	1	1	1	1	1	1	1	09	01	01
CAN	02	00100	03	06	09	1	1	1	1	1	1	1	1	01	01	01
COMPANY	01	0010C	05	04	03	1	1	1	1	1	1	1	1	01	01	01
COPY	01	0010C	07	03	10	1	1	1	1	1	1	1	1	01	01	01
DO	01	00100	04	04	03	1	1	1	1	1	1	1	1	01	01	01
EACH	02	0010C	04	08	10	2	2	2	2	2	2	2	2	03	01	02
ENCLOSED	01	00100	13	06	06	1	1	1	1	1	1	1	1	13	01	02
FOR	01	00100	08	06	10	1	1	1	1	1	1	1	1	10	01	02
FROM	01	00100	11	06	11	1	1	1	1	1	1	1	1	01	01	02
HAS	01	00100	05	06	11	1	1	1	1	1	1	1	1	01	01	02
HAVE	01	00100	03	03	03	1	1	1	1	1	1	1	1	01	01	01
HE	01	00100	03	03	03	1	1	1	1	1	1	1	1	01	01	01
IF	01	00100	03	03	03	1	1	1	1	1	1	1	1	01	01	01
IF	01	00100	03	03	03	1	1	1	1	1	1	1	1	01	01	01
IF	02	00100	03	03	03	4	4	4	4	4	4	4	4	13	01	02
IF	01	00100	05	05	02	1	1	1	1	1	1	1	1	10	01	02
IF	01	00100	05	05	02	1	1	1	1	1	1	1	1	10	01	02
IF	01	00100	05	05	02	1	1	1	1	1	1	1	1	10	01	02
IF	01	00100	05	05	02	1	1	1	1	1	1	1	1	10	01	02
IF	01	0010C	01	03	10	1	1	1	1	1	1	1	1	13	01	02
IF	01	00100	01	04	10	1	1	1	1	1	1	1	1	13	01	02
IF	01	0010C	01	04	10	1	1	1	1	1	1	1	1	13	01	02
IF	01	0010C	01	04	10	1	1	1	1	1	1	1	1	13	01	02

ICN
Exhibit C
DICTIONARY JOBSTREAM

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EXAMPLE

EDITED TEXT IMAGE

DEAR SIR: *****
 YOUR LETTER OF MAY FIRST CAME TO ME THIS DAY . IT WILL BE / ONLY THREE
 DAYS BEFORE I CAN MAIL YOU THE TWO HUNDRED DAILY /01/ PAPERS FOR WHICH YOU
 ASKED . IS THIS ALL RIGHT WITH YOU ? I WOULD / PUT A FAST SERVICE ON
 THIS PACKAGE . THE COST WILL BE THREE DOLLARS /02/ FOR THE FIRST ONE
 HUNDRED , BUT ONLY TWO DOLLARS FOR THE REMAINING / ONE HUNDRED .

CORDIALLY ,

NUMBER OF TEXT CARDS READ----- 7
 NUMBER OF GOOD WORDS ON TEXT CARD----- 60
 NUMBER OF WORDS REJECTED ON TEXT CARDS----- 8
 NUMBER OF GOOD SYLLABLES ON TEXT CARDS----- 74
 NUMBER OF DIFFERENT GOOD WORDS ON TEXT CARDS----- 43
 PERCENT OF DIFFERENT WORDS ON TEXT CARDS
 (DIFFERENT GOOD WORDS / GOOD WORDS)----- 71.666
 SYLLABIC INTENSITY (GOOD SYLLABLES / GOOD WORDS)----- 1.233

PARAMETER CARD INFORMATION:
 LESSON-CODE DJ----- 08
 LESSON CODE ZHRS----- 35
 LESSON CODE ZICOL----- 46
 MELLINGER LIST POSITION----- 01500
 PERRY LIST POSITION----- 12500



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EXAMPLE

EDITED TEXT IMAGE

DEAR SIR :
I READ YOUR LETTER OF MAY FIRST THIS DAY . IT WILL / BE ONLY THREE
DAYS BEFORE I CAN MAIL YOU THE TWO DAILY /CI/ PAPERS FOR WHICH YOU
ASKED . IS THIS ALL RIGHT WITH YOU ? I / WOULD PUT GOOD SERVICE ON
THIS PACKAGE . THE CCST WILL BE THREE /OZ/ DOLLARS FOR THE FIRST .
BUT ONLY TWO DOLLARS FOR THE / REMAINING .
CGRDIALLY ,

NUMBER OF TEXT CARDS READ	7	PARAMETER CARD INFORMATION:
NUMBER OF GOOD WORDS ON TEXT CARD	61	LESSON CODE DJ
NUMBER OF WORCS REJECTED ON TEXT CARDS	0	LESSGN CODE 21HS
NUMBER OF GOOD SYLLABLES ON TEXT CARDS	75	LESSON CODE 21COL
NUMBER OF DIFFERENT GOOD WORDS ON TEXT CARDS	43	MELLINGER LIST POSITION
PERCENT OF DIFFERENT WORDS ON TEXT CARDS (DIFFERENT GOOD WORDS / GOOD WORDS)	70.491	PERRY LIST POSITION
SYLLABIC INTENSITY (GOOD SYLLABLES/GOOD WORDS)	1.229	

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EXAMPLE

GROUP	FREQUENCY		PERCENT		WORD USAGE		FREQUENCY	
	MELLINGER	PERRY	MELLINGER	PERRY	MELLINGER	PERRY	MELLINGER	PERRY
00100	41	38	67.21	62.29	67.21	62.29	62.29	62.29
00200	4	2	6.55	13.11	73.76	75.40	75.40	78.67
00300	5	2	8.19	3.27	81.95	78.67	83.57	80.50
00400	1	1	1.63	0.00	83.58	80.50	88.48	85.20
00500	2	1	3.27	1.63	86.85	83.57	90.11	88.47
00600	1	2	1.63	3.27	88.48	85.20	91.74	91.74
00700	1	2	1.63	3.27	90.11	88.47	93.37	91.74
00800	1	2	1.63	0.00	93.37	91.74	95.00	91.74
00900	0	0	0.00	3.27	95.00	93.37	96.63	95.00
01000	0	0	0.00	0.00	96.63	95.00	98.26	96.63
01200	1	0	1.63	0.00	98.26	96.63	99.89	98.26
01300	3	0	4.91	0.00	99.89	98.26		
01600	0	1	0.00	1.63				
01900	0	1	0.00	1.63				
03800	0	1	0.00	1.63				
05600	0	1	0.00	1.63				
11400	0	1	0.00	1.63				
TOTAL	61	61	55.91	99.89				

Exhibit D
SHORTHAND ANALYSIS
page 3

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EXAMPLE

TYPE	FREQUENCY DJ	WORD FORM	COUNT	PERCENT OF WORD FORM BY TOTAL WORD COUNT
BRIEF/SPEED FORM (1)	31	18	50.81	29.50
BRIEF/SPEED FORM DERIVATIVES (2)	1	1	1.63	1.63
WCFD ENDINGS (3)	5	5	8.19	8.19
WORD BEGINNING (4)	0	2	0.00	3.27
TOTAL	37	26	60.63	42.59

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EXAMPLE

BEGINNING STROKE DIRECTION

DIRECTION	FREQUENCY DJ	PERCENT FREQUENCY DJ	FREQUENCY 21	PERCENT FREQUENCY 21
DOWNWARD CURVE (01)	15	24.59	24	24.24
DOWNWARD HOOK (02)	4	6.55	4	6.55
DOWNWARD STRAIGHT STROKE (03)	1	1.63	1	1.63
DISJUNCTED DOWNWARD HOOK (04)	0	0.00	0	0.00
DISJUNCTED DOWNWARD HOOK (05)	0	0.00	0	0.00
DISJUNCTED DOWNWARD STRAIGHT STROKE (06)	0	0.00	0	0.00
UPWARD CURVE (07)	6	9.93	6	9.93
UPWARD HOOK (08)	7	11.77	7	11.77
UPWARD STRAIGHT STROKE (09)	10	16.39	10	16.39
DISJUNCTED UPWARD HOOK (10)	0	0.00	0	0.00
DISJUNCTED UPWARD STRAIGHT STROKE (11)	0	0.00	0	0.00
UPWARD CURVE (12)	10	16.39	10	16.39
UPWARD STRAIGHT STROKE (13)	2	3.27	2	3.27
FORWARD CURVE WITH UPWARD TURN (14)	0	0.00	0	0.00
DISJUNCTED STRAIGHT SLANTING STROKE (15)	0	0.00	0	0.00
DISJUNCTED FORWARD CURVE (16)	0	0.00	0	0.00
DISJUNCTED FORWARD STRAIGHT STROKE (17)	0	0.00	0	0.00
CIRCLE (18)	0	0.00	0	0.00
DISJUNCTED CIRCLE (19)	0	0.00	0	0.00
BROKEN CIRCLE (20)	0	0.00	0	0.00
DOT (21)	0	0.00	0	0.00
LOOP (22)	0	0.00	0	0.00
OTHER (23)	0	0.00	0	0.00
TOTAL	61	99.95	61	99.95



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EXAMPLE

DIRECTION	ENDING STROKE	DIRECTION	FREQUENCY DJ	PERCENT DJ	FREQUENCY 21	PERCENT 21
DOWNWARD CURVE (01)			6	18.75	26.47	0.00
DOWNWARD HOOK (02)			0	0.00	0.00	2.54
DOWNWARD STRAIGHT STROKE (03)			1	3.12	0.00	0.00
DOWNWARD STRAIGHT STROKE WITH UPWARD HOOK (04)			0	0.00	0.00	0.00
DISJOINED DOWNWARD HOOK (05)			0	0.00	0.00	0.00
DISJOINED DOWNWARD STRAIGHT STROKE (06)			0	0.00	0.00	0.00
DISJOINED CURVE (07)			1	3.12	2.54	0.00
UPWARD HOOK (08)			2	6.25	1.00	0.00
UPWARD STRAIGHT STROKE (09)			7	21.87	14.70	0.00
DISJOINED UPWARD HOOK (10)			0	0.00	0.00	0.00
DISJOINED UPWARD STRAIGHT STROKE (11)			0	0.00	8.92	0.00
DISJOINED CURVE (12)			3	9.37	12.50	0.00
DOWNWARD STRAIGHT STROKE (13)			1	3.12	2.54	0.00
DOWNWARD STRAIGHT STROKE WITH UPWARD HOOK (14)			0	0.00	0.00	0.00
DISJOINED STRAIGHT SLANTING STROKE (15)			0	0.00	0.00	0.00
DISJOINED FORWARD CURVE (16)			0	0.00	0.00	0.00
DISJOINED FORWARD STRAIGHT STROKE (17)			0	0.00	0.00	0.00
CIRCLE (18)			8	25.00	3.00	0.00
DISJOINED CIRCLE (19)			0	0.00	0.00	0.00
BROKEN CIRCLE (20)			0	0.00	0.00	0.00
DOT (21)			1	3.12	2.54	0.00
LCPP (22)			0	0.00	0.00	0.00
OTHER (23)			0	0.00	0.00	0.00
TOTAL			32	99.97	99.97	

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EXAMPLE

NUMBER OF STROKES	NUMBER OF STROKES PER WORD	
	FREQUENCY DJ	PERCENT FREQUENCY DJ
07	1	1.63
06	2	3.27
05	3	4.91
04	4	6.55
03	11	18.03
02	5	14.75
01	29	47.54
TOTAL	61	99.96



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EXAMPLE

NUMBER OF SYLLABLES PER WORD

NUMBER OF SYLLABLES	FREQUENCY	PERCENT FREQUENCY
03	2	3.27
02	10	16.59
01	49	80.32
TOTAL	61	99.98



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EXAMPLE

LESSON CODE FREQUENCY COUNT

LESSON	FREQUENCY DJ	FREQUENCY ZIC	PERCENT DJ	PERCENT ZIH	FREQUENCY ZIC	CUMULATIVE DJ	PERCENT ZIH	FREQUENCY ZIC
25	0	1	0.00	0.00	1.63	0.00	0.00	1.63
17	0	1	0.00	1.63	0.00	0.00	1.63	1.63
16	0	1	0.00	1.63	0.00	0.00	3.27	3.27
14	0	2	0.00	3.27	3.27	0.00	6.53	6.53
13	0	3	0.00	0.00	4.91	0.00	0.00	4.91
12	0	0	0.00	1.63	0.00	0.00	8.16	8.16
11	0	3	0.00	0.00	4.91	0.00	8.16	12.72
10	0	3	0.00	0.00	13.11	0.00	8.16	20.88
9	0	4	0.00	0.00	16.55	0.00	16.55	27.43
8	17	0	27.86	0.00	0.00	27.86	0.00	27.86
7	5	0	8.19	4.51	0.00	36.05	21.26	34.38
6	22	0	39.09	22.55	0.00	73.11	43.21	38.01
5	3	0	5.11	10.00	0.00	75.38	44.26	38.01
4	3	13	5.11	18.19	21.31	88.49	67.15	57.32
3	5	13	8.19	13.11	21.31	96.68	80.26	78.63
2	2	13	3.27	15.67	21.31	99.95	99.95	99.95
TOTAL	61	61	99.95	99.93	99.94			

Exhibit D
SHORTHAND ANALYSIS
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SCHOOL OF BUSINESS
SHORTHAND EVALUATION SYSTEM II
INDIANA STATE UNIVERSITY

EXAMPLE

PRINCIPLE USAGE FREQUENCY TABLE

DJ PRINCIPLE	FREQUENCY	PERCENT FREQUENCY BY TOTAL WORD COUNT	21 PRINCIPLE	FREQUENCY	PERCENT BY TOTAL WORD COUNT	FREQUENCY
-ING (01)	1	1.63	ER (02)	3	4.91	
-LY (03)	4	6.25	-ED (03)	1	1.63	
EXCEPTIONS TO RE- (93)	1	1.63	-ING (03)	1	1.63	
			BE- (13)	3	4.91	
			-LY (15)	1	1.63	
			RE- (26)	1	1.63	
			CONTRACTED FORMS (74)	1	1.63	
			TOTAL	11	17.97	
			TOTAL	6	9.81	

SCHOOL OF BUSINESS
SHORTHAND EVALUATION SYSTEM I
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EXAMPLE

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MASTER WORD USAGE LIST

WORD IMAGE	FR CT	SY CT	HELLINGER-PERRY			LESSON INTRO			DJ FORM			DJ PRINCIPLE			21 PRINCIPLE			3			21			STROKES		
			POSITION	DJ	21H	21C	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2
ASKED	001	01	00100	07	06	02											18	18	12	12	09	11	12	02	02	02
BEGRE	001	01	00500	05	07	06											18	18	12	12	09	11	12	02	02	02
BUT	002	01	00100	08	06	09		1									01	01	01	01	09	09	02	02	01	01
CAN	001	01	00100	05	06	09		1									01	01	01	01	09	09	02	02	01	01
COST	001	01	00100	05	04	03		1									12	03	03	03	18	12	12	01	01	01
DAILY	001	02	00200	08	16	25		3									12	03	03	03	18	12	12	01	01	01
OAY	001	01	00200	08	07	06		3									12	03	03	03	18	12	12	01	01	01
CAYS	001	01	00300	02	03	03		1									05	09	09	09	12	01	01	03	05	01
DEAR	002	01	00100	07	04	03		1									05	09	09	09	12	01	01	03	05	01
FIRST	002	01	00100	07	06	03		1									09	09	09	09	12	01	01	03	05	01
FGR	002	01	00100	08	14	10		1									01	01	01	01	09	11	01	05	01	01
GCCP	001	01	00200	08	07	11		1									12	20	03	03	12	01	01	01	01	02
IS	003	01	00100	08	01	11		1									12	20	03	03	12	01	01	01	01	02
LETTER	001	01	00100	05	01	01		1									12	20	03	03	12	01	01	01	01	02
MAIL	001	01	00300	02	02	10		1									13	13	13	12	12	12	03	03	03	03
MAY	001	01	00100	02	01	10		1									13	13	13	12	12	12	03	03	03	03
CF	001	01	00100	05	06	06		1									13	13	13	12	12	12	03	03	03	03
GNV	002	02	00100	08	09	13		3									13	13	13	12	12	12	03	03	03	03
SHORTHAND ANALYSIS	001	02	01300	05	07	11		3									01	01	01	01	03	03	03	03	03	03
page 11	001	02	00500	08	03	10		3									01	01	01	01	03	03	03	03	03	03
16	001	03	00700	02	12	10		3									01	01	01	01	03	03	03	03	03	03
EXHIBIT D	001	02	00400	05	17	01		1									12	12	12	12	09	09	09	09	09	09
page 11	001	01	00500	05	17	02		1									12	12	12	12	09	09	09	09	09	09
16	003	01	00100	08	04	03		1									07	07	07	07	12	12	12	12	12	12
02	002	01	00300	05	06	02		1									08	08	08	08	18	18	18	18	18	18
01	002	01	00100	04	09	11		1									07	07	07	07	08	08	08	08	08	08
01	002	01	00100	08	03	03		1									09	09	09	09	08	08	08	08	08	08
01	002	01	00100	08	03	03		1									09	09	09	09	08	08	08	08	08	08
01	002	01	00100	08	03	03		1									09	09	09	09	08	08	08	08	08	08

MASTER WORD USAGE LIST

WORD IMAGE	FR SY CT	MELLINGER-PERRY POSITION	LESSON INTRO DJ 21H 21C	DJ FORM 1 2 3	21 FORM 1 2 3	DJ PRINCIPLE 1 2 3	21 PRINCIPLE 1 2 3	CHARACTER STROKES 60J B21 EDJ E21 N2J N21
WCULD	001 01	00100	03 03	1	1			09 C9 08 08 08 08
YOU	003 01	00100	05 01	1				01 01 01 01
YOUR	001 01	00100	05 01	1				01 01 01 01

