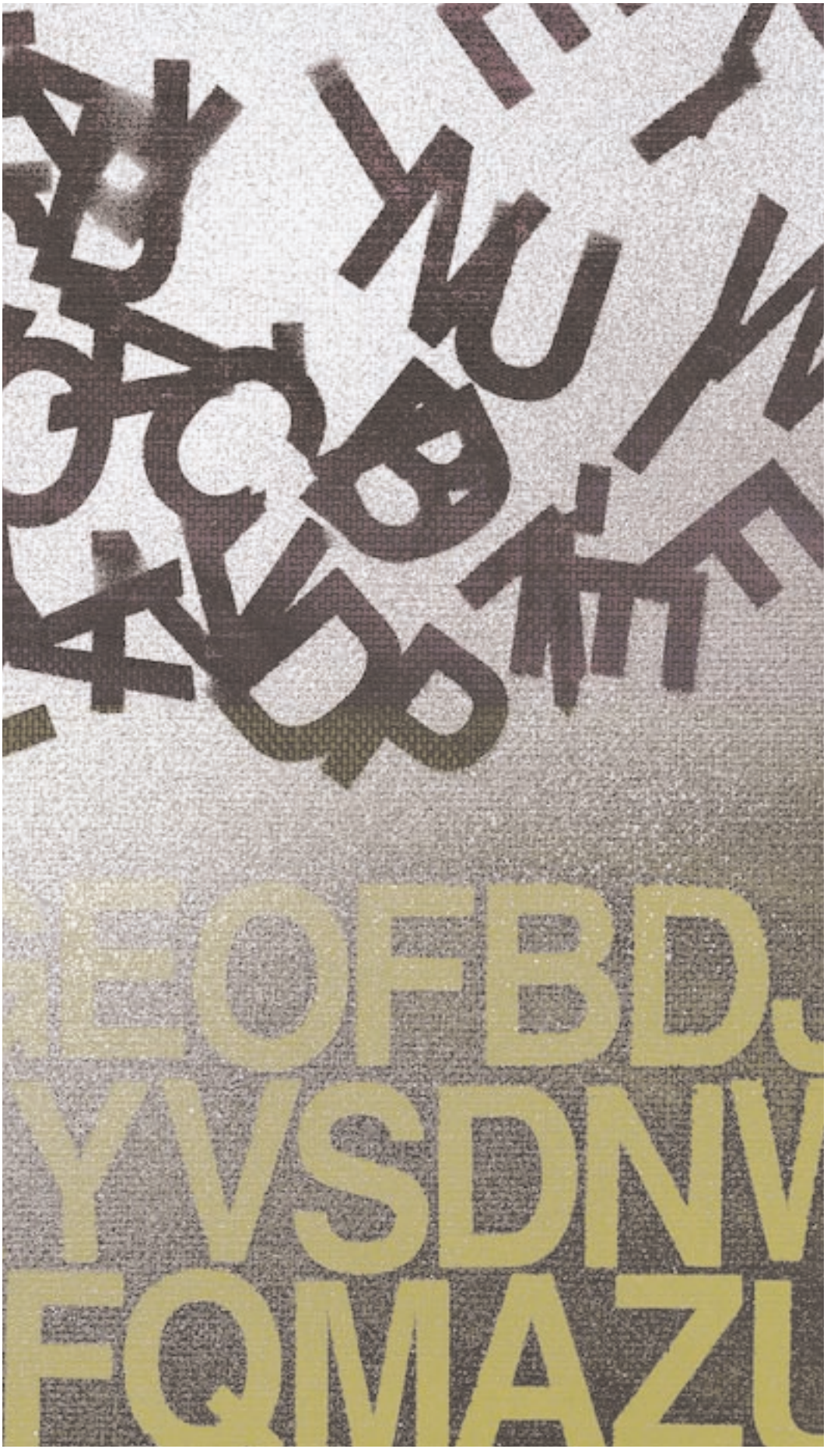

Learning Type Measure® Manual

Participants should share their HMI scores and post on their paper chart the range of Right Mode, Left Mode, and Whole-Brained participants for their learning style group (Ones, Twos, Threes, and/or Fours).

Note: Again, if you use the LTM without overlaying the HMI score, then confine your discussion and the groups' discussions to the four quadrant results coupled with the watching/doing results. These two dimensions are important insights in their own right.

Technical Documentation

Introduction

The results reported in this technical manual are based on the Learning Type Measures (LTM) administered to 390 people attending workshops on 4MAT, a teaching method based on people's different learning styles or types.

The measure described here reflects the four learning types of Dr. Bernice McCarthy, the author of 4MAT.

Part A contains 15 items with four stems each. Respondents are asked to rank each stem from 4 (most like you) to 1 (least like you). The stems have been keyed to represent each learning type.

Part B contains 11 items with two choices each. The choices represent "Doers" or "Watchers." Respondents are asked to choose one of the two choices that is most like themselves. Here, too, a key is provided for each choice as being indicative of a "Doer" or a "Watcher."

Validity

The stems in the 15 items of Part A represent the descriptions of the four types of learners found in several books and articles by Dr. McCarthy and her colleagues. Therefore, the measure has content validity, since the items represent those four styles. Similarly for the items in Part B, these choices represent learning types activities, i.e., doing or watching.

There are three demonstrations we wish to present to support the claim that the LTM has construct validity. First, do people have a learning Type, i.e., there is one type that is distinguishable from the rest?

To answer this question, we score the LTM in the following way: A key is provided for the respondent to score his or her own test. Respondents add up the ratings for the stems representing one type, then do the same thing for each of the remaining three types. Of the four sums calculated, the maximum represents the respondent's learning type. All four learning types are represented in this sample as shown in Table 1 (next page).

Table 1 Frequency Distribution of Learning Types

Type	Count	Percent
Ones	167	42.8
Twos	55	14.1
Threes	78	20.0
Fours	80	20.5
No Single Type	10	2.6
Total	390	100.0

Only 10 people of the 390 had a tie between two sums. For teaching or understanding oneself, even this more complex information is meaningful according to Dr. McCarthy's theory.

The second question concerned with Construct Validity is: Do people have sharply peaked profiles or are the sums across the four types nearly the same? The maximum sum is 60 (4 ratings on all 15 items in the same type) and the minimum is 15 (1 ratings on all 15 items in the same type). To test the hypothesis of peakedness, we calculated the difference between the maximum sum and the next highest sum. The results are displayed in Table 2 on the next page.

Table 2 Difference Between the Maximum and the Next Highest Sum

Difference	Count	Percent
0	10	2.6
1	35	9.0
2	22	5.6
3	25	6.4
4	23	5.9
5	27	6.9
6	26	6.7
7	30	7.7
8	13	3.3
9	24	6.2
10	18	4.6
11	10	2.6
12	20	5.1
13	16	4.1
14	11	2.8
15	14	3.6
16	13	3.3
17	11	2.8
18	5	1.3
19	9	2.3
20	11	2.8
21	4	1.0
22	5	1.3
23	5	1.3
25	3	0.8
Total	390	100.0

70% of the respondents had differences between their maximum sum and their next highest sum of 5 or more. 50% had differences of 7 or more. Differences ranged from 0 (for the ten who had two identical sums) to 25 (a very peaked profile).

A final question concerning construct validity focuses on the "correct" respondents rating a particular stem strongly, i.e., 3 or 4. Table 3 shows the result of this analysis.

Table 3 Analysis of Each Stem in Part A

		Proportion of "Key People" Rating the Stem				Proportion of "Key People" Rating the Stem	
Stem	**Key**	**4**	**3 or 4**	**Stem**	**Key**	**4**	**3 or 4**
1a	2	63.6	83.6	8a	4	66.3	86.3
1b	1	54.5	84.4	8b	1	68.9	91.7
1c	3	75.6	92.3	8c	3	37.2	76.9
1d	4	65.0	88.8	8d	2	67.3	87.3
2a	1	65.3	82.1	9a	3	56.4	89.7
2b	2	63.6	89.1	9b	4	63.8	85.1
2c	3	59.0	84.6	9c	1	43.1	65.3
2d	4	62.5	91.3	9d	2	69.1	92.7
3a	3	65.4	96.2	10a	4	61.3	80.1
3b	2	40.0	63.6	10b	2	58.2	70.9
3c	4	41.3	75.1	10c	3	41.0	67.9
3d	1	69.5	94.1	10d	1	48.5	84.4
4a	4	31.3	66.3	11a	4	57.5	88.8
4b	2	72.7	89.1	11b	2	41.8	83.6
4c	1	56.3	79.7	11c	1	46.1	73.0
4d	3	35.9	66.7	11d	3	51.3	87.2
5a	1	73.1	88.7	12a	1	75.4	92.2
5b	4	57.5	82.5	12b	2	56.4	89.1
5c	3	32.1	78.3	12c	3	41.0	65.4
5d	2	50.9	78.2	12d	4	33.8	62.6
6a	2	67.3	81.8	13a	3	37.2	69.3
6b	4	67.5	86.3	13b	2	43.6	74.5
6c	3	44.9	90.8	13c	1	35.9	68.2
6d	1	49.7	79.0	13d	4	67.5	82.5
7a	3	55.1	83.3	14a	1	78.4	91.6
7b	1	70.1	82.7	14b	2	45.5	71.0
7c	4	58.8	83.8	14c	3	28.2	66.7
7d	2	49.1	70.9	14d	4	50.0	83.8
			15a	1	55.7	79.7	
			15b	2	43.6	72.7	
			15c	3	44.9	73.1	
			15d	4	83.8	98.8	

Reliability

There are two forms of reliability to be presented here. The first is internal consistency, measured by the Cronbach alpha statistic, which has a range from 0 to 1. Items which form a unidimensional scale, i.e., which all measure the underlying dimension represented by the total score have a high alpha and items which measure several different dimensions have a low value for alpha. Achievement tests typically have an alpha of between 0.80 and 0.90. Attitude or affective inventories have alphas between 0.70 and 0.90. The alpha values for the four sets of items forming the four learning type sums in Part A and the do vs. watch items in Part B are shown in Table 4.

Table 4 Internal Consistency of Item Scales

Scale	Cronbach Alpha
Part A:	
Learning Type One	0.853
Learning Type Two	0.835
Learning Type Three	0.767
Learning Type Four	0.885
Part B:	
Do vs. Watch	0.863

The second form of reliability is test-retest. This statistic, the correlation between two administrations of the same measure, yields an estimate of stability of the measure. The test-retest reliability coefficient, because it is indicative of the consistency of scores over time, is also referred to as a coefficient of stability. Analysis of the LTM yields a .71 test-retest coefficient. Reliability is in part a function of the nature of the variable being measured and since all self-report measures of human qualities are expected to contain some degree of error, a .71 test-retest coefficient is an indicator of a high level of stability.

Concurrent Validity

Concurrent validity is the relationship between two simultaneous but independent judgments on the same trait or ability. Here, to establish concurrent validity for the Learning Type Measure (LTM), we compare LTM scores with two other measures describing types, the Learning Style Inventory (LSI), and the Myers Briggs Type Indicator (MBTI).

The Relationship Between LTM and LSI

175 persons completed both the LTM and the LSI. It would not be proper to correlate the four sum scores produced by the LTM with the four scores produced by the LSI, for the following reasons. In the LSI, differences are calculated and a point is plotted based on the coordinates determined by those differences. In the LTM the highest sum score determines the learning type.

Instead, we will test the relationship between the LTM and the LSI using a contingency table analysis and determine the strength of the relationship of the two constructs using relevant statistics.

Count Row Pct Col Pct	L Type 1.00	2.00	3.00	4.00	Row Total
1.00	44.0 95.7 51.8			2.0 4.3 6.3	46.0 26.3
2.00	22.0 37.3 25.9	26.0 44.1 81.3	6.0 10.2 23.1	5.0 8.5 15.6	49.0 33.7
3.00	5.0 17.9 5.9	5.0 17.9 15.6	15.0 53.6 57.7	3.0 10.7 9.4	28.0 16.0
4.00	14.0 33.3 16.3	1.0 2.4 3.1	5.0 11.9 19.2	22.0 52.4 68.8	42.0 24.0
Column Total	85.0 48.6	32.0 18.3	25.0 14.9	32.0 18.3	42.0 24.0

Chi-Square	D.F.	Significance
137.42826	9	$p < .0001$

Statistic	Value
Cramer's V	.51163
Contingency Coefficient	.66323

There is a 61.1% agreement between the two measures (107/175). The chi-square test, Cramer's V and the Contingency Coefficient all show a significant relationship between the LSI and the LTM as well.

The Relationship Between the LTM and the MBTI

Legend

		SUM 1	SUM 2	SUM 3	SUM 4
E	*Correlation*	.1933	–.4027	–.3492	.4569
	Count	(58)	(58)	(58)	(58)
	Significance	P = .073	P = .001	P = .004	P = .000
S	*Correlation*	.0395	.2553	.5013	–.6123
	Count	(58)	(58)	(58)	(58)
	Significance	P = .384	P = .027	P = .000	P = .000
T	*Correlation–*	.6588	.6164	.4777	–.3626
	Count	(58)	(58)	(58)	(58)
	Significance	P = .000	P = .000	P = .000	P = .003
J	*Correlation*	–.2138	.6804	.3242	–.6774
	Count	(58)	(58)	(58)	(58)
	Significance	P = .054	P = .000	P = .007	P = .000
I	*Correlation*	–.2458	.4769	.4261	–.5384
	Count	(58)	(58)	(58)	(58)
	Significance	P = .031	P = .000	P - .000	P = .000
N	*Correlation*	–.0293	–.1706	–.5481	.5605
	Count	(58)	(58)	(58)	(58)
	Significance	P = .413	P = .100	P = .000	P = .000
F	*Correlation*	.6519	–.5800	–.4778	.3421
	Count	(58)	(58)	(58)	(58)
	Significance	P = .000	P = .000	P = .000	P = .004
P	*Correlation*	.2209	–.6834	–.3489	.6920
	Count	(58)	(58)	(58)	(58)
	Significance	P = .048	P = .000	P = .004	P = .000

Significant relationships between the LTM and the MBTI are as follows:

The F, or Feeling score is most associated with the Learning Type 1 score.

The I, Introvert, T, Thinking, and J, Judging scores are most associated with the Learning Type 2 score.

The S, Sensing score, is most associated with the Learning Type 3 score.

The E, extrovert, N, Intuitive, and P, Perceiving scores are most associated with the Learning Type 4 score.

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SECTION A: TECHNICAL NOTES FOR THE HMI

Content Validity

From a review of the literature in the area of brain hemisphere dominance (see Bibliography), forty items were prepared which reflected themes that the various authors had attributed to right or lefthemisphere laterality. They reflect a range of dimensions of thought, behavior and feelings.

An empirical test of the left/right scoring of each question was performed on the original items by correlating each item with the total test score, corrected by removing that item's score from the total. Thirty-two items produced responses that corresponded to the expected direction of scoring. Those 32 items were tested in further analyses.

Concurrent Validity

Total scores from the 32 item test were correlated with the Torrance measure, (SOLAT-C) Your Style of Learning and Thinking, Form C. Forty-nine subjects took both measures during a workshop on learning styles and hemispheric laterality. For those subjects, the Spearman rank correlation coefficient was 0.819. (The Pearson Product-moment correlation is 0.659.) These results show the HMI measure to be similar to the Torrance measure, but not identical or measuring something completely different.

Reliability (Internal Consistency)

Items were rescored so that high negative scores are related to a left hemisphere mode and high positive scores are related to a right hemispheric mode. Choices were coded in the following manner.

Left Mode Choices:	A lot like you	-2
	Somewhat like you	-1
Right Mode Choices:	A lot like you	+1
	Somewhat like you	+2

A score of zero might be interpreted two ways, no preference or equal preferences to each mode. A frequency distribution of the 76 subjects who took the HMI showed consistent clustering near the center or to one side rather than a U-shaped curve.

Cronbach's alpha was calculated for the 76 subjects' responses resulting in a coefficient of 0.90.

Correlations between each item score and the total test score are given in Table 1. The total score is corrected by removing each item considered, and left-brain item scores were reversed so that all item scores were positive.

Reliability (Test-Retest!)

A sample of 47 subjects were administered the HMI twice, approximately two months apart. The Pearson Product Moment Correlation coefficient between the two testings was 0.904.

Table 1: Item-Total Correlations \Corrected)

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ITEM	CORRELATION	ITEM	CORRELATION	ITEM	CORRELATION	ITEM	CORRELATION
1	0.663	9	0.159	17	0.577	25	0.526
2	0.575	10	0.416	18	0.433	26	0.291
3	0.484	11	0.433	19	0.441	27	0.268
4	0.268	12	0.377	20	0.439	28	0.392
5	0.643	13	0.424	21	0.415	29	0.465
6	0.515	14	0.216	22	0.484	30	0.608
7	0.425	15	0.596	23	0.539	31	0.373
8	0.311	16	0.468	24	0.541	32	0.276

Section B: Norms for the HMI

Introduction

Approximately 2000 educators completed the Learning Style Inventory (LSI) and the Hemispheric Modality Indicator (HMI). The largest proportion were teachers and a few were administrators. Respondents also indicated their age and sex.

The following analyses are an attempt to provide users or potential users with some norms for comparison with local or regional data.

Results

Table 1 shows the distribution of learning styles for respondents whose four subscores totaled 120. Almost one-quarter of the respondents' totals were not correct and therefore the subscores could not be considered accurate, either. (The subscores are needed to calculate the learning style.) The most noteworthy point is the paucity of Three's. In other studies involving elementary teachers, there were less Two's than in this general population. (NOTE: Perhaps proportionally more Two's can add correctly?)

Tables 2A and 2B break down the LSI scores by age. The counts and row percentages are displayed in the two tables, respectively. Table 2B specifically shows very similar distributions of learning styles of each age and a test of significance showed no relationship between the two.

The relationship between learning style and sex is shown in Tables 3A, 3B and 3C. In the responding population there were almost exactly twice as many women as men. Table 3B shows females disproportionately higher in styles One and Four and lower in Two and Three. Among males, the largest proportion were Two's and among females, Fours. There was a statistically significant relationship between learning style and sex (Chi-Square = 54.6, $p<.001$).

A frequency distribution of HMI scores is shown in Table 4A. A graph of these frequencies is given in Figure 1. The shape of the distribution is approximately normal except for large drops between -2 and -10, and +2 and +10. This supports the proposed category boundaries used in the next few tables.

The distribution of HMI scores by predefined categories is shown in Table 4B. Left hemisphere and right hemisphere dominated respondents represent almost three quarters of the sample.

Tables 5A, 5B and 5C show the distribution of HMI scores by sex. Tables 5B and 5C indicate males being over represented in the left dominance and females in the right. There is a statistically significant relationship between HMI and sex. (Chi-Square= 42.18, $p<.001$).

Appendices

The relationship between learning style and hemispheric dominance is given in Tables 6A, 6B and 6C. Both tables 6B and 6C show the Twos are disproportionately left-hemisphere dominant and Fours are disproportionally right-hemisphere dominant. There is a statistically significance relationship between HMI and learning style (ChiSquare = 373.1, p,.001).

Table 1: Distribution of Learning Styles

	N	PERCENT
ONE	331	21.9
TWO	491	32.5
THREE	281	18.6
FOUR	410	27.1
TOTAL	1513	100.0

Table 2A: Learning Style by Age (Counts)

AGE	ONE	TWO	THREE	FOUR	TOTAL
21-25	11	28	10	27	76
26-30	35	44	27	45	151
31-35	64	75	44	53	236
36-40	69	109	61	97	336
41-45	44	72	46	63	225
46-50	34	50	35	43	162
51-55	24	30	16	29	99
56-60	15	18	8	11	52
61-65	5	4	5	6	20
66-80	1	0	1	1	3
TOTALS	**302**	**430**	**253**	**375**	**1360**

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Table 2B: Learning Style by Age (Percent)

AGE	ONE	TWO	THREE	FOUR	TOTAL
21-25	14.5	36.8	13.2	35.5	5.6
26-30	23.2	29.1	17.9	29.8	11.1
31-35	27.1	31.8	18.6	22.5	17.4
36-40	20.5	32.4	18.2	28.9	24.7
41-45	19.6	32.0	20.4	28.0	16.5
46-50	21.0	30.9	21.6	26.5	11.9
51-55	24.2	30.3	16.2	29.3	7.3
56-60	28.8	34.6	15.4	21.2	3.8
61-65	25.0	20.0	25.0	30.0	1.5
66-80	33.3	0.0	33.3	33.3	0.2
TOTALS	**22.2**	**31.6**	**18.6**	**27.6**	

Table 3A: Learning Style by Sex (Counts)

	MALE	FEMALE	
ONE	92	232	324
TWO	189	280	469
THREE	124	147	271
FOUR	89	312	401
TOTALS	**494**	**971**	**1465**

Table 3B:Learning Style by Sex (Row Percentage)

	MALE	FEMALE	
ONE	28.4	71.6	100.0
TWO	40.3	59.7	100.0
THREE	45.8	54.2	100.0
FOUR	22.2	77.8	100.0
TOTALS	**33.7**	**66.3**	

Table 3C: Learning Styles by Sex (Column Percentages)

	MALE	FEMALE	
ONE	18.6	23.9	22.1
TWO	38.3	28.8	32.0
THREE	25.1	15.1	18.5
FOUR	18.0	32.1	27.4
TOTALS	**100.0**	**100.0**	

Table 4A: HMI (Distribution–4 Point Interval)

HMI	N	HMI	N
-62 to -59	0	3 to 6	99
-58 to -55	1	7 to 10	67
-54 to -51	4	11 to 14	88
-50 to -47	14	15 to 18	63
-46 to -43	15	19 to 22	68
-42 to -39	30	23 to 26	65
-38 to -35	31	27 to 30	58
-34 to -31	48	31 to 34	36
-30 to -27	49	35 to 38	25
-26 to -23	74	39 to 42	22
-22 to -19	88	43 to 46	18
-18 to -15	95	47 to 50	16
-14 to -11	97	51 to 54	5
-10 to -7	114	55 to 58	1
-6 to -3	90	59 to 62	1
-2 to 2	122		

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Figure 1: Frequency Distribution of HMI Scores (4 point intervals)

Table 4B: HMI Distribution by Category

		N	PERCENT
LEFT	< -8	607	40.4
LEFT/WHOLE	-8 to -2	143	9.5
WHOLE	-2 to 2	122	8.1
RIGHT/WHOLE	2 to 8	136	9.0
RIGHT	> 8	496	33.0
TOTALS		1504	100.0

Table 5A: HMI by Sex (Counts)

	MALE	FEMALE	
LEFT	256	329	585
LEFT/WHOLE	52	87	139
WHOLE	42	77	119
RIGHT/WHOLE	34	97	131
RIGHT	126	359	485
TOTALS	510	949	1459

Table 5B: HMI by Sex (Row Percentages)

	MALE	FEMALE	
LEFT	43.8	56.2	100.0
LEFT/WHOLE	37.4	62.6	100.0
WHOLE	35.3	64.7	100.0
RIGHT/WHOLE	26.0	74.0	100.0
RIGHT	26.0	74.0	100.0
TOTALS	35.0	65.0	

Table 5C: HMI by Sex Column Percentages

	MALE	FEMALE	
LEFT	50.2	34.7	40.1
LEFT/WHOLE	10.2	9.2	9.5
WHOLE	8.2	8.1	8.2
RIGHT/WHOLE	6.7	10.2	9.0
RIGHT	24.7	37.8	33.2
TOTALS	100.0	100.0	

Table 6A: HMI by Learning Styles (Counts)

	ONE	TWO	THREE	FOUR	TOTAL
LEFT	54	245	123	43	465
LEFT/WHOLE	26	36	25	19	106
WHOLE	38	22	12	17	89
RIGHT/WHOLE	33	15	14	36	98
RIGHT	102	31	30	185	348
TOTALS	253	349	204	300	1106

Table 6B: HMI by Learning Style (Row Percentages)

	ONE	TWO	THREE	FOUR	TOTAL
LEFT	11.6	52.7	26.5	9.2	100.0
LEFT/WHOLE	24.5	34.0	23.6	17.9	100.0
WHOLE	42.7	24.7	13.5	19.1	100.0
RIGHT/WHOLE	33.7	15.3	14.3	36.7	100.0
RIGHT	29.3	8.9	8.6	53.2	100.0
TOTALS	22.9	31.6	18.4	27.1	100.0

Table 6C: HMI by Learning Style (Column Percentages)

	ONE	TWO	THREE	FOUR	TOTAL
LEFT	21.3	70.2	60.3	14.3	42.0
LEFT/WHOLE	10.3	10.3	12.3	6.3	9.6
WHOLE	15.0	6.3	5.9	5.7	8.0
RIGHT/WHOLE	13.0	4.3	6.9	12.0	8.9
RIGHT	40.3	8.9	14.7	61.7	31.5
TOTALS	100.0	100.0	100.0	100.0	

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Professional Networks

National Organizations Which Have Endorsed or Certified About Learning (4MAT) Training

State Departments of Education

Florida Department of Education - Sponsored 4MAT training

Hawaii Department of Education – Approved 4MAT as one of the models for Comprehensive School Reform in the state.

Illinois State Board of Education – Certified About Learning as an approved Professional Development Provider in the state

Massachusetts Department of Education – Certified About Learning as an approved Professional Development Provider in the state.

New Jersey Department of Education – Certified About Learning and 4MAT Training as an approved Professional Development Provider in the state

North Carolina Department of Public Instruction – Sponsored 4MAT training

Oklahoma Department of Education – Sponsored 4MAT training

Texas Department of Education – Approved 4MAT as one of the models for Comprehensive School Reform in the state.

Wisconsin Department of Education – Approved 4MAT as one of the models for Comprehensive School Reform in the state.

Major School Districts Which Have Endorsed 4MAT Training

Jefferson County Schools, Birmingham, Alabama

Northeast Independents School District, San Antonio, Texas

Palm Beach County School District, Palm Beach, Florida

Yonkers School District, Yonkers, New York

New York City Department of Education

Certified About Learning as an approved Professional Development Provider in the New York City Schools

Colorado Department of Workforce Development

International Organizations Which Have Endorsed or Certified About Learning (4MAT) Training

Curriculum Institute of Singapore

Sponsored 4MAT training

Mercuri International

World's Largest Sales Training Company selected 4MAT as their training design model for all its training in 44 different countries

The Centre for Creative Leadership

has adopted 4MAT as their instructional design for their *Leading Creatively* course.
Greensborough, NC
Brussels, Belguim
Colorado Springs, CO
San Diego, CA
Singapore

The Ontario Secondary School Teachers Federations (Huff et al., 1986) recommends the 4MAT system to its members, noting:

This is where teachers must begin….[4MAT is] being done in a very organized way in several boards in Ontario. North York has spent several years incorporating 4MAT into pilot schools…Many other schools and boards are also becoming aware of the possible potential and providing Professional Development opportunities in learning styles for teaching staffs. (p. 41)

South Australia Department of Education, Training and Employment (TAFE)

This education and training unit within the South Australia government has been actively researching and applying 4MAT since 1995. They have found that 4MAT offers a common frame of reference by incorporating other learner-centered principles and theories they were exploring; it is a practical and systematic design tool, enabling them to translate theory into practice;facilitators find that it promotes an environment conducive to learning; and 4MAT training is not only available to them but also provides levels of training, each adding another dimension to their understanding.
(Palmer, 1999).

Colleges and Universities Teaching 4MAT

College of Santa Fe, Santa Fe, New Mexico

College of the Southwest, Hobbs, New Mexico

Connecticut College, New London

Doane College, Lincoln, Nebraska

Emporia State University, Emporia, Kansas

Idaho State University, Pocatello

Palm Beach Community College, Palm Beach, Florida

Southwestern College, Chula Vista, California

University of Alabama, Birmingham

University of Arkansas, Little Rock

University of Florida

University of Hawaii, Manoa

University of Massachusetts - Dartmouth

University of Minnesota

University of Nebraska-Lincoln

University of Nebraska-Omaha

University of North Carolina – Chapel Hill

University of Wisconsin, Oshkosh (Center for Career Development)

University of Wyoming, Laramie

Weber State University, Ogden, Utah

Additional Sponsors of 4MAT Training

American Association of School Administrators

Association for Supervision and Curriculum Development

Center for Creative Leadership

Education Commission of the States

Florida Department of Labor

IDEA: Institute for Development of Education Fellows Program

National Association of Corrections

National Association of Elementary School Principals

National Association of Secondary School Principals

National Staff Development Council

School Administrators Association of New York (SAANYS)

Superintendent's Association (The state of Florida)

The Smithsonian Institute

The U.S. Department of Housing and Urban Development (HUD)

The United States Navy

About Learning Position Papers

The Education of Multiple Intelligences

A Position Paper of About Learning, Incorporated

November, 1997

This paper articulates About learning, Inc.'s position on the issue of multiple intelligences It is our hope that this paper will aid 4MAT practitioners in articulating the connections between the 4MAT Method of Instruction and this critical educational issue.

It is also our intent to distribute this information to as many qualified educators as possible since our goal is to aid them in understanding how The 4MAT Method of Instruction can provide valuable assistance in honoring the multiple methods through which people learn.

To this end, we encourage you to copy and distribute this paper.

About Learning, Inc. is a research, publishing, and consulting firm that provides training and consulting in the effective use of 4MAT. 4MAT is an innovative framework that capitalizes on natural learning processes used by everyone.

For information on our products and training, please contact us at (800) 822- 4MAT. Or write us at About Learning, Inc., 1251 N. Old Rand Road, Wauconda, IL 60084.

The Education of Multiple Intelligences

A Position Paper of About Learning, Inc. by Bryant Lindsey, Ed.D.

November, 1997

Not too long ago, many educators thought about intelligence as a single number, an "intelligence quotient" (or "IQ"), which could be measured by a test that took only about an hour and which remained unchanged throughout life. Now we're all fairly sure that (1) there are multiple intelligences and, furthermore, that (2) intelligence may be increased (Perkins, 1995).

How Many Intelligences Are There?

Since the publication of Howard Gardner's Frames of Mind: The Theory of Multiple Intelligences (1983), educators have grown more comfortable with the idea that intelligence is too complicated and too important to be represented by a single number such as those commonly derived from IQ (intelligence quotient) tests. But how many intelligences are there and what difference does it make whether there is one intelligence, or two intelligences (such as "right mode" and "left mode" intelligences), three intelligences, seven intelligences, or, for that matter, 120 intelligences, or even more?

In fact, psychologists, neurophysiologists, and geneticists may debate for many years about exactly how many intelligences there are and how they are related. For example, Gardner himself defined seven intelligences in his seminal work; but, he has not limited himself to only seven. Other psychologists, such as Robert Sternberg (1996), have preferred to define fewer — three in the case of Sternberg. Some psychologists still emphasize that there may be only one really important intelligence — the IQ. And some have preferred to define many more intelligences than either Gardner or Sternberg — more than thirty years ago Guilford (1967), for example, found it helpful to specify as many as 120 "factors" in his "structure of the intellect".

About Learning, Inc. with its 4MAT System of Instruction (McCarthy, 1996, 1987, 1981) is prepared to address the question of how intelligences should be educated without prejudging the question of how many intelligences there are or whether they can yet be measured adequately. About Learning, Inc. has found that 4MAT is very powerful in its implications for the education of multiple intelligences — just as About Learning, Inc. has found that theoretical work on multiple intelligences is very powerful in its implications for the 4MAT System.

How Fast We Are Learning Things About the Brain

In a recent presentation to About Learning, Inc., Robert Sylwester (1997) pointed out that most of what we know about the brain we have learned in the last 10 years, and most of that we have learned in the last two (!) years. Moreover, the rate at which we are learning about the brain does not appear to be slowing down. How does this progress relate to multiple intelligences?

Gardner (1993) himself notes that within a few decades neuroscientists will have far firmer knowledge about the organization and development of the brain. "After years of observing mental processes as they actually occur in the living brain, they will be able to describe the neural structures that are entailed in the conduct of various intellectual activities; they will be able to indicate the extent to which these activities are actually independent of one another; and they will know to what extent individuals who are exceptional performers in one or another intellectual realm actually exhibit neural processes that differ from those exhibited by less extraordinary individuals. Genetic studies are likely to reveal whether specific intellectual strengths (such as musical or spatial intelligence) are under the control of individual genes or gene complexes." So, we can expect that we will know much more about the existence of multiple intelligences and their interrelationships in the not-too-distant future. In the meantime, About Learning, Inc. is committed to incorporating new findings about the brain and about multiple intelligences into the 4MAT System as soon after they become known as possible.

4MAT® Learning Styles, and Multiple Intelligences

Gardner (1993) states: "While lip service is paid to the existence of differences among students (and among teachers!), there have been few systematic attempts to elaborate the educational implications of these differences. Should a sensitivity to different intelligences or learning styles become part of the 'mental models' constructed by new teachers, the next generation of instructors are far more likely to be able to reach each of their students in the most direct and effective way.

The 4MAT System: A Singular Method for Creating Multiple Approaches to Learning.

The 4MAT Framework is a useful model for integrating a variety of student abilities and capacities into the instructional process. The following three descriptions provide an overview of About Learning, Inc.'s view on how Multiple Intelligences Theory overlays onto the 4MAT Method of Instruction.

Right and Left Mode Techniques

The overlay of both kinds of hemispheric operations on each of the four quadrant sections of the 4MAT Natural Cycle incorporates multiple intelligence dimensions. The Left Mode operating with analysis, examining cause and effect, breaking things down, categorizing, using verbal language

and symbols, abstracting experience, generating theory, and working in sequence- the Right mode operating out of being, intuiting, seeing wholes, forming images and mental combinations, seeking and using patterns, relationships and connections, using nonverbal language, manipulating form and space and working simultaneously- these together bring the fullness of multiple processing to the instructional design of the 4MAT classroom teacher.

Modalities

The simple addition of nonverbal strategies, activities and assessments that incorporate the notions of auditory, visual and kinesthetic into each 4MAT unit creates a simple, but elegant way to instantly apply the theory of multiple intelligence to classroom instruction.

The 4MAT Cycle of Learning

4MAT is formed from the perceiving and processing dimensions of the natural learning cycle. The four quadrants embody the essential elements of learning: feeling, reflecting, thinking and acting. All successful learning deals with these four elements and answers

The four questions: Why? What? How? If? When teachers design instruction around this cycle, they need to…

- Establish personal meaning (Intrapersonal Intelligence)
- Explore diverse opinions and viewpoints (Interpersonal Intelligence)
- Conceptualize and structure knowledge (Logical/Linguistic Intelligence)
- Promote usefulness and transferability (Spatial Intelligence), and
- Encourage Creative Expressions of Knowledge

Musical and Bodily/Kinesthetic Intelligences are incorporated throughout mostly through the 4MAT design emphasis on Right Mode strategies. Mathematical Intelligence is used when math is specifically taught as well as when it is appropriate to enhance meanings, ideas, skills or individual projects.

Extended Staff Development for Multiple Intelligences

About Learning, Inc. is prepared to work with local educational agencies on a continuing basis to help them implement innovative approaches dealing with multiple intelligences. About Learning, inc. welcomes inquiries concerning multiple-intelligence theory and other educational innovations. Inquiries may be directed to Susan Morris, Director of Education and Training of About Learning, Incorporated, at 1251 N. Old Rand Road, Wauconda, Illinois 60084. Telephone: 847/487-1800; Fax: 847/487-1811; Email: susan@aboutlearning.com

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About the Author

Bryant Lindsey is a writer and educator trained at Duke, William and Mary, and N.C. State University.

Inclusion of Students with Special Needs— 4MAT Helps

A Position Paper of About Learning, Incorporated

November, 1997

This paper articulates About Learning, Inc.'s position on the issue of inclusion. It is our hope that this paper will aid 4MAT practitioners in articulating the connections between the 4MAT Method of Instruction and this critical educational issue.

It is also our intent to distribute this information to as many interested educators as possible since our goal is to aid them in understanding how The 4MAT Method of Instruction can provide valuable assistance in addressing inclusion through curricular design.

To this end, we encourage you to copy and distribute this paper.

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Inclusion of Students with Special Needs — 4MAT Helps

A Position Paper of About Learning, Incorporated
by Bryant Lindsey, Ed. D., and Alix Pearce, M. A. T.

November, 1997

Following enactment in 1975 of Public Law 94 -142 (which has since been renamed the "Individuals with Disabilities Education Act" (IDEA)), local educational agencies all across the United States have attempted to provide "disabled students" with a free, "appropriate" public education in "the least restrictive environment." Specifically, the law states "to the maximum extent appropriate, handicapped children...are (to be) educated with children who are not handicapped, and that special classes, separate schooling, or other removal of handicapped children from the regular educational environment (should occur) only when the nature or severity of the handicap is such that education in regular classes with the use of supplementary aids and services cannot be achieved satisfactorily." (P. L. 94-142, Section 1412 [5] [B]).

Nevertheless, for many years following original enactment of P. L. 94-142, most special education was characterized by separating "disabled students" from "normal students" for substantial periods of each week for the purpose of giving them special assistance away from "normal" classrooms. When it came to regular classrooms, students with special needs were not really, in a word, "included." That has changed and is continuing to change — dramatically. Now there is an effort nationwide to be more "inclusive" in our policies regarding students with special needs.

Why has the situation changed so dramatically? Why has "inclusion" emerged as a major policy priority for advocates of students with special needs? The situation has changed primarily because our understanding of what is "appropriate" and of what constitutes a "least restrictive environment" has evolved markedly since 1975. In this regard, Villa and Thousand (1995) point out that "in 1975...the professional education literature was void of any information or strategies for using supplementary aids and services to effectively include students with disabilities.

However, since that time, the use of supplementary aids and services to effectively include all students has been frequently identified and described in the literature". In short, our classrooms are becoming more inclusive because we are learning how to have better, more inclusive classrooms.

Inclusion is Not Just a Fad

Additionally, with the development and elaboration of The 4MAT System of Instruction (McCarthy, 1981, 1987, 1996) we have a pedagogy for systematically addressing the needs of all types of learners. About Learning, Inc.'s 4MAT is a powerful tool for organizing and delivering instruction in both "regular" and "special" classrooms. With the increased diversity of students in "inclusive" classrooms and schools, many teachers find 4MAT virtually indispensable for instructional design.

For these and many other reasons, About Learning, Inc. agrees with Kochhar and West (1996) that "inclusion is not just a fad". If only because of the increasing number of students with special needs and the added emphasis of federal and state courts on "least restrictive environment", About Learning, Inc. expects that there will be more inclusion in the future rather than less. About Learning, Inc. and 4MAT can help any local educational agency in any state to improve its efforts at inclusion and to get ready for the more inclusive classrooms of the future.

"Good" Inclusion and "Bad" Inclusion

4MAT can make the difference between "good" inclusion and "bad" inclusion. In the words of Kochhar and West (1996): "It is the 1990's, and the journey toward integration of all children and youths within their community schools has only just begun. The inclusion of children (with special needs) into regular classes has accelerated quickly in the past decade and in many places has occurred too fast and without adequate planning for restructuring. There is growing concern by teachers, special educators, and administrators that many 'bad' inclusion policies are being implemented. Such inclusion efforts are failing to provide the necessary supportive services that students with disabilities need when they are placed into regular classrooms. On the other hand, there are many models of 'very good' inclusion."

About Learning, Inc. can help any local educational agency devise models of "very good" inclusion. In particular, About Learning, Inc. believes no local educational agencies should any longer have to use what have been called "dump-and-hope" methods of inclusion.

Why Implementation of Inclusion Should Include 4MAT

4MAT addresses the natural, experiential cycle of learning that takes learners from (1) personal meaning to (2) conceptualization to (3) practice to (4) creative applications — by incorporating learning-style theory and wholebrain-processing theory.

Inclusion is better with 4MAT — markedly better, we think — for at least five reasons:

1. Philosophy of 4MAT. The very philosophy of 4MAT complements the idea of "inclusion". Students can be learning-different and yet be successful. Both the concepts of inclusion and of 4MAT celebrate diversity and promote the idea that a teacher can meet the needs of all students, however different.
2. Structure for Planning. 4MAT provides a structure for planning which helps the teacher focus on the critical content. Teachers need to decide what is critical for every student to

know and to be able to do. The brainstorming component of 4MAT also encourages them to decide what content can be eliminated for some or added for others. It encourages them to think about how the delivery of the content can be adapted to students — building in right- and left-mode activities, using multiple intelligences and modalities. It encourages them to look at overlying themes or concepts.

3. Emotional Link to Content for Students. The first part of 4MAT's natural learning cycle is critical to everyone, but especially to the "at risk" student — who may be learning disabled, gifted, or from a deprived background — and who needs an emotional link to the content and relationships with teachers and fellow students. It provides a level playing field for all the students, whatever their backgrounds.
4. "Differentiation of Instruction" for All Students. The real differentiation of instruction will come primarily in the middle parts of 4MAT's natural learning cycle. Some students will need to spend more time in acquisition of skills, for example, and the products of their learning may be limited by their abilities, interests, and needs. Others will "dive into" making the learning their own. 4MAT encourages giving students choices in extending and personalizing their learning. A good teacher will make sure the choices reflect the needs of students and that the evaluation will as well.
5. "Over-Identification" of Students With Special Needs — Reduced Costs? Many educators believe we may have serious problems with "over-identification" of students who have special needs. Some educators competent in both special education and 4MAT believe that proper use of 4MAT by schools and local educational agencies can reduce the "over-identification" of youth who need to be classified as "students with special needs". This is because 4MAT honors the unique learning styles of all students and helps them find success rather than frustration. To the extent this is possible, 4MAT implementation may be able to help reduce local, state, and federal costs associated with "over-identification".

Extended Staff Development for Inclusion

About Learning, Inc. is prepared to work with state and local educational agencies on a continuing basis to help them plan and implement policies for inclusion of children with special needs into regular classrooms as well as to evaluate and improve inclusion during and after implementation. Numerous 4MAT clients have had success with inclusion.

About Learning, Inc. offers a three-tiered, train-the trainer program as well as assistance with strategic, long-range planning for school districts that want to implement 4MAT. Implementation is custom-designed and includes on-going coaching and instruction in order to meet the specific needs of school cultures and school-district cultures.

Inquiries concerning 4MAT and inclusion may be directed to Susan Morris; Director of the Education Division; About Learning, Incorporated; 23385 Old Barrington Road; Barrington, Illinois 60010. Numbers are 847-382-7272 (phone), 847-382-4510 (fax), and susanm@excelcorp.com (e-mail).

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About the Authors

Bryant Lindsey is a writer and educator trained at Duke, William and Mary, and N.C. State University. Alix Pearce, with degrees from Sweet Briar and Brown, is Supervisor of Gifted Education for Stafford County (VA) Schools and has trained with 4MAT since 1989. Her staff development 4MAT plan, "Differentiating Instruction for the Gifted Student in the Heterogeneous classroom", is available through About Learning, Inc..

Cooperative Learning: Better with 4MAT

A Position Paper of About Learning, Incorporated

November, 1997

This paper articulates About Learning, Inc.'s position on the issue of cooperative learning. It is our hope that this paper will aid 4MAT practitioners in articulating the connections between the 4MAT Method of Instruction and this critical educational issue.

It is also our intent to distribute this information to as many qualified educators as possible since our goal is to aid them in understanding how The 4MAT Method of Instruction can provide valuable assistance in creating learning environments that foster greater cooperation among students.

To this end, we encourage you to copy and distribute this paper.

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Cooperative Learning: Better with 4MAT

A Position Paper of About Learning, Incorporated
by Bryant Lindsey, Ed. D.

November, 1997

The Instructional Challenges of Cooperative Learning

We now know much more about the effects of cooperation and competition on learning than we did a few decades ago. Thanks to the work of Johnson and Johnson (1991), Slavin (1983) and numerous other dedicated researchers and educators, we now have a framework for stating when and where it is most helpful to use "cooperative", "collaborative", and/or "individualistic" learning techniques in the classroom. The now extensive literature on cooperative, collaborative, and individualistic learning is worthy of study in its own right. But, it is also worthwhile to ask how this literature relates to time-tested, research-based, teaching and learning techniques, as included in About Learning, Inc.'s 4MAT System of Instruction; and it is the purpose of this position paper to address this question.

Cooperation Is the Forest

Johnson and Johnson (1991) point out that cooperation is the basis for all learning and, in their opinion, this is not to say that "the skills of ... individualization are unimportant. They are important, but only within the larger context of cooperation with others, and a person needs to know when to ... work individualistically and when to cooperate. Unfortunately, instruction in schools at present seems to stress competition or perhaps individualization without much attention to the skills needed to facilitate effective cooperation. To encourage a positive and effective learning environment and to promote the achievement and socialization outcomes of schools we must

realize that cooperation is the forest -- competition and individualism are but trees."

4MAT and Cooperative Learning: Together is Better

No one has yet written a definitive text, so far as we are aware, on the relationship of cooperative learning to (1) learning styles, (2) the natural learning cycle, and (3) the 4MAT System. But, About Learning, Inc. has found that educators who are well-versed in using cooperative learning strategies are easily able to "overlay" cooperative learning techniques onto the natural learning cycle once they have learned 4MAT. Furthermore, a deeper understanding of the optimal effects of cooperative and individual learning results from applying these techniques within the framework of the natural learning cycle rather than in using the techniques by themselves.

The structure of the 4MAT framework provides teachers and designers of instruction with a balanced vehicle for addressing cooperative learning strategies throughout a complete lesson plan. The basic flow of a 4MAT-planned unit makes it especially useful to cooperative learning practitioners. Here's how 4MAT works:

1. Quadrant One: Connection to Personal Meaning

All effective 4MAT planned lessons begin with a teacher-directed experience that directly engages learners with a connection to a concept drawn from the content to be taught. It is critical for this initial learning environment to be imbued with the quality of trust that will enable each participant to share personal perceptions and opinions, to dialog about the quality of the shared experience, and to reach some agreed-upon consensus that provide a focus on the specifics of the content to come. Cooperative discussion is critical to this part of the learning, and it is critical for both the teacher and the students to understand the basics of group process strategies.

2. Quadrant Two: Conceptualization

Once content focus has been fostered, the teacher moves to the more formal direct-teaching part of the 4MAT cycle, the place where the specifics of the content are addressed. Although this part of the cycle most often involves individual learning, it can often be enhanced by having learners participate in the acquisition of new knowledge through strategies and/or learning contracts for that enable them to share new information with peers.

3. Quadrant Three: Practice

When learners have acquired new knowledge, it is necessary for them to test, try and tinker with what they have learned. It is the place for the learners to take over the learning, a place for learning together and for learning alone. 4MAT practitioners find the need for cooperative learning strategies to be critical to the flow of instruction at this stage of the natural cycle, especially if they choose to give their students project options for exploring and extending what has been learned.

4. Quadrant Four: Creative Applications and Personal Integration

As students are engaged in applying what they have learned in new and innovative ways, 4MAT provides great opportunities for students to not only work on projects in cooperative groups but also to use each other for feedback and editing when they have chosen to work on their creations alone. With 4MAT designed instruction, the teacher has a balanced framework for ensuring that students experience the strategies which are most appropriate to the learning at hand.

The 4MAT System thus provides a context, perhaps, the most powerful and instructive context available, for determining whether and when to use particular cooperative and individual learning techniques. Although we find that cooperative learning may be particularly important at the beginning and end of the natural learning cycle, in practice it may be used helpfully throughout the cycle.

About Learning, Inc. also thinks that learners with particular learning styles may be more inclined to cooperative, collaborative, and individual learning techniques, respectively, than learners with other learning styles, although this is a question deserving of further study. So, it is important to know how to offer a variety of techniques -- whether cooperative, collaborative, or individual--to learners with particular styles, when appropriate.

Finally, About Learning, Inc. notes that much of the positive effect of cooperative learning techniques—particularly in the lower grades – can be initiated by individual teachers and schools in conjunction with the 4MAT System without major policy changes.

Extended Staff Development for Cooperative Learning

4MAT clients have had success with cooperative learning. About Learning, Inc. is prepared to work with local educational agencies on a continuing basis to help them implement cooperative learning programs, to evaluate cooperative learning programs, and to make cooperative learning programs successful after initial implementation.

About Learning, Inc. offers a three-tiered, train-the-trainer program as well as assistance with strategic, long-range planning for school district that want to implement 4MAT. Implementation is custom-designed and includes on-going coaching and instruction in order to meet the specific needs of individual school cultures and school-district cultures.

Inquiries Welcomed by About Learning, Incorporated

About Learning, Incorporated, welcomes inquiries concerning block scheduling and other educational innovations. Inquiries concerning block scheduling may be directed to Susan Morris, Director of the Education and Training of About Learning, Inc., at 1251 N. Old Rand Road, Wauconda, Illinois 60084. Numbers are 847-487-1800 (phone), 847-487-1811 (fax), and susan@aboutlearning.com (e-mail).

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Block Scheduling: Issues and Answers

A Position Paper of About Learning, Incorporated

January, 1998

This paper articulates About Learning, Inc.'s position on the issue of block scheduling. It is our hope that this paper will aid 4MAT practitioners in articulating the connections between the 4MAT Method of Instruction and this critical educational issue.

It is also our intent to distribute this information to as many qualified educators as possible since our goal is to aid them in understanding how The 4MAT Method of Instruction can provide valuable assistance in the implementation of block scheduling.

To this end, we encourage you to copy and distribute this paper.

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Block Scheduling: Issues and Answers

A Position Paper of About Learning, Incorporated
by Bryant Lindsey, Ed. D.

January, 1998

In 1991, the United States Congress established the National Education Commission of Time and Learning to examine educational change initiatives in America. In 1994 this commission published a detailed analysis of existing educational reform efforts, including various projects designed to improve school scheduling practices and increase time allocated for meaningful academic inquiry (Canady and Rettig, 1995). In general the commission's report highlighted the shortcomings of traditional school organizational practices, particularly the problems associated with six and seven period class schedules. Additionally, and perhaps more vital, the commission report also chronicled the often daunting problems good teachers encountered as they attempted to conduct relevant learning activities while managing an innumerable set of required non-academic tasks.

Allocating larger blocks of time for individual class sessions has been suggested as one approach schools can use to foster more in-depth academic inquiry and provide time for a variety of teaching/learning strategies. "Block scheduling," a term commonly used in the literature to describe experimental scheduling plans which reduce the number of classes offered each day in order to allocate additional time per class period for student inquiry (and offer teachers expanded options for incorporating varied instructional activities), is one promising option for reforming existing practice (Cawelti, 1994).

Appropriate Use of Additional Time

However promising, block scheduling has received mixed reviews in the educational community. In schools where blocks are being evaluated favorably teachers are part of a school wide

effort to create collaborative systems which result in a change in the ways teachers teach. In schools where "blocks" have not been successful the culprit is usually a failure to provide adequate preparation for teachers to change their teaching repertoire. In the final analysis, the block schedule is a necessary but not sufficient variable related to improving student performance. The critical variable is relevant changes in the ways teachers teach which can be facilitated by the provision of additional time.

The Single Most Important Factor

In short, if we have learned anything from block scheduling reform efforts it is that the "single most important factor in determining the success or failure of block scheduling programs will be the degree to which teachers successfully alter instruction to utilize extended time blocks effectively. "If instructional practices do not change, the block scheduling movement of the 1990's...will be buried in the graveyard of failed educational innovations." Canady and Rettig (1995). However, because changes in school schedules "often constitute a profound educational change for a school community," changing teacher perceptions about the nature of teaching is pre-requisite to changing instructional practices. Additionally, according to Bernice McCarthy, changes in teacher perceptions, when linked to collaborative opportunities to experiment with research-derived instructional strategies yield the most lasting improvements.

The 4MAT System -- The Key to Successful Block Scheduling

The 4MAT System is a powerful tool for organizing and delivering instruction. 4MAT addresses the natural, experiential cycle of learning that takes learners from (1)personal meaning to (2)conceptualization to (3)practice to (4)creative applications. 4MAT also provides a pedagogy for systematically addressing the needs of different types of learners.

Using Bernice McCarthy's 4MAT System (McCarthy, 1981, 1987, 1993) teachers can maximize the use of additional time provided by block schedules. Unlike many theoretical systems, 4MAT is a tool which can be used immediately to improve classroom instruction.

4MAT offers teachers a framework for designing instruction that helps students...

- Attribute personal meaning to what they are learning;
- Create meaningful, coherent representations of knowledge;
- Link new information with existing knowledge;
- Reflect and analyze concepts;
- Problem-solve and problem-find critical issues;
- Engage in active processing including opportunities for self-expression, group work, discussions, practice, evaluation and synthesis of material to be learned.

Extended Staff Development for Block Scheduling

About Learning, Inc., distributors and proponents of The 4MAT System, is prepared to work with local educational agencies on a continuing basis to help them implement block scheduling, to evaluate block scheduling, and to make block scheduling successful after initial implementation. About Learning, Inc. offers a three-tiered, train-the-trainer program as well as assistance with strategic, long-range planning for school districts that want to implement 4MAT.

Please contact us for referrals or research on the impact of 4MAT in block scheduled schools.

4MAT can be used very successfully in high schools which are beginning block scheduling or which have already begun block scheduling.

Inquiries Welcomed by About Learning, Incorporated

About Learning, Incorporated, welcomes inquiries concerning block scheduling and other educational innovations. Inquiries concerning block scheduling may be directed to Susan Morris, Director of the Education and Training of About Learning, Inc., at 1251 N. Old Rand Road, Wauconda, Illinois 60084. Numbers are 847-487-1800 (phone), 847-487-1811 (fax), and susan@aboutlearning.com (e-mail).

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