

# Analysis of PDAL Data

- **Overview of Analysis**
- **Data Structure**
  - **Illustration with hypothetical data**
- **Potential of PDAL Data**
- **Construction of Scales**
  - **Preliminary result of descriptive analysis of MSP data**
- **Comparative Data**
- **Next Steps**



## **Analysis of PDAL Data: Overview**

- **Implementation analysis**
  - Patterns of responses to monthly logs
  - Response rates; sample attrition; extent of missing data
- **Descriptive analysis**
  - Patterns of teachers' PD experiences
  - Variation in PD quality across teachers, activities, and sites
  - Correlates of high-quality PD activities
  - Latent classes of teachers based on their PD experiences
- **Impact analysis**
  - Assess the impact of PD on math & science instruction

# Implementation

- **Launched: July, 2003**
- **Closed: November 15, 2004**
- **Sample: teachers who filled out SEC1 or who taught in sample schools**
- **Introduction packet: letter, instructions, glossary, helpline info, UserID and password**
- **Monthly Reporting Deadline: Teachers reported on previous month by the 15<sup>th</sup>**
- **Incentive: \$100 in 2 installments**
- **Reminders: Postcards, emails (explicit instructions and current data), detailed phone calls**



## **Analysis of PDAL Implementation Data**

- **Implementation analysis**
  - **Patterns of responses to monthly logs**
  - **Response rates; sample attrition; extent of missing data**

# PDAL Completion/Response Rates

	Sample	PDAL					
		Math	Science	Total	Completion Rate <sup>1</sup>	Response <sup>2</sup>	Rate
MSP Site							
Brockport	91	31	17	48	53%	63	69%
Cleveland	180	50	61	111	62%	137	76%
Corpus Christi	93	35	20	55	59%	70	75%
El Paso	112	22	14	36	32%	64	57%
Treatment							
Comparison	213	42	46	88	41%	135	63%
Treatment	263	96	66	162	62%	199	76%
MSP_Site*Treatment							
Brockport-Comparison	43	8	8	16	37%	25	58%
Brockport-Treatment	48	23	9	32	67%	38	79%
Cleveland-Comparison	68	16	13	29	43%	46	68%
Cleveland-Treatment	112	34	48	82	73%	91	81%
Corpus Christi-Comparison	51	8	19	27	53%	37	73%
Corpus Christi-Treatment	42	27	1	28	67%	33	79%
El Paso-Comparison	51	10	6	16	31%	27	53%
El Paso-Treatment	61	12	8	20	33%	37	61%
<b>Total</b>	<b>476</b>	<b>138</b>	<b>112</b>	<b>250</b>	<b>53%</b>	<b>334</b>	<b>70%</b>

Note:<sup>1</sup> PDAL completion rate represents the number of teachers who completed usable PDAL data out of the intended sample.

<sup>2</sup> PDAL response includes not only PDAL completers but also those who submitted partially completed data or who reported "inactive" month entries.



## Implementation Analysis

- **Number of Activities (over 14 months)**
  - Range: 1 - 25
  - Mean = 3.9 (SD = 3.3)
- **Number of Logs (over 14 months)**
  - Range: 1 - 43
  - Mean = 6.6 (SD = 6.3)
- **Sessions**
  - Per session: mean 9.5 minutes
  - Per teacher: mean of 79 minutes; 84% finished in one session; 12% finished in two sessions; 4 % in three or more sessions.



## Implementation Analysis

- **Timing of log entries:**
  - Weekends are least popular. Tues. - Thurs. are most popular
  - Spike at the beginning of each month
- **User understanding of the instrument**
  - 95% of logs created were fully completed
- **Communication:**
  - Info Packets
  - Phone calls, emails, letter reminders
  - Helpline



## Descriptive Analysis

- **Data Aggregation**
- **Scales**
- **Variation**

# Black Box of Aggregated PD Data

<i>Teacher</i>	<i>Across Activities</i>	Jul-03	Aug-03	Sep-03	Oct-03	Nov-03	Dec-03	Jan-04	Feb-04	Total Contact Hours	Mean Active Learning
Mr. Anderson										109	0.8
Ms. Lopez										106	1.3
Mrs. Kelly										40	0.5
Mr. Lee										98	0.8
Mrs. Smith										8	1.0
Aggregate										361	0.9

# PDAL Data Structure:

## Disaggregated log data: Teacher by activity by time

<i>Teacher</i>	<i>Activity</i>	Jul-03	Aug-03	Sep-03	Oct-03	Nov-03	Dec-03	Jan-04	Feb-04	No. of Logs
Mr. Anderson	A	1	1	-	-	-	-	-	-	2
	B	-	-	1	-	1	-	1	-	3
	C	-	-	-	-	1	-	-	-	1
Ms. Lopez	A	1	1	-	-	-	-	-	-	2
	D	-	-	-	-	1	1	1	1	4
Mrs. Kelly	E	-	1	1	-	-	-	-	-	2
Mr. Lee	E	1	1	1	-	-	-	-	-	3
	F	-	-	1	1	-	-	-	-	2
Mrs. Smith	G	-	-	-	-	1	-	-	-	1
No. of logs		3	4	4	1	4	1	2	1	20

# PDAL Data Structure:

## Activity-level data aggregated across teachers

Across teachers	<i>Activity</i>	Jul-03	Aug-03	Sep-03	Oct-03	Nov-03	Dec-03	Jan-04	Feb-04	No. of Logs
Anderson,Lopez	<b>A</b>	2	2	-	-	-	-	-	-	4
Anderson	<b>B</b>	-	-	1	-	1	-	1	-	3
Anderson	<b>C</b>	-	-	-	-	1	-	-	-	1
Lopez	<b>D</b>	-	-	-	-	1	1	1	1	4
Kelly, Lee	<b>E</b>	1	2	2	-	-	-	-	-	5
Lee	<b>F</b>	-	-	1	1	-	-	-	-	2
Smith	<b>G</b>	-	-	-	-	1	-	-	-	1
<b>No. of activities</b>		2	2	3	1	4	1	2	1	20

# PDAL Data Structure:

## Teacher-level data aggregated across activities

<i>Teacher</i>	<b>Across activities</b>	<b>Jul-03</b>	<b>Aug-03</b>	<b>Sep-03</b>	<b>Oct-03</b>	<b>Nov-03</b>	<b>Dec-03</b>	<b>Jan-04</b>	<b>Feb-04</b>	<b>No. of Logs</b>
Mr. Anderson	A,B,C	1	1	1	-	2	-	1	-	6
Ms. Lopez	A,D	1	1	-	-	1	1	1	1	6
Mrs. Kelly	E	-	1	1	-	-	-	-	-	2
Mr. Lee	E,F	1	1	2	1	-	-	-	-	5
Mrs. Smith	G	-	-	-	-	1	-	-	-	1
<b>No. of teachers</b>		<b>3</b>	<b>4</b>	<b>3</b>	<b>1</b>	<b>3</b>	<b>1</b>	<b>2</b>	<b>1</b>	<b>20</b>

# Contact Hours

Disaggregated log-level data:

Teacher by activity by time

<i>Teacher</i>	<i>Activity</i>	Jul-03	Aug-03	Sep-03	Oct-03	Nov-03	Dec-03	Jan-04	Feb-04	Total Contact Hours	No. of Logs	Mean Contact Hours
Mr. Anderson	A	32	30	-	-	-	-	-	-	62	2	31.0
	B	-	-	12	-	13	-	14	-	39	3	13.0
	C	-	-	-	-	8	-	-	-	8	1	8.0
Ms. Lopez	A	32	32	-	-	-	-	-	-	64	2	32.0
	D	-	-	-	-	10	10	12	10	42	4	10.5
Mrs. Kelly	E	-	20	20	-	-	-	-	-	40	2	20.0
Mr. Lee	E	18	18	16	-	-	-	-	-	52	3	17.3
	F	-	-	28	18	-	-	-	-	46	2	23.0
Mrs. Smith	G	-	-	-	-	8	-	-	-	8	1	8.0
Total Contact Hours		82	100	76	18	39	10	26	10	361	20	18.1
No of Logs		3	4	4	1	4	1	2	1			
Mean Contact Hours		27.3	25.0	19.0	18.0	9.8	10.0	13.0	10.0			

# Contact Hours

## Activity-level data aggregated across teachers

<i>Across Teachers</i>	<i>Activity</i>	Jul-03	Aug-03	Sep-03	Oct-03	Nov-03	Dec-03	Jan-04	Feb-04	Total Contact Hours	No. of Logs	Mean Contact Hours
Anderson,Lopez	A	64	62	-	-	-	-	-	-	126	4	31.5
Anderson	B	-	-	12	-	13	-	14	-	39	3	13.0
Anderson	C	-	-	-	-	8	-	-	-	8	1	8.0
Lopez	D	-	-	-	-	10	10	12	10	42	4	10.5
Kelly, Lee	E	18	38	36	-	-	-	-	-	92	5	18.4
Lee	F	-	-	28	18	-	-	-	-	46	2	23.0
Smith	G	-	-	-	-	8	-	-	-	8	1	8.0
<b>Total Contact Hours</b>		<b>82</b>	<b>100</b>	<b>76</b>	<b>18</b>	<b>39</b>	<b>10</b>	<b>26</b>	<b>10</b>	<b>361</b>	<b>20</b>	<b>16.1</b>

# Contact Hours

Teacher-level data aggregated  
across activities

<i>Teacher</i>	<i>Across Activities</i>									Total	No. of	Mean
		Jul-03	Aug-03	Sep-03	Oct-03	Nov-03	Dec-03	Jan-04	Feb-04	Contact Hours	Logs	Contact Hours
Mr. Anderson	A,B,C	32	30	12	-	21	-	14	-	109	6	18.2
Ms. Lopez	A,D	32	32	-	-	10	10	12	10	106	6	17.7
Mrs. Kelly	E	-	20	20	-	-	-	-	-	40	2	20.0
Mr. Lee	E,F	18	18	44	18	-	-	-	-	98	5	19.6
Mrs. Smith	G	-	-	-	-	8	-	-	-	8	1	8.0
<b>Total Contact Hours</b>		<b>82</b>	<b>100</b>	<b>76</b>	<b>18</b>	<b>39</b>	<b>10</b>	<b>26</b>	<b>10</b>	<b>361</b>	<b>20</b>	<b>16.7</b>

# Active Learning

## Disaggregated log-level data:

### Teacher by activity by time

<i>Teacher</i>	<i>Activity</i>	Jul-03	Aug-03	Sep-03	Oct-03	Nov-03	Dec-03	Jan-04	Feb-04	Total Active Learning	No. of Logs	Mean Active Learning
Mr. Anderson	A	2	2	-	-	-	-	-	-	4	2	2.0
	B	-	-	1	-	0	-	0	-	1	3	0.3
	C	-	-	-	-	0	-	-	-	0	1	0.0
Ms. Lopez	A	2	1	-	-	-	-	-	-	3	2	1.5
	D	-	-	-	-	1	1	2	1	5	4	1.3
Mrs. Kelly	E	-	0	1	-	-	-	-	-	1	2	0.5
Mr. Lee	E	1	0	0	-	-	-	-	-	1	3	0.3
	F	-	-	1	2	-	-	-	-	3	2	1.5
Mrs. Smith	G	-	-	-	-	1	-	-	-	1	1	1.0
<b>Total Active Learning</b>		<b>5</b>	<b>3</b>	<b>3</b>	<b>2</b>	<b>2</b>	<b>1</b>	<b>2</b>	<b>1</b>	<b>19</b>	<b>20</b>	<b>1.0</b>
<b>No of Logs</b>		<b>3</b>	<b>4</b>	<b>4</b>	<b>1</b>	<b>4</b>	<b>1</b>	<b>2</b>	<b>1</b>			
<b>Mean Active Learning</b>		<b>1.7</b>	<b>0.8</b>	<b>0.8</b>	<b>2.0</b>	<b>0.5</b>	<b>1.0</b>	<b>1.0</b>	<b>1.0</b>			

# Active Learning

## Activity-level data aggregated across teachers

<i>Across Teachers</i>	<i>Activity</i>	Jul-03	Aug-03	Sep-03	Oct-03	Nov-03	Dec-03	Jan-04	Feb-04	Total Active Learning	No. of Logs	Mean Active Learning
Anderson,Lopez	A	4	3	-	-	-	-	-	-	7	4	1.8
Anderson	B	-	-	1	-	0	-	0	-	1	3	0.3
Anderson	C	-	-	-	-	0	-	-	-	0	1	0.0
Lopez	D	-	-	-	-	1	1	2	1	5	4	1.3
Kelly, Lee	E	1	0	1	-	-	-	-	-	2	5	0.4
Lee	F	-	-	1	2	-	-	-	-	3	2	1.5
Smith	G	-	-	-	-	1	-	-	-	1	1	1.0
<b>Total Active Learning</b>		<b>5</b>	<b>3</b>	<b>3</b>	<b>2</b>	<b>2</b>	<b>1</b>	<b>2</b>	<b>1</b>	<b>19</b>	<b>20</b>	<b>0.9</b>

# Active Learning

## Teacher-level data aggregated across activities

<i>Teacher</i>	<i>Across Activities</i>									<b>Total Active Learning</b>	<b>No. of Logs</b>	<b>Mean Active Learning</b>
		Jul-03	Aug-03	Sep-03	Oct-03	Nov-03	Dec-03	Jan-04	Feb-04			
Mr. Anderson	A,B,C	2	2	1	-	0	-	0	-	5	6	0.8
Ms. Lopez	A,D	2	1	-	-	1	1	2	1	8	6	1.3
Mrs. Kelly	E	-	0	1	-	-	-	-	-	1	2	0.5
Mr. Lee	E,F	1	0	1	2	-	-	-	-	4	5	0.8
Mrs. Smith	G	-	-	-	-	1	-	-	-	1	1	1.0
<b>Total Active Learning</b>		5	3	3	2	2	1	2	1	19	20	0.9

# Duration of PD Activities

- **Mean Contact Hours**

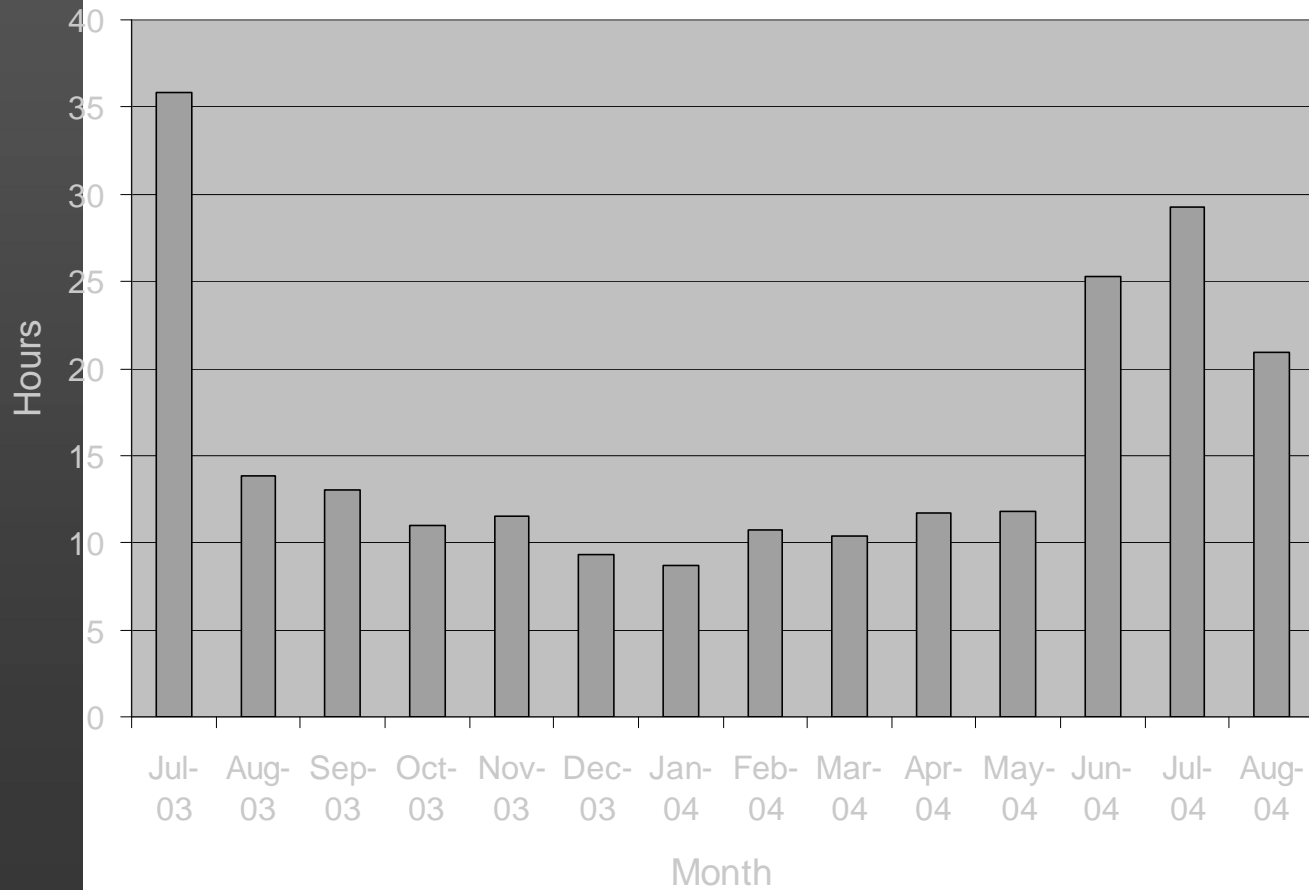
<i>Source</i>	<i>N</i>	<i>Mean</i>	<i>SD</i>	<i>Min</i>	<i>Max</i>
Monthly Logs	1797	15.4	19.2	1	160
Teachers	273	16.9	15.8	1	105

- **Total Contact Hours**

- **Activity Span**

- Can combine within-month span variable with within-month contact hours variable to create a new activity span variable: less than a day, a day, 2-4 days, a week, 2 weeks to a month, 2-4 months, 5-7 months, 8 months to a year, to a year or longer

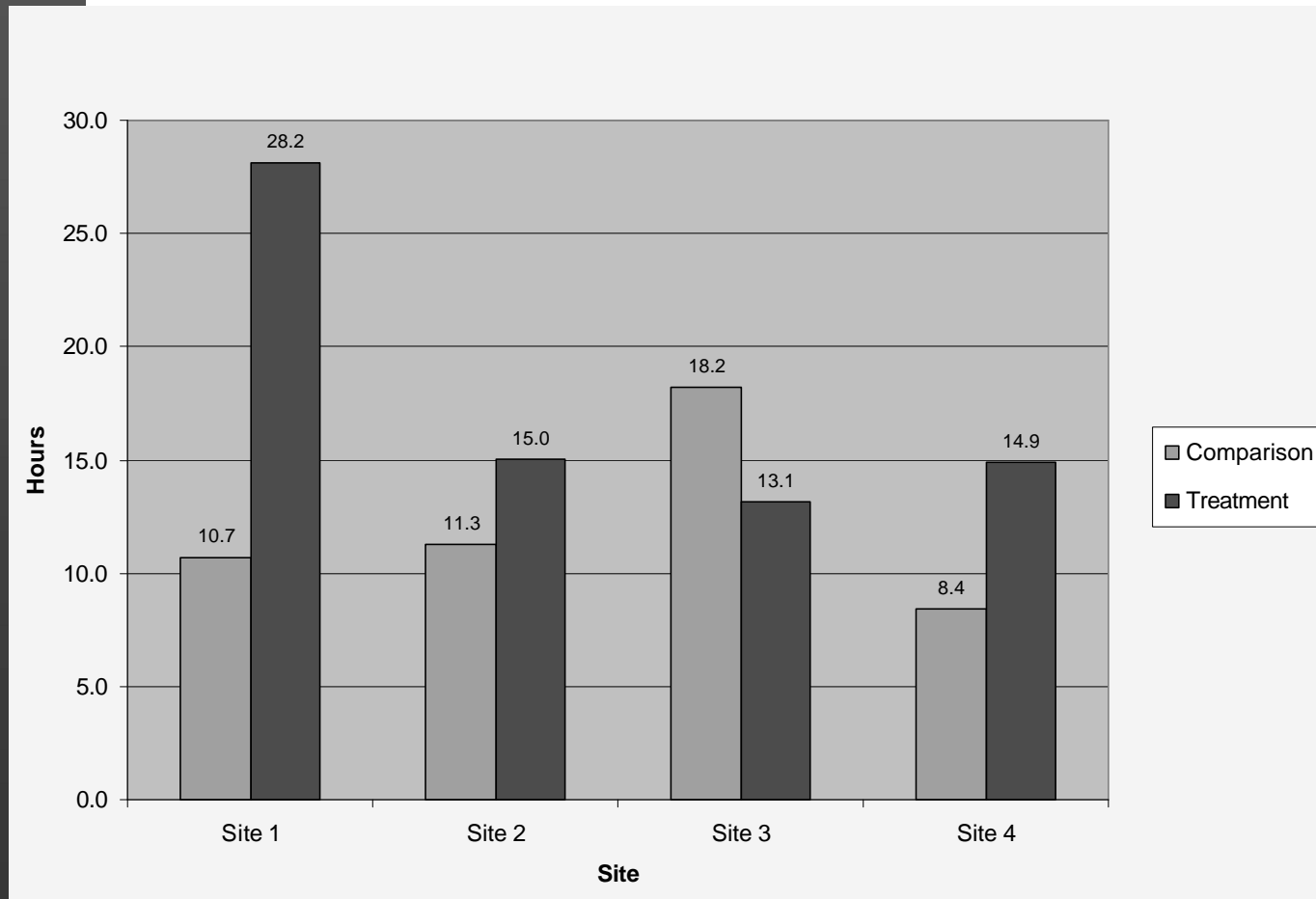
# Mean Contact Hours by Month



# Math PD Quality by Site by Treatment Status

Variable	Category	N	Mean contact hours	Active learning	Coherence	Collective participation (At a given month)	Strengthen subject matter knowledge	Topic intensity
MSP Site			**	ns	*	ns	ns	ns
	Site 1	37	22.5		2.4			
	Site 2	49	13.9		2.2			
	Site 3	34	14.0		2.3			
	Site 4	28	11.9		2.0			
Treatment			**	ns	ns	*	ns	*
	Comparison	45	11.2			0.86		2.5
	Treatment	103	17.7			0.62		6.7
MSP_Site*Treatment			*	ns	ns	ns	ns	ns
	Site 1-Comparison	12	10.7					
	Site 1-Treatment	25	28.2					
	Site 2-Comparison	14	11.3					
	Site 2-Treatment	35	15.0					
	Site 3-Comparison	6	18.2					
	Site 3-Treatment	28	13.1					
	Site 4-Comparison	13	8.4					
	Site 4-Treatment	15	14.9					

# Mean Contact Hours in Math PD by Site by Treatment Status



# Active Learning

<i>Source</i>	<i>N</i>	<i>Mean</i>	<i>SD</i>	<i>Min</i>	<i>Max</i>	<i>Reliability</i>
Monthly Logs	1781	1.1	0.8	0	3	0.83
Teachers	270	1.1	0.6	0	3	0.85

## *Sample Items:*

Observe demonstrations of teaching techniques?

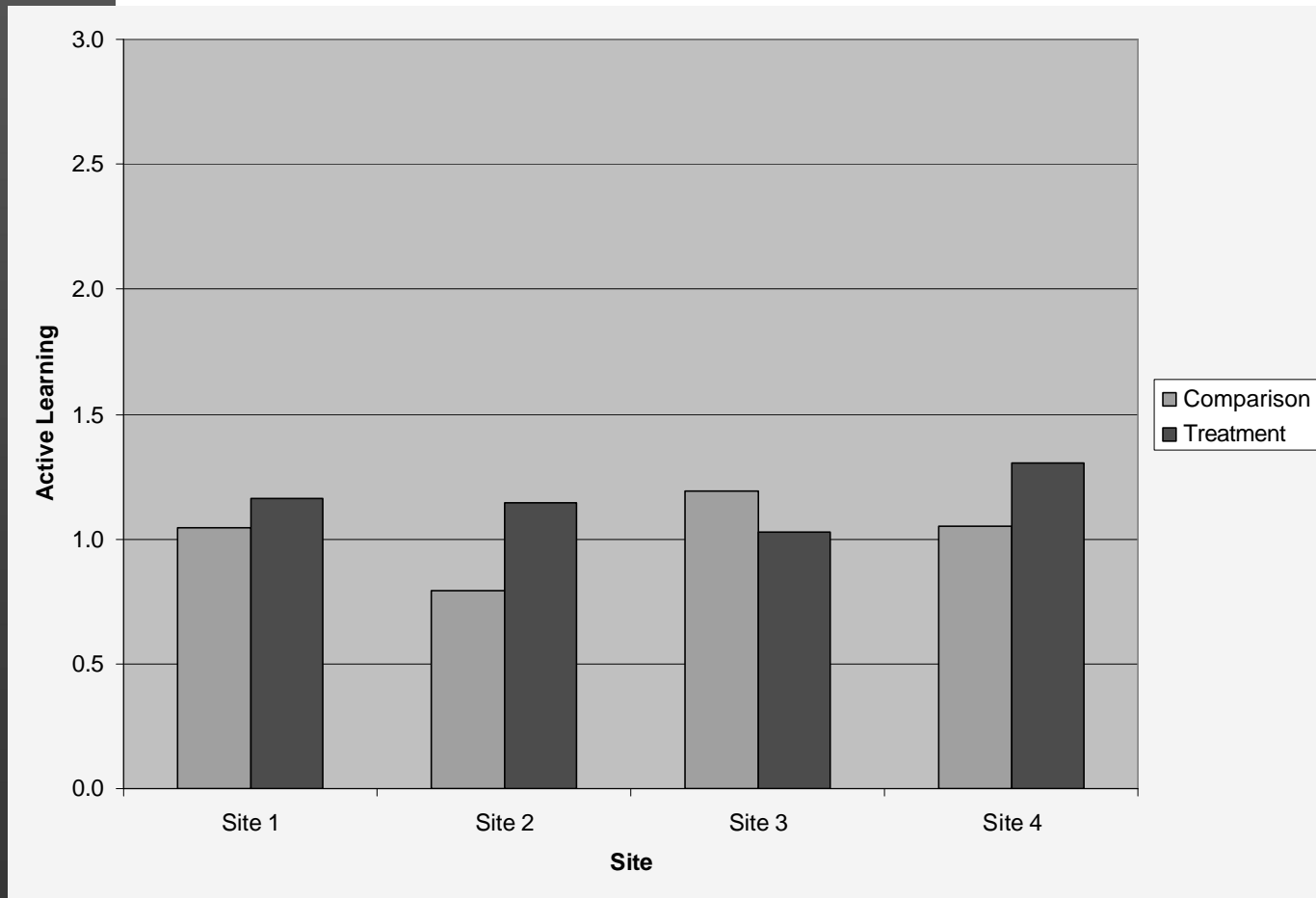
Review student work or score assessments?

Receive coaching or mentoring in the classroom?

Give a lecture or presentation to colleagues?

On the scale of 0=never, 1=rarely, 2=sometimes, 3=often

# Active Learning in Math PD by Site by Treatment Status



# Coherence

<i>Source</i>	<i>N</i>	<i>Mean</i>	<i>SD</i>	<i>Min</i>	<i>Max</i>	<i>Reliability</i>
Monthly Logs	1709	2.3	0.7	0	3	0.85
Teachers	268	2.3	0.5	0	3	0.83

## *Sample Items:*

Designed to support the school-wide improvement plan adopted by your school?

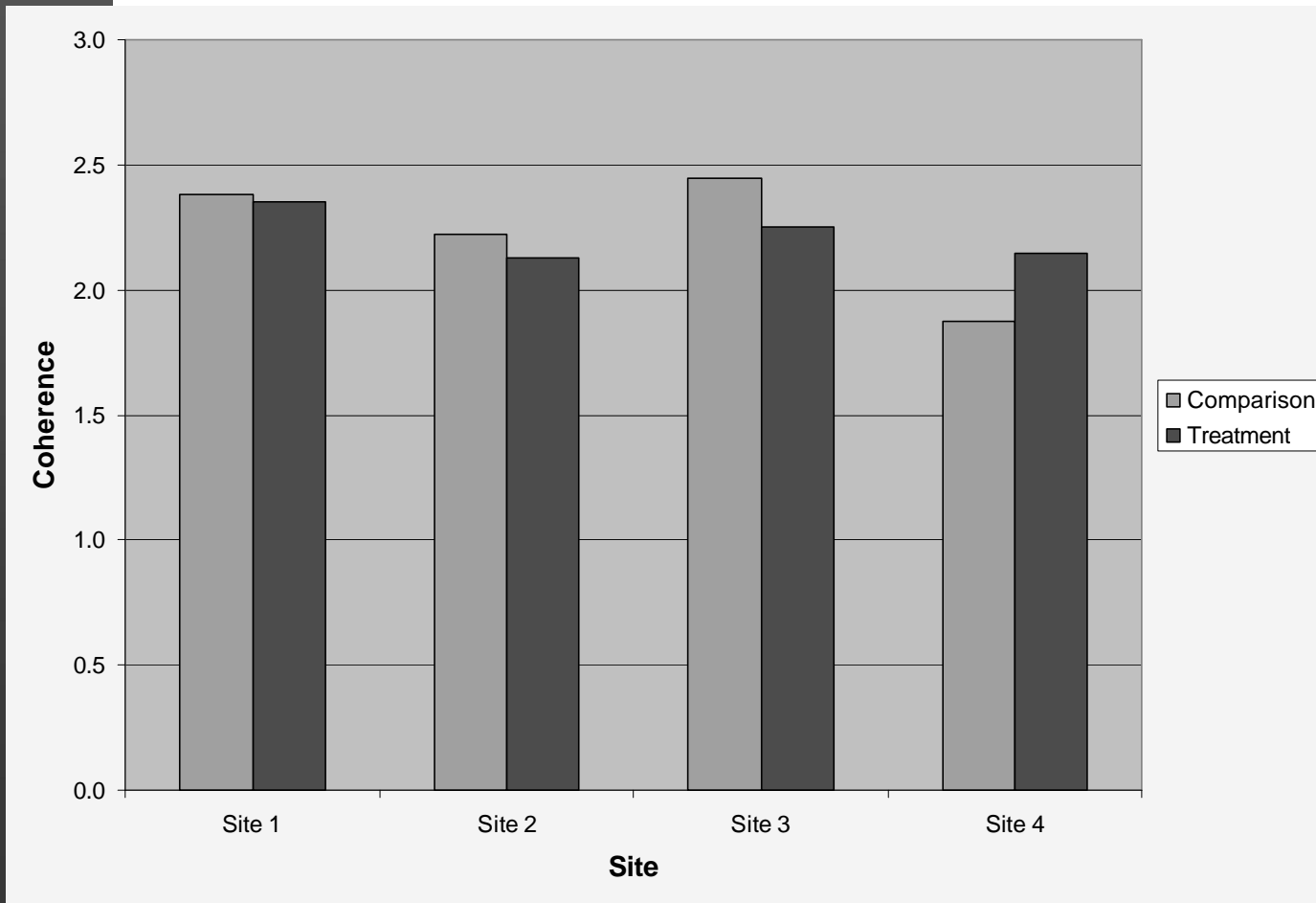
Consistent with your department or grade level plan to improve teaching?

Consistent with your own goals for your professional development?

Based explicitly on what you had learned in earlier professional development activities?

On the scale of 0=never, 1=rarely, 2=sometimes, 3=often

# Coherence in Math PD by Site by Treatment Status



# Collective Participation

<i>Source</i>	<i>N</i>	<i>Mean</i>	<i>SD</i>	<i>Min</i>	<i>Max</i>	<i>Reliability</i>
Monthly Logs	1766	0.62	0.73	0	2	0.51
Teachers	269	0.72	0.58	0	2	0.54
Teachers (Cum.	269	1.28	0.78	0	2	0.60

*Sample Items:*

I participated with most or all of the teachers from my school.

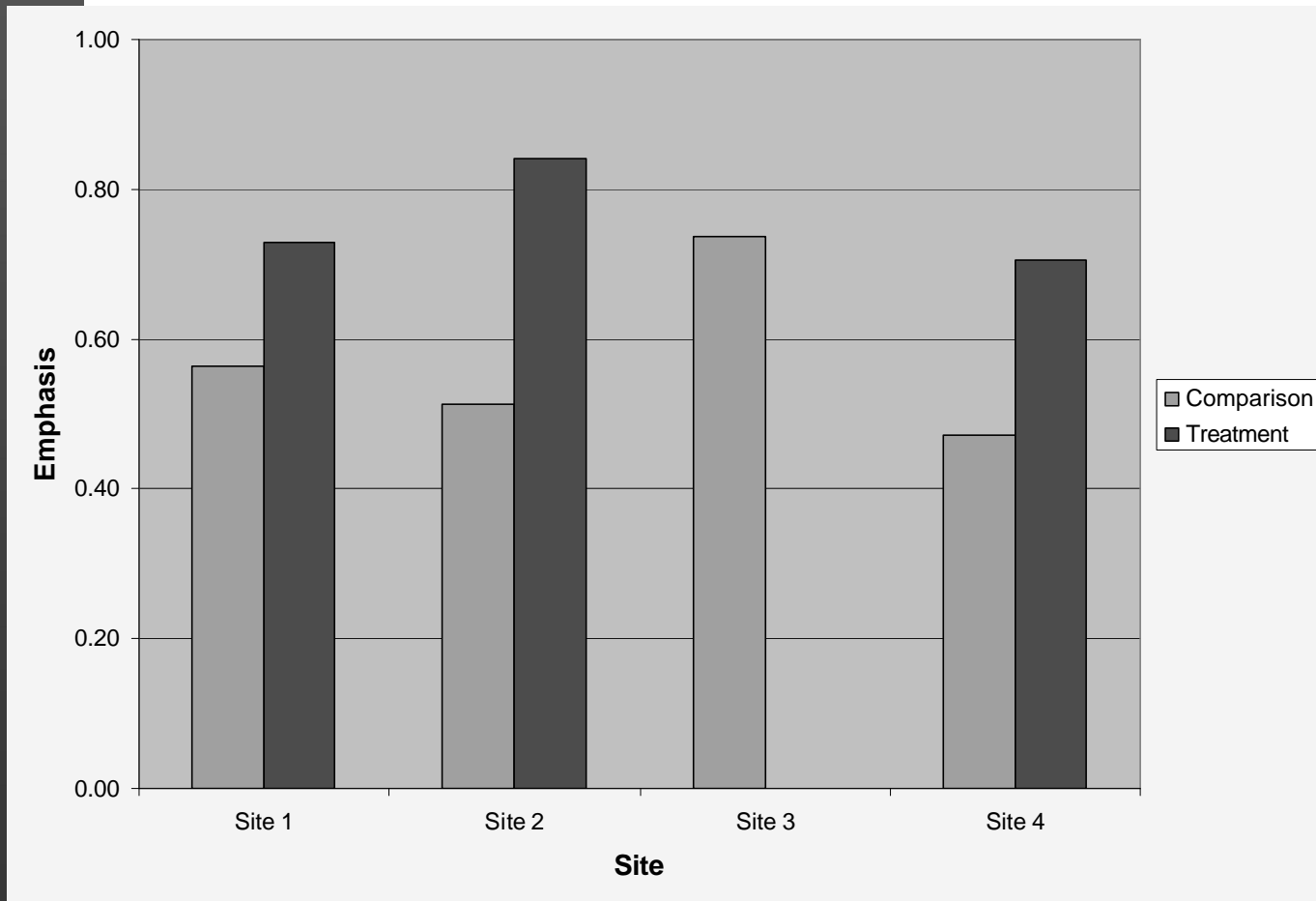
I participated with most or all of the teachers from my department or grade level.

On the scale of 0 - 2: Sum of the two collective participation items

# Content Focus

<b>Source</b>	<b>N</b>	<b>Mean</b>	<b>SD</b>	<b>Min</b>	<b>Max</b>
<b>Monthly Logs</b>	<b>1689</b>	<b>0.71</b>	<b>0.46</b>	<b>0</b>	<b>1</b>
<b>Teachers</b>	<b>262</b>	<b>0.75</b>	<b>0.31</b>	<b>0</b>	<b>1</b>
<b>Question:</b>					
<b>Was strengthening subject matter knowledge a purpose of the PD activity that you participated in?</b>					
<b>On the scale of 0 - 1: 0 = no, 1 = yes</b>					

# Emphasis on Strengthening Subject Matter Knowledge in Science PD by Site by Treatment Status



# Content Focus

- Coverage of Math Topical Areas

<i>Topical Area</i>	<i>N</i>	<i>Mean</i>	<i>SD</i>	<i>Min</i>	<i>Max</i>
<b>Number Sense, Properties, Relationships</b>	<b>989</b>	<b>0.35</b>	<b>0.48</b>	<b>0.0</b>	<b>1.0</b>
<b>Measurement</b>	<b>990</b>	<b>0.27</b>	<b>0.44</b>	<b>0.0</b>	<b>1.0</b>
<b>Algebraic Concepts</b>	<b>990</b>	<b>0.40</b>	<b>0.49</b>	<b>0.0</b>	<b>1.0</b>
<b>Geometric Concepts</b>	<b>990</b>	<b>0.31</b>	<b>0.46</b>	<b>0.0</b>	<b>1.0</b>
<b>Operations</b>	<b>989</b>	<b>0.28</b>	<b>0.45</b>	<b>0.0</b>	<b>1.0</b>
<b>Analysis/Probability/Statistics</b>	<b>989</b>	<b>0.35</b>	<b>0.48</b>	<b>0.0</b>	<b>1.0</b>

# Content Focus

- **Intensity of Topical Coverage in Math PD**

<i>Source</i>	<i>N</i>	<i>Mean</i>	<i>SD</i>	<i>Min</i>	<i>Max</i>
Monthly Logs	990	4.74	8.72	0	80
Teachers	151	5.41	8.55	0	80

- **Intensity of Topical Coverage in Science PD**

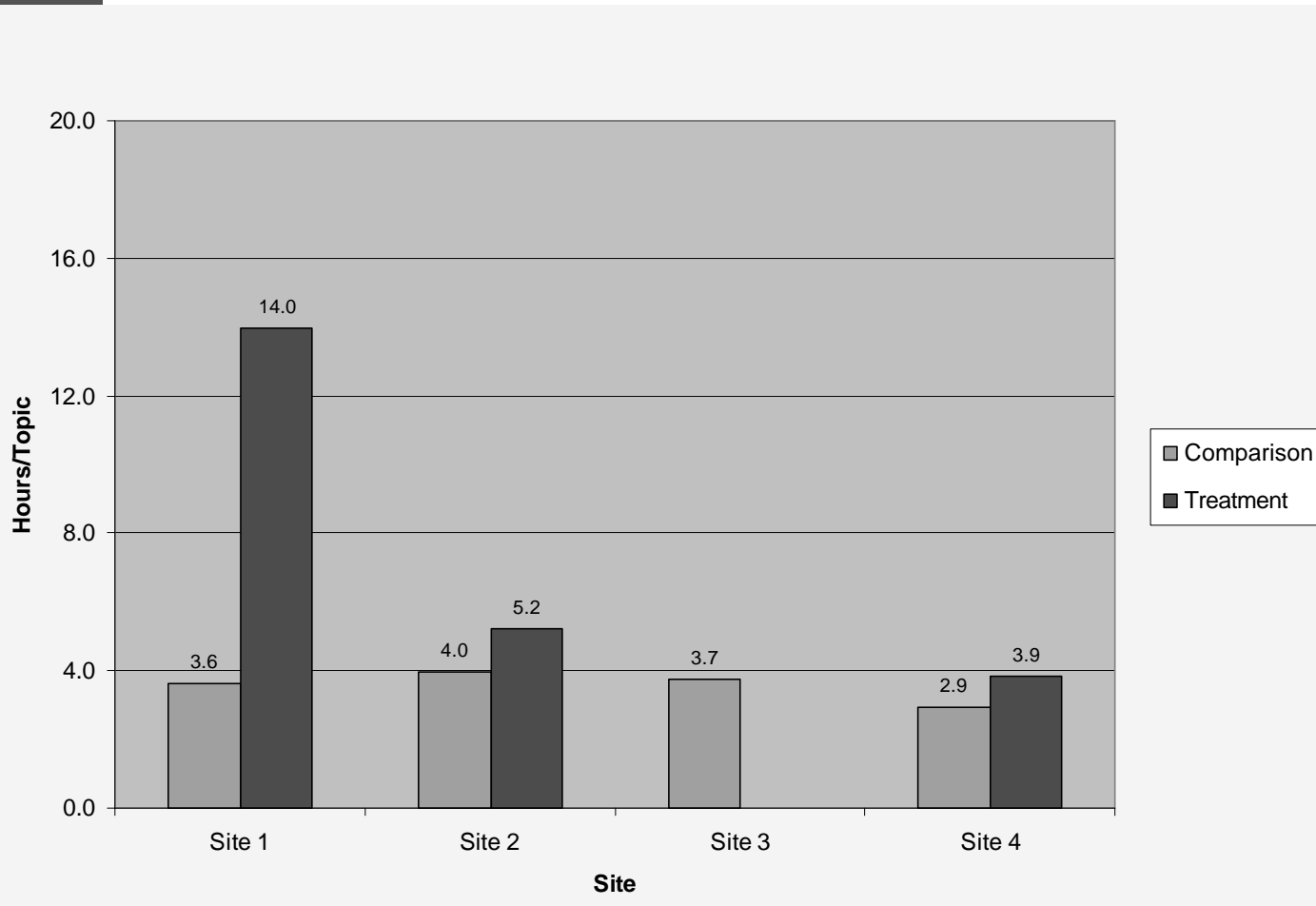
<i>Source</i>	<i>N</i>	<i>Mean</i>	<i>SD</i>	<i>Min</i>	<i>Max</i>
Monthly Logs	805	4.84	9.15	0	80
Teachers	125	5.06	6.24	0	36

Note: Intensity was computed by dividing contact hours by the number of topical areas covered in an activity.

# Science PD Quality by Site by Treatment Status

Variable	Category	N	Mean contact hours	Active learning	Coherence	Collective participation (At a given month)	Strengthen subject matter knowledge	Topic intensity
MSP Site			ns	ns	ns	ns	ns	**
	Site 1	18						9.4
	Site 2	63						4.9
	Site 3	23						3.6
	Site 4	21						3.5
Treatment			ns	ns	ns	ns	***	*
	Comparison	54					0.61	3.6
	Treatment	71					0.81	6.2
MSP_Site*Treatment			ns	ns	ns	ns	ns	*
	Site 1-Comparison	8						3.6
	Site 1-Treatment	10						14.0
	Site 2-Comparison	15						4.0
	Site 2-Treatment	48						5.2
	Site 3-Comparison	22						3.7
	Site 3-Treatment	1						0.9
	Site 4-Comparison	9						2.9
	Site 4-Treatment	12						3.9

# Topical Intensity in Science PD by Site by Treatment Status





# **Analysis of PDAL Data: Next Steps**

- **Validation analysis**
  - **Compare PDAL data with SEC2 data**
- **PDAL exit survey data analysis**
- **Usability study**