

# USING THE LAMM CLASSROOM OBSERVATION SYSTEM TO FACILITATE THE ADOPTION OF ACTIVE LEARNING METHODOLOGIES

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# Outline

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- # Engineering Education Research issues
- # Classroom strategy
- # Data collected
- # Conclusions

# Engineering Education Research (EER) and Quality of Learning

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- # Why?
- # What?
- # How?

# Medical Research

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- # Longitudinal studies
- # Meta-studies
- # Use a proxy e.g. cholesterol levels for heart and artery condition

# Active Learning

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Felder, Learning and Teaching Styles in Engineering Education, 1988

# Active Learning

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Felder, Learning and Teaching Styles in Engineering Education, 1988

“mismatch between most engineering education and the learning styles of most engineering students”

# Active Learning

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Longitudinal Study of Engineering Student  
Performance and Retention,  
(comparisons with traditionally-taught students)

Felder, RM, Felder, GN and Deitz E J. A  
J. Engineering Education, 87(4), 469-480, 1998

# Active Learning - meta study

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Results from > 30 quantitative studies (167 published papers)

"Effects of cooperative learning on undergraduates in science, mathematics, engineering, and technology: A meta-analysis."

Springer, L., Stanne, M. E., and Donovan, S. (1998).



# McKinsey Report on world's best school systems (OECD, 2008)

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- what did best quality systems have in common?
- based on OECD data (PISA)
- “teachers regularly invite each other into each other's classes to observe and coach”

# EFFECTIVE TEACHING WORKSHOP

Richard Felder, Emeritus Professor, North Carolina State University



# Activity Banks

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#D.R. Paulson & Faust J L, Active Learning for the College Classroom,

<http://www.calstatela.edu/dept/chem/chem2/Active/>

#R. M. Felder & R. Brent, Active Learning.

[www.uwf.edu/cutla/workshops/Active%20Handout.pdf](http://www.uwf.edu/cutla/workshops/Active%20Handout.pdf)

# Activity examples

Think-Pair-Share	Student Summary	Students create quizzes
Active Review Sessions	Lists	Jig-saw group activities
Puzzles/paradoxes	Reciprocal pair questioning	Muddiest point

# Self /Peer Observation

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- # Observer – peer or trained student assistant
- # Video – self, peer or student assistant

# Measure ...

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# learner activity

# Measure ...

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- # learner activity
- # learner participation

# Measure ...

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- # learner activity
- # learner participation

## Learner Activity Monitoring Matrix: LAMM



# LAMM

## LAMM – Learner Activity Monitoring Matrix

Date: 08/04/2008

Room: 1.03

Class and Course:

Lecturer:

Timetable: 15.00 – 16.30

Observer: C P

Location: ESTBarreiro ✓

ISEL

Mins	Listening to lecturer or other student	Resolving exercises/problems (individual)	Checking/ comparing answers	Pair discussion or other pair-work	Group work (>2)	Distracted	Other	11° students
2								
4								
6								
8								
10								
12								
14								
16								
18								
20								
22								
24								
26								
28								
30								
32								
34								
36								
38								
40								
42								
44								
46								
48								
50								
52								
54								
56								
58								
60								
Weight	1	2	2	3	3	0	0	

Activity index =

# LAMM

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Date: 08/04/2008

Room: 1.03

Class and Course:

Lecturer:

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Observer: C P

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ISEL

Mins	Listening to lecturer or other student	Resolving exercises/problems (individual)	Checking/ comparing answers	Pair discussion or other pair-work	Group work (>2)	Distracted	Other	Nº students
2	X							18
4	X							18
6	X							20
8	X							20
10	X							20
12	X							26
14	X							28
16	X							28
18	X							28
20	X							29
22	X							29
24	X							29
26	X							29
28	X							29
30	X							29
32	X							29
34	X							29
36	X							29
38	X							29
40	X							29
42	X							29
44	X							29
46	X							29
48	X							29
50	X							29
52	X							29
54	X							28
56	X							27
58	X							27
60	X							27
Weight	1	2	2	3	3	0	0	

Activity index = 30 x 1 = 30

# LAMM

## Learner Activity Monitoring Matrix

Date: 13/05/2008

Room: 1.03

Class and Course: Probability and Statistics, Civil Engineering

Lecturer: O D

Timetable: 15.00 – 16.30

Observer: RC

Location: ESTBarreiro ✓

ISEL

Mins	Listening to lecturer or other student	Resolving exercises/problems (individual)	Checking/ comparing answers	Pair discussion or other pair-work	Group work (>2)	Distracted	Other	Nº students
2	X							13
4	X							13
6	X							13
8	X							12
10		X						13
12		X						13
14		X						13
16		X						13
18		X						13
20		X						13
22	X							13
24			X					13
26			X					13
28	X							13
30	X							13
32	X							13
34	X							13
36	X							13
38				X				13
40				X				13
42				X				13
44					X			13
46					X			13
48					X			13
50	X							13
52	X							13
54	X							13
56	X							13
58	X							13
60	X							13
Weight	1	2	2	3	3	0	0	

Activity Index =  $16 \times 1 + 8 \times 2 + 6 \times 3 = 50$

# Activity Index values

Observation	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Lecturer 1	30	28	44	30	38	35	35	31	48	66	35	53	68	48	34	54
Lecturer 2	30	37	30	30	35	33	51	30	70	35	41	30				
Lecturer 3	30	30	30	37	42	30	75	80	86	81	40	39	34	34	81	
Lecturer 4	30	56	50	37	57	38	37	37	50	54	38	39				
Lecturer 5	48	64	76	72	57	54										



# L.A.M.M. - Learner Activity Monitoring Matrix

Course	Civil
Class	CVN11
Room	0.04

Lecturer	BW
Timetable	18.00
Observer	ND

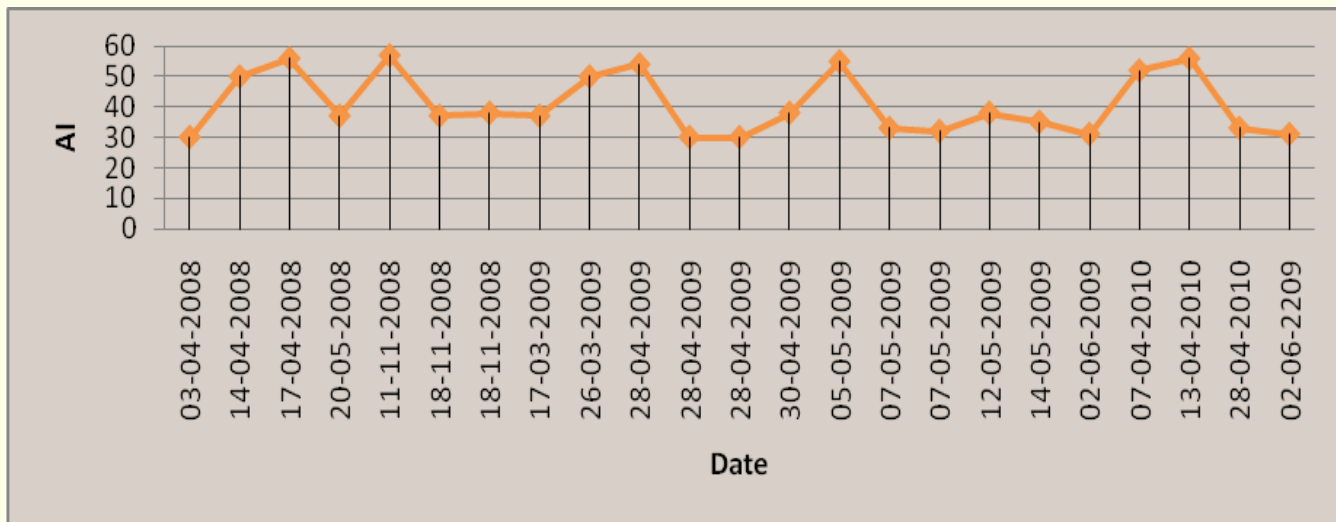
Location	EST Barreiro
Date	03-05-2010

Time	Minutes	Listening to lecturer or other student	Resolving exercises/problems (individual)	Checking/ comparing answers	Pair discussion or other pair-work	Group work (>2)	Distracted	Other	Nº of students	Spontaneous learner contribution (X)	Learners respond to individualised question (Y)	Learners respond to whole-class question (z)
10.30	2	1							20		1	
10.31	4	1							20		2	
10.32	6		1						21			
10.33	8		1						23			
10.34	10		1						23			
10.35	12		1						23			
10.36	14		1						23			
10.37	16			1					23	1		
10.38	18			1					23			
10.39	20	1							23		2	
10.40	22	1							23		2	1
10.41	24	1							23	2	1	
10.42	26	1							23			
10.43	28				1				23			
10.44	30				1				23			
10.45	32				1				23			
10.46	34				1				23			
10.47	36	1							23			
10.48	38	1							23			
10.49	40	1							23	1	4	
10.50	42	1							23		1	
10.51	44				1				23			
10.52	46				1				23			
10.53	48				1				23			
10.54	50					1			23			
10.55	52					1			23			
10.56	54	1				1			23		1	
10.57	56	1							23		1	
10.58	58	1							23			
	60	1							23			
Weight		1	2	2	3	3	0	0	682	1	1	0,5

Activity index	58
Participation Parameter	19,5

# LAMM data for an individual instructor

AI	30	50	37	57	37	38	37	50	54	30	30	38	55	33	32	38	35	31	52	56	33	31
PP	na	3	8	11	7	8	25	29	17	16	11	12	18	21	22	16	27	13	0	0	14	13



# Comparison of Instructors

## LAMM Results

Instructors	Activity index	Participation parameter
AL-oriented (n = 92)	45,39	17,1
Traditional (n = 15)	30,2	9,5



# Comparison of Instructors

## LAMM Results

Instructors	% lecture time
AL-oriented (n = 92 observed classes)	62
Traditional (n = 15 observed classes)	93

# Comparison of Instructors - US Study

## VOS Results

Instructors	% lecture time
HPL-oriented (n = 17 observed courses)	48.4
Traditional (n = 11 observed courses)	52.9

# In conclusion

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- Learner activity is a useful proxy for learning in lecture classes
- LAMM measurement of Learner Activity...
  - is flexible and easy to introduce
  - encourages peer observation and exchange
  - provides data

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