

Social and Cognitive Design in Energy Efficiency Training for NYC School Building Operators



Michael Bobker, M.Sc., CEM
Building Performance Lab
City University of New York
Building Operator Certification Program

Building Operator Certification (BOC) in the NYC Public Schools

- 1,000+ trainees over two years
- 90 hours classroom time (30 weeks)



Building Operator Certification – Level I



*A Partnership of the
NYC Department of Education
Division of School Facilities,
International Union of Operating
Engineers, and the
City University of New York*



Class 1

- **AGENCY COMMITMENT**

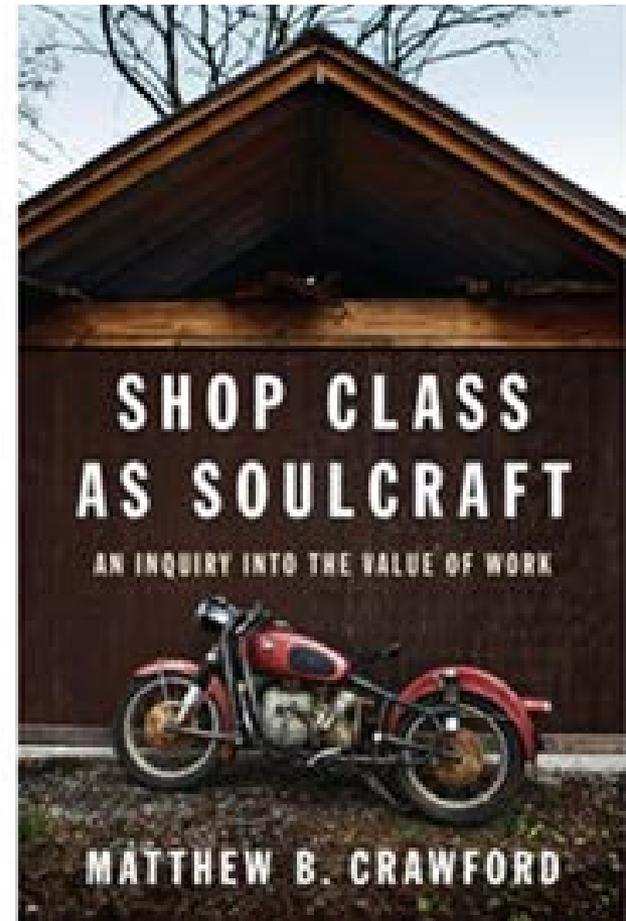
Transformative Goal

Greening the grizzly skeptic



Transformative Goal

- **Operators'**
New mission
- **new NEURON**
connections



Transformation

It

- 30 week experience

takes

- Progressive development of skills, thought-processes

T I M E

Logic Model & Improvement Process

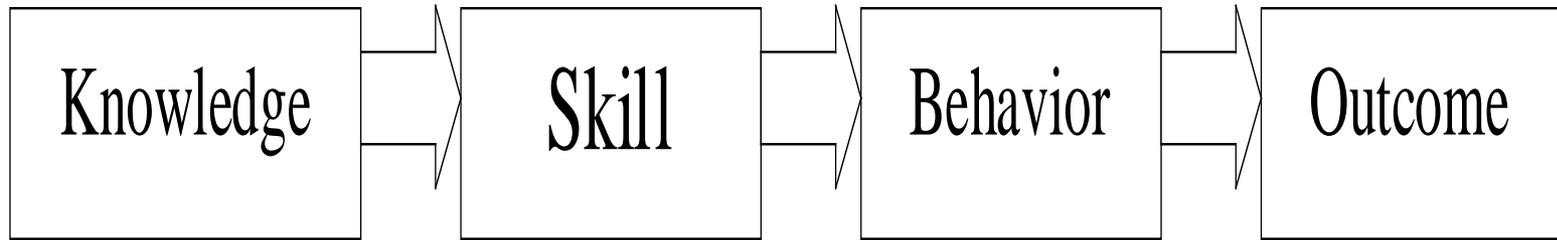
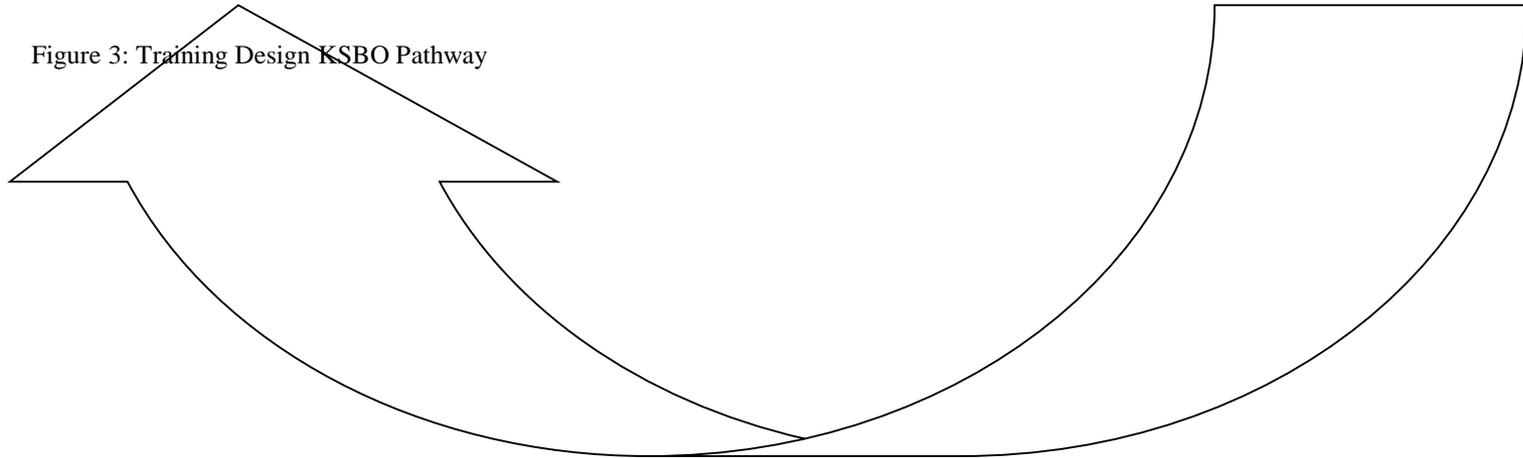
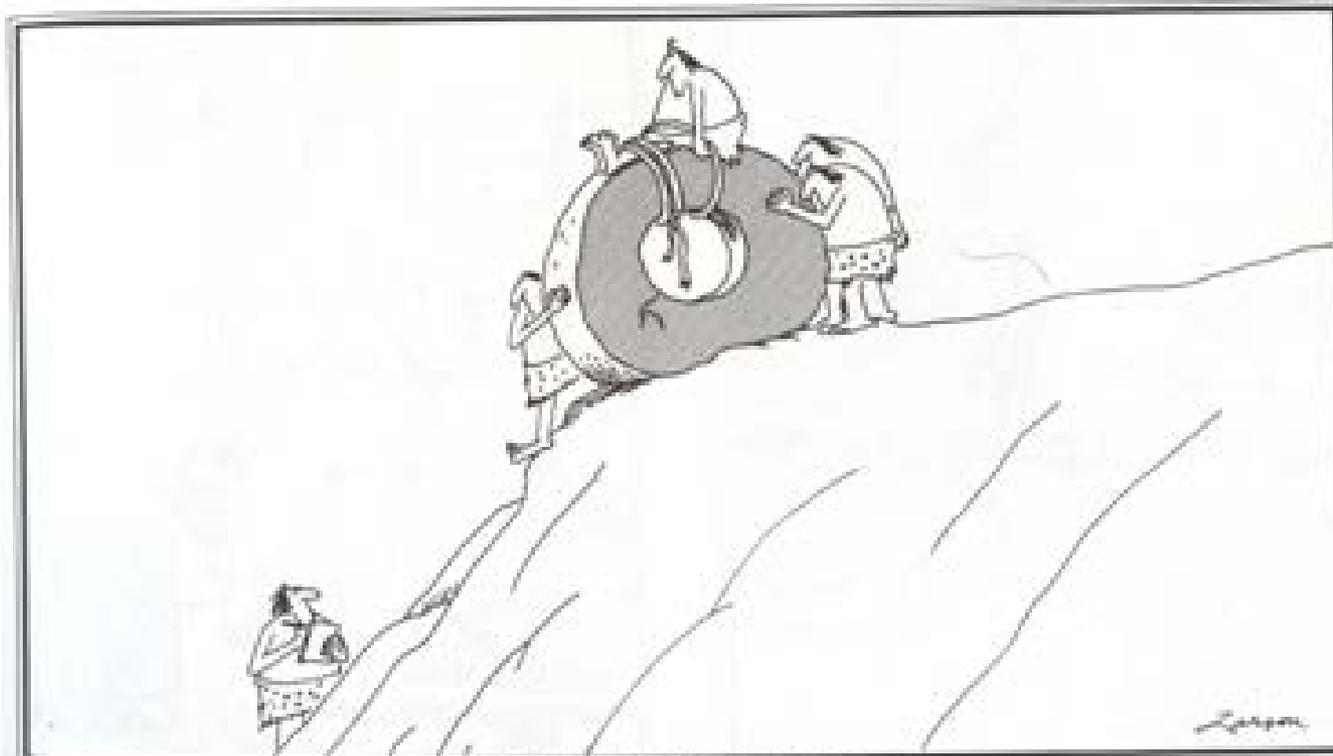


Figure 3: Training Design KSBO Pathway



The improvement process



Early experiments in transportation

Preach

Behavior;

Use

Resistances

- Show areas where effective autonomy can flourish
- Pursue discussions of why things **don't** happen

Structure DOING

- *Observation*

Observe and DRAW
Building Systems

- *Data*

- *PROJECTS*

Energy data feedback
from benchmarking
data

Plan improvements

Use data in projects

2 tables:

- Use by type
- End-use allocation

Teaching Tools - 2

What students have to do: energy use histories

TABLE 1 - SUMMARY OF ANNUAL ENERGY USE BY ENERGY TYPE
FOR THE YEAR SEPT 1, 2009 - AUGUST 31, 2010 UNLESS OTHERWISE NOTED

	unit	QTY	MMBTU	\$	unit cost	\$/MMBTU	MMBTU / SF	\$ / SF	% of BTU	% of Cost
Electricity	kwh		0		#D1W/O1	#D1W/O1	#D1W/O1	#D1W/O1	#D1W/O1	#D1W/O1
Nat Gas	therm		0		#D1W/O1	#D1W/O1	#D1W/O1	#D1W/O1	#D1W/O1	#D1W/O1
Fuel Oil, #_	gallon		0		#D1W/O1	#D1W/O1	#D1W/O1	#D1W/O1	#D1W/O1	#D1W/O1
Steam	mb		0		#D1W/O1	#D1W/O1	#D1W/O1	#D1W/O1	#D1W/O1	#D1W/O1
Other			0	0	#D1W/O1	#D1W/O1	#D1W/O1	#D1W/O1	#D1W/O1	#D1W/O1
Total			0	0	#D1W/O1	#D1W/O1	#D1W/O1	#D1W/O1	100%	100%

NOTES:
1. MMBTU of all energy types are calculated at the Site Value
2. Building Area (SF) is gross square footage, including basement

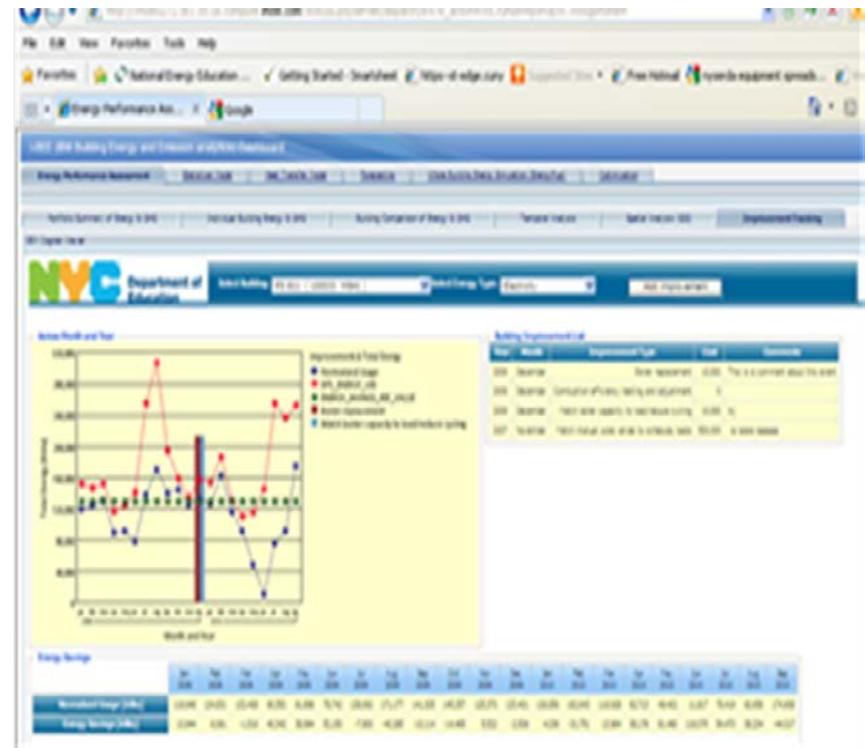
		per million
kwh	3414	0.003414 kwh
nat gas	100000	0.100 therm
oil, #2	140000	0.140 gal
oil, #4	145000	0.145 gal
oil, #6	152500	0.153 gal

TABLE 2 - ANNUAL ENERGY USE BY END-USE FUNCTION
FOR THE YEAR SEPT 1, 2009 - AUGUST 31, 2010 UNLESS OTHERWISE NOTED

END USE SYSTEM	BTU (MMBTU)	QTY (MMBTU)	ADJUSTED %	HEAT	HEAT/CST	WATER	W	W / SF	% OF TOTAL
COOLING SYSTEM									
CLIMATE CONTROL	100%								
HEATING SYSTEM									
WATER SYSTEM									
PLUMBING SYSTEM									
MECHANICAL SYSTEM									
ELECTRICITY									
POWER SYSTEM	43%								
PLUMBING SYSTEM	23%								
MECHANICAL SYSTEM	16%								
CLIMATE CONTROL	16%								
WATER SYSTEM	16%								
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Support COMPARISON

Actions
&
Outcomes



Long-term On-going Process

- Social network
- Events
 - maintenance of certification “fair”
- Evaluation
 - as longitudinal research

Thank You!

Contact Information

Michael.Bobker@baruch.cuny.edu

City University of New York