Everyday A3 Conversations: Practicing for Mastery

Eric Olsen
California Polytechnic State University
March 21, 2013

Agenda

- Welcome
- Introduction of MBB Webcast Series
  - Larry Goldman, MoreSteam.com
- Today's Session
  - Eric Olsen, Cal Poly
- Open Discussion and Questions

MoreSteam.com

- Founded in 2000
- Trained nearly 400,000 Lean Six Sigma professionals
- Served over 2,000 corporate customers (including 50+% of the F500)
- First firm to offer the complete Black Belt curriculum online
- Courses reviewed and approved by ASQ and PMI
- Academic Partnerships with Ohio State University, Cal Poly and George Washington University

Select Customers:

Today's Presenter

Eric Olsen

Assoc. Professor, Orfalea College of Business at California Polytechnic State University

- *Teaches in the undergraduate and master's programs emphasizing courses in lean thinking, six sigma, and operations*
- *Over 20 years of industry experience in engineering and manufacturing management*
- *MA/PhD Operations Management – The Ohio State University*

Title: **Everyday A3 Conversations - Practicing For Mastery**

Owner	Date	Rev
Eric Olsen	**3/21/13**	**B**

I. Background

Develop people who practice, lead, and teach critical thinking!

- ✓ "Toyota sets up all its operations as experiments and teaches the **scientific method** to its workers."
  (*DNA of the Toyota Production System*, Spear & Bowen, 1999)
- ✓ "Principle 9: Grow leaders who thoroughly **understand the work, live the philosophy, and teach it** to others."
  (*The Toyota Way*, Liker, 2004)
- ✓ While the basic **A3 thinking follows a common logic**, the precise **format and wording are flexible**, and most organizations **tweak the design to fit their unique requirements**."
  (*Managing to Learn*, Shook, 2008)

II. Current Conditions

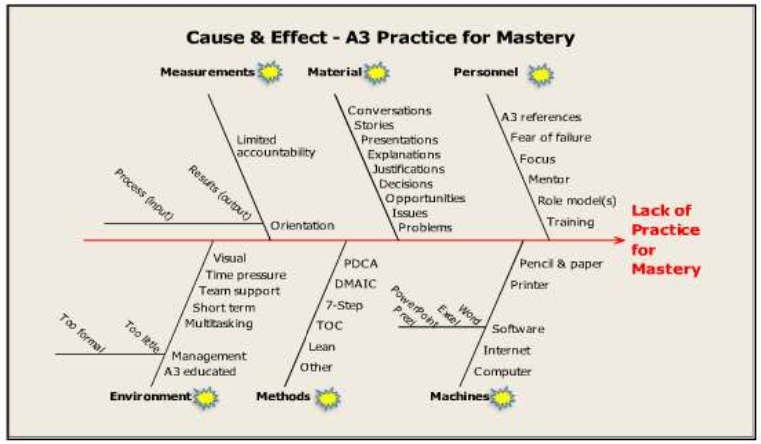
1. Companies **swim in a sea of problems** - *fish see water last.*
2. A3 thinking is being recognized an major active ingredient in **the "secret sauce" of lean six sigma**.
3. **Engaging employees** in problem solving "**moves the needle**".
4. A3 problem solving and DMAIC share a **common ancestry: PDCA**.
5. **Many people have been trained** and appreciate A3s, but **rarely do they gain traction beyond the classroom** or first experience.
6. **Even when supported by management**, ubiquitous A3 has a hard time gaining traction.
7. Everyone is tired of having the **same old conversations** and arguments **without clear conclusions or action plans**.
8. A3s are considered **formal, complex tools at are brought out only for special occasions**.

Problem Statement: ***We do not get enough practice in A3 thinking for mastery.***

III. Goals/Targets

- Increase A3 practice from infrequent to frequent.
- Make A3 thinking pervasive in the organizational culture *[KATA]*.
- Reduce perceived barriers to A3 use (e.g. "correctness", formality, and complexity).

IV. Analysis

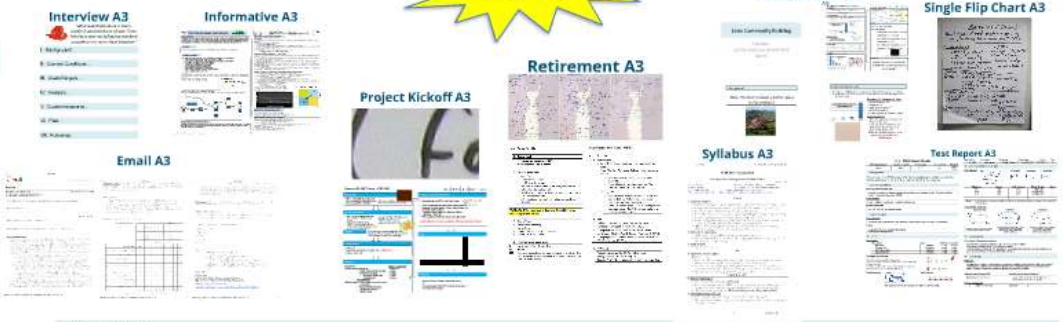


V. Proposed Countermeasures

"The 10,000 Hour Rule."
(Outliers, Gladwell, 2008)

1. **Look for excuses** to use an A3 approach
2. Consider the ***20% A3***
3. Be an **A3 geek**

EXAMPLES



VI. Plan

1. Start small. Think "**small reversible experiments**."
2. Get a format you know well and feel comfortable with.
3. Just DO IT - ***Be the change***.
4. Hold yourself accountable.
5. Get the first one done soon - *The crappy little first draft*.
6. **LEARN** - Pick yourself up and do it again.
7. Be easy on yourself - *Learning is a PROCESS*.
8. Ask for A3s from your co-workers - ***Have conversations***.
9. Share - ***go public***.

VII. Follow-up

Key Learnings based on my experienced on my experience:

- A3 thinking is an **analytical and creative process**.
- There is **no wrong or right way** to use A3 thinking - only experiences that we learn from.
- **You don't have to be an expert** to get the **80% value**.

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webpage: cob.calpoly.edu/faculty/eric-olsen/
Central Coast Lean - www.cob.calpoly.edu/centralcoastlean/

Reviewed by	MoreSteam.com		

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IV. Analysis

A3 Mini Tutorial

Title: What are you talking about?

Owner/Date

I. Background

Why are you talking about it?

II. Current Conditions

Where do things stand today?

- Show visually using charts, graphs, drawings, maps, etc.

What is the problem?

III. Goals/Targets

What specific outcomes are required?

IV. Analysis

What is the root cause(s) of the problem?

- Choose the simplest problem- analysis tool that clearly shows the cause-and-effect relationship.

V. Proposed Counter Measures

What is your proposal to reach the future state, the target condition?

How will your recommended countermeasures affect the root cause to achieve the target?

VI. Plan

What activities will be required for implementation and who will be responsible for what and when?

What are the indicators of performance or progress?

VII. Followup

What issues can be anticipated?

- Ensure ongoing PDCA.
- Capture and share learning.

Adapted from "Managing to Learn" by John Shook, 2008

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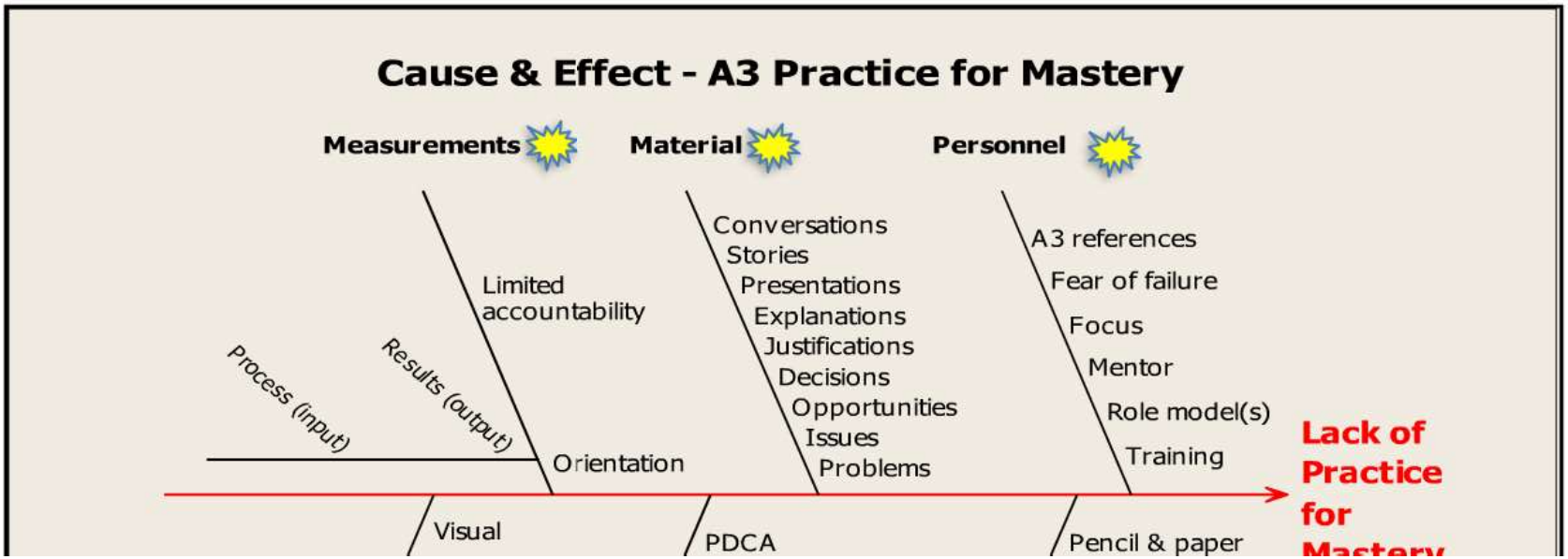

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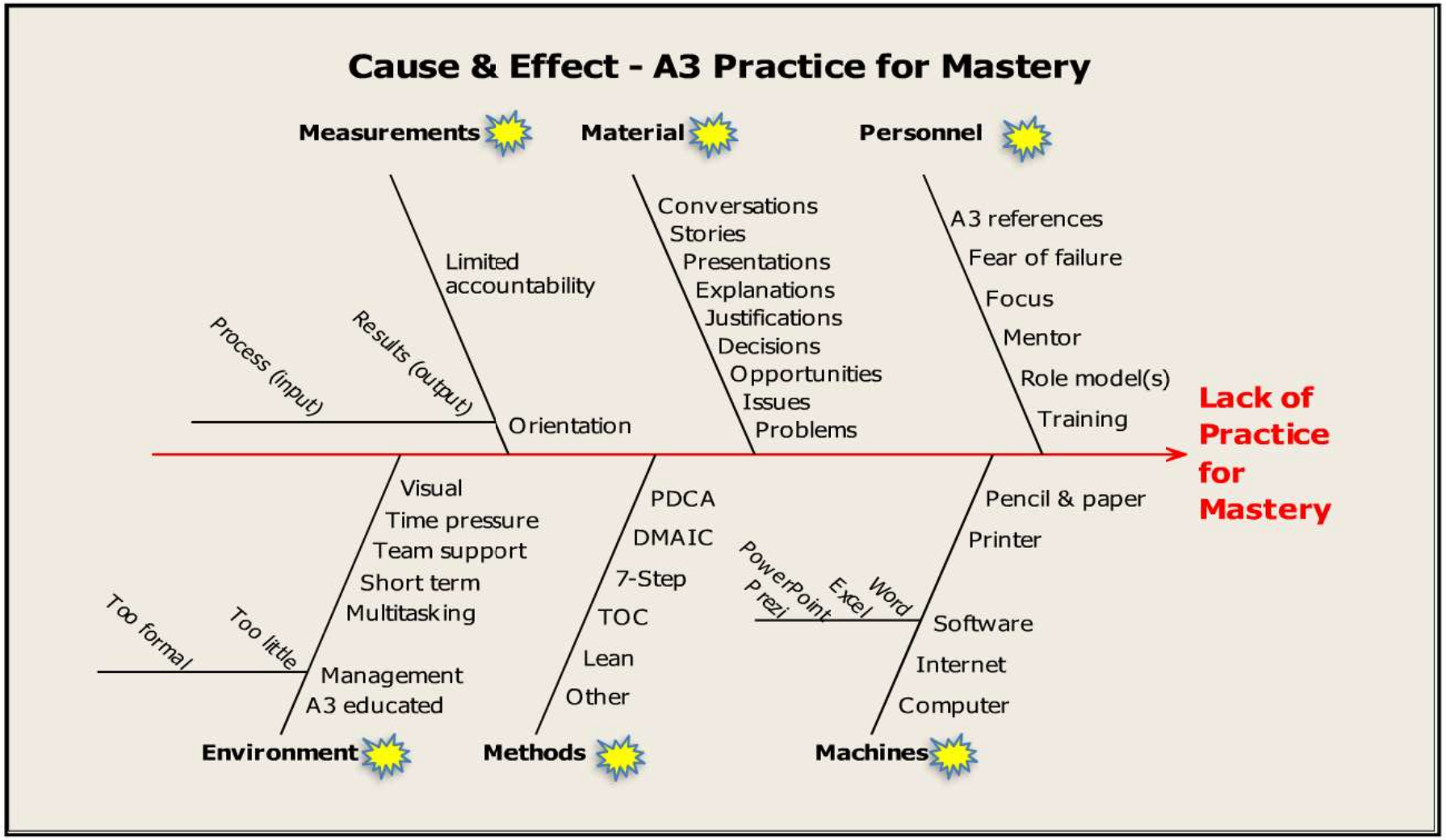

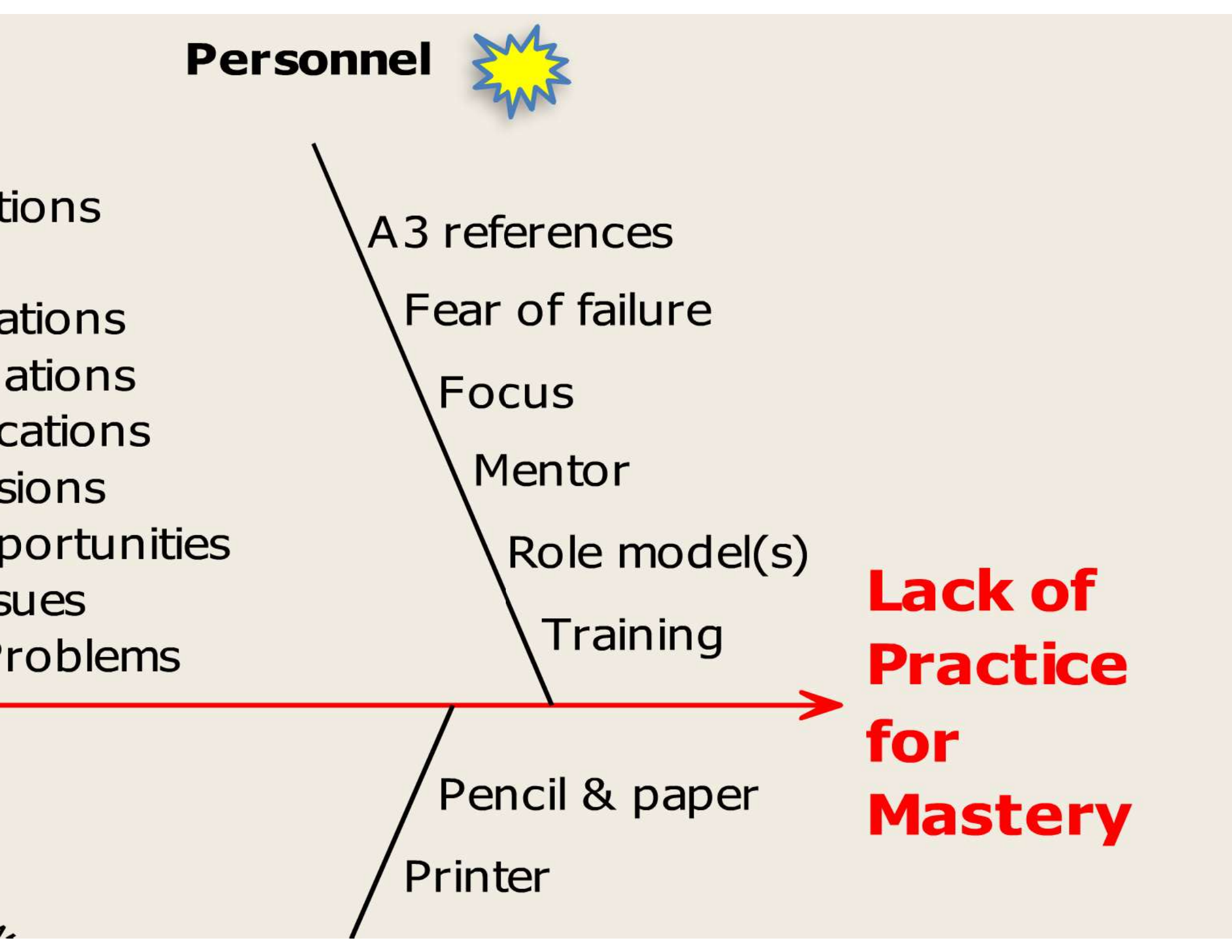
Personnel
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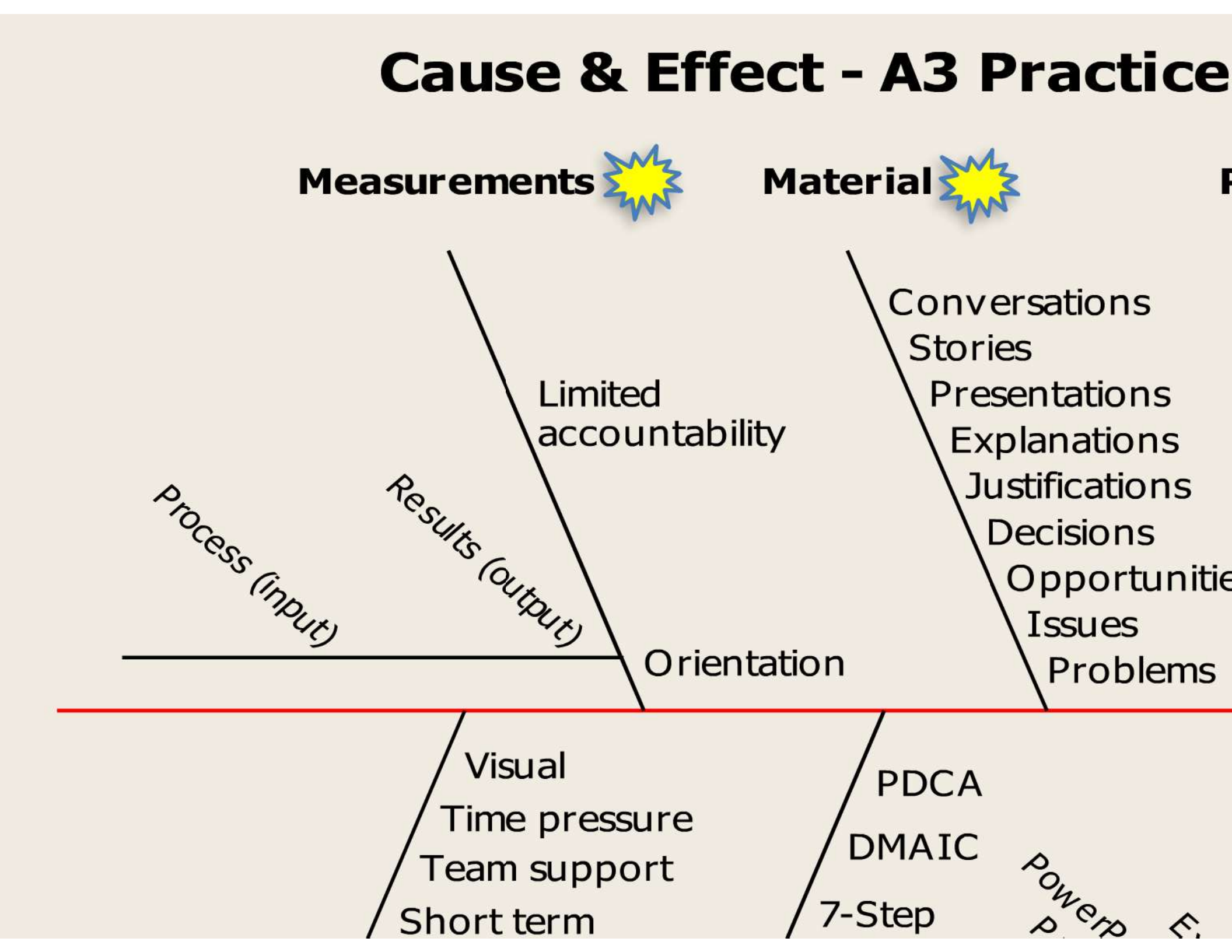
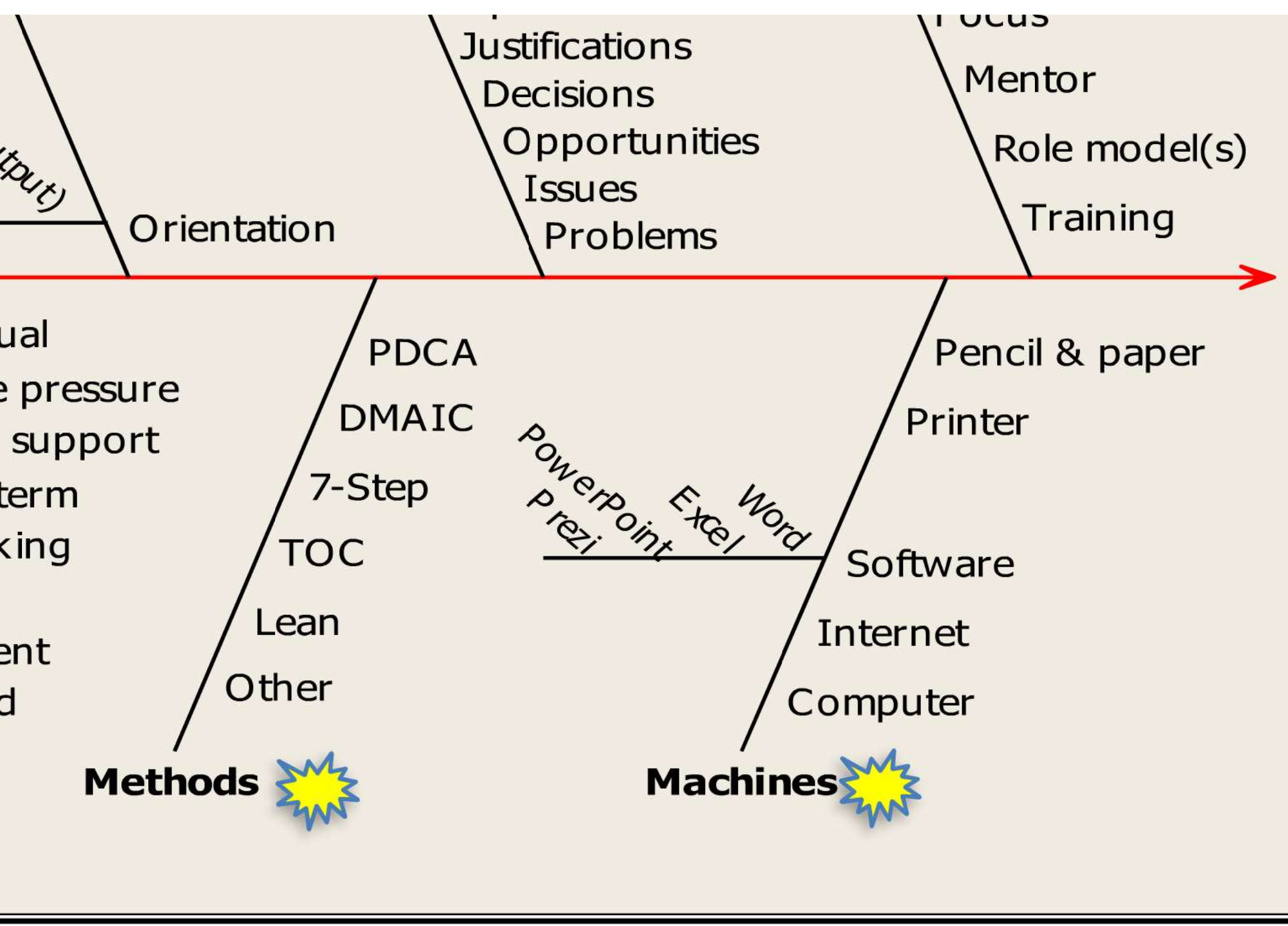
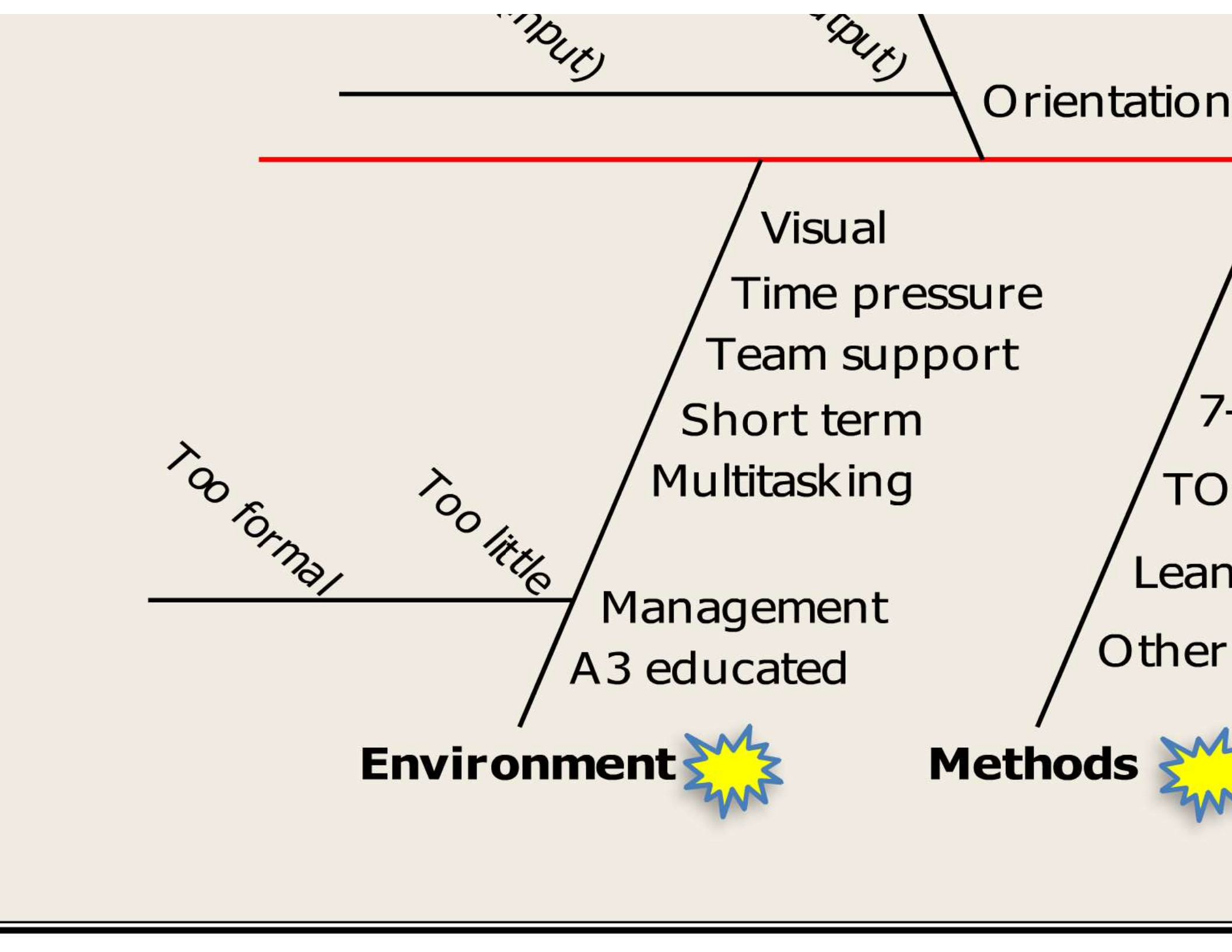
portunities
sues
roblems
A3 references
Fear of failure
Focus
Mentor
Role model(s)
Training
Lack of Practice for Mastery
Pencil & paper
Printer


Cause & Effect - A3 Practice
Measurements
Material
Limited accountability
Process (input)
Results (output)
Orientation
Conversations
Stories
Presentations
Explanations
Justifications
Decisions
Opportunitie
Issues
Problems
Visual
Time pressure
Team support
Short term
PDCA
DMAIC
7-Step


Justifications
Decisions
Opportunities
Issues
Problems
Mentor
Role model(s)
Training
Orientation
PDCA
DMAIC
7-Step
TOC
Lean
Other
Methods
PowerPoint
Excel
Word
Prezi
Pencil & paper
Printer
Software
Internet
Computer
Machines


nput)
tput)
Orientation
Visual
Time pressure
Team support
Short term
Multitasking
Too formal
Too little
Management
A3 educated
Environment
Methods
Lean
Other

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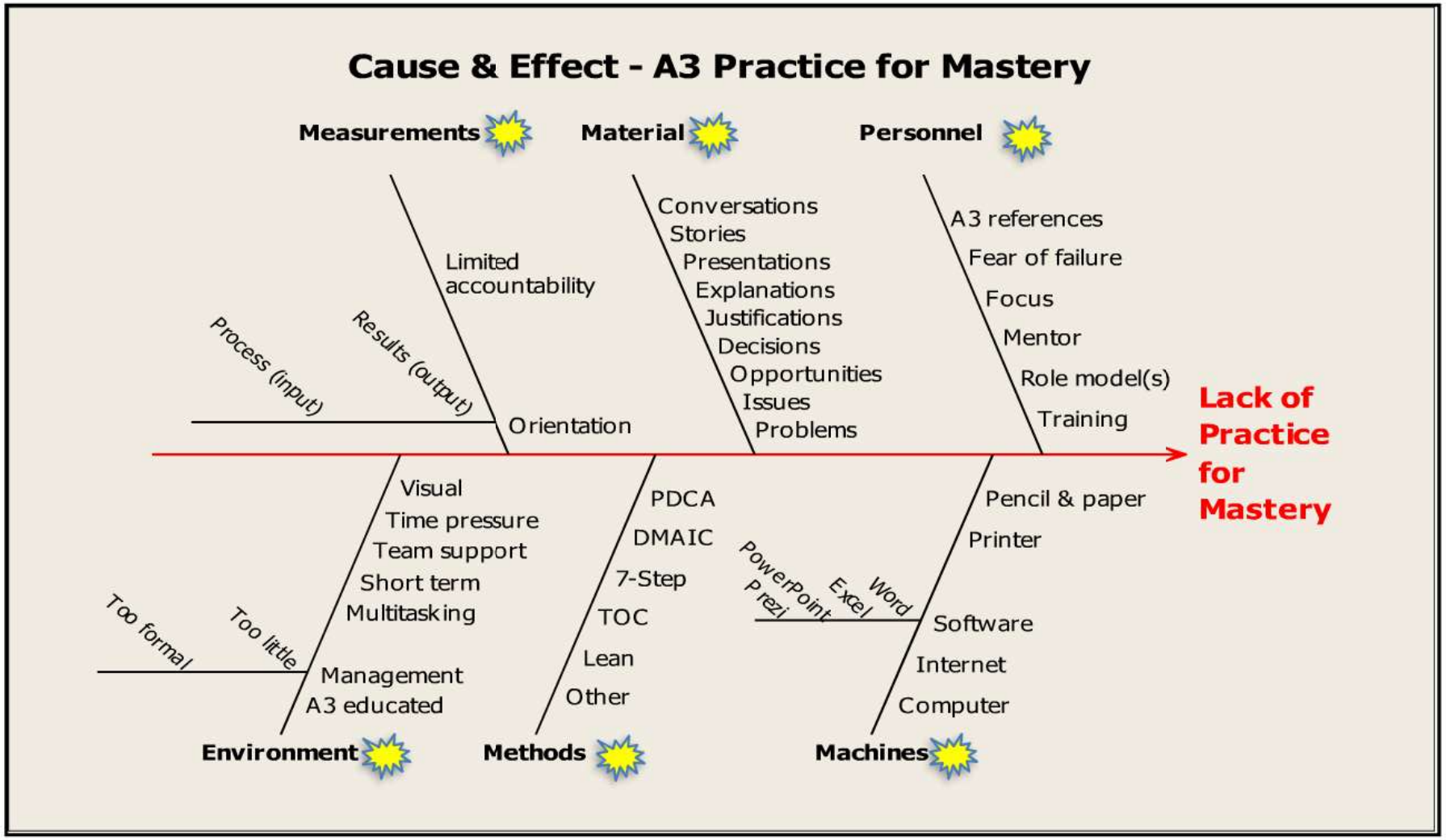

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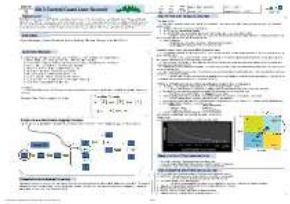
EXAMPLES

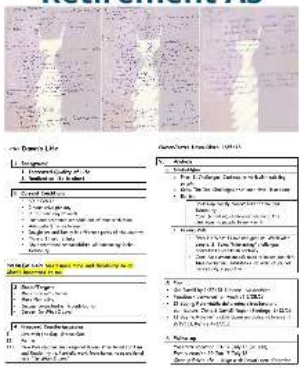
Interview A3

Informative A3



Project Kickoff A3

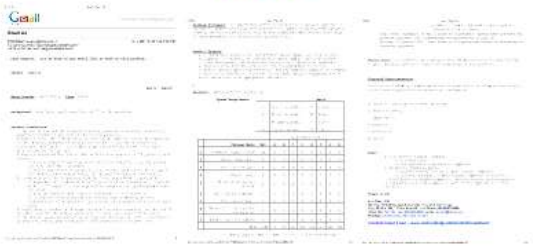
Retirement A3



PowerPoint A3

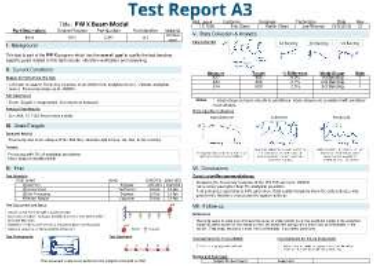
Single Flip Chart A3

Email A3



Syllabus A3

Test Report A3



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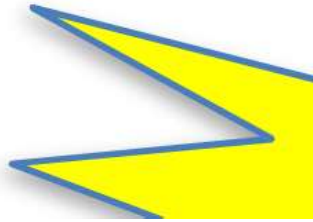
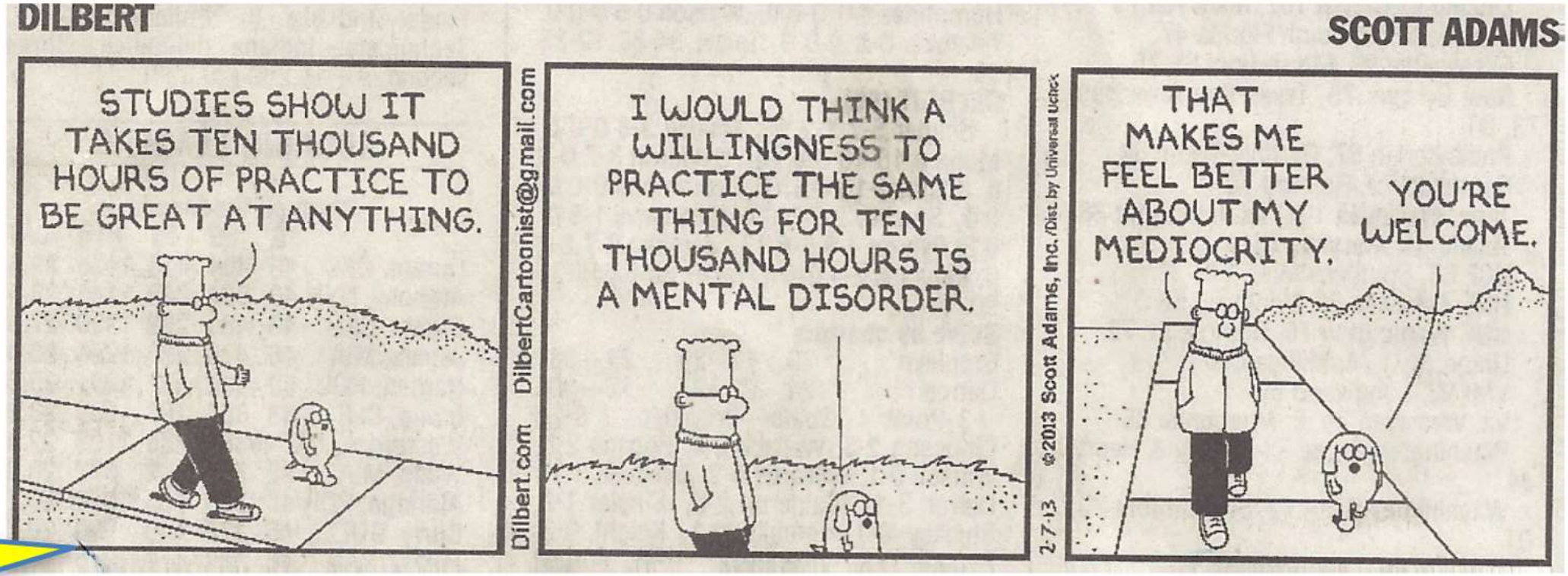
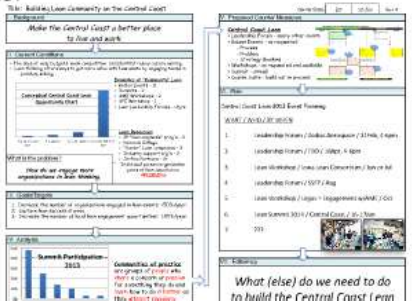


Eric Olsen	3/21/13	B



PowerPoint A3

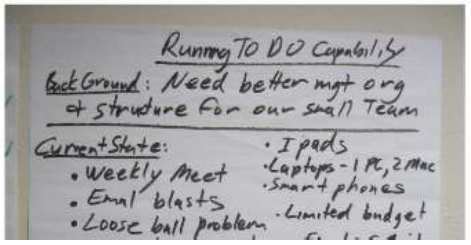
A3:



Lean Community Building

Eric Olsen
Central Coast Lean Summit 2013
4Jan13

Single Flip Chart A



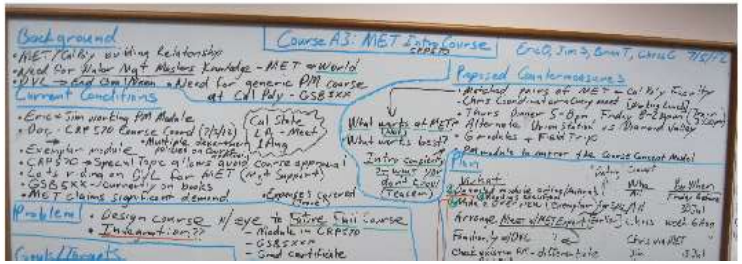
, 2008)

use an A3 approach

?

EXAMPLES

Project Kickoff A3



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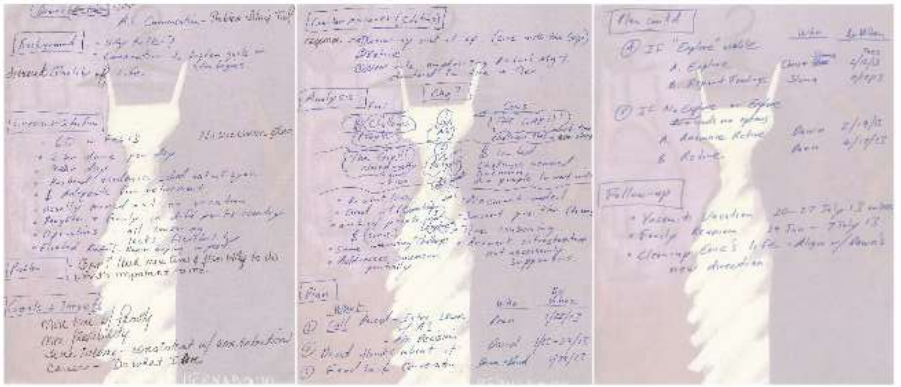
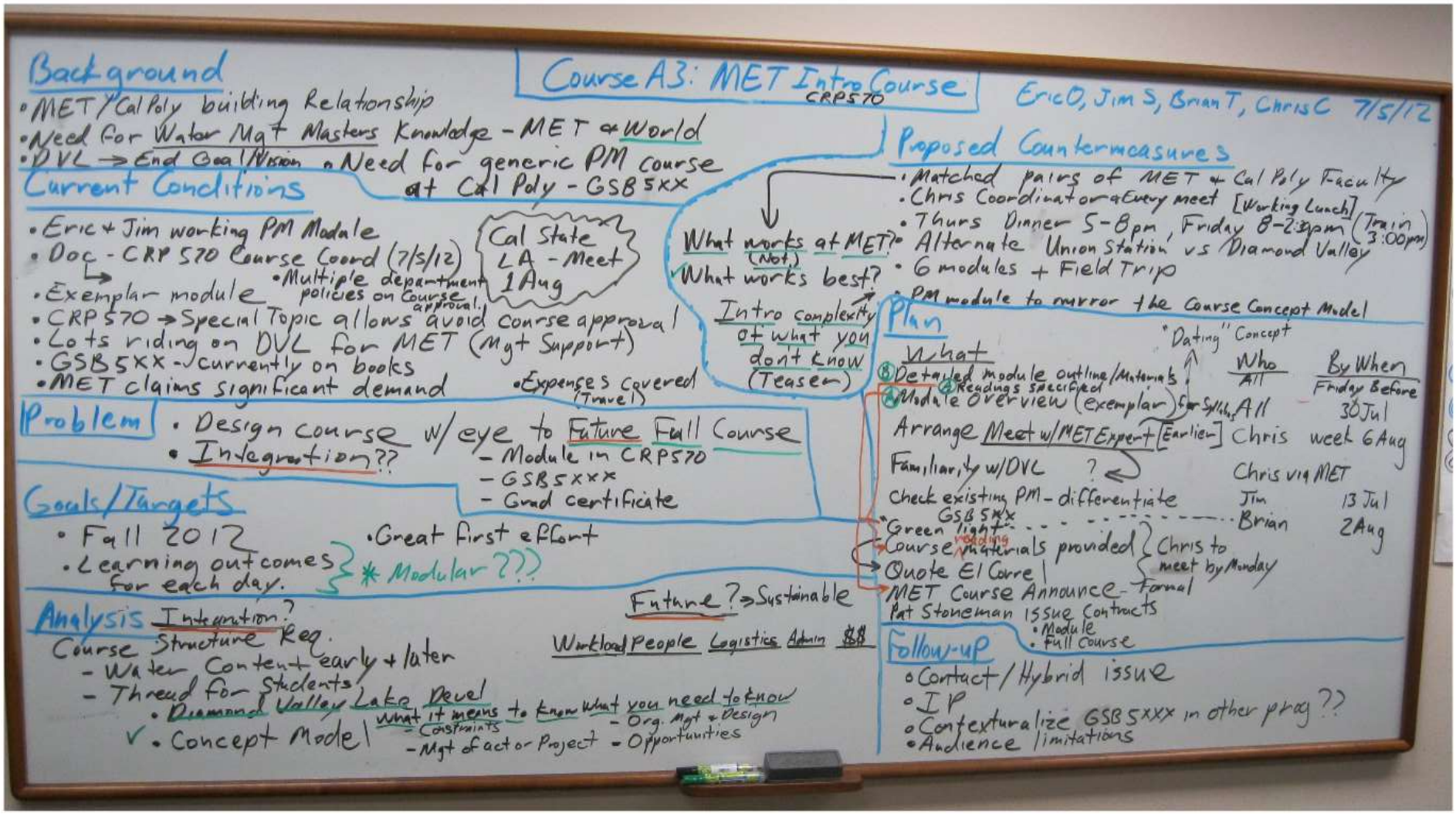


Title: Dawn's Life

Owner/Date: Dawn Olsen 1/25/13

Project Kickoff A3



Course A3: MET Intro - CRP 570

Eric O	Chris C	Jim S	Brian T	7/5/12

Background

- MET/ Cal Poly building relationship
- Need for Water Management Masters' knowledge @ MET & <u>WORLD!</u>
- DVL --> End Goal/ Vision
- Need for generic PM course at Cal Poly

Current Conditions

- Eric and Jim working PM Module
- Doc → CRP 570 Course Coord. (7/5/12)
- Exemplar module provided
- CRP 570 -- special topic allows to avoid course approval *[Multiple depart polices on course approval!]*
- Lots riding in DVL for MET (Mgt Support)
- GSB 525 - Currently on books
- MET claims significant demand
- Expenses covered (travel)

Cal State LA - Meet August 1st

Problem

1. Design course w/eye to future full course: *Module in CRP 570 -- GSB 5XX – Grad Certificate*
2. Use <u>integrated</u> approach to curriculum.

Target/Goal(s)

- Fall 2012
- Learning outcomes for each day --> Modular???
- Great first effort

Analysis

<u>Integration?</u>
Course structure required
- Water content early and later
- Thread for students
  - Diamond Valley Lake development
- <u>Concept Model</u>

What it means to know what you need to know
- Constraints
- Mgt of activity or project
- Org Mgt and design
- Opportunities

<u>Future?--> Sustainable</u>
- Work load
- People
- Logistics
- Admin
- Money

Proposed Countermeasure(s)

- Matched pairs of MET & Cal Poly Faculty → *What (didn't) worked at MET?* *What works best?*
- Chris coordinator & every meet (working lunch)
- Meeting Format/Logistics: Thurs dinner 5-8pm, Fri 8-2:30pm (train 3:00pm)
- Alternate Union Station vs. Diamond Valley
- 6 Modules + field trip
- PM module to mirror the course concept model

<u>Overall Objective</u>: Intro to complexity - What you don't know [teaser].

Plan

	What?	Who?	By When?
1	Detailed module outline materials	All	Friday before class meeting
2	Readings Specified		
3	Module overview per exemplar for syllabus	All	30-Jul
4	Arrange meet w/MET expert (dating concept)	Chris	week 6Aug
5	Provide familiarity with DVL	Chris via MET	
6	Check existing GSB525 PM course - differentiation	Jim	13-Jul
7	"Green Light"	Brian	2-Aug
8	Issue instructor contracts	Pat Stoneman	
9	- Module		
10	- Full course		
11	Course materials provided to Chris	Eric & Jim	Monday before class meeting
12	Qote support from El Correl	Chris	

Followup

- Contact hours / hybrid approval issue
- IP
- Contextualize GSB 5XX in other programs??
- Audience limitations

Informative A3

ENTITY	2013 Central Coast Lean Summit	VP	GM	MGR	Initiator	Owner: Bryan Davenport	Date:1/16/2013	ZODIAC AEROSPACE
06	CENTRAL COAST LEAN		Tony Guy	Tony Guy	Bryan Davenport	Mentor: N/A	Approval Date: 1/16/2013	Internal Use Zodiac

Background

Eric Olsen a professor at Cal Poly San Luis Obispo has now put on the Central Coast Lean Summit twice. This years Summit was held on 1/4/2013. It provides a forum for local and a few out of the area business the chance to mingle and learn from one another on all topics "lean," business sectors and academic institutions represented at the conference included: hospital ca re, several manufactures and consultants, SLO and Ventura County government, Ohio State University, and Cal Poly

Attendees

Bryan Davenport, Irene Gonzalez, Aaron Buckley, Michael Conley, and Josh Parra

Activities Realized

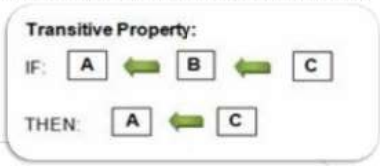
The Summit was comprised of lectures, some of which had team activities. The topics included:

- "White Collar Lean: Kaizen Events for the Office" by Mike Osterling
- "How to Solve a System Problem: An Introduction to Cause Mapping" by Peg Pennington
- "Speed Kills...especially if too slow!" by Luke Faulstick
- "Customer Focused Culture at SSF" by Steven Kane
- "Benefits of Electronic Kanban" by Nicole Smith
- "Set-up Reduction for Printers" by Malcolm Keif
- "Lean Healthcare: Culture Matters!" by John Ruffner
- "Lean Government: It's all in Your Head!" by Elaine Crandell
- "Lean Community Building" by Eric Olsen

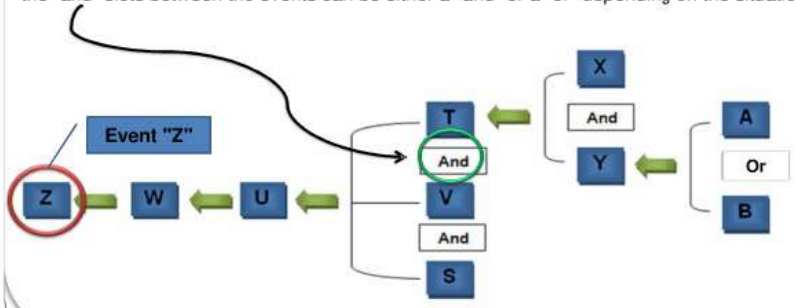
A3 Posters

- Several business and Cal Poly students posted posters in an A3 format which were available for viewing throughout the event.

Examples From "Cause Mapping" the activity :



Simple Generalized Cause Mapping Example:
the "and" slots between the events can be either a "and" or a "or" depending on the situation



Expectations compared to actual

Overall the group that attended the conference felt it met our expectations and was a worth while use of our time. The summit followed its agenda very closely, and the information obtained matched the conference's schedule descriptions. It would be worth while to attend the Lean Summit in 2014.

Key Points and Lessons Learned

The Lean Office

- Most lean office projects have their focus in the wrong place. They focus on the "value" added activities instead of the "non-value" added activities.
- It is hard to relate the 7 wastes to office activities
- The 8th waste is: **Underutilized People**
- The focus should be on the non-value added steps (that is where most of the waste can be found)
  - examples: generating paper work before it is needed, increasing variation by batching documents, working on documents that are not needed while the ones that are required sit idle,
- Kaizen workshops
  - Should have 4 to 6 weeks of pre-study to fully understand the issues
  - Should **NOT** have any open items at the end of the event

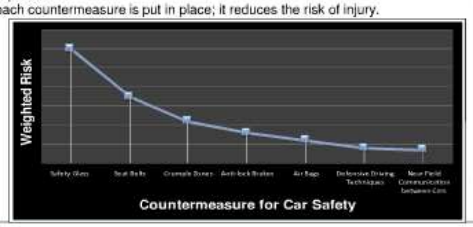
A lesson to learn from a transformer MFG: "Power Partners"

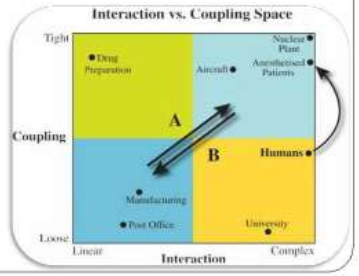
- After hurricane Sandy hit the gulf coast in 2012, Power Partners was able to deliver finished products to the affected areas before the current supplier could.
  - In order for this to occur they had to create and finish all of the required engineering and documents, set up their production line, produce, and deliver faster than their competitors could.
- They were able to do this due to them taking the time up-front by identify potential customers and working with them to understand their requirements and specifications
- Although they were not currently the supplier to the areas they were able to help the communities by being a part of getting the power on faster than expected
- Due to their success they were able to win contracts in new areas becoming the main supplier due to their extremely short lead times compared to the industry standard
  - They are able to reduce their lead times by building "better" relationships with their customers and suppliers. "They don't sit on it;" meaning they are proactive and go out of their way to be better.

Thinking of a Problem as a System: Using Cause Mapping to identify all of the key points

- The basis of Peg's argument can be linked to C. Perrow's "Normal Accident" Theory.
  - The 2 X 2 matrix below "Interaction vs., Coupling Space" is a pictorial representation of this theory, see below.
- She argued that as a system becomes more complex the more important it is to use lean tools.
  - She also noted we should think of root "causes" not a root cause.
- Cause mapping can be used to detail all of the possible "causes" that occurred for the problem to be noticed.
  - See the example under "Activities Realized" section of this document
- When starting a cause map identify the following corporate goals impacted: Safety, Quality, Cost, Delivery, and Moral/Management
- What's **NOT** a cause (things not to end on in the map)
  - Human error
  - Equipment Failure
  - Procedure not followed
  - Training inadequacies
  - Design error
  - Poor communication
- Systems Thinking and understanding all of the potential "causes" can be used to reduce risks.; see the Countermeasure for Car Safety example below.

As each countermeasure is put in place; it reduces the risk of injury.





Weak points of the presentations

- We found it was hard to learn in a presentation only setting.
- It was not clearly outlined that it take a team to construct a "proper " cause map
- Perception of most of the items presented were easier said than done

Improvements identified we could use

We felt we could benefit by incorporating the following items or ideas into our BU:

- Cultural shift - all employees need to have a sense of ownership of the company
  - This fits in well with our "lean transformation" and will take time
- The problem solving tool - Cause Mapping
  - We deal with many variables that all need to be considered to find a set of solutions for complex problems.
- Using data to solve problems, minimize risk, and to measure all aspects of an item
- Having a vision with goals and targets
- We need to do a better job at risk reduction and identification
- Taking time up front to understand potential customers → PSU

Interview A3

What would you do as a Team Leader if you found one of your Team Members was not following standard procedure in a non-critical situation?

I. Background…

II. Current Conditions…

III. Goals/Targets…

IV. Analysis…

V. Countermeasures…

VI. Plan…

VII. Follow-up…

VII. Follow-up…

Overall the group that attended the conference felt it met our expectations and was a worth while use of our time. The summit followed its agenda very closely, and the information obtained matched the conference's schedule descriptions. It would be worth while to attend the Lean Summit in 2014.

- The problem solving tool - Cause Mapping
  - We deal with many variables that all need to b
- Using data to solve problems, minimize risk, and to meas
- Having a vision with goals and targets
- We need to do a better job at risk reduction and identific
- Taking time up front to understand potential customers –

Email A3

3/10/13 Gmail - Email A3

Gmail by Google

Eric Olsen <leanops1@gmail.com>

Email A3

Eric Olsen <eolsen@calpoly.edu> Sun, Mar 10, 2013 at 4:29 PM
To: Larry Goldman <lgoldman@moresteam.com>
Cc: Ellen Milnes <emilnes@moresteam.com>

Lean Experts, Let me know if you would like to work on this problem.

Cheers, Eric O.

Rev B Mar13

Owner/Leader: Eric Olsen **Team:** ?????

Background: Developing problem-solving skill in the workforce.

Current Conditions:

1. The use of A3s and the A3 problem solving process is becoming increasingly popular as companies progress on their lean journeys.
2. Experts agree that a high value outcome of the application of the A3process is the thinking and problem solving skills that it builds in associates.
3. A3s were developed at Toyota when computers and large format electronic printing was not ubiquitous.
4. Experts recommend that A3s be done with A3 size paper (11x17"), pencil, and eraser.
   a. A3 size paper allows a problem, analysis, and plan to be captured on one side of a sheet of paper.
   b. Pencil and eraser allow the A3 to be readily updated as the A3 owner builds his or her understanding of the problem and countermeasures.
5. Learners new to the A3 process find the large paper hard to work with.
   a. Reproduction to share with colleagues is often inconvenient. Copiers with 11x17" capability are required or two-piece or taped reproductions are used.
   b. Desktop scanners don't usually accommodate 11x17" formats.
   c. To capture learning for future access, and to share with large audiences via slide presentation, A3s are often converted into electronic form.
6. People have a comfort with computers and electronic communication that could in effect replace the comfort previously attributed to pencil and eraser.
7. The current work environment often requires distributed teams to collaborate on problems, making paper and pencil enabled processes less practical.

3/10/13 Gmail - Email A3

Problem Statement: An opportunity exists to rethink the A3 process emphasis on "pencil and paper" technology that maintains the spirit of collaborative problem solving, updates the process to make it more compatible with current technology and work practices, and increases its general usage.

Goals / Targets:

1. A3 initiation increases in organizations where applied by 50% in 1 year.
2. Completed A3s increase in organizations where applied by 50% in 1 year.
3. A cradle-to-grave, all electronic, easy to use A3 process is available.
4. Over 90% of medium size businesses have the capability to use the modifiedA3 process without purchasing additional capital equipment or software.
5. Over 80% of existing A3 users find the modified process acceptable for at least occasional use in appropriate situations.

–

Analysis: [Team consensus required.]

System Design Matrix **Rev A**

A	A3 process skills				E	Software	
B	Electronic skills				F	Printer	
C	Formatting skills				G	Scanner	
D	Computer hardware				H	Copier	
	System Requirements						

	Customer Wants	Wgt	A	B	C	D	E	F	G	H
1	Ability to supply feedback	10	9	3	9	9	9	3	3	3
2	Remote collaboration	9	9	3	9	9	9	3	3	3
3	Uses common hardware	9	0	1	1	9	3	9	9	9
4	Easy to change	8	1	9	9	1	9	3	3	3
5	Electronic storage and retrieval	8	0	9	1	3	9	0	3	0
6	Space restricted (11x17")	7	3	3	9	1	3	9	9	9
7	Uses common software	7	0	3	3	1	9	1	3	0
8	Allows use of common problem solving tools	5	1	3	9	1	9	1	9	9
9	Retains common A3formatting	5	3	3	9	1	9	3	9	9
	WGT'd SCORE		220	282	434	306	516	252	360	315

Interpretation: Higher relative scores for columns indicate higher

3/10/13 Gmail - Email A3

positive or negative interaction between system elements and customer wants.

Conclusion: Software is the element of a potential system that provides the greatest potential for "rethinking" an approach to A3 problem solving. A3 process skill should not be a significant factor in designing an effective approach.

Future State: A user-friendly A3 process that allows businesses to more readily adopt A3 problem solving and access the full range of its benefits.

Proposed Countermeasures:

Consider the following software platforms or combination of software technologies as the starting point for countermeasure development:

1. Gmail and Gmail aps -- *INITIAL SELECTION*
2. Microsoft Office
3. Apple aps
4. Facebook
5. SharePoint
6. Other?

Plan:

1. PLAN [Eric O - 10Dec13 complete]
   a. Identify team.
   b. Get agreement on problem and approach.
2. DO [Team - 1April complete]
   a. Iterate initial (this?) A3 with selected approach.
   b. Generate multiple A3s with selected approach as required.
3. CHECK [Eric O - 1May14 complete]: Measure results against targets.
4. ACT [Eric O - 1Jun14 complete]: Standardize approach and share results.

Cheers, Eric O.

Eric Olsen, PhD
Cal Poly - Orfalea College of Business - Industrial Technology
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office: 805 756-1754 cell: 805 602-0228 e-mail: eolsen@calpoly.edu
webpage: cob.calpoly.edu/faculty/eric-olsen/

Central Coast Lean - www.cob.calpoly.edu/centralcoastlean/

VI. Plan

Owner/Leader: Eric Olsen **Team**: ?????

Background: Developing problem-solving skill in the workforce.

Current Conditions:

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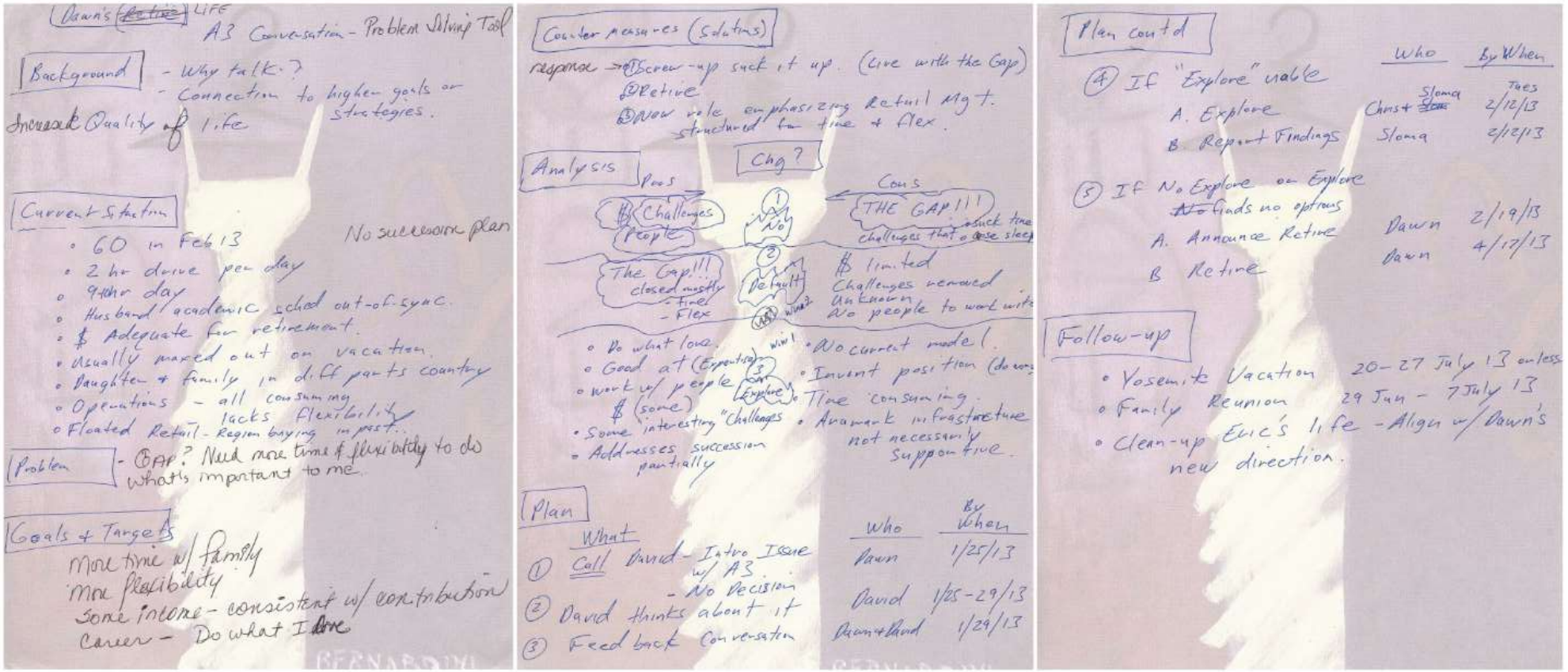
Retirement A3



Title: Dawn's Life

Owner/Date: Dawn Olsen 1/25/13

1. Background

V. Analysis

a. ~~Status Quo~~

Title: **Dawn's Life**

Owner/Date: **Dawn Olsen 1/25/13**

1. Background

1. **Increased Quality of Life**
2. **Realization life is short**

2. Current Conditions

- 60 in Feb 13
- 2 hour drive per day
- 9 – 10 hour day at work
- Husband academic schedule out of sync with mine
- Adequate $ for retirement
- Daughters and family in different parts of the country
- Time-off hard to take
- GM operational responsibility- all consuming; lacks flexibility

PROBLEM GAP: Need more time and flexibility to do what's important to me.

3. Goals/Targets

- More time with family
- More flexibility
- Income consistent with contribution
- Career: Do What I Love

4. Proposed Countermeasures

I. Live with the Gap- Status Quo

II. Retire

III. New Role emphasizing Regional Buying structured for time and flexibility. ie. Partially work from home, no operational role, "Do What I Love"

V. Analysis

a. ~~Status Quo~~

- Pros: $; Challenges; Continue to work with existing people
- Cons: The Gap; Challenges that suck time , lose sleep

• Retire

- Pros: Gap mostly closed; lots of time and flexibility
- Cons: $ limited; challenges removed; The Unknown; no people to work with.

• Buying Role

- Pros: Do What I Love and good at; Work with people; $; Some "interesting" challenges; addresses succession partially
- Cons: No current model; need to invent position; time consuming; ARAMARK infrastructure not necessarily supportive.

5. Plan

- Call David by 1/25/13. Discuss. No decision
- Feedback conversation week of 1/28/13
- If Buying Role viable determine structure and particulars. Chris & David? Report Findings. 2/12/13
- If Buying Role not viable Dawn announce retirement 2/19/13. Retire 4/17/13.

6. Follow-up

Yosemite vacation 20-27 July 13 (or less)
Family reunion 29 Jun- 7 July 13
Cleanup Eric's life - Align with Dawn's new direction.

PowerPoint A3

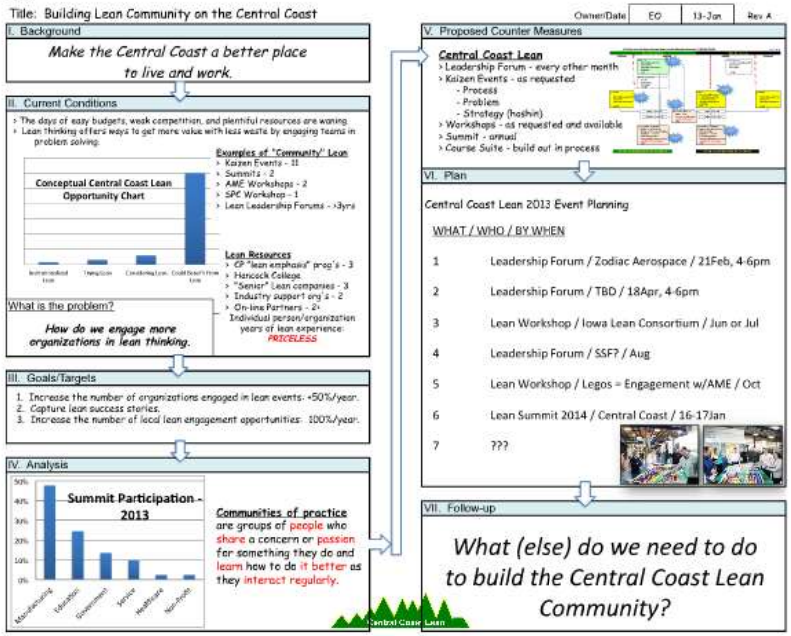
Lean Community Building

Eric Olsen

Central Coast Lean Summit 2013

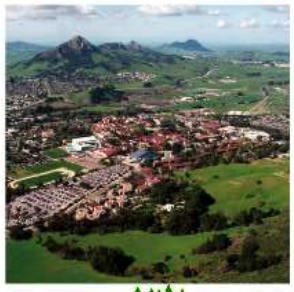
4Jan13

A3:



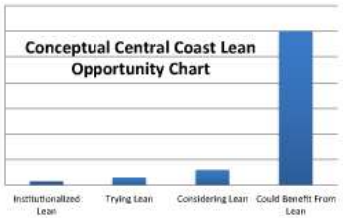
I. Background

Make the Central Coast a better place to live and work.



II. Current Conditions

› The days of easy budgets, weak competition, and plentiful resources are waning.
› Lean thinking offers ways to get more value with less waste by engaging teams in problem solving.

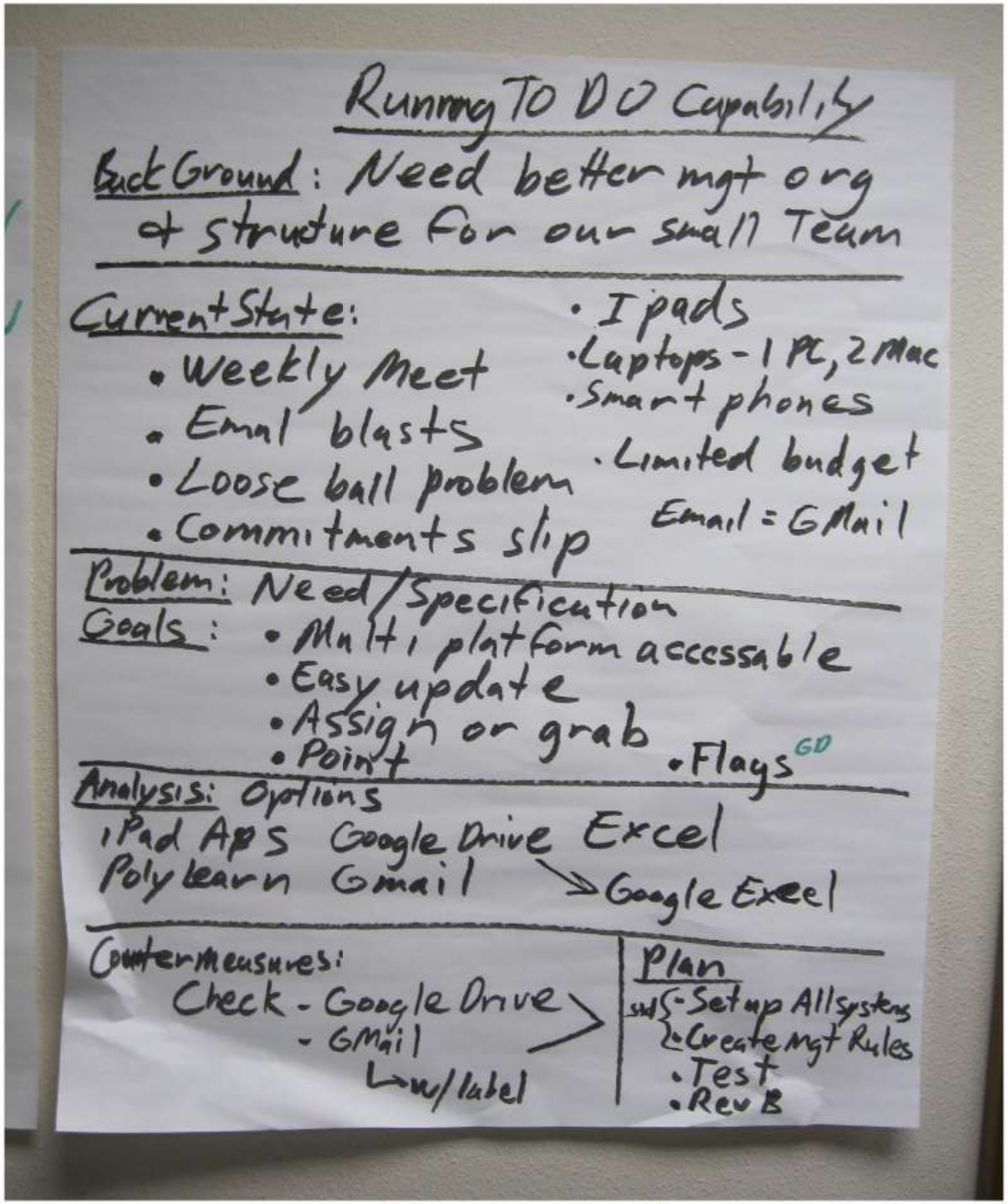


Examples of "Community" Lean
- Kaizen Events - 11
- Summits - 2
- AME Workshops - 2
- SPC Workshop - 1
- Lean Leadership Forums - >3yrs

Lean Resources
- CP "lean emphasis" prog's - 3
- Hancock College
- "Senior" Lean companies - 3
- Industry support org's - 2
- On-line Partners - 2+

Individual person/organization years of lean experience:
PRICELESS

Single Flip Chart A3



Test Report A3

Title: PW X Beam Modal

Part Description:	Engine Program	Part Number	Part Identifier	Material
Beam	PW X	12345	sn 2	stainless steel

AML Job #	Customer	Engineer	Technician	Date	Rev
13-7000	Eric Olsen	Kaitlin Olsen	Joe Wrench	3/3/2013	D

I. Background

This test is part of the **PW X** program which has the **overall goa**l to qualify the test benches. Specific goals related to this test include: vibration verification and screening.

II. Current Conditions

Reason for Performing this Test:

Correlate measured frequency response to prediction from analytical model. Validate analytical model. Frequency range up to 1000Hz.

Part Description

Beam. Supplier: Imaginariam. Development hardware

Previous Test Results:

See AML 12-7123 for previous results.

III. Goals/Targets

Expected Results

Frequency and mode shapes of the first three fundamental modes: 1st, 2nd, & 3rd bending

Targets:

Frequency with 5% of analytical predictions
Mode shapes visually similar

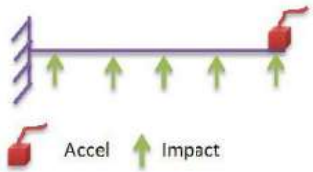
IV. Plan

Test Schedule

ITEM	WHAT	WHO	EXPECTED	COMPLETE
1	Test Plan	Engineer	2/5/2013	2/8/2013
2	Conduct Test	Technician	10-Feb	20-Feb
3	Data Processing	Engineer	22-Feb	22-Feb
4	Review Results	Customer	23-Feb	23-Feb

Test Equipment and Setup

Modal: roving hammer with 1 accelerometer
Boundary Condition: Clamped to table at one end, free at the other - Simulate fixed-free
Excitation: small modal hammer, 5 impact locations evenly spaced
Measure response: uniax accel at tip of free end

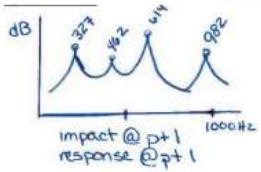


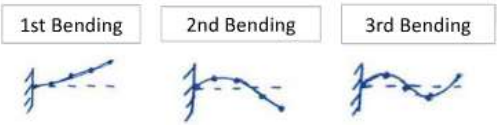
Test Photographs

Test Geometry

V. Data Collection & Analysis

Data Collected:



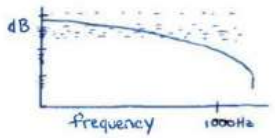


Measure	Target	% Difference	Mode Shape	Note
327	300	9.0%	1st Bending	1
462	450	2.7%	2nd Bending	1
614	600	2.3%	3rd Bending	1

Notes: 1. Mode shape compare visually to predictions. Mode shapes are consistent with predicted mode shapes.

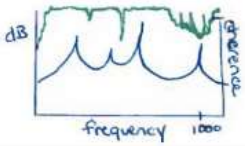
Data Quality Indicators

Input Spectrum



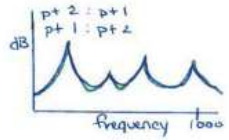
The frequency spectrum of the hammer input indicates ample excitation up to 900Hz.

Coherence



Coherence is good (near or equal to 1) for the first three peaks. For the 4th peak the coherence drops at the peak indicating a problem with the data.

Reciprocity



Model assumes a linear system. In a linear system the FRFs of two reciprocity measurements should overlay. The PW X Beam is a linear system.

VI. Conclusions

Conclusion/Recommendations:

Measured the frequency response of the PW X Beam up to 1000Hz.
1st bending was higher than 5% analytical prediction.
Test conducted according to AML guidelines. Data quality indicators show the data collected was good for the first three modes and the system is linear.

VII. Follow-up

Reflections:

Clamping beam to table may not have the same boundary condition as the analytical model. If the analytical model boundary condition are based on the final bench test configuration there may be differences in the results. Frequency response is sensitive to differences in boundary conditions.

Improvements for Future (AML):

Different fixturing to ground fixed end

Improvements for Future (Customer):

Adjust analytical model to align with actual test boundary condition instead of bench boundary conditions.

Review and Approvals:

Subject Matter Expert	Supervisor	

/13

nue to work with existing

s that suck time , lose sleep

losed; lots of time and

allenges removed; The
e to work with.

ove and good at; Work with
nteresting" challenges;
ion partially
nodel; need to invent position;
RAMARK infrastructure not
tive.

cuss. No decision
ek of 1/28/13
rmine structure and
Report Findings. 2/12/13
awn announce retirement

uly 13 (or less)
uly 13
with Dawn's new direction.

Syllabus A3

Eric Olsen

Cal Poly - Orfalea College of Business

GSB 534 - Spring 2012

Lean Operations Management – Graduate Course

Mar12 Rev S

Dr. Eric Olsen — Assistant Professor of Industrial Technology
Bldg 03 Rm 435 — Office Hours: W/Th 1:30-2:30pm or appointment
Office: 805 756-1754 — Course Web Address: see PolyLearn
Email: colsen@calpoly.edu — Website: http://www.cob.calpoly.edu/faculty/eric-olsen/

PLAN

1. Grasp the situation

- Operations, along with marketing and finance, is a fundamental function to any business.
- In a general sense, operations are simply processes that transform inputs to outputs.
- In most companies, operations has the majority of employees.
- In the US, the service business sector is growing (+85%) and manufacturing is shrinking.
- Outsourcing of operations to low cost regions is a fact of business.
- Lean thinking, as a set of principles and tools has been both popular and successful in improving the performance of many different types of operations.
- MBA students need a good set of basic principles and tools with which to address operations management decisions in a variety of industries.

2. Select the best alternative

- Teach lean thinking to MBAs in a variety of operations contexts.
- Focus on a few key tools, like value stream mapping and A3 problems solving, to build and retain skill in lean thinking.

3. Build the plan

- See course outline.

DO

4. Implement, monitor, adjust

Responsibilities:

- Instructor: Deliver lean operations content, facilitate class exercises and discussions, access student learning, and monitor and adjust the course as required.
- Students: Complete all assigned readings and exercises on time. Complete 5-minute presentation on lean topic. Add value to class activities. Contribute to team projects.
- Guest presenters: Add insight and richness to select topics.

CHECK & ACT

5. Measure and analyze

- Individual quizzes: 20% each - **60% total**
- Individual class participation: **10%** including in class discussion, attendance, pop quizzes, discussion board postings, and occasional individual or team assignments.
- Team project and presentation: **30% total (10% present, 20% written mat'l)**

6. Learn and continue the cycle

- Individual and class reflections will be collected during the last session.
- Well-considered ideas for improvements to learning content and method will be accepted throughout the class.

Owner	Date	Rev
Eric Olsen	**3/21/13**	**B**

V. Proposed Countermeasures

"The 10,000 Hour Rule."

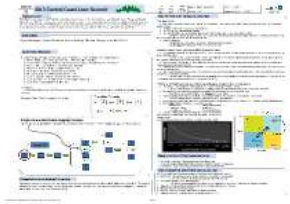
(Outliers, Gladwell, 2008)

1. **Look for excuses** to use an A3 approach
2. Consider the ***20% A3***
3. Be an **A3 geek**

EXAMPLES

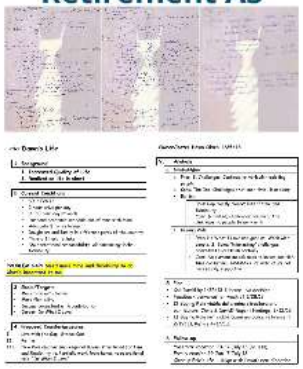
Interview A3

Informative A3



Project Kickoff A3

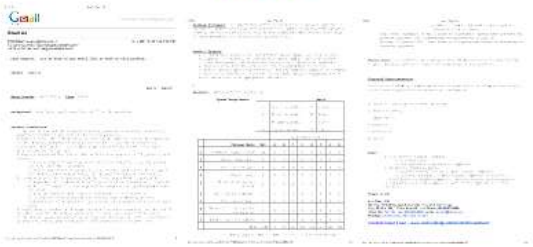
Retirement A3



PowerPoint A3

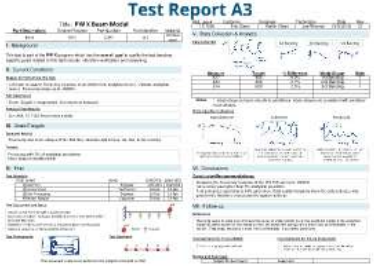
Single Flip Chart A3

Email A3



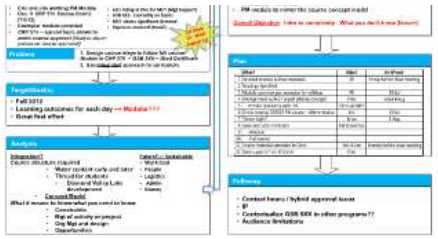
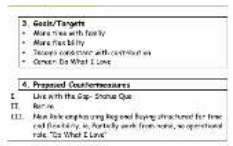
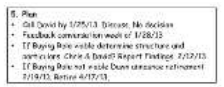
Syllabus A3

Test Report A3



VI. Plan

1. Start small. Think "**small reversible experiments**."
2. Get a format you know well and feel comfortable with.
3. Just DO IT - ***Be the change***.
4. Hold yourself accountable


VI. Plan

1. Start small. Think "**small reversible experiments**."
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4. Hold yourself accountable.
5. Get the first one done soon - *The crappy little first draft*.
6. **LEARN** - Pick yourself up and do it again.
7. Be easy on yourself - *Learning is a PROCESS*.
8. Ask for A3s from your co-workers - ***Have conversations***.
9. Share - ***go public***.

VII. Follow-up

<u>Key Learnings based on my experienced on my experience</u>:

- A3 thinking is an **analytical and creative process**

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- There is **no wrong or right way** to use A3 thinking - only experiences that we learn from.
- **You don't have to be an expert** to get the **80% value**.

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Title: **Everyday A3 Conversations - Practicing For Mastery**

Owner	Date	Rev
Eric Olsen	**3/21/13**	**B**

I. Background

Develop people who practice, lead, and teach critical thinking!

- ✓ "Toyota sets up all its operations as experiments and teaches the **scientific method** to its workers."
  (*DNA of the Toyota Production System*, Spear & Bowen, 1999)
- ✓ "Principle 9: Grow leaders who thoroughly **understand the work, live the philosophy, and teach it** to others."
  (*The Toyota Way*, Liker, 2004)
- ✓ While the basic **A3 thinking follows a common logic**, the precise **format and wording are flexible**, and most organizations **tweak the design to fit their unique requirements**."
  (*Managing to Learn*, Shook, 2008)

II. Current Conditions

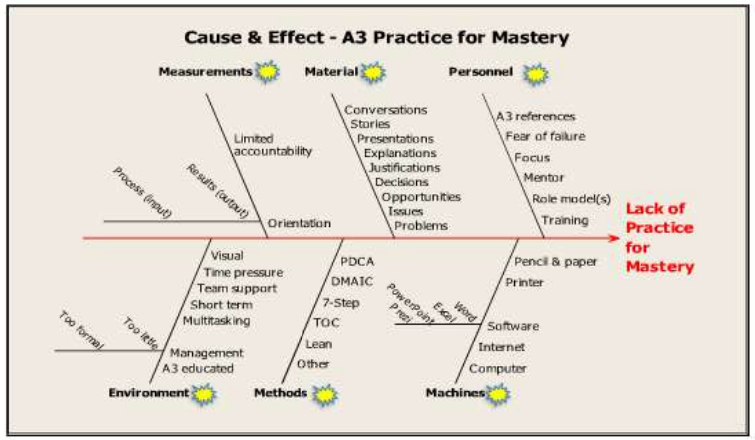
1. Companies **swim in a sea of problems** - *fish see water last.*
2. A3 thinking is being recognized an major active ingredient in **the "secret sauce" of lean six sigma**.
3. **Engaging employees** in problem solving "**moves the needle**".
4. A3 problem solving and DMAIC share a **common ancestry: PDCA**.
5. **Many people have been trained** and appreciate A3s, but **rarely do they gain traction beyond the classroom** or first experience.
6. **Even when supported by management**, ubiquitous A3 has a hard time gaining traction.
7. Everyone is tired of having the **same old conversations** and arguments **without clear conclusions or action plans**.
8. A3s are considered **formal, complex tools at are brought out only for special occasions**.

Problem Statement: ***We do not get enough practice in A3 thinking for mastery.***

III. Goals/Targets

- ➢ Increase A3 practice from infrequent to frequent.
- ➢ Make A3 thinking pervasive in the organizational culture *[KATA]*.
- ➢ Reduce perceived barriers to A3 use (e.g. "correctness", formality, and complexity).

IV. Analysis

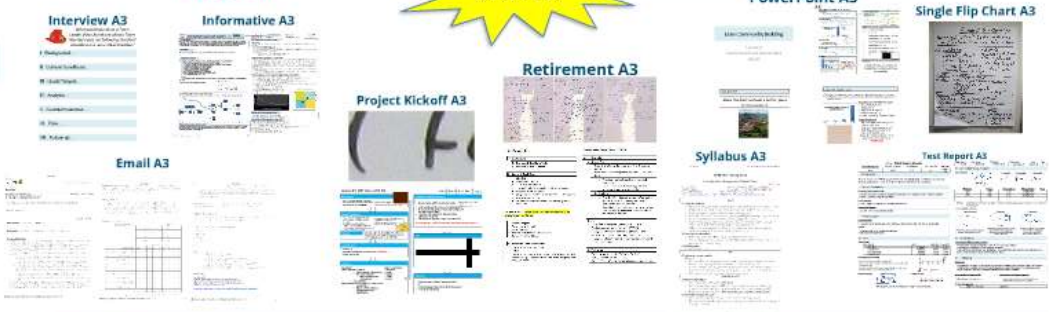


V. Proposed Countermeasures

"The 10,000 Hour Rule."
(Outliers, Gladwell, 2008)

1. **Look for excuses** to use an A3 approach
2. Consider the ***20% A3***
3. Be an **A3 geek**

EXAMPLES



VI. Plan

1. Start small. Think "**small reversible experiments**."
2. Get a format you know well and feel comfortable with.
3. Just DO IT - ***Be the change***.
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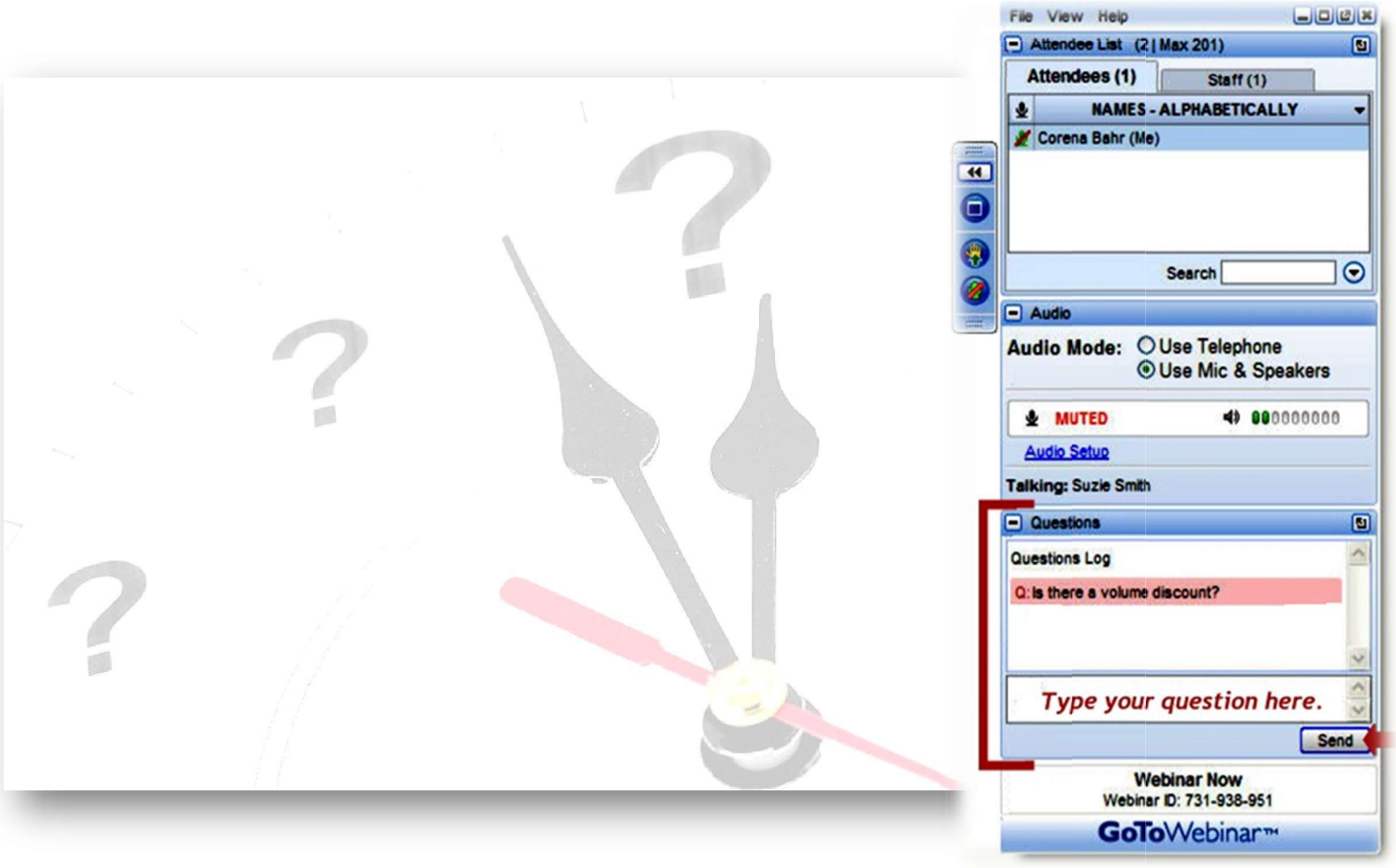
Thank You for Joining Us



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Resource Links and Contacts

Questions? Comments? We'd love to hear from you.

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