Making the Invisible Visible: How Culture, Distance and Communication Impact Our Global Supply Chains

- Sam Yankelevitch

Author: Lean Potion#9- Communication: The Next Lean Frontier
Airbus 380 Delay = $6.1 Billion
Airbus 380 Delay = $6.1 Billion
Airbus 380 Delay = $6.1 Billion
Airbus 380 Delay = $$6.1\text{Billion}$$
Scheise!

Mon Dieu!
Wiring - Germany

Catia 4

Fuselage - France

Catia 5
Airbus 380 Delay = $6.1 Billion
The problem: Communication

Catia 4 ≠ Catia 5

Not the same language....

Misunderstanding → contributed to $BIG loss
the problem: Communication

Costs:
- Production days lost
- Productivity cost
- Late delivery
Communication : the next Lean frontier.

1. Communication is a Process,

2. Complexity has crept in,

3. Continuous Improvement.
My Background

Industrial Engineer  1981

Inspired by The Goal- Eliahu Goldratt

First Toyota Production System books 1985

Started implementing 1987
Leaks in our processes.

50% bad parts

45 Day lead time

Rework, Scrap, Sorting, Moving, Storing...
My Background

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First Toyota Production System books 1985

Started implementing 1987

Sourced equipment, tools and materials in Germany, Spain and Italy. China, Malaysia and the Philippines.

Over 10 years in German Automotive Tier 2
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Sourced equipment, tools and materials in Germany, Spain and Italy. China, Malaysia and the Philippines.

Over 10 years in German Automotive Tier 2

Global perspective

Importance of communication

Interdependence
7 WASTES

- Over-Production
- Inventory
- Motion
- Waiting
- Transportation
- Over-processing
- Right First Time Rework & Defects
Toyota in the early 1950’s

50 mile radius
Short Lead Times

Japanese: language and culture

7 Wastes - Local
Toyota in the early 1950’s

Cause and effect happen
Close in time and distance

Solutions tend to be simpler
Complexity....60 years later
Complexity....60 years later

Welcome to the New Factory Floor!
Complexity...Global

Long Distances

Many Cultures

Long Lead Times
Complexity...Global

- Long Distances
  - Cause and effect happen close in time and distance

- Many Cultures
  - Solutions tend to be simpler

- Long Lead Times
Complexity....Global

Cause and effect happen with long intervals and long distances

Solutions tend to be difficult

Big Muda = Big Waste
Complexity....Global

Complex problems Require solutions that involve many...

This means collaboration

Communication

Big Muda = Big Waste
Communication is a Process

Sender

Meaning A

Meaning B

Receiver
Communication is a Process

Sender

Meaning A

Meaning B

Receiver

B ≠ A

Misunderstanding
Non-Conformance
Communication is a Process

7 WASTES

- Over-Production
- Inventory
- Over-processing
- Transportation
- Waiting
- Motion
- Right First Time Rework & Defects

Clarity
Repeat
Wait
Translate
Interpret
Clarify
Wait
Repeat
Communication: 3 Non Verbal examples

IT Systems
Operation Instructions
Drawings & Specs
IT talks to IT

Interfaces:

Human
Corrections

Handling

Potential errors
Operations Instructions

Can over tighten? and strip thread or lock the nut?

What tool?

疑問は、日本の元に相談してください
Drawings & Specs

What wood to use?
How cured?

How do we measure the curvatures of the bridge?

Is there a Violin Master in the house?
The meaning of your message is the result you get.
If Communication is a process

Can we apply Continuous Improvement?
Continuous Improvement

Let 無駄 come to the surface,

.......make the invisible-visible.

Identify + Analyze
Correct + Improve
Reduce costs
Leaks in our Communication process.
Communication is a Process
Value Stream Mapping
Value Stream Mapping
Value Stream Mapping
Value Stream Mapping
Value Stream Mapping

Customer

Drawings & Specs

Supplier

Process 1: Distorted

Process 2: Deleted

Process 3: Generalization

Process 4

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Value Stream Mapping

Supplier

- Process 1: Distorted
  - Clarify, Translate, Interpret

- Process 2: Deleted
  - Repeat

- Process 3: Generalization
  - Wait, Clarify

- Process 4: Repeat with Errors

Customer

Drawings & Specs
Value Stream Mapping

Customer

Drawings & Specs

Supplier

Process 1: Distorted
  - Clarify,
  - Repeat

Process 2: Deleted
  - Repeat

Process 3: Generalization
  - Repeat with Errors

Process 4

Rework

Waiting

Defects

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Value Stream Mapping

- Complexity
- Lots of Communication to get the job done
- Identify Risk areas
Five S

- Sort
- Set in Order
- Sustain
- Standardize
- Shine
Sort out - Non Value Added

Assumptions: acronyms, English, buzzwords

Distortions: metrics 98% On Time delivery

Deletion: critical details not included
Set in Order

A place for everything, everything in its place.
Set in Order

Chain of command

Communication flow

Collaboration

Decisions

Contingencies
Set in Order

It’s *NOT* the Sum of individual efforts that creates value......
Set in Order

It is the Sum of **Effective Interactions** that creates value
It is the Sum of Effective Interactions that creates value
Roles and Responsibilities not clearly defined led to Communication Issues and Booking Issues
Set in Order

- Responsible for doing the task
- Accountable with Authority
- Consulted for knowledge
- Informed and updated
Set in Order

<table>
<thead>
<tr>
<th></th>
<th>Program Manager</th>
<th>VP Operations</th>
<th>Country Manager</th>
<th>VP Finance</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Task 1</strong></td>
<td>R</td>
<td>C</td>
<td>I</td>
<td>A</td>
</tr>
<tr>
<td><strong>Task 2</strong></td>
<td>A</td>
<td>R</td>
<td>C</td>
<td>I</td>
</tr>
<tr>
<td><strong>Task 3</strong></td>
<td>R</td>
<td>C</td>
<td>I</td>
<td>A</td>
</tr>
<tr>
<td><strong>Task 4</strong></td>
<td>I</td>
<td>I</td>
<td>A</td>
<td>R</td>
</tr>
<tr>
<td><strong>Task 5</strong></td>
<td>R</td>
<td>A</td>
<td>C</td>
<td>C</td>
</tr>
</tbody>
</table>
## Set in Order

<table>
<thead>
<tr>
<th>Task</th>
<th>Program Manager</th>
<th>VP Operations</th>
<th>Country Manager</th>
<th>VP Finance</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>R</td>
<td>C</td>
<td>I</td>
<td>A</td>
</tr>
<tr>
<td>2</td>
<td>A</td>
<td>R</td>
<td>C</td>
<td>I</td>
</tr>
<tr>
<td>3</td>
<td>R</td>
<td>C</td>
<td>I</td>
<td>A</td>
</tr>
<tr>
<td>4</td>
<td>I</td>
<td>I</td>
<td>A</td>
<td>R</td>
</tr>
<tr>
<td>5</td>
<td>R</td>
<td>A</td>
<td>C</td>
<td>C</td>
</tr>
</tbody>
</table>
Shine

*Leave things as they were for the next interaction*
Shine

*Leave things as they were for the next interaction*

Clarify misunderstandings for continued collaboration

Apologize where proper.
Standardize


What if?
Standardize


What if?
Standardize

"Without data you're just another person with an opinion."

W. Edwards Deming
P D C A - Expectations
PDCA - Expectations

Plan

Do

Check

Act

Plan your message according to the receiver. Avoid Jargon, Acronyms, Buzzwords. Use standard English.
PDCA - Expectations

Plan

Do

Check

Act

Deliver your message, Clearly. Avoid Distortions, Deletions.
PDCA - Expectations

- Plan
- Do
- Check
- Act

Review to ensure it was received and meanings match.
PDCA - Expectations

Plan
Do
Check
Act

Adjust for the next cycle. Improve what is necessary to make sure meanings match.
Ni faras kiam aferoj ne iras laŭ plano?
CAUSES OF MISCOMMUNICATION- Drawings and Specs

- **Structure**
  - Undiscussable due to hierarchy
  - No Mentoring
  - Incompetent Employees

- **People**
  - Assumed clarity
  - TOC: I understood
  - Did not include critical details

- **Procedures**
  - No Standard work
  - No design validation
  - Poor Translation

- **Systems**
  - Information Overload
  - Weak IT database

- Produced Incorrect sized violin

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1. **Clarify the problem**

Tech drawings are being received incomplete from customers.

The lack of details is creating a "quality" loop for drawings.

It is impossible to provide a timeline to the customer.

It is impossible to provide an offer.

2. **Breakdown the problem**

<table>
<thead>
<tr>
<th>Drawings</th>
<th>C</th>
<th>NC</th>
</tr>
</thead>
<tbody>
<tr>
<td>8</td>
<td></td>
<td></td>
</tr>
<tr>
<td>8</td>
<td></td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>2</td>
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<td>2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>0</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>20</td>
<td>20</td>
<td>6</td>
</tr>
</tbody>
</table>

Variance of 23% Non-conforming
Time wasted validating
All drawings are suspect
2 Weeks response is not possible.

3. **Set the target**

1. Ensure that the customer realizes that the standard is not being observed
2. Clarify the expected standard and specifications
3. Define the standard between the 2 companies
4. Ensure a 2 week response time

4. **Analyze the root cause**

![Fishbone diagram](attachment:image.png)

5. **Develop Countermeasures**

<table>
<thead>
<tr>
<th>Countermeasure</th>
<th>Impact on target</th>
</tr>
</thead>
<tbody>
<tr>
<td>Training engineers</td>
<td>Improve competency</td>
</tr>
<tr>
<td>Ensure standard is followed</td>
<td>Avoid deviations</td>
</tr>
<tr>
<td>Establish Quick feedback loop</td>
<td>Early warning system</td>
</tr>
</tbody>
</table>

6. **Implement Countermeasure**

- Trained engineers: 9/8/206
- Training manual complete: 9/10/2006

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7. Monitor Results & Process

<table>
<thead>
<tr>
<th>Drawings</th>
<th>C</th>
<th>NC</th>
</tr>
</thead>
<tbody>
<tr>
<td>10</td>
<td>10</td>
<td>0</td>
</tr>
<tr>
<td>3</td>
<td>3</td>
<td>0</td>
</tr>
<tr>
<td>4</td>
<td>4</td>
<td>0</td>
</tr>
<tr>
<td>2</td>
<td>2</td>
<td>0</td>
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<tr>
<td>2</td>
<td>2</td>
<td>0</td>
</tr>
<tr>
<td>5</td>
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<tr>
<td>26</td>
<td>26</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td></td>
<td>0%</td>
</tr>
</tbody>
</table>

8. Standardise & Share Success

- Distribute to all areas using drawings
- Establish A3 for Specifications
- Establish team to define dictionary of language terms
**Failure Mode and Effects Analysis**

This template illustrates a Failure Mode and Effects Analysis (FMEA), also referred to as a Potential Failure Mode and Effects Analysis (PFMEA) or Failure Modes, Effects and Criticality Analysis (FMECA). A detailed discussion can be found at www.ASQ.org.

**Learn About FMEA**

**Learn About Quality**

---

## Failure Mode and Effects Analysis

<table>
<thead>
<tr>
<th>Item:</th>
<th>Process Function</th>
<th>Responsibility:</th>
<th>Action Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>Drill Hole</td>
<td></td>
<td>J. Doe</td>
<td></td>
</tr>
<tr>
<td>Model: Current</td>
<td></td>
<td>J. Doe</td>
<td></td>
</tr>
<tr>
<td>Core Team: J. Doe (Engineering), J. Smith (Production), B. Jones (Quality)</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Failure Mode and Effects Analysis

- **Process Function:** Hole to deep
- **Potential Effect(s) of Failure:** Break through bottom of plate
- **Potential Cause(s)/Mechanism(s) of Failure:** Improper machine setup
- **Current Process Controls:** Operator training and instructions
- **Recommended Action(s):** Install Tool Detectors
- **Responsibility and Target Completion Date:** J. Doe 3/1/2008 5 5 1 25

**Deviations from Process**

<table>
<thead>
<tr>
<th>Item: Incorrect Use of English</th>
</tr>
</thead>
<tbody>
<tr>
<td>7 Misunderstood Instruction</td>
</tr>
<tr>
<td>Quality and Delivery problem</td>
</tr>
</tbody>
</table>

**Deviations from Process**

<table>
<thead>
<tr>
<th>Item: Rely on people vs. System tools (Inventory control)</th>
</tr>
</thead>
<tbody>
<tr>
<td>7 Human error</td>
</tr>
<tr>
<td>Wrong rev components used FIFO violation</td>
</tr>
</tbody>
</table>

**Deviations from Process**

<table>
<thead>
<tr>
<th>Item: Implement non-approved non-standard Poke Yokes</th>
</tr>
</thead>
<tbody>
<tr>
<td>7 NC parts pass through</td>
</tr>
<tr>
<td>Impact to Customer assembly line</td>
</tr>
</tbody>
</table>

**Deviations from Process**

**Learn More**

To learn more about other quality tools, visit the ASQ Learn About Quality web site.
<table>
<thead>
<tr>
<th>Issue</th>
<th>Description</th>
<th>Score</th>
<th>Root</th>
<th>Frequency</th>
<th>Cause</th>
<th>Corrective Action</th>
<th>Responsible</th>
<th>Date</th>
<th>Priority</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Incorrect Use of English</td>
<td>Misunderstood Instruction</td>
<td>7</td>
<td>4</td>
<td>6</td>
<td>168</td>
<td>Cultural Training</td>
<td>J. Doe</td>
<td>3/1/2008</td>
<td>5</td>
<td>5</td>
</tr>
<tr>
<td>Rely on people vs. System tools (inventory</td>
<td>Human error</td>
<td>7</td>
<td>5</td>
<td>3</td>
<td>105</td>
<td>Root causes and corrective to reduce</td>
<td>S. Vinning</td>
<td>10/30/2014</td>
<td>4</td>
<td>3</td>
</tr>
<tr>
<td>Implement non approved non standard Poke</td>
<td>Traceability lost</td>
<td>7</td>
<td>4</td>
<td>6</td>
<td>140</td>
<td>Establish Agreements to always use tools</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yokes</td>
<td>Impact to Customer assembly line</td>
<td>7</td>
<td>2</td>
<td>5</td>
<td>70</td>
<td>Design and install a process poke yoke. Increase LPA</td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td></td>
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<td></td>
</tr>
</tbody>
</table>

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Drill Deep

Cause and effect for complex systemic issues

- Prevent
- Protect
- Predict

Drill Deep Worksheet

<table>
<thead>
<tr>
<th>Column 1</th>
<th>Column 2</th>
<th>Column 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Data 1</td>
<td>Data 2</td>
<td>Data 3</td>
</tr>
<tr>
<td>Data 4</td>
<td>Data 5</td>
<td>Data 6</td>
</tr>
</tbody>
</table>

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<table>
<thead>
<tr>
<th>Why did the Manufacturing System not prevent this</th>
<th>Drill Deep</th>
<th>Corrective Action</th>
<th>Verification</th>
<th>Owner</th>
<th>Due Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>Weak Problem Solving Technique</td>
<td>M1</td>
<td>Roles &amp; Responsibilities (ownership) not defined for Problem Solving</td>
<td>Establish and document the roles and responsibilities for Problem Solving.</td>
<td>Monthly Management review meetings will analyze problem solving documentation. (MRT Measurable.)</td>
<td></td>
</tr>
<tr>
<td>Prevent</td>
<td>M2</td>
<td>Past practices were assumed to be &quot;successful&quot; without well defined roles.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Manufacturing System Error Proofing &amp; Standardized Work</td>
<td>M3</td>
<td>Validation of past corrective actions allowed the success to be assumed.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Quality Assurance</td>
<td>M4</td>
<td>Validation process was not defined or documented in an action plan before implementation.</td>
<td>Define and document validation process for Problem Solving.</td>
<td>Problem Solving teams and internal audits after each occurrence.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>M5</td>
<td>Te</td>
<td>Implement Action Plan for validation prior to implementation.</td>
<td></td>
<td>Problem Solving teams and internal audits after each occurrence.</td>
</tr>
<tr>
<td></td>
<td>M-RC</td>
<td>Validation process was not defined or documented in an action plan before implementation.</td>
<td>Define and document validation process for Problem Solving.</td>
<td>Problem Solving teams and internal audits after each occurrence.</td>
<td>Monthly Management review</td>
</tr>
<tr>
<td>Q</td>
<td>Why did the Quality System not Protect GM from this Weak Problem Solving Technique</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>----</td>
<td>----------------------------------------------------------------------------------</td>
<td></td>
<td></td>
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<td></td>
</tr>
<tr>
<td>Q1</td>
<td>Roles &amp; Responsibilities (ownership) not defined for Problem Solving</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Q2</td>
<td>Quality role was informally defined as problem solving owner and messenger to the customer. Cross functional team approach was secondary.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Q3</td>
<td>Inconsistent cross functional team approach to Problem Solving required short term reactions to meet customer response dates.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Q4</td>
<td>Lack of Leadership commitment to cross functional team approach allowed failure.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Q5</td>
<td>Leadership did not recognize the benefit of cross functional team approach to problem solving.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Q6</td>
<td>Leadership does not have experience with benefits of using a cross functional team approach.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Q7</td>
<td>Leadership does not use cross functional teams as a standardized approach.</td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>Q-RC</td>
<td>Leadership does not use cross functional teams as a standardized approach.</td>
<td></td>
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</tr>
<tr>
<td></td>
<td>Roles &amp; Responsibilities (ownership) not defined for Problem Solving</td>
<td>Establish and document the roles and responsibilities for Problem Solving.</td>
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<td></td>
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<tr>
<td>---</td>
<td>---</td>
<td>---</td>
<td>---</td>
<td></td>
<td></td>
</tr>
<tr>
<td>P1</td>
<td>There is no documentation requiring consistent use of cross functional teams for Problem Solving.</td>
<td>Establish and document the roles and responsibilities for Problem Solving.</td>
<td>Monthly Management review meetings will analyze problem solving documentation. (MRT Measurable)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>P2</td>
<td>Formal Problem Solving process does not exist.</td>
<td>Write a formal Problem Solving procedure that includes Roles &amp; Responsibilities, Escalation Process, Timeline, Root Cause Analysis, Validation of Corrective Actions and prevention of recurrence.</td>
<td>Verification that Problem Solving Procedure is implemented occurs when Release and Approval process for Document Control is complete. Verification that the procedure has been institutionalized will be developed by MRT.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>P3</td>
<td></td>
<td></td>
<td></td>
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<td></td>
</tr>
<tr>
<td>P4</td>
<td></td>
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<tr>
<td>P5</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>P-RC</td>
<td>Formal Problem Solving process does not exist.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Communication: the next Lean frontier.

1. Communication is a Process,

2. Complexity has crept in,

3. Continuous Improvement.
Supply Chain professionals can.....

Be aware of SC risk related to communication, culture and distance.

Use CI process methodologies to see and solve hidden problems.

Take responsibility for the quality of your communication.
Thank You!!

Samyankel@yahoo.com