Design and Validation of a Lean Leader Behavior Self-Assessment Tool

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Armstrong Institute for Patient Safety and Quality
Johns Hopkins Medicine

Mission

We partner with patients, their loved ones and all interested parties to end preventable harm, to continuously improve patient outcomes and experience, and to eliminate waste in health care.
Disclosures

None

Background

• Johns Hopkins Bayview Medical Center sought to prepare healthcare leaders for their role managing in a lean management system environment
  ➢ Identified the principle-based behaviors we wanted from managers & staff
  ➢ Reviewed the literature for existing lean assessment tools
Review of Literature

- Majority of lean assessments were at the organization level
- Focused on implementation of Lean tools and methods

<table>
<thead>
<tr>
<th>Lean Assessment Tool</th>
<th>Industry</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lean Production Checklist</td>
<td>Manufacturing</td>
</tr>
<tr>
<td>Lean Construction Maturity Model</td>
<td>Construction</td>
</tr>
<tr>
<td>Lean Manufacturing: Performance Evaluation Audit</td>
<td>Manufacturing</td>
</tr>
<tr>
<td>Lean Index</td>
<td>Wood products industry</td>
</tr>
<tr>
<td>Lean Enterprise Self-Assessment Tool (LESAT)</td>
<td>Aerospace</td>
</tr>
<tr>
<td>Shingo Prize for Manufacturing Excellence</td>
<td>Manufacturing</td>
</tr>
<tr>
<td>Shingo Prize for Operational Excellence</td>
<td>Expanded to other industries in 2008</td>
</tr>
</tbody>
</table>

Study Aims

- **Aim 1**
  - *Develop and validate a tool to assess adoption of ideal Lean behaviors at an individual level*

- **Aim 2**
  - *Pilot the validated tool at Johns Hopkins Bayview Medical Center.*
Setting

Acute Care Medical Centers within the Johns Hopkins Health System in Maryland.

Methods: Tool Development
Drawing from Lean Management Thought Leaders

- Shigeo Shingo
  - Industrial engineer, expert in Toyota Production System
- John Toussaint
  - Physician expert in Lean Management in healthcare
- David Mann
  - Organizational psychologist, expert in Lean Management Systems
Methods: Tool Development
Shingo Guiding Principles for Enterprise Excellence

Shingo Institute, https://shingo.org

Methods: Tool Development
Toussaint & Ehrlich Lean Behavioral Dimensions

Toussaint JS, Ehrlich, SP. Five Changes Great Leaders Make to Develop an Improvement Culture. NEJM Catalyst, April 27, 2017.
Methods: Tool Development

Toussaint & Berry Lean Principles

6 principles:
• Lean is an Attitude of Continuous Improvement
• Lean is Value-Creating
• Lean is Unity of Purpose
• Lean is Respect for the People Who Do the Work
• Lean is Visual
• Lean is Flexible Regimentation


Methods: Tool Development

Mann’s Managerial Elements

• Leader Standard Work
• Visual Controls
• Daily Accountability
• Discipline

Methods: Tool Development
Cross Walk of Themes

- Continuous Improvement
  - Shingo
  - Toussaint & Ehrlich
  - Toussaint & Berry
  - Mann

- Create Value
  - Seek Perfection
  - Embrace Scientific Thinking
  - Focus on Process
  - Perseverance
  - Curiosity
  - Attitude of Continuous Improvement
  - Visual
  - Value-Creating

- Unity of Purpose
  - Flow & Pull Value
  - Assure Quality at the Source
  - Create Value for the Customer
  - Think Systematically
  - Create Constancy of Purpose
  - Unity of Purpose

- Respect for People
  - Respect Every Individual
  - Lead with Humility
  - Humility
  - Respect
  - Respect for the People Who Do the Work
  - Self-Discipline
  - Willingness
  - Flexible Regimentation
  - Leader/Work
  - Standard/Discipline

Methods: Tool Development
Lean Leader Principle-Based Behavioral Domains

- Promote **Continuous Improvement**
- **Create Value**
- Inspire **Unity of Purpose**
- Demonstrate **Respect for People**
- Embrace **Flexible Regimentation**
Methods: Tool Development
Constructing questions

- Brainstormed specific behaviors
  - JHBMC leaders and staff
  - Health system lean experts
- Combined lists
- Categorized behaviors by domain
- Paired down to the essence of each domain
- Resulted in 27 items

Methods: Tool Development

- Section 1: You, Your Peers, and Your Leadership
  - 27 items (81 responses)
- Section 2: Your Organization
  - 5 items
- Section 3: You (Demographics)
Methods: Tool Development
Content Validity

• Requested participation from 9 Lean experts
  – Upon agreement to participate, emailed excel version of the tool
• Received 8 responses
  – 2 Health Services Researchers
  – 1 Expert in Lean Manufacturing
  – 5 Experts in Lean Healthcare
• Responses collated for analysis

Methods: Tool Development
Content Validity

• Relevancy assessment of each item using the following four-point Likert scale:
  4 -Highly Relevant
  3 -Quite Relevant
  2 -Somewhat Relevant
  1 -Not Relevant
  [In Agreement]

• Calculated Item-level Content Validity Indices (I-CVI)
  – I-CVI = # in agreement / # responses
  – Included items with I-CVI of at least 0.75*

* Polit et al.: For 6-10 reviewers, I-CVI is valid if at least 0.78. I-CVI used by Marsteller et al. at 0.75 threshold.
Results & Data Analysis
Section 1: You, Your Peers, and Your Leadership

- In this section, think about the frequency with which YOU, YOUR PEERS, and YOUR LEADERSHIP exhibit the following behaviors.
- **5 Domains**
  - Continuous Improvement
  - Create Value
  - Unity of Purpose
  - Respect for People
  - Flexible Regimentation

### Results & Data Analysis: Content Validity

<table>
<thead>
<tr>
<th>Section</th>
<th># of items</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Initial Version</td>
</tr>
<tr>
<td><strong>Section 1: You, Your Peers, and Your Leadership</strong></td>
<td>27</td>
</tr>
<tr>
<td>Continuous Improvement</td>
<td>7</td>
</tr>
<tr>
<td>Create Value</td>
<td>5</td>
</tr>
<tr>
<td>Unity of Purpose</td>
<td>4</td>
</tr>
<tr>
<td>Respect for People</td>
<td>8</td>
</tr>
<tr>
<td>Flexible Regimentation</td>
<td>3</td>
</tr>
<tr>
<td><strong>Section 2: Your Organization</strong></td>
<td>5</td>
</tr>
<tr>
<td><strong>Section 3: You (Demographics)</strong></td>
<td>n/a</td>
</tr>
</tbody>
</table>
Results & Data Analysis: 
Scale Content Validity

- Calculated Scale-level Content Validity Indices (S-CVI)
  - $S\text{-CVI} = \text{average of I-CVIs} = 0.956^*$

Strengths & Limitations

**Strengths**
- Private collection of the content validity feedback from experts

**Limitations**
- Selection Bias: Experts chosen may have opinions that differ from others

*Polit et al.: S-CVI is valid if at least 0.90.*
Next Steps

• Face Validity
  – 2 focus groups of acute care leaders identified by Senior Director of Innovation & Continuous Improvement
    • “More” Lean exposed
    • “Less” Lean exposed
  – Feedback on usability and sensibility
    • Do the questions make sense to you?
    • What do you think about how we are trying to measure a culture of continuous improvement?
    • Is there a concept you think does not apply to you?

• Application of tool at Acute Care Medical Center

Future Research

• Based on results from the pilot, consider opportunities to validate the tool in other settings
References

- Shingo Application Guidelines. Behavior Assessment Scale. [https://shingo.org](https://shingo.org)