Science of Improvement
Applying it for Better Outcomes

Deming’s Profound Knowledge

Maureen Tshabalala: Director – IHI
Regional Projects: Southern Africa

19th February 2018
What is Quality?

“Quality is meeting and exceeding the customer’s needs and expectations and then continuing to improve.”

W. Edwards Deming
The Messiness (complexity) of Life!
Quality

- Delivering the right care…
- In the right manner…
- In the right place…
- At the right time…
- All the time.

To do this perfectly well, we need Knowledge
It all starts with knowledge!

**Subject Matter Knowledge:** Knowledge basic to the things we do in life. Professional knowledge.

**Science of Improvement:** The interplay of the theories of systems, variation, knowledge, and psychology.
Improvement occurs when we learn how to combine subject matter knowledge and the science of improvement in creative ways to develop effective ideas for change.
“Dr. Edwards Deming made an important contribution to the science of improvement by recognizing the elements of knowledge that underpin improvements over a wide range of applications.

He called this body of knowledge a **System of Profound Knowledge**.

**Profound** denotes the deep insight that this knowledge provided into how to make changes that will result in improvement in a variety of settings.

**System** denotes the emphasis on the interaction of the components rather than on the components themselves.”
"The system of profound knowledge provides a lens. It provides a new map of theory by which to understand and optimize our organizations."
(Deming, *Out of the Crisis*)

It provides an opportunity for dialogue and learning!
"The system of profound knowledge provides a lens. It provides a new map of theory by which to understand and optimize our organizations." (Deming, Out of the Crisis)

It provides an opportunity for dialogue and learning!
Every system is perfectly designed to achieve exactly the results it gets.
An example of people not understanding the concept of a system....

I'm sure glad the hole isn’t in our end...
"The system of profound knowledge provides a lens. It provides a new map of theory by which to understand and optimize our organizations."
(Deming, Out of the Crisis)

It provides an opportunity for dialogue and learning!
What are we trying to accomplish?

What change can we make that will result in an improvement?

How will we know that a change is an improvement?

Model for Improvement

<table>
<thead>
<tr>
<th>Act</th>
<th>Plan</th>
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<tbody>
<tr>
<td>Study</td>
<td>Do</td>
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Source: Associates in Process Improvement
"The system of profound knowledge provides a lens. It provides a new map of theory by which to understand and optimize our organizations." (Deming, *Out of the Crisis*)

It provides an opportunity for dialogue and learning!
Comment on the data from these two facilities

Facility A: Number of stroke patients admitted/m

Facility B: Number of stroke patients admitted/m
Variation

Ups and downs in the data are normal

Facility A:
Number of stroke patients admitted/m

0 1 2 3 4 5 6 7 8
J F M A M J J A S O N D

Facility A: Number of stroke patients admitted/m
Understanding Variation

- Variation exists in every process, irrespective of how automated.

- Appreciating variation ensures you attend to a “special cause” and don’t think that random movement of your data up and down (“common cause”) is a sign of improvement.
Understanding Variation

- The less the variation, the greater the efficiency (it's predictable)

- You need to introduce variation into a process to achieve improvement
Type of Variation

**Common Cause**
- Is inherent in the design of the process
- Is due to regular, natural or ordinary causes
- Affects all the outcomes of a process
- Results in a “stable” process that is predictable
- Also known as random or unassignable variation

**Special Cause**
- Is due to irregular or unnatural causes that are not inherent in the design of the process
- Affect some, but not necessarily all aspects of the process
- Results in an “unstable” process that is not predictable
- Also known as non-random
"The system of profound knowledge provides a lens. It provides a new map of theory by which to understand and optimize our organizations."
(Deming, Out of the Crisis)

It provides an opportunity for dialogue and learning!
"People don't resist change. They resist being changed!"

Senge 1990
Maslow’s Hierarchy of Needs (original five-stage model)

- **Self-actualisation**
  - personal growth and fulfilment
- **Esteem needs**
  - achievement, status, responsibility, reputation
- **Belongingness and Love needs**
  - family, affection, relationships, work group, etc
- **Safety needs**
  - protection, security, order, law, limits, stability, etc
- **Biological and Physiological needs**
  - basic life needs - air, food, drink, shelter, warmth, sex, sleep, etc
Diffusion of Innovation Curve

- Innovators: 2.5%
- Early Adopters: 13.5%
- Early Majority: 34%
- Late Majority: 34%
- Laggards: 16%

Rogers 1995
A round man cannot be expected to fit in a square hole right away. He must have time to modify his shape.

Mark Twain

Adapted from "The Resistance Pyramid" elaborated from Nieder and Zimmerman by Galpin (The Human Side of Change 1996)
What *insights* might be obtained by looking through the Lens of Profound Knowledge?

**Appreciation for a System**
- Interdependence, dynamism of the parts
- The world is not deterministic
- Direct, indirect and interactive variables
- The system must have an aim
- The whole is greater than sum of the parts

**Theory of Knowledge**
- What theories drive the system?
- Can we predict?
- Learning from theory and experience
- Operational definitions (what does a concept mean?)
- PDSAs for learning and improvement

**Human Behavior**
- Interaction between people
- Intrinsic versus extrinsic motivation
- Beliefs, values & assumptions
- What is the Will to change?

**Understanding Variation**
- Variation is to be expected!
- Common or special causes of variation
- Data for judgment or improvement?
- Ranking, tampering & performance management
- Potential sampling errors
Exercise: Profound Knowledge

- Now that you understand the components of PK, we would like you to apply the Lens of Profound Knowledge to your project.
- You can work alone or with others.
- Use the PK Worksheet to record your responses. Remember that there are no right or wrong responses.
- Engage in a dialogue on PK (not a debate, a discussion or a chit chat but a true dialogue about the theories and assumptions surrounding your project and the degree to which it is "messy").
- Spend about 10 minutes working on this exercise.
## Profound Knowledge Worksheet

### Project Topic:
- Appreciation for a System
- Psychology *(Human Behavior)*
- Theory of Knowledge
- Understanding Variation

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<th>Appreciation for a System</th>
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