

Evolution of PDSA and the Difference Between PDSA and PDCA

Austin ASQ Meeting
February 10, 2016



Presented By Clifford L. Norman

cnorman@apiweb.org

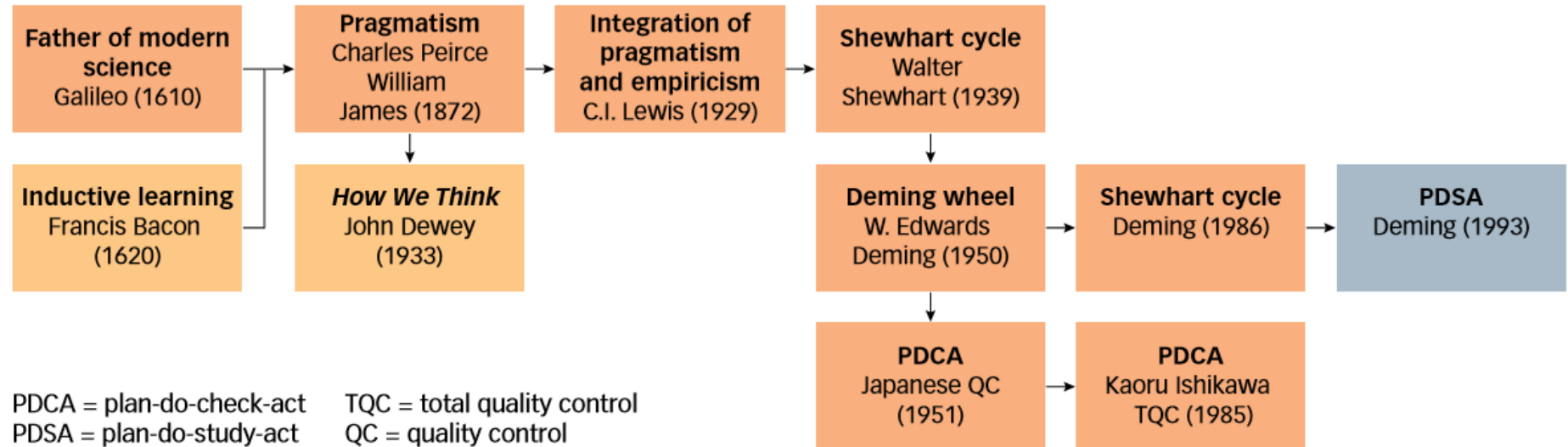
Associates in Process Improvement (API)

Three Basic Questions

- 1. How did Deming's PDSA evolve?**
- 2. Did Deming create the PDCA?**
- 3. Are the PDCA and PDSA related?**

Standing on the shoulders of giants..

Evolution of the scientific method and PDSA cycle / FIGURE 1



Wisdom of the Ages

Model for Improvement

What are we trying to accomplish?
How will we know that a change is an improvement?
What change can we make that will result in improvement?

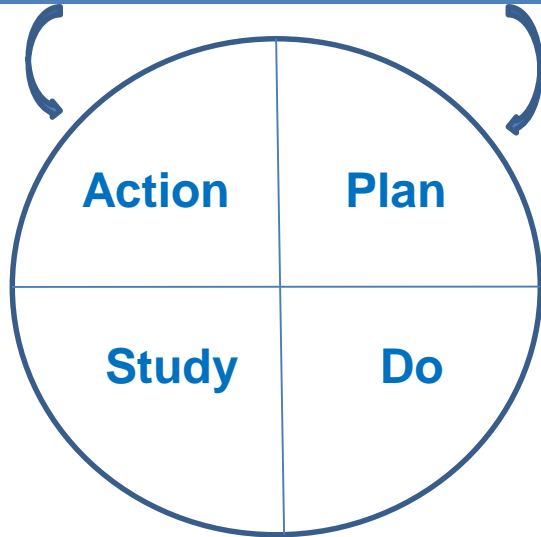
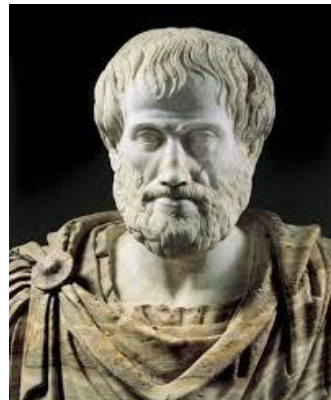
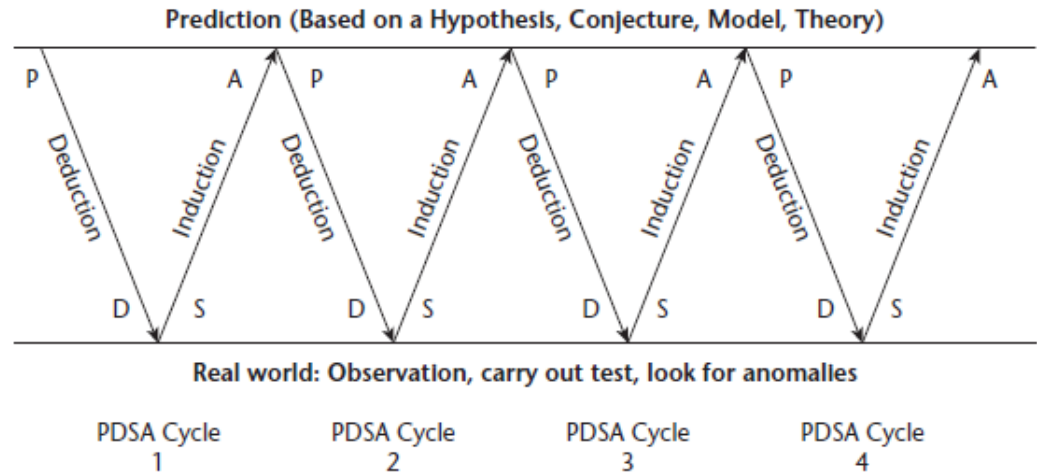


FIGURE 4.4. THE ITERATIVE NATURE OF LEARNING AND IMPROVEMENT.



Evolution of the Scientific Method

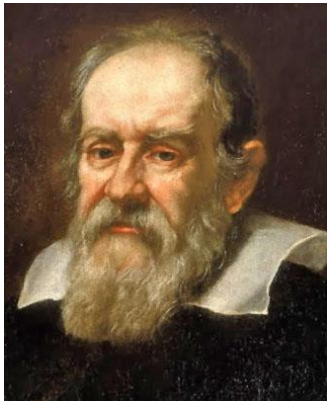
Galileo, 1610 and Bacon, 1620

Father of Modern
Science
Galileo 1610

Inductive
Learning
Francis Bacon
1620

Scientific Method

Conducting experiments
Deductive/inductive
reasoning



The First
Scientist
Ibn al-Haytham
995



Evolution of the Scientific Method

Pierce and James, 1872 and Dewey, 1933

Father of Modern Science
Galileo 1610

Inductive Learning
Francis Bacon
1620

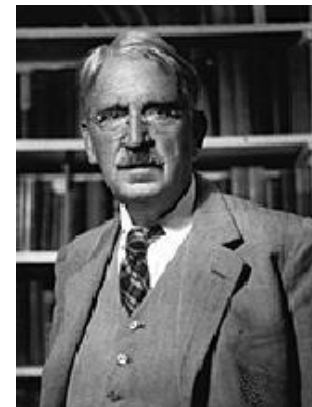
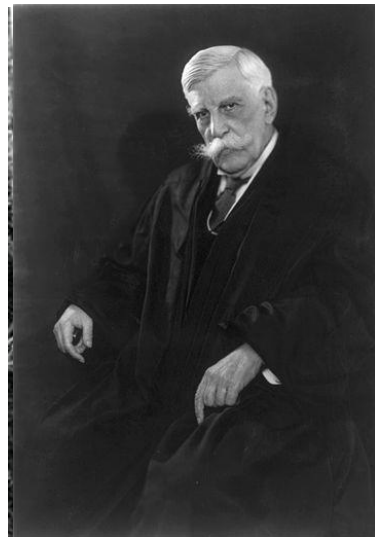
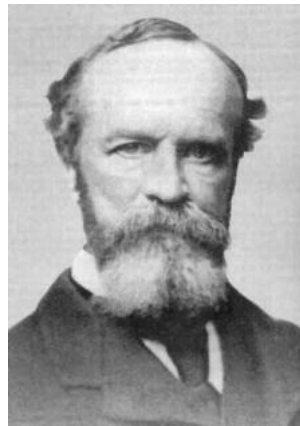
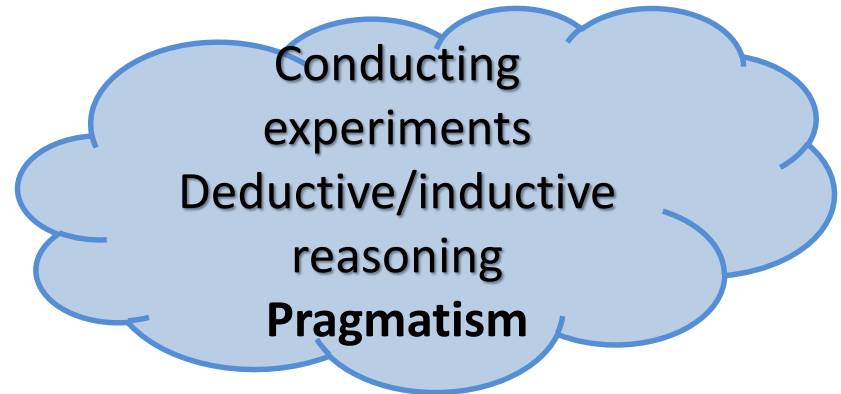


Pragmatism
Charles Pierce
William James
Harvard 1872



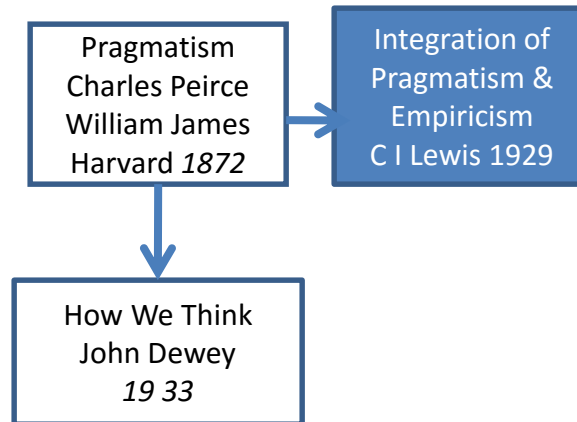
How We Think
John Dewey
1933

Scientific method

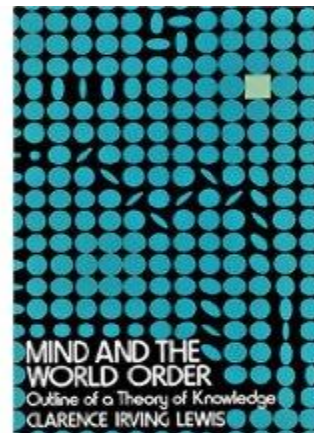


Evolution of Scientific Method

C. I. Lewis, 1929

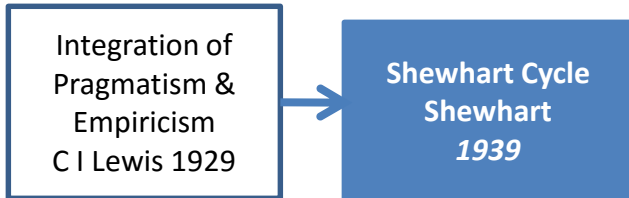


1. ***a priori* truth is definitive and offers criteria by means of which experience can be discriminated;**
2. **the application of concepts to any particular experience is hypothetical and the choice of conceptual system meets pragmatic needs; and**
3. **the susceptibility of experience to conceptual interpretation requires no particular metaphysical assumption about the conformity of experience to the mind or its categories.**



Scientific method to manufactured product

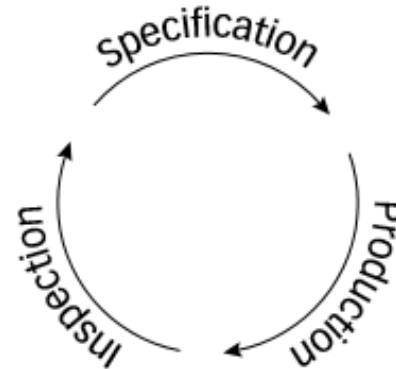
Shewhart, 1939



Shewhart cycle—1939 / FIGURE 2



Shewhart cyclical concept



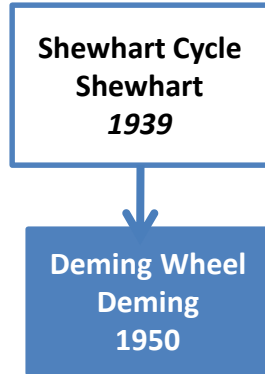
Every statement must be capable of being tested



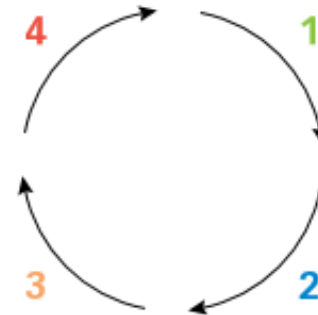
A continuing and self-corrective method for making the most efficient use of raw and fabricated materials

Expanding the Shewhart Cycle to design of product

Deming, 1950



Deming wheel—1950 / FIGURE 3

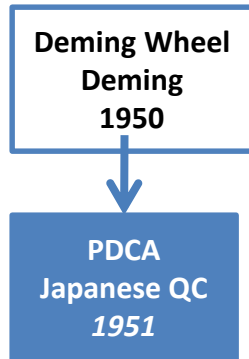


1. Design the product (with appropriate tests).
2. Make the product and test in the production line and in the laboratory.
3. Sell the product.
4. Test the product in service and through market research. Find out what users think about it and why nonusers have not bought it.

5. Re-design the product, in the light of consumer reactions to quality and price.
Continue around and around the cycle.

Evolution of the PDCA Cycle

Japanese executives* (1951) recast the Deming wheel



Japanese PDCA cycle—1951 / FIGURE 4

PDCA = plan-do-check-act



The Deming wheel vs. the Japanese PDCA cycle / TABLE 1

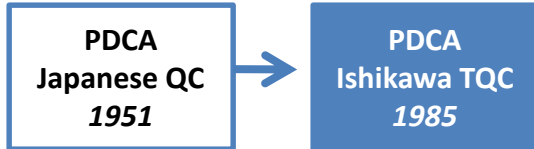
1. Design = plan	Product design corresponds to the planning phase of management.
2. Production = do	Production corresponds to doing, making or working on the product that was designed.
3. Sales = check	Sales figures confirm whether the customer is satisfied.
4. Research = act	If a complaint is filed, it must be incorporated into the planning phase and action taken in the next round of efforts

PDCA = plan-do-check-act



Goals and targets Are included in the plan of the PDCA

Dr. Mizuno, 1959



The PDCA Cycle, Ishikawa, 1985

1. Determine goals and targets.
2. Determine methods of reaching goals.
3. Engage in education and training.
4. Implement work.
5. Check the effects of implementation.
6. Take appropriate action.

Japanese PDCA cycle—1985 / FIGURE 5

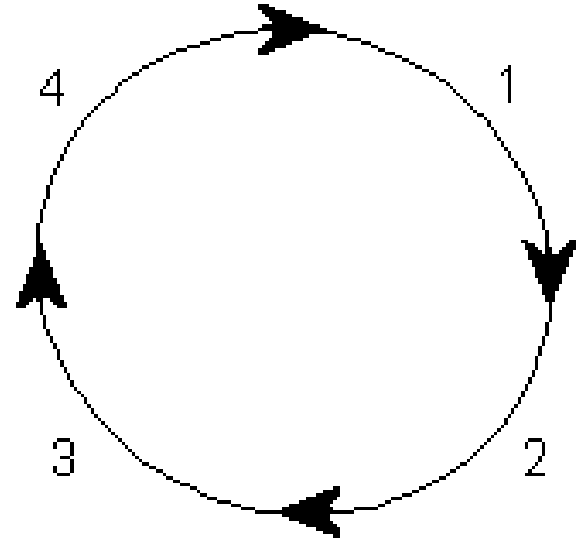
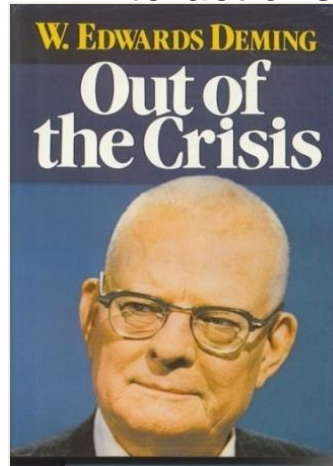
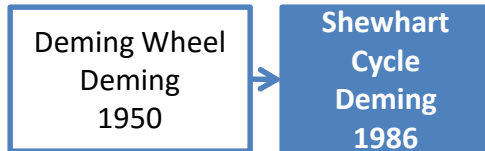


PDCA = plan-do-check-act

Evolution of the PDSA Cycle

Deming, 1986 reintroduces the Shewhart Cycle.

Any step may need guidance of statistical methodology for economy, speed, and protection from faulty conclusions from failure to test and measure the effects of interactions.



- 1. What could be the most important accomplishments of the team? What changes might be desirable? What data are available? Are new observations needed? If yes, plan a change or test. Decide how to use the observations.**
- 2. Carry out the change or test decided upon, preferably on a small scale.**
- 3. Observe the effects of the change or test.**
- 4. Study the results. What did we learn? What can we predict?**
- 5. Repeat Step 1, with knowledge accumulated.**

Evolution of the PDSA Cycle

"This paper is great, I think." --Deming, 23 Nov. 1986

W. EDWARDS DEMING, PH.D.
CONSULTANT IN STATISTICAL STUDIES

WASHINGTON 20016
4924 BUTTERWORTH PLACE
TEL. (202) 363-8552

23 Nov. 1986

Dear Ross,

This paper is great, I think.

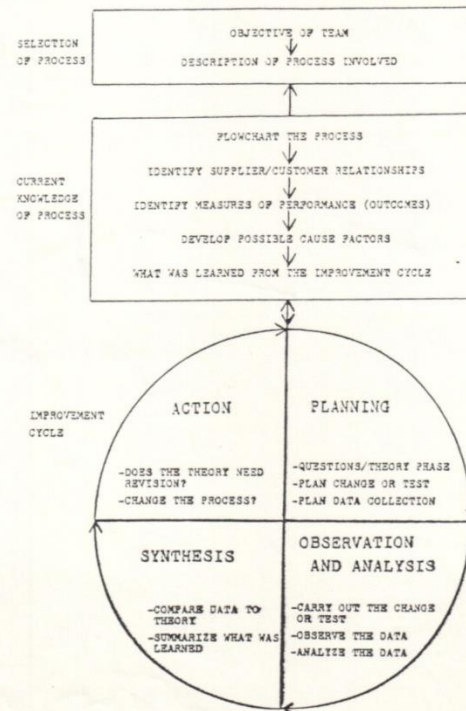
I hope that you are pushing on
your books. We all need it.
Best greetings.

W. Edwards Deming

The principal basis for action on the supplier's part is on data from the most timely process feedback loop. The objective is process improvement. The other two loops will serve to evaluate the progress.

The strategy for ^{of process} process improvement involves three major activities. These activities include the selection of the process, documenting the current knowledge of the process, and the use of an improvement cycle to increase the knowledge of the process. FIGURE 5 provides an overview of this strategy.

FIGURE 5: STRATEGY FOR PROCESS IMPROVEMENT



Evolution of the PDSA Cycle

At a Deming Four-day Seminar--Deming, 15 Jan. 1987

Jan 15, 1987

Hyatt

Ron:

I'd appreciate your
help on the Shewhart Cycle.

I will explain it at
9 o'clock. Then you
run through it in
your own way.

Is this good?

WED

Evolution of the PDSA Cycle

"Ron, Do you like this?" --Deming, 25 Feb. 1987

Action

Plan

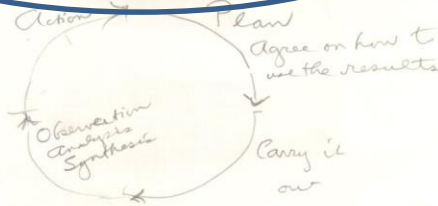
Agree on how to use the results

Carry it out

Observation
Analysis
Synthesis

A process of learning
Shewhart Improvement Cycle

Ron 25 Feb. 1987
Do you like this? - WED



A process of learning
Shewhart Improvement Cycle

Evolution of the PDSA Cycle

"I will enclose my idea of the Shewhart Cycle."

--Deming, 25 March 1988

W. EDWARDS DEMING, PH.D.
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TEL. (202) 363-8552

25 March 1988

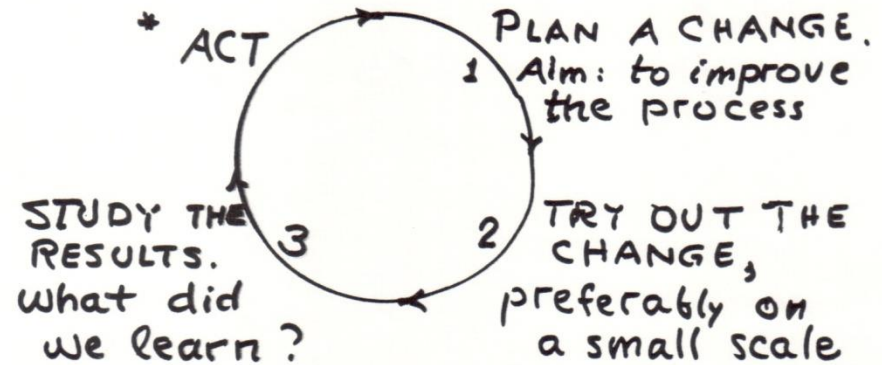
Dear Tom,

Your paper is great. I like it very much. I made a few marks here and there, nothing important. The only place that worries me is the Shewhart cycle. One must study the results of the change. This means that there must be a change. Step 2 is to try out the change suggested, preferably on a small scale. I will enclose my idea of the Shewhart cycle. I look forward to seeing you Monday and hearing your paper. I remain

Sincerely yours,

W. Edwards Deming

THE SHEWHART CYCLE



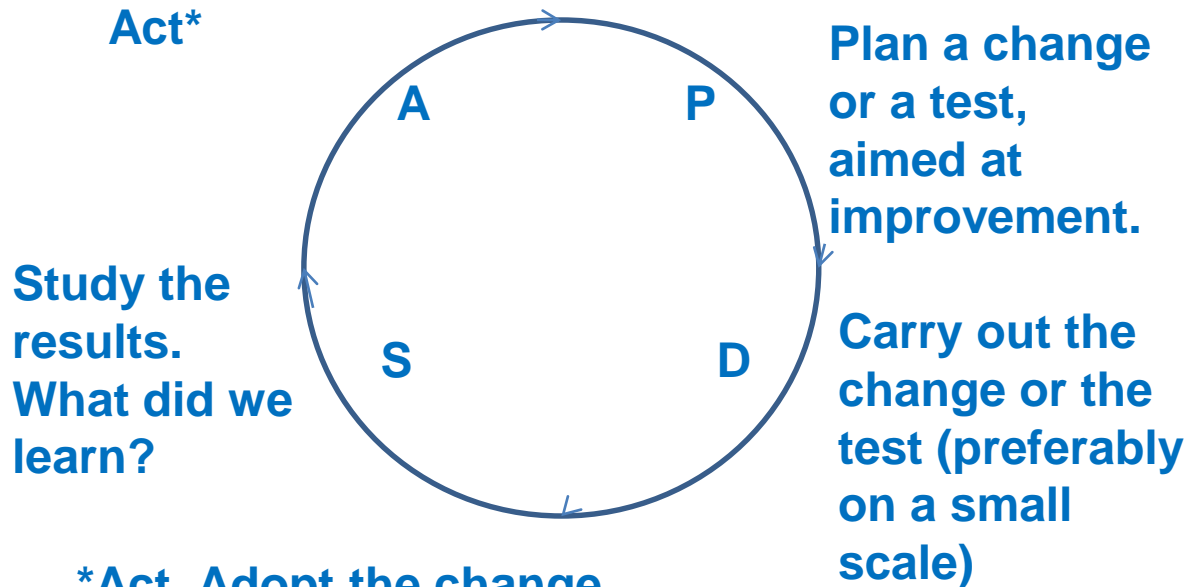
* ACT. Adopt the change
or
Run through the cycle again,
under different environmental
conditions.

or
Abandon the idea.

Evolution of the PDSA Cycle

Handout from Deming's Four-day seminar, Jan. 30-Feb. 2, 1990

The Shewhart Cycle for Learning and Improvement The P D S A Cycle



The PDSA Cycle is named!

"I originated the PDSA cycle in Japan in 1950."

Deming, 6 Jan 1991

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CONSULTANT IN STATISTICAL STUDIES

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4924 BUTTERWORTH PLACE

TEL. (202) 363-8552
FAX (202) 363-3501

6 January 1991

Dear Ron,

Your work-sheets for the PDSA
are very helpful. I note that
in Fig. 1.5 you changed
the title to improving quality,
instead of improvement of quality.
The latter
~~It~~^{It} is better. Use the substantive,
not the participle. It was
good of you & Tom to come.
Best greetings.

I originated the PDSA
cycle in Japan, 1950

W. Edwards Deming

1990

Improvement of Quality

IMPROVEMENT CYCLE

DATE _____
TEAM _____
CYCLE# _____



PLAN

OBJECTIVE OF CYCLE

• What additional knowledge is necessary to take action?

QUESTIONS TO BE ANSWERED FROM THE DATA OBTAINED IN THIS CYCLE

PREDICTIONS

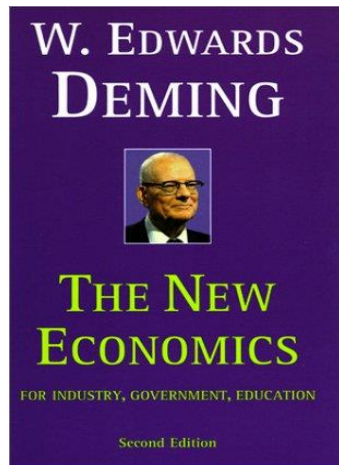
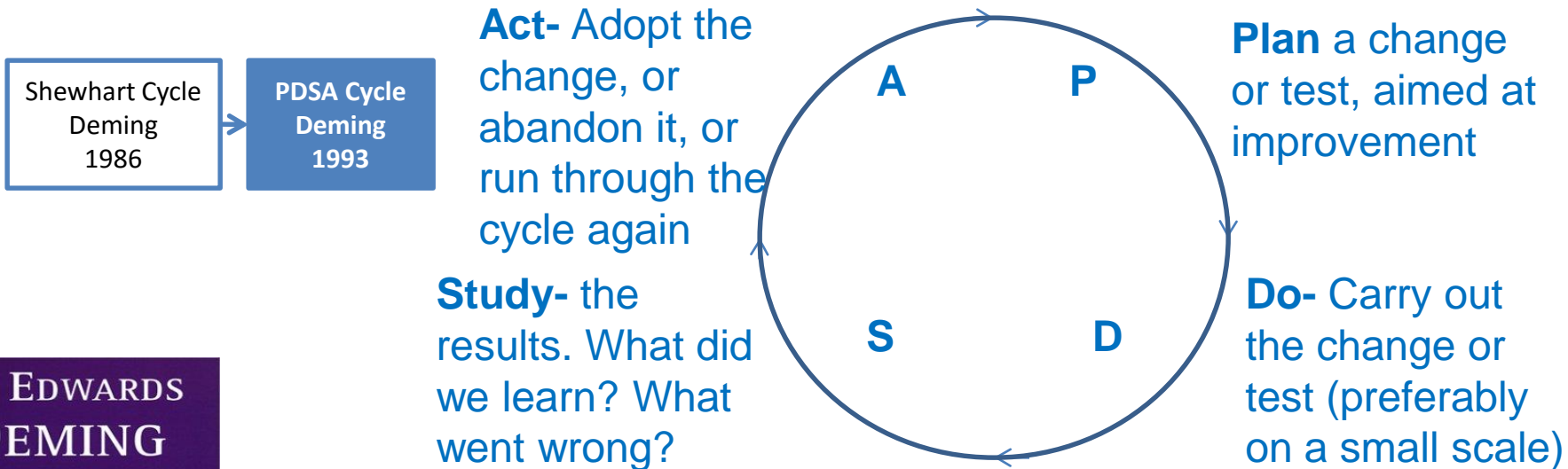
- Are historical data available to answer the questions above?
- Does the team agree on these predictions?

by

Associates in Process Improvement

Version 3.3

The Shewhart Cycle for Learning and improvement-- The PDSA Cycle--Deming, 1993



This cycle* is a flow diagram for learning, and for improvement of a product or of a process.

Under ACT, the reader may note that to adopt the change, or to abandon it, requires prediction.

* Page 131. Footnote: The PDSA Cycle originated in my teaching in Japan in 1950. It appeared in the 1950 JUSE booklet *Elementary Principles of the Statistical Control of Quality*.

Did Deming embrace the PDCA?

Aug. 19, 1980 Roundtable Discussion with Dr. Deming

Deming was asked how the QC Circle (plan, do, check, and act) and the Deming Circle (design it, make it, sell it, then test it in service) relate?

Deming's response was *"They bear no relation to each other."*

UNITED STATES GENERAL ACCOUNTING OFFICE

PROCEEDINGS OF

A ROUNDTABLE DISCUSSION

ON

PRODUCT QUALITY -- JAPAN VS. THE UNITED STATES

TUESDAY, AUGUST 19, 1980

W. EDWARDS DEMING, PH.D.
CONSULTANT IN STATISTICAL STUDIES

WASHINGTON 20016
4924 BUTTERWORTH PLACE

TEL. (202) 363-8552
FAX (202) 363.3501

17 November 1990

Dear Ron,

I don't recall all the content of your book, which I am delighted to learn is really in its final stages, but I was just thinking, if it speaks of the PDSA cycle, be sure to call it PDSA, not the corruption PDCA. I admired your wisdom and performance in Nashville. I thank you and remain

Sincerely yours,

W. Edwards Deming

To Mr. Ron Moen
8970 Dixie Highway
Clarkston, Michigan 48016

Did Deming embrace the PDCA?
*"If it speaks of the PDSA cycle,
be sure to call it PDSA, not the
corruption PDCA."* Deming, 17
November 1990

Did Deming embrace the PDCA?

“It is the PDSA Cycle, not PDCA. Check means to hold back. How PDCA ever came into existence I know not.”

--Deming, , June 1, 1991 letter to H. M. Taylor

JMH
3,2

Library of Congress archives: additional information about W. Edwards Deming (1900- 1993) now available

Peter B. Petersen

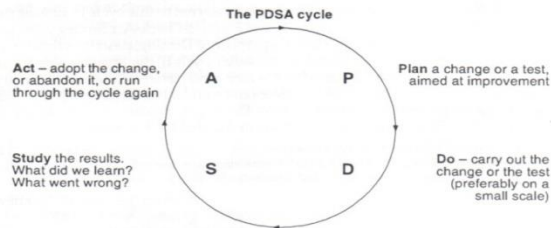
Professor of Management and Organization Theory,
Johns Hopkins University, Baltimore, USA

W. Edwards Deming (1900-1993) was a most unusual person. The following

JMH
3,2

114

Figure 1.
The Shewhart Cycle for
learning and
improvement



in 1950 in Japan. I call it the Shewhart Cycle because the ideas came from him" [33]. An earlier version of this cycle appears in Deming's 1986 book *Out of the Crisis*, but his final version of this cycle is depicted in *The New Economics*, a book published the year he died. What is shown below is how Deming finally described his PDSA cycle:

A survey of current literature reveals wide use of the term PDCA Cycle. In this particular case the word "check" is used instead of "study." Deming's preference for the word "study" is quite clear in excerpts from three of his letters. In responding to a letter he received in 1991, Dr. Deming had the following to say about a chart labeled Plan/Do/Check/Act. "What you propose is not the Deming Cycle. I don't know the source of the cycle that you propose [34]. Later that year, Deming was more specific about the difference between PDSA and PDCA and gave the reason why he preferred PDSA. "It is the PDSA Cycle, not PDCA. Check means to hold back. How PDCA ever came into existence I know not" [35]. On February 20, 1992, Dr. Deming received a request to copy the Shewhart Cycle presented in Figure 5, page 88 of his 1986 book *Out of the Crisis*. The person requesting this permission labeled the chart, "The Shewhart Cycle also called the Deming Cycle." Deming responded by sending a copy of the cycle that would be shown in the book that he was just completing and would be published the next year. "Your version of the PDSA Cycle pleases me. I now use slightly different words; copy enclosed. You might prefer the new version" [36].

A survey of current literature revealed a number of other opinions. Cole in his 1995 book refers to this cycle with three different titles:

- The Shewhart Plan-Do-Check-Act Cycle [37, p. 27]
- The Deming PDCA Cycle [37, p. 182]
- The Deming/Shewhart Plan-Do-Check-Act Paradigm [37, p. 210]

*Peter Petersen
Library of Congress
1998*

1. How did Deming's PDSA evolve?

- **Deming evolved the PDSA from 1986 until 1993.**
- **Deming always called it as “The Shewhart Cycle for Learning and Improvement.”**
- **It's origin is Shewhart's industrial application of the scientific method and not a modification of the PDCA**
- **PDSA is used for testing and implementation**

2. Did Deming create the PDCA?

- **The Japanese developed the PDCA based on Deming's JUSE Seminars in 1950 (no one person claims authorship)**
- **Deming never embraced the PDCA**
- **PDCA is used for implementation and compliance; it has not changed in the last 40 years.**

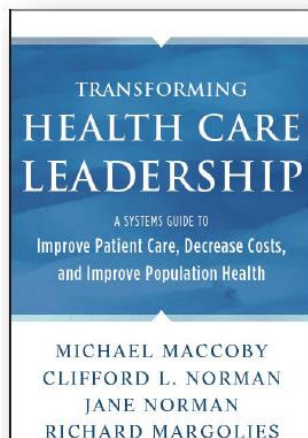
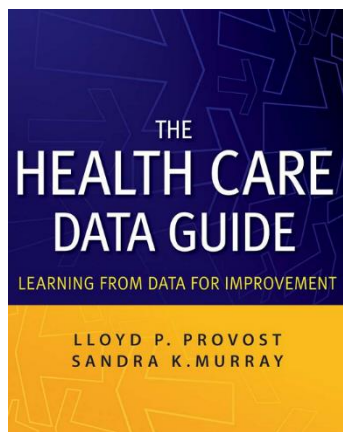
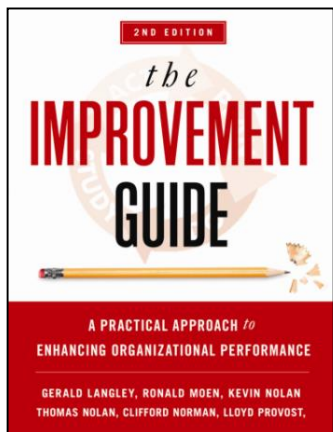
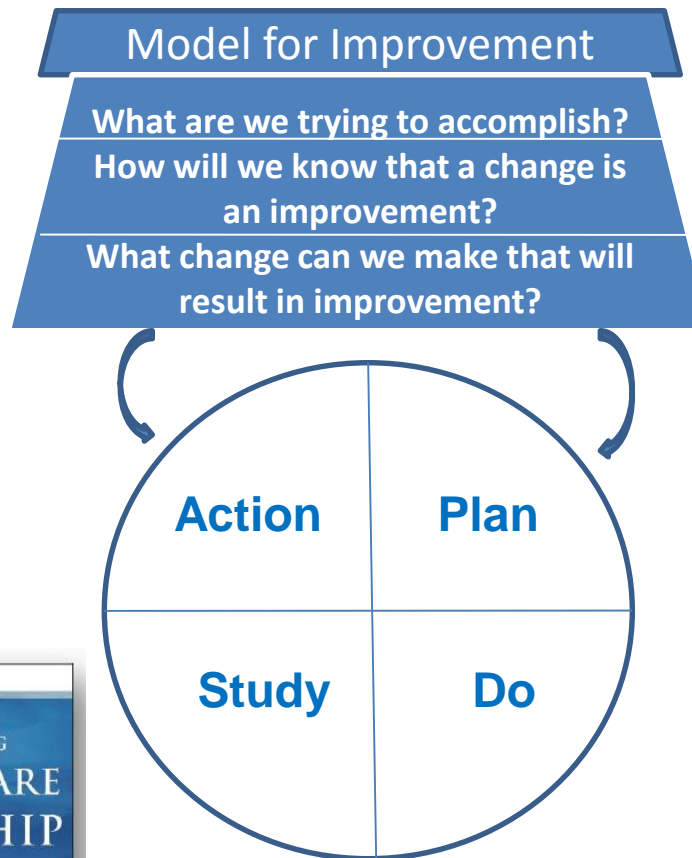
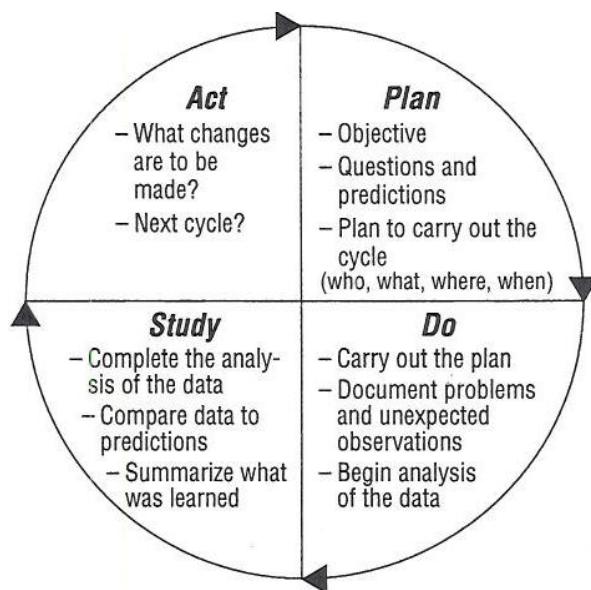
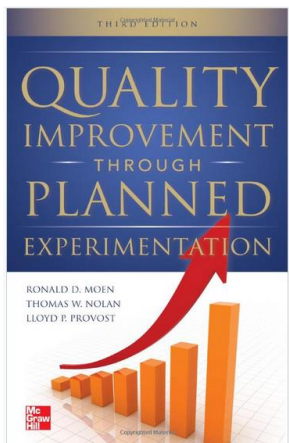
3. Are the PDCA and PDSA related?

- **PDCA was aimed at implementation and achieving a goal established by management.**
- **PDSA follows the long held idea of the iterative learning process of deductive and inductive reasoning.**
- **Both are related through the scientific method.**

Has the Deming PDSA Cycle evolved?

API: PDSA Cycle and Model for Improvement

1991, 1994, 1996 (1st) 2009 (2nd), 2011, 2013



British Medical Journal

January 12, 2016

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BMJ Quality & Safety Online First, published on 12 January 2016 as 10.1136/bmjqs-2015-005076

THE PROBLEM WITH...



OPEN ACCESS

The problem with Plan-Do-Study-Act cycles

Julie E Reed,¹ Alan J Card^{2,3}

“ITS SIMPLICITY BELIES ITS SOPHISTICATION”

Thank You!

Questions?