



KNOWLEDGE comes from repeating the Plan-Do-Study-Act cycle.

“There is widespread fear of knowledge...but advances in competitive position will have their roots in knowledge.”⁶

1. **The Shewhart Cycle for Learning (the Deming Cycle) consists of continuously performing, in order, the four elements Plan-Do-Study-Act (PDSA).**

Plan means to plan a change to improve a stable system whose output is important to a customer. Planning starts with the identification of a stable system with an opportunity for improvement. The plan should come from a theory of how and why the system functions. The theory may vary from a hunch to a law of nature. The plan should also include a prediction of new system performance based on current knowledge of the present system.

Do means to test the theory, preferably on a small scale. It is not enough to have the theory or plan for improvement because no plan can ever be validated until it is tested.

Study means to observe and interpret the quantitative and qualitative results of the test. Quantitative data collected over time before and during the test is typically plotted on a control chart that can indicate whether there has been a change in the system. But quantitative data is not the whole story. Qualitative data—stories, feelings, opinions, reactions—is also valuable. Such data can be analyzed with some of the nonquantitative tools in *TQT*—affinity diagrams, relations diagrams, and others. The learning is limited to the system in which the theory is tested.

Act means to use the new learning generated in “study” to modify practice. Three actions are typical: standardize an improvement, abandon a theory that did not lead to improvement, or run the test again under different conditions.

In this way, a new or revised theory is generated to fuel the next rotation of the learning cycle. Each rotation thus builds on the one before it and lays ground work for the one after it.

⁶W. Edwards Deming, notes from *Quality, Productivity, and Competitive Position*, a Ford Motor Company seminar, October 29-November 1, 1991.

2. The whole cycle must operate for learning to occur.

The PDSA cycle is powerful because it integrates theory and practice. Theory gives rise to new practices predicted to be effective; new practices tested give rise to revised and new theories. Again, it is not a case of theory or practice, but one of theory **and** practice.

It is enlightening to look at the PDSA cycle as a balance between two poles: Plan and Study versus Do and Act. Either pair, taken alone, is ineffective. Plan and study all the time, and you accomplish nothing. Do and act all the time, and you learn nothing. It is the combination that matters.

3. The knowledge principle implies that leaders must be continuous learners who foster continuous learning in other people and in the organization as a whole.

Most people can recognize the two poles of behavior (above) in others, and even in themselves. Leaders of the transformation balance the two in their own approaches to leading and managing. Unfortunately, it is much easier to hatch one quick plan after another and put them into action than to dedicate thoughtful reflection before and after a new plan is put into place.

Just as leaders themselves continue to learn, they encourage learning in others. They support experimentation. They talk with people about what can be learned when things go well and when things do not go well. They often cultivate planned departures from tradition (see the Planned Change Principle) to learn purposefully.

For an entire organization to continue to build its collective knowledge, leaders provide opportunities to share learning from department to department, location to location. Leaders view challenges to the organization as opportunities for learning and present them as such, encouraging everyone to engage in finding productive new ways of thinking and acting.

THE KNOWLEDGE PRINCIPLE ILLUSTRATED

HOMETOWN SCHOOLS

The Council used this matrix to find likely candidates for applying the Deming Cycle. (Part of the matrix is shown below.)

Key Output Measure	Current Measure?	Charts Available?	Stable System?	Improvement Opportunity?
1. Dropout rate	yes	yes	no	high
2. New teacher retention rate	no	no	?	high
3. # Student injuries/week	no	no	?	low
4. Expenditure per student	yes	no	?	low
5. Cycle time: course development	no	no	?	medium
6. Employer satisfaction index	no	no	?	medium
7. College freshman remediation rate	yes	yes	yes	high
8. etc.

An obvious candidate for improvement and learning is the system measured by the remediation rate. Data is available, the system is stable and predictable, and the Council believes there is opportunity to improve. (A new coordinating body was just formed to improve high school-to-college articulation.) The systems measured by the dropout rate and new teacher retention rate are also likely candidates. A lack of data, however, reduces the improvement opportunity for new teacher retention to a hunch, nothing more. Any team beginning to work there would be faced with the task of establishing a measurement system. Dropout rates—with plenty of data for study—reflect an unstable system. This may indicate some schools or groups in need of special help—a legitimate candidate.

