W. Edwards Deming’s

A System of Profound Knowledge

A lecture series based upon Chapter 4: A System of Profound Knowledge,
A System of Profound Knowledge

A. Aim of this Lesson
   1. Purpose: To present a system of profound knowledge.

   2. The current management methods must undergo transformation. This transformation will require profound knowledge. The individual components of our system, instead of being competitive, will for optimization reinforce each other for accomplishment of the aim of the system.

   3. Our system of profound knowledge provides a lens. This system offers a new business map with which to understand and optimize the departments we work in. Our system will make a positive contribution to the entire company.

B. Our First Step
   1. The first step is transformation of the individual.

   2. Transformation of the individual will come from an understanding of the system of profound knowledge.

   3. Once the individual understands the system of profound knowledge, he or she will apply its principles in every relationship with other people. Team members will have a foundation for decision making. They will have a foundation for transforming the organizations that they belong to.

   4. Characteristics of an individual transformed by the system of profound knowledge:
      a. Set an example.
      b. Be a good listener, yet will not compromise.
      c. Continually teach other people.
      d. Help people to pull away from their current practice and beliefs. They will help people to change into the new philosophy without imposing guilt for past actions.

   5. Metanoia

C. The System of Profound Knowledge: Basic Structure
   1. The system of profound knowledge is comprised of the following 4 components:
      a. Appreciation for a system.
      b. Knowledge about variation
      c. Theory of knowledge
      d. Psychology

   2. One does not need to be an expert in any one of the above 4 components in order to participate in the system of profound knowledge.

   3. Deming’s 14 Points for Management are a natural result of applying the system of profound knowledge (see our Post on Deming’s 14 Points).
D. Initial Remarks
1. The 4 components of the system of profound knowledge are interdependent. The 4
components cannot be separated. For example, knowledge of psychology is incomplete
without knowledge of variation.

2. Fear invites wrong figures.

3. Statistical calculations and predictions based on warped figures may lead to frustration,
confusion, and wrong decisions.

4. “A leader of transformation, and managers involved, need to learn the psychology of
individuals, the psychology of a group, the psychology of society, and the psychology of
change.” W. Edwards Deming

E. A System
1. What is a system?
   a. A system is a network of interdependent components that work together to accomplish
      the aim of the system.
   b. A system must have an aim. Without an aim, there is no system.
   c. A system must be managed.

2. What is optimization?
   The process of orchestrating the efforts of all components toward achievement of the
stated aim.

3. Interdependence
   a. The greater the interdependence between business components, the greater will be the
      need for communication and cooperation between them.
   b. The greater the interdependence between business components the greater will be the
      need for overall management.
   d. The efforts of the various departments at your company are not additive. Their
      efforts are interdependent.
   e. To achieve its goals, one department may, left to itself, kill off another department.
   f. A good orchestra is an example of an optimized system. See Figure#1 below.
      The musicians are not there to play solos as prima donnas, each one trying to catch the
      ear of the listener. They are there to support one another. Each musician need not be
      the best player in the country.

   Figure#1: Degree of Interdependence

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4. Obligation of a Component
   a. Each business component is obligated to contribute its best to the system. Each component must not maximize its own profit, sales, production, nor any other competitive measure.
   b. Some components may operate at a loss to themselves in order to optimize the whole system.

5. Basis for Negotiation
   a. “Optimization for everyone concerned should be the basis for negotiation between any two people, between divisions... Everybody would gain.” E. Deming.
   b. Optimization is voided if one party enters the negotiation with the avowed aim to defend his rights, the aim of game playing, or the aim of issuing demands.

F. Knowledge about Variation
   1. Life is Variation
      There will always be variation between people, in output, in product, and in services. One must ask, “What is the variation trying to tell us about a process and about the people that work in the process?”

   2. Definition of Variation: the process of exhibiting or undergoing change.

   3. The two sources of process variation are special causes of variation (or assignable causes) and common causes of variation.

   4. Special Causes of Variation (Assignable Causes)
      a. Special causes of variation are faults from fleeting events. Assignable causes are special factors that have a large impact on process variation. These factors might be machines out of adjustment, materials that are slightly different, differences between workers, differences in the environment created by inconsistency on the part of management, or methods that may be slightly altered.
      b. Special causes are identifiable.
      c. Their impact is sufficient to create a marked change in the pattern of variation.
      d. Variation resulting from special causes is known as uncontrolled variation.

   ![Characterization of Uncontrolled Variation](image)
5. Common Causes of Variation (Chance Causes)
   a. Common causes of variation are faults of the system. These factors are common or random causes of trouble.
   b. Process variations occur because the materials, machines, operators, and methods all interact to produce variation.
   c. As a result, chance variation is relatively consistent over time because it is the result of multiple contributing factors.
   d. Variation resulting from common causes is known as controlled variation.

![Idealized concept of Controlled Variation](image)

6. Frequent Errors
   a. Two errors are frequently made in attempts to improve process results.
   b. Mistake 1: React to an outcome as if it came from a special cause, when it came from common causes of variation.
   c. Mistake 2: Treat an outcome as if it came from common causes of variation, when it came from a special cause.

7. Stable and Unstable States
   a. Stable State: In the state of statistical control, the variation to expect in the future is predictable. Quality, performance, costs, and quantity are predictable. Walter Shewhart called this the stable state.
   b. Unstable State: The process does not exhibit statistical control. The variation to expect in the future is unpredictable. Again, performance is not predictable. The process is in an unstable state.
   c. Management of people is entirely different in an unstable state versus a stable state.
   d. Remember that confusion between the two states will lead to calamity.

8. Management requires knowledge about interaction of forces. Management of people requires knowledge of the system’s effect upon the performance of people.
G. Theory of Knowledge

1. Management in any form is prediction.

2. Knowledge is built upon theory. A statement will convey knowledge when it predicts future outcome. This prediction will incur the risk of being wrong. However, a knowledge-based statement will fit without failure observations of the past.

3. Rational prediction requires theory. Rational prediction builds knowledge through the systematic extension and revision of theory based on comparison of prediction with theory.

4. Without theory, there is nothing to revise. Application of rational prediction will disclose the inadequacies (if any) of a theory. Inadequacies will result in the need for revision of the theory or even the creation of a new theory.

5. Theory is a window into the world.
   a. Theory leads to prediction.
   b. Without prediction, examples and experience teach nothing.
   c. To copy an example of success, without the aid of theory, may lead to disaster.

6. Any rational plan is prediction concerning procedures, behavior, conditions, materials, or equipment.

7. Use of data requires prediction.
   a. Interpretation of data from an experiment or test is prediction.
   b. Only in the state of statistical control, statistical theory provides, with a high degree of belief, prediction of future performance.
   c. A statement devoid of rational prediction does not convey knowledge.
   d. No quantity of examples will establish a theory.
   e. A single unexplained failure of a theory will require modification or abandonment of the theory.

8. No true value.
   a. There is no true value of any state, condition, or characteristic that is defined in terms of observation or measurement.
   b. Change of procedure for measurement or observation produces a new number.
   c. There is no such thing as a fact regarding an empirical observation.
   d. For optimization to occur, communication and negotiation require operational definitions.
   e. Operation Definition: a procedure agreed upon for translation of a concept into measurement of some kind.

9. Information is not knowledge.
   a. Knowledge has temporal spread.
   b. Knowledge comes from theory.
   c. Example: A dictionary contains information but not knowledge.

10. Losses and wild results may occur from successive application of random forces or random changes that may individually be unimportant. Examples: 1) Worker training worker in succession, 2) Management of a company or committee, working with best efforts in policy, leading themselves astray without guidance of profound knowledge.

11. Enlargement of a committee is not a reliable way to acquire profound knowledge.
H. Psychology

1. Definition: the study of the human mind and behavior, as individuals and groups.

2. Psychology helps us to understand people, interaction between people and circumstances, interaction between a manager and his people, and interaction between customer and supplier.

3. People are different from one another. A manager must be aware of these differences. A manager must implement these differences for optimization of everybody’s abilities.

4. Sadly, America’s current management philosophy functions under the supposition that all people are alike.

5. People learn at different speeds and in different ways.

6. There are two types of motivation: intrinsic and extrinsic sources of motivation.

7. Intrinsic Motivation
   a. People are born with a need for relationships with other people. People possess a need for love and esteem by others.
   b. A person is born with a natural inclination to learn. Learning is a source of innovation.
   c. A person inherits the right to enjoy his work.
   d. Good management helps people to nurture and preserve these positive inner attributes.
   e. At times, the family environment may shatter intrinsic motivation at an early age. Various management practices complete the destruction.

8. Extrinsic Motivation
   a. An external force that may indirectly bring positive results.
   b. Money, rewards, and grades are examples of extrinsic motivation.
   c. Some extrinsic motivation helps to build self-esteem.
   d. Total submission to extrinsic motivation leads to destruction of the individual. Extrinsic motivation in the extreme crushes intrinsic motivation.
   e. No child or adult can enjoy learning if he/she must frequently be concerned about grading for his/her performance.

9. Of utmost importance, a manager must take time to understand what motivates an individual. Everyone is different from everyone else. A manager must spend time to listen to an employee to understand whether she is looking for recognition by her peers, by the company, time to take a university course, flexible working hours, etc. By doing so, a manager will provide positive outcomes for his people. In addition, people may experience replacement of extrinsic motivation with intrinsic motivation.

9. Overjustification: an award in the form of money for an intrinsically motivated job. Overjustification is demoralizing. Merit awards and ranking will generate conflict and dissatisfaction. Rewards motivate people to work only for rewards.

10. Recognition: A show of appreciation to someone may mean far more to him/her than monetary reward. A good manager should give a pat on the back for a job well done.