**Using Change Concepts for Improvement**

While all changes do not lead to improvement, all improvement requires change. The ability to develop, test, and implement changes is essential for any individual, group, or organization that wants to continuously improve. There are many kinds of changes that will lead to improvement, but these specific changes are developed from a limited number of change concepts.

A change concept is a general notion or approach to change that has been found to be useful in developing specific ideas for changes that lead to improvement. Creatively combining these change concepts with knowledge about specific subjects can help generate ideas for tests of change. After generating ideas, run Plan-Do-Study-Act (PDSA) cycles to test a change or group of changes on a small scale to see if they result in improvement. If they do, expand the tests and gradually incorporate larger and larger samples until you are confident that the changes should be adopted more widely.

Associates in Process Improvement (API), the same group of experts who brought us the Model for Improvement, also created a list of change concepts — 72 of them, to be exact — to help improvement teams develop good ideas for changes to test.

The 72 change concepts grouped into the following nine categories below.

1. Eliminate waste: In a broad sense, waste can be considered as any activity or resource in an organization that does not add value to an external customer. Some possible examples of waste are materials that are thrown away, rework of materials and documents, movement of items from one place to another, inventories, time spent waiting in line, people working in processes that are not important to the customer, extra steps or motion in a process, repeating work that has previously been done by others, over-specification of materials and requirements, and more staff than required to match the demand for products and services.
2. Improve workflow: Products and services are produced by processes. How does work flow in these processes? What is the plan to get work through a process? Are the various steps in the process arranged and prioritized to obtain quality outcomes at low costs? How can we change the work flow so that the process is less reactive and more planned?
3. Optimize inventory: Inventory of all types is a possible source of waste in organizations. Inventory requires capital investment, storage space, and people to handle and keep track of it. In manufacturing organizations, inventory includes raw material waiting to be processed, in-process inventory, and finished goods inventory. For service organizations, the number of skilled workers available is often the key inventory issue. Extra inventory can result in higher costs with no improvement in performance for an organization. How can we reduce costs associated with the maintenance of inventory? Understanding where inventory is stored in a system is the first step in finding opportunities for improvement. The use of inventory pull systems such as "just-in-time" is one philosophy of operating an organization to minimize the waste from inventory.
4. Change the work environment: Changes to the environments in which we work, study, and live can often provide leverage for improvements in performance. Production of products and services takes place in some type of work environment. As we try to improve quality, reduce costs, or increase value of these products and services, technical changes are developed, tested, and implemented. But many of these technical changes do not lead to improvement because the work environment is not ready to accept or support the changes. Changing the work environment itself can be a high-leverage opportunity for making other changes more effective.
5. Enhance the producer-customer relationship: To benefit from improvements in quality of products and services, the customer must recognize and appreciate the improvements. Many ideas for improvement can come directly from a supplier or from the producer's customers. Many problems in organizations occur because the producer does not understand the important aspects of the customers’ needs or customers are not clear about their expectations from suppliers. The interface between producer/provider and their customers presents opportunities to learn and develop changes that will lead to improvement.
6. Manage time: This age-old concept provides an opportunity to make time a focal point for improving any organization. An organization can gain a competitive advantage by reducing the time to develop new products, waiting times for services, lead times for orders and deliveries, and cycle times for all functions in the organization. Many organizations have estimated that less than five percent of the time needed to manufacture and deliver a product to a customer is actually dedicated to producing the product. The rest of the time is spent starting up or waiting.
7. Manage variation: Everything varies! But how does knowing this help us to develop changes that will lead to improvement? Many quality and cost problems in a process or product are due to variation. The same process that produces 95 percent on-time delivery or good product is the same process that produces the other 5 percent of late deliveries or bad product. Reduction of variation in such cases will improve the predictability of outcomes (may actually exceed customer expectations) and help to reduce the frequency of poor results
8. Error Proofing: Errors occur when our actions do not agree with our intentions even though we are capable of carrying out the task. Often, we have to act quickly in a given situation or are required to accomplish a number of tasks sequentially or even simultaneously. Making these slips is part of being human. We might do such things as:
* Forget to enter information or enter it incorrectly
* Leave out a step in a process or do them in the wrong sequence
* Include the wrong merchandise in a shipment
* Try to use something in the wrong way
* Put something together wrong

Although these errors or slips are the result of human actions, they occur because of the interaction of people with a system. Some systems are more prone to error than others. We can reduce errors by redesigning the system to make it less likely for people in the system to make errors. This type of system design or redesign is called error proofing.

The frequency of errors is a function of the number of opportunities to make errors and the probability of making an error given we have the opportunity. For example, if the same information is entered in the computer on three separate occasions, we would expect three times more errors than if the information were only entered once.

We should always be looking for ways to reduce the number of steps in a process or the number of parts in a product. This will allow for the opportunities for errors to be reduced. Error proofing is then used to reduce the probability of making an error for a given opportunity. We can error proof by using technology (e.g., adding equipment to automate repetitive tasks), by using methods to make it more difficult to do something wrong, or by the integration of these methods with technology. Methods for error proofing are not directed at changing people's behavior, but rather at changing the system to prevent slips. The methods are directed at reducing errors from actions that are done almost subconsciously when performing a process or using a product.

1. Focus on the design of products and services: Although most change concepts address the way that a process is performed, many also apply to improvements to a product or service. This section contains eight change concepts that are particularly useful for developing changes to products or services that do not naturally fit into any of the other groupings.

The complete list of the 72 change concepts is on the next page:

* Eliminating waste, improving workflow, optimizing inventory (1-27, 40-45, 71)
* Enhancing producer-customer relationship and changing the work environment (28–40)
* Better managing time (46–50)
* Managing variation, designing systems to avoid mistakes (51–62)
* Design of products and services (63–70, 72)

By themselves, the change concepts aren’t ready to be tested. Instead, you need to use them in combination with your subject matter expertise and knowledge of the local landscape to develop specific ideas.

Adapted from Institute for Healthcare Improvement Open School course QI 102: How to Improve with The Model for Improvement. Source: Langley GL, Moen R, Nolan KM, Nolan TW, Norman CL, Provost LP. The Improvement Guide: A Practical Approach to Enhancing Organizational Performance. 2nd ed. San Francisco, CA: Jossey-Bass Publishers; 2009

1. Eliminate things that are not used

2. Eliminate multiple entries

3. Reduce or eliminate overkill

4. Reduce controls on the system

5. Recycle or reuse

6. Use substitution

7. Reduce classifications

8. Remove intermediaries

9. Match the amount to the need

10. Use sampling

11. Change targets or set points

12. Synchronize

13. Schedule into multiple processes

14. Minimize handoffs

15. Move steps in the process close together

16. Find and remove bottlenecks

17. Use automation

18. Smooth workflow

19. Do tasks in parallel

20. Consider people as in the same system

21. Use multiple processing units

22. Adjust to peak demand

23. Match inventory to predicted demand

24. Use pull systems

25. Reduce choice of features

26. Reduce multiple brands of the same item

27. Give people access to information

28. Use proper measurements

29. Take care of basics

30. Reduce demotivating aspects of the pay system

31. Conduct training

32. Implement cross-training

33. Invest more resources in improvement

34. Focus on core process and purpose

35. Share risks

36. Emphasize natural and logical consequences

37. Develop alliances and cooperative relationships

38. Listen to customers

39. Coach the customer to use a product/service

40. Focus on the outcome to a customer

41. Use a coordinator

42. Reach agreement on expectations

43. Outsource for “free”

44. Optimize level of inspection

45. Work with suppliers

46. Reduce setup or startup time

47. Set up timing to use discounts

48. Optimize maintenance

49. Extend specialist’s time

50. Reduce wait time

51. Standardization (create a formal process)

52. Stop tampering

53. Develop operation definitions

54. Improve predictions

55. Develop contingency plans

56. Sort product into grades

57. Desensitize

58. Exploit variation

59. Use reminders

60. Use differentiation

61. Use constraints

62. Use affordances

63. Mass customize

64. Offer product/service anytime

65. Offer product/service anyplace

66. Emphasize intangibles

67. Influence or take advantage of fashion trends

68. Reduce the number of components

69. Disguise defects or problems

70. Differentiate product using quality dimensions

71. Change the order of process steps

72. Manage Uncertainty – not tasks.