Ozcan: Chapter 6 Reengineering

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Chapter 6 Topics

- Ozcan's Description of Reengineering
- Work Design in Health Care Organizations
  - Work Design
  - Job Design
- Work Measurement - Standard Times
  - Stopwatch Time Studies
  - Standard and Predetermined Times
- Work Measurement Using Work Sampling
  - Determination of Sample Size
- Work Simplification
  - Flow Chart
  - Work Distribution Chart
  - Flow Process Chart
- Worker Compensation

What is Reengineering? (Traditional Interpretation)

- Reengineering is a methodology that promotes the radical redesign of business processes
- Goal to achieve dramatic improvements in performance measures
  - Quality and cost
  - Service
  - Speed
- Hammer, M., & Champy, J. (1993). *Reengineering the corporation: A manifesto for business revolution.* New York: Harper Business.

What is Reengineering ? (Ozcan Interpretation 1)

- Reengineering is a methodology intended to overcome the difficulty in realizing TQM/CQI performance over a long duration, as well as the myopic conduct of organizational change, restructuring and downsizing.
- To reengineer the system, healthcare managers must be able to understand work-design, jobs, job measurement, process activities, and reward systems – all well known concepts of industrial engineering. With that knowledge, they can recognize the bottlenecks in the old system, identify unnecessary and repetitive tasks, and eliminate them.

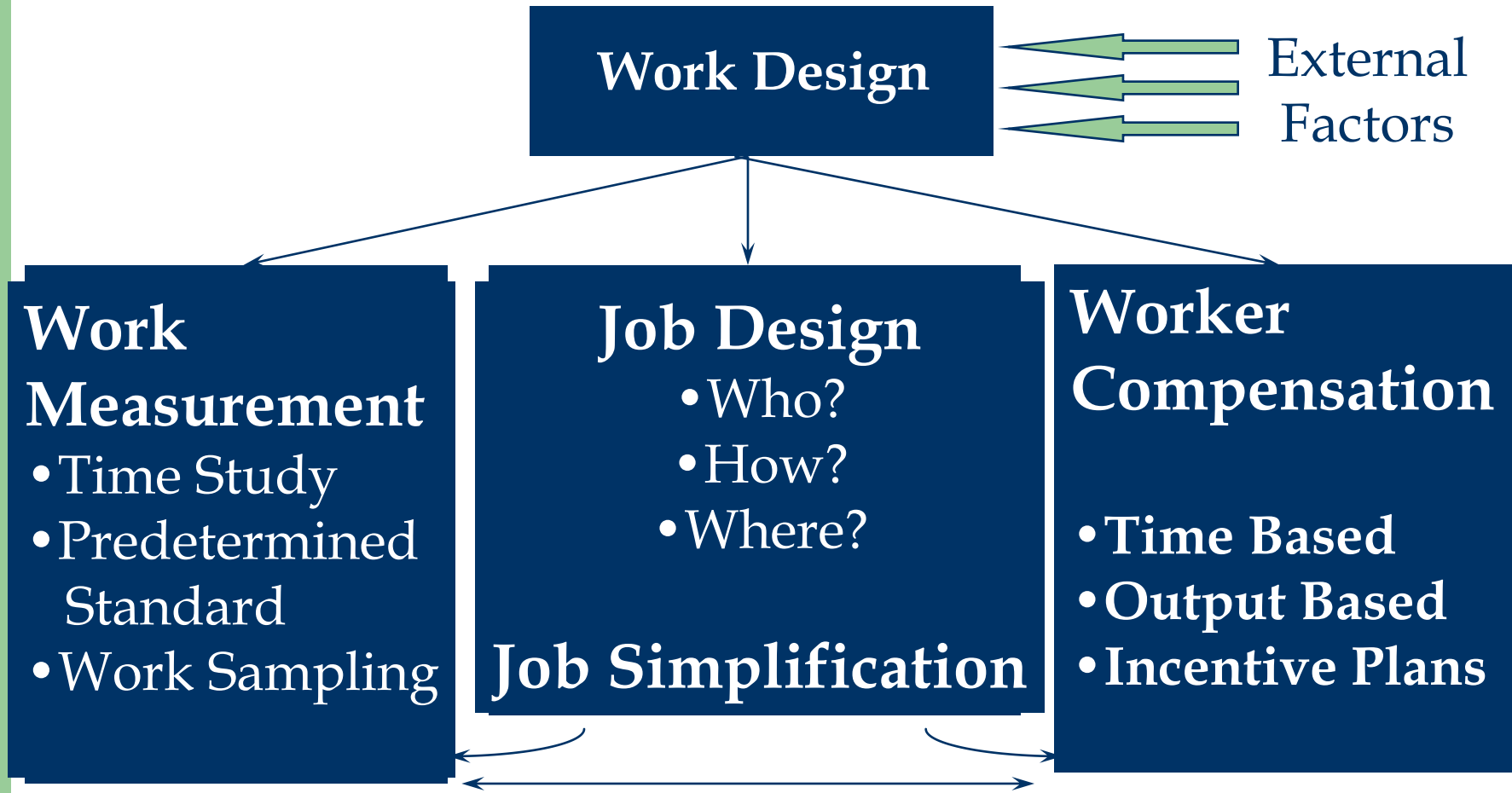
What is Reengineering? (Ozcan Interpretation 2)

- Reengineering is a strategic view of arranging, delivering and managing care
- Requires changes across departmental, organizational, operational, and administrative procedures
- Results in a new way of thinking that produces a comprehensive, integrated, and seamless process that is centered on the patient
- Breaks down *silo mentality* among departments through examination of common processes
- Leads to a waste-free health care delivery system by adding value to service processes without adding additional resources "Lean Health Care"

Importance of Work Design

- Human resources/manpower represents over 40% of healthcare facility budgets (Ozcan page 123)
- Human resource management issues
  - Productivity and satisfaction of staff involves an understanding of the work environment
  - Work must be designed so that employees are happy, organizational productivity is high, and costs are minimized

Work Design- A Systems Perspective

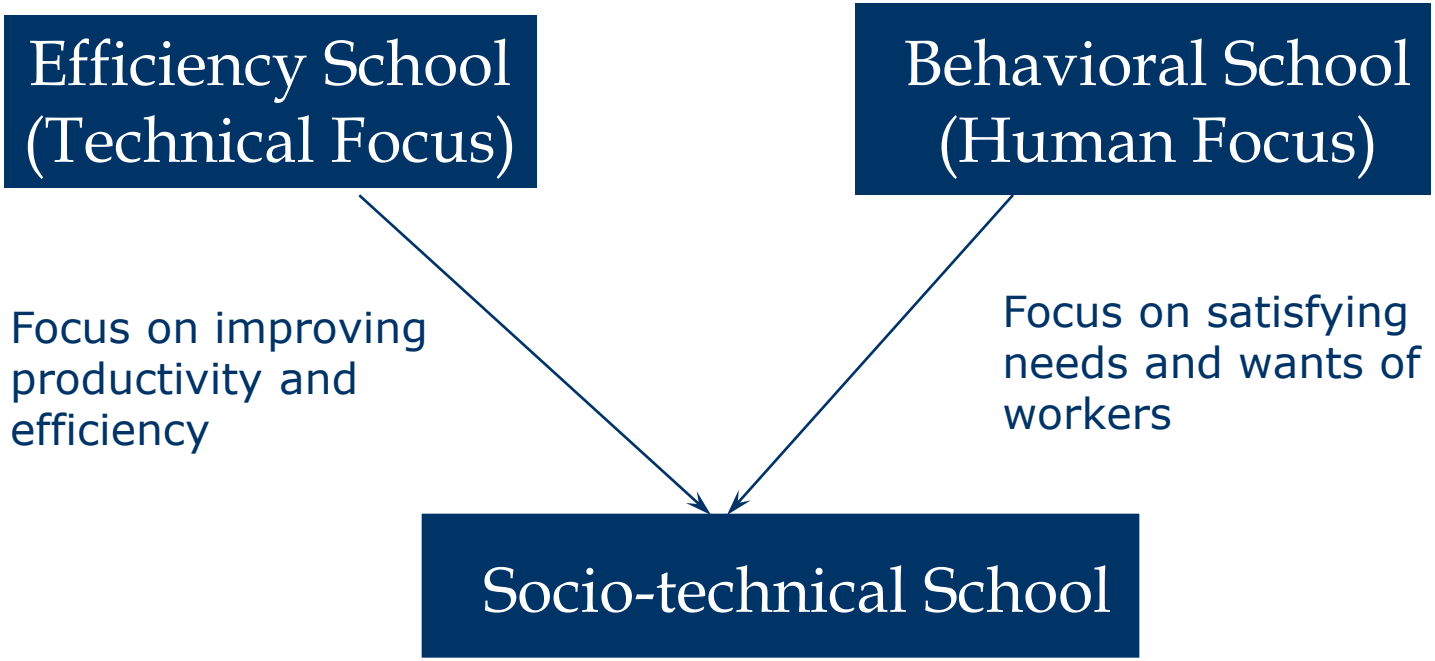


Source: Ozcan Figure 6.1

Brief History of Job Design

- Frederick Taylor (1911)
  - Developed scientific management approach
  - Focused on time studies
  - Asserted that conflicts between labor and management occurred because management had no idea how long jobs actually took
- Frank and Lillian Gilbreth (1920's and beyond)
  - Motion studies
  - Routine, predictable, repetitive, separable tasks
- Herzberg (1959) - satisfiers and dissatisfiers

Socio-technical School Approach



How can jobs be improved? – Behavioral School

- *Job enlargement--* give workers a larger portion of the total task (horizontal loading-- additional work at same level of skill and responsibility)
- *Job enrichment--* increasing responsibility for planning and coordinating tasks (vertical loading)
  - Serving on strategic planning committees
  - Leading a continuous quality improvement project
  - Ideally leads to greater job satisfaction and autonomy
- *Job rotation--* workers periodically exchange jobs (limited applicability in healthcare)

Work Measurement Using Time Standards

- Time standards are important in establishing productivity measures, determining staffing level and schedules, estimating labor costs, budgeting, and designing incentive systems
- A *time standard* represents the amount of time needed for the *average worker* to do a *specific job* working under *typical conditions*

Standard Time Development

The amount of time it should take a qualified worker to complete a specified task, working at a sustainable rate, using given methods and equipment, raw materials, and workplace arrangements is called a **standard time.**

Standard time can be developed through:

- Stop-watch studies
- Historical times
- Predetermined data
- Work sampling

Stopwatch Time Studies

- Take time over a number of trials (cycles)
- Workers should be educated regarding the process to avoid suspicion and avoid the Hawthorne Effect
- Number of cycles to time (i.e., sample size)
  - variability in observed times
  - desired accuracy
  - desired level of confidence for the estimate

Determining Sample Size

Accuracy desired may be explained by the percentage of the mean of the observed time. For instance, the goal may be to achieve an estimate within 10 percent of the actual mean. The sample size is then determined by:

$$n = \left(\frac{z * s}{a * \bar{x}} \right)^2$$

Desired Confidence	2-sided Z-value
90	1.65
95	1.96
98	2.33
99	2.58

where:

z = number of std. dev. needed for desired confidence

s = sample std. dev.

a = desired accuracy

xbar = sample mean

An Alternative Formula

Desired accuracy may be expressed as an amount (e.g., within one minute of the true mean). The formula for sample size becomes:

$$n = \left(\frac{z * s}{e} \right)^2$$

where

e = Accuracy or maximum error acceptable

To make an initial estimate of sample size, you should take a small number of observations and then compute the mean and std. dev. to use in the formula for n.

Example 6.1

A heath care analyst wishes to estimate the time required to perform a certain job. A preliminary stopwatch study yielded a mean of 6.4 minutes and a standard deviation of 2.1 min. The desired confidence level is 95 percent. How many observations will be needed (including those already taken) if the desired maximum error is:

a) +/- 10 percent?
b) one-half minute?

a) $$n = \left(\frac{1.96 * 2.1}{.10 * 6.4} \right)^2 = 41.4 \quad or \quad 41(Ozcan)$$

b) $$n = \left(\frac{1.96 * 2.1}{0.5} \right)^2 = 67.8 \quad or \quad 68$$

Determining the Standard Time – Normal Time

- *Observed Time--* average of observed times
  - OT = $\sum x_i / n$
- *Normal Time--* observed time adjusted for worker performance
  - NT = OT * PR (where PR = performance standard measured for the entire job)
  - NT = $\sum (E_j * PR_j)$ (where PR is measured element by element)
  - PR equals 1 for the average worker; PR< 1 is for a slower worker

Allowance Factor

- Standard time equals normal time multiplied by an allowance factor **ST = NT * AF**
- Allowance Factor
  - accounts for personal delays, unavoidable delays, and/or rest breaks
  - AF_{job} = 1+A, where A= allowance percentage based on job time
  - AF_{day} = 1/(1-A), where A = allowance percentage based on work day

Allowance Factor Computations

- Compute the allowance factor if:
  - The allowance is 20 percent of job time.
  - The allowance is 20 percent of work day.

A) AF = 1 + A = 1.20, or 120%

B) AF = 1/(1-A) = 1/(1-.2) = 1.25 = 125%

Table 6.1 Typical Allowance Percentages for Varying Healthcare Delivery Working Conditions

Allowance Level	Percent
1. Basic-low (personal, fatigue, standing)	11
2. Basic-moderate (basic-low and mental strain)	12
3. Basic-high (basic-moderate and slightly uncomfortable heat/cold or humidity	14
4. Medium-low (basic high and awkward position)	16
5. Medium-moderate (medium-low and lifting requirements up to 20 lbs.)	19
6. Medium-high (medium-moderate and loud noise)	21
7. Extensive-low (medium-high and tedious nature of work)	23
8. Extensive-medium (extensive-low and with complex mental strain)	26
9. Extensive-high (extensive-medium and lifting requirement up to 30 lbs.)	28

Source: Adapted from B.W. Niebel, 1988.

What are the problems with time studies?

- Subjective performance ratings and allowances
- Only observable jobs can be studied
- Highly costly -- best for repetitive tasks
- Disrupts worker routine
- May cause worker resentment