



Advanced Process Architectures

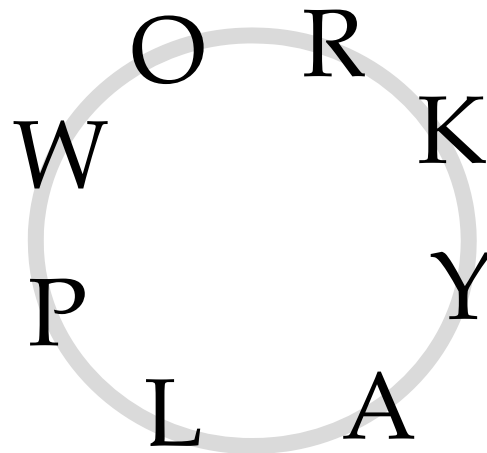
PART TWO

Exploring the Nature of Work and Play

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■■■■ A closer look at the category of work

Work / Play



- In this part we look at the definition of work and how it relates to our understanding of process.



■■■■ *What is Work?*

- ❑ If we are going to understand “work process,” we must explore the nature of work
- ❑ There are many other processes in our lifeworld -- how do we identify work as something different from all the others?
- ❑ Work is a fundamental epistemic category that organizes our everyday lifeworld
- ❑ The major distinction by which **work** is defined is the difference between it and **play**
- ❑ We must question play if we want to learn about work!
- ❑ Most of our activities in life are classified as either work or play
- ❑ It is a fundamental structure of the lifeworld which is socially constituted and culturally determined.

Political Economic Definition of work

Use Value
what it is worth to you

Exchange Value
what it is worth to
someone else

- The standard definition of work contrasts Use and Exchange value.
 - Use value is private, and Exchange value is public
 - Work is something that has both Use and Exchange value
 - When we work we do something that has a Use value to someone who, in turn, gives us money that has an Exchange value
 - The negotiation over the wage gives public value to private labor
- Work in political economy is seen in relation to money, not the product

Commodity-Oriented Definition of Work

Work is what moves or transforms one's self, materials or information which results in a product that can be sold

- If we concentrate on the commodity that is produced rather than the economic value of the labor, then we get a different definition of work
 - The context is the markets for the commodity, not on the labor pool
 - Work as transformation concentrates on the end result of the work, not on the cost of the work
- The emphasis is on price of the commodity, not on the wage earned by the laborer(s).

Semiotic Definition of Work

Work is a sign of values within society

- A sign is something that indicates something else
 - Signs are the basis of the social context of human interaction
- All work produces signs, and work itself is a sign, within the social context
 - Different jobs may have high prestige without being well paid or without producing a product
 - Clergy
 - Soldier
- The emphasis is on value, relevance, significance and aesthetics

Organizational Definition of Work

Work denotes a role within an organizational system

- People are seen in the context of their organizational systems
 - Work is what someone with a particular position does within a social organization
 - There may be no overt signs of the role someone plays within an organization
- There are both formal and informal kinds of organizational structures
 - Organizational work need not have any product or wage
 - Traditional sociology, politics, economics addresses this view of work

■■■■ *Many Definitions of Work*

Organizational Work	Semiotic Work
Commodity Work	Political Economic Work

- ❑ These are not all the possibilities -- just some of the major ones
 - Of these, the semiotic definition is least common
- ❑ Work is multifaceted and must be defined with respect to at least these four different contexts
- ❑ Process must take a multidimensional view of work

WORK

Work is a socially valued active transformation of material or information that produces a product or service and operates within a specific organizational context

- ❑ Social value covers both the semiotic significance and the economic valuation
- ❑ Related assumptions:
 - We must work to survive
 - Work is good for us
 - The product of work is valuable
- ❑ Related epistemics:
 - Work can be differentiated from *Leisure*
 - Use value can be differentiated from exchange value
 - The sign value and commodity values can be distinguished

■■■■ *The Opposite of Work*

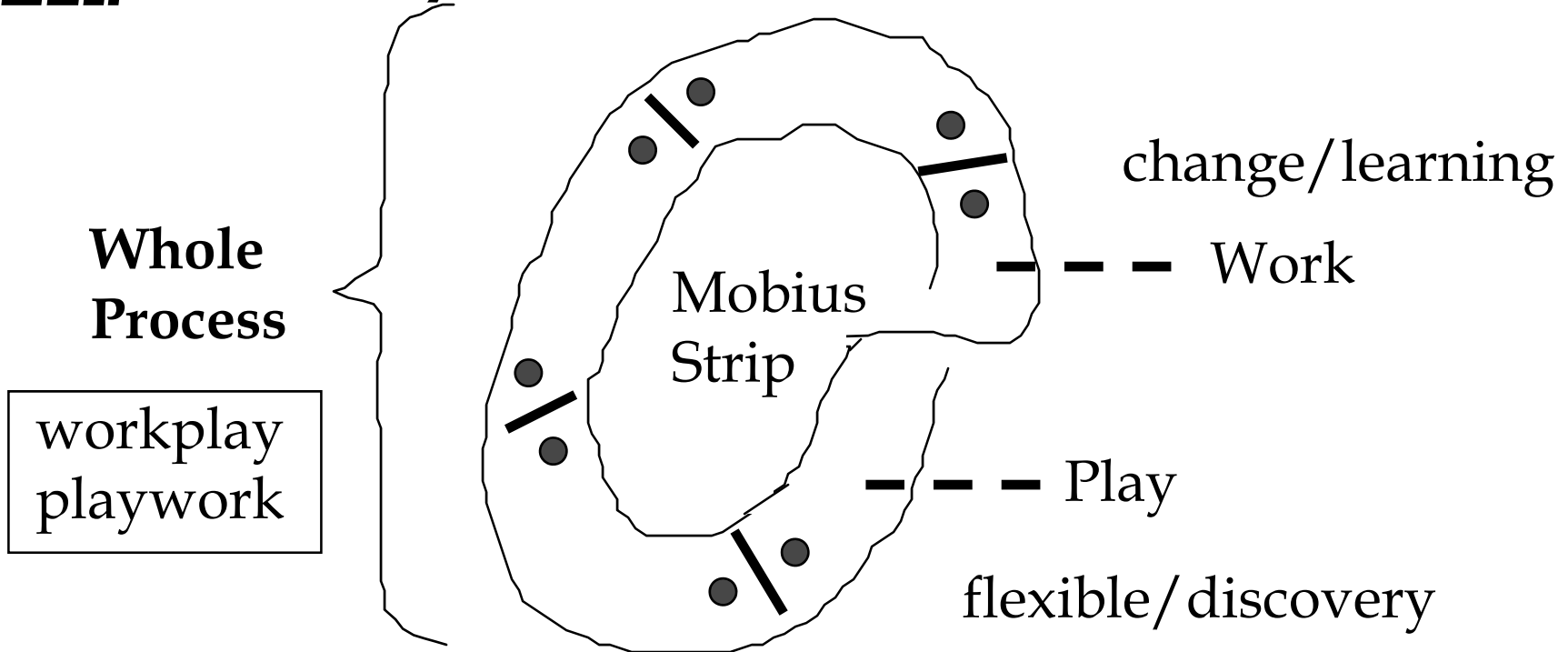


- All our definitions of work seem to make sense until we begin to consider “play”
 - Play can be organized (team sports)
 - Play can have semiotic value (points)
 - Play can produce a product (crafts)
 - Play can have economic value to others (professional sports)
- All the different definitions of work break down when considered in relation to its opposite “play”
 - Play is both like work and radically different
 - Play is the cultural shadow of work

Attributes of Play

- ❑ Play is essential to human creativity and discovery
- ❑ “Play” means in one sense flexibility which is an attribute we want in our processes
- ❑ Play characterizes the meta-level where flexibility and discovery come together, i.e. emergence
 - It is at opposite end of the series of meta-levels from work
- ❑ Humans experience far less entropy in their play than work
- ❑ Play is an essential human characteristic not considered when we only deal with “serious work”
- ❑ Play is a prime contributor to human happiness and self-fulfillment
- ❑ Play needs to be brought back into consideration by process studies

Global/Local Paradox



- Globally the same; locally different
- Work like play; Play like work
 - flexible\discovery at the heart of work
 - change\learning at the heart of play
- Play decenters the concept of work

FUN

Production, consumption, writing

- ❑ In the workplay state there is no difference between man and nature because there is no subject/ object dichotomy.
- ❑ In the workplay state there is only the flows in the playing field and the work of making the plays
- ❑ When you play (work) with something, you take it into a non-dual modality so you can get the feel of it.
- ❑ The workplay process has aspects
 - Production
 - Consumption
 - Inscription
- ❑ The workplay process has social features
 - Reciprocity of action
 - Shared choice
 - Mutual causality

FUN

- The non-dual experience has various intensities
 - Highly intense -- ecstasy
 - Balanced intensity -- fun and exhilaration
 - Low intensity -- concentration
- The difference between work and play is that we culturally demand low intensity non-dual experiences as part of work and high intensity non-dual experience as part of play
- If we make work fun, we increase the intensity of the non-dual experience in it
- Both duration and intensity determine how much fun there is in work
- Work is fun when we are totally engaged and meet the challenge

■■■■ *Play Is Another Name for Risk*

- ❑ Risk is becoming a more and more important aspect of process
 - Economic situation underscores risks
 - Recognized as a key factor in success
- ❑ Risk is an attribute of the play within a game
 - Risk taking can only occur where we envision multiple possible moves with different rewards
- ❑ Game theory studies relations between risk taking and possible outcomes
- ❑ Risk management is about anticipating risks and managing the consequences with aversion tactics
- ❑ The risks are the “play” within the environment of the project
- ❑ Risk taking is a kind of serious playfulness

Metaphor: The Game

- Our primary metaphor for process should be the GAME
- Process is the *game context* of work
 - The organization is the playing field
 - The process definition is the rules of the game
 - The metrics are the score
 - The practitioners are the team
 - Higher maturity and process wisdom is the goal of the game
 - It is a game you play against yourself as a company
 - It can include teamwork as in some sports
 - *It gives the process a context that can be related to by everyone*
 - *It uses the already established category of play as a means of situating process*
 - *It allows us to understand the difference between process and work as abstract versus concrete levels of participation*

■■■■ *Playing the Game*

WORK

Is given an added dimension by the challenge of playing the game while doing the work

PROCESS (GAME)

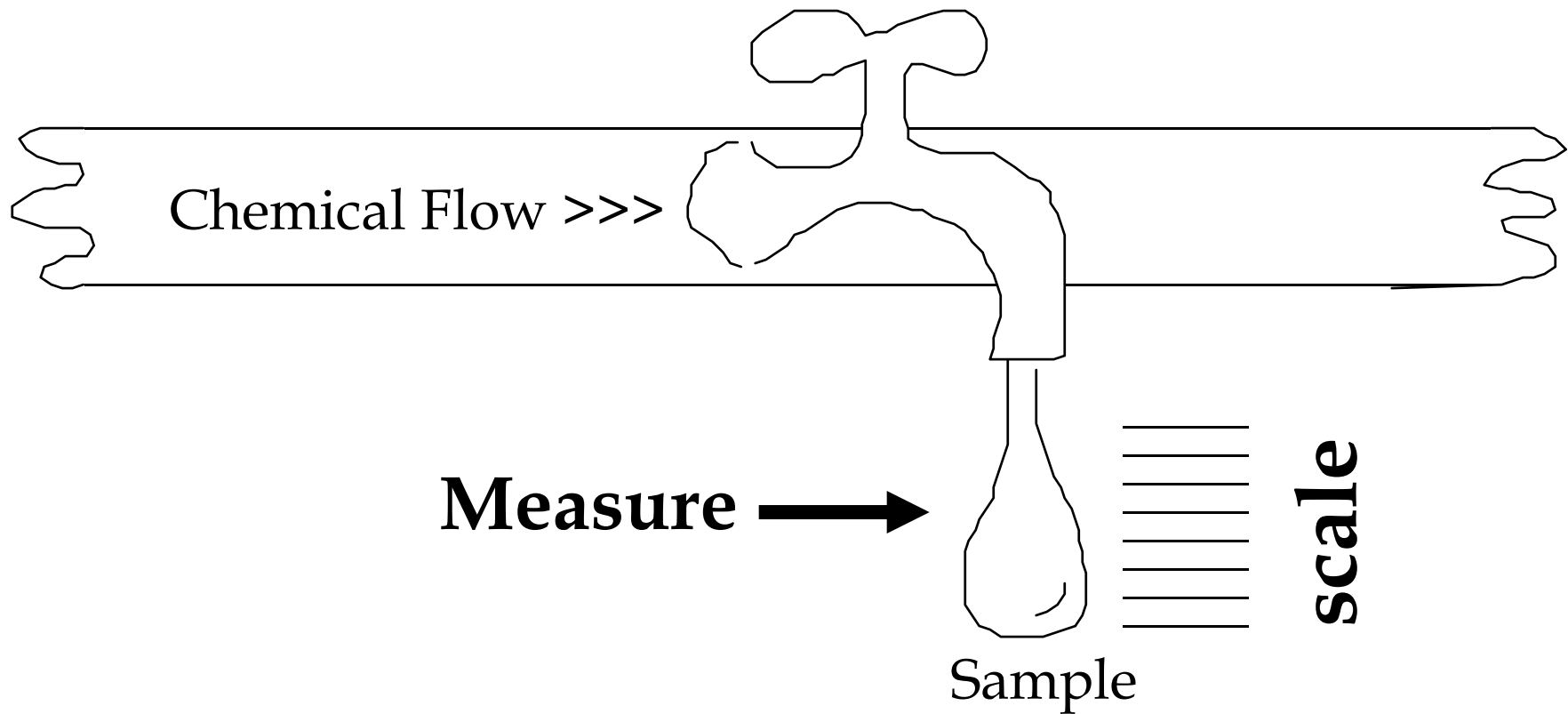
Harnesses the playful aspect of work to create context for practitioners to understand the process

- This metaphor connects the practitioners to the process in a readily understandable manner
- The metaphor is not limited like the statistical process control and socio-technical systems metaphors
- It gives us a way to understand the relation between work and process that is already culturally encoded and humanistically comprehensible



The old metaphor:

Statistical Process Control



□ Pipes and Spigots



■■■■ *Statistical Process Control*

- Created as a way to control the outputs of the continuous processing of chemical plants
 - Measures intermediate products that are flowing through the pipes of the plant by sampling and applying statistics to picture the normal range of operation at a particular point in the system
- It does not give a systematic overview of the processing plant as a whole, but only snapshots of local states of intermediate products
- It is not human-centered, but a technology-centered metaphor
- It is still product and not process-oriented
 - Aimed at sampling intermediate products to know the state of the process flows and control the quality of final products
 - Local variations in intermediate products controlled by feedback in order to control overall quality of end result
- Problem with highly technical engineering work: *no flows*

■■■■ *The Japanese Success Story*

- Deming took Statistical Process Control to Japan and applied it to production lines -- Taguchi method is a refinement
 - The result was an impressive increase in end product quality
 - In the production line there were actual material objects that flowed by like in the chemical processing plant that could be measured
 - Product and production design became important ancillary disciplines to production control through feedback within the organization
 - Statistical Process Control gained a reputation for being the best way to instill quality in an end product through Deming and Taguchi in Japan
- These techniques have slowly been re-imported into the United States
 - The SEI has taken the lead in applying them to software production
 - Maturity model is a prime example of this approach

■■■■ *Another Metaphor: Socio-technical Systems*

- Developed in England and first applied to mining and production lines by Eric Trist of Tavistock Institute, London
- Treats the social and the technical environment as one system
 - Takes account of the place of humans in the technical sub-system
 - Gives a global view of the technical work context
 - Soft-systems methodology (Action Research) of Checkland is an outgrowth of this approach
 - Self-regulating work teams is a key idea in this approach
 - Based on industrial studies

■■■■ *Three Metaphors Compared*

<u>Socio-technical Systems</u>	<u>Gaming</u>	<u>Statistical Process Control</u>
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Global	Human scale	Local
Human considered	Human centered	Technical
System oriented	Rules oriented	Product oriented

- ❑ Gaming is at an intermediary position between socio-technical systems and Statistical Process Control approaches
- ❑ Gaming considers the whole human within the work context as simultaneously participating in a game process context
- ❑ Gaming provides us with an alternative vision of work processes
 - is easy to relate to
 - based on play

Where the Other Metaphors Break Down

- Pava applied socio-technical systems view to office work
 - He found that it did not apply without modification
 - He introduced the distinction between
 - Routine work
 - Non-routine work
 - With this distinction, he could fit socio-technical systems within the office milieu
- Statistical Process Control is blind to the existence of non-routine work
 - If there is no flow it cannot be sampled
- Socio-technical systems is blind to non-routine work
 - it considers everything a system -- extreme macro-view
 - non-routine aspects of work are lost within the soft (social and psychological) aspects of system

Reality, Models and Meta-models

- Reality
 - appraising the nature of reality
 - choice of paradigm
 - acquisition of knowledge
 - dealing with complexity
- Modeling
 - determination of the epistemology of the inquiring system
 - problem definition
 - choice and application of the model
 - solving the problem
 - applying the solution
 - avoiding pitfalls of modeling
- Meta-modeling
 - definition of other hierarchies
 - determination of the epistemology of the inquiring system at each level of recursion
 - defining the problem to be solved at each level of recursion
 - identifying rationalities and meta-rationalities
 - distinction between data, information and intelligence
 - system malfunctions and failures
 - other meta-modeling failures

John van Gigch

Routinization

- Klir's General Systems Theory uses a hierarchy of meta-models to describe system change
 - Structural systems demand at least second order formalizations
 - micro formalisms of content within form
 - The creation of structural designs pushes out of the merely routine work into non-routine meta-work
- Using models, meta-models, etc. we are able to climb the staircase of meta-levels of change and learning
 - Modeling at meta-levels is the major contributor to the necessity of non-routine work
 - Whatever can be captured by a first order formal model can be routinized

■■■■ A Key Distinction

Routine Work

non-expert
mostly manual
context independent
causal

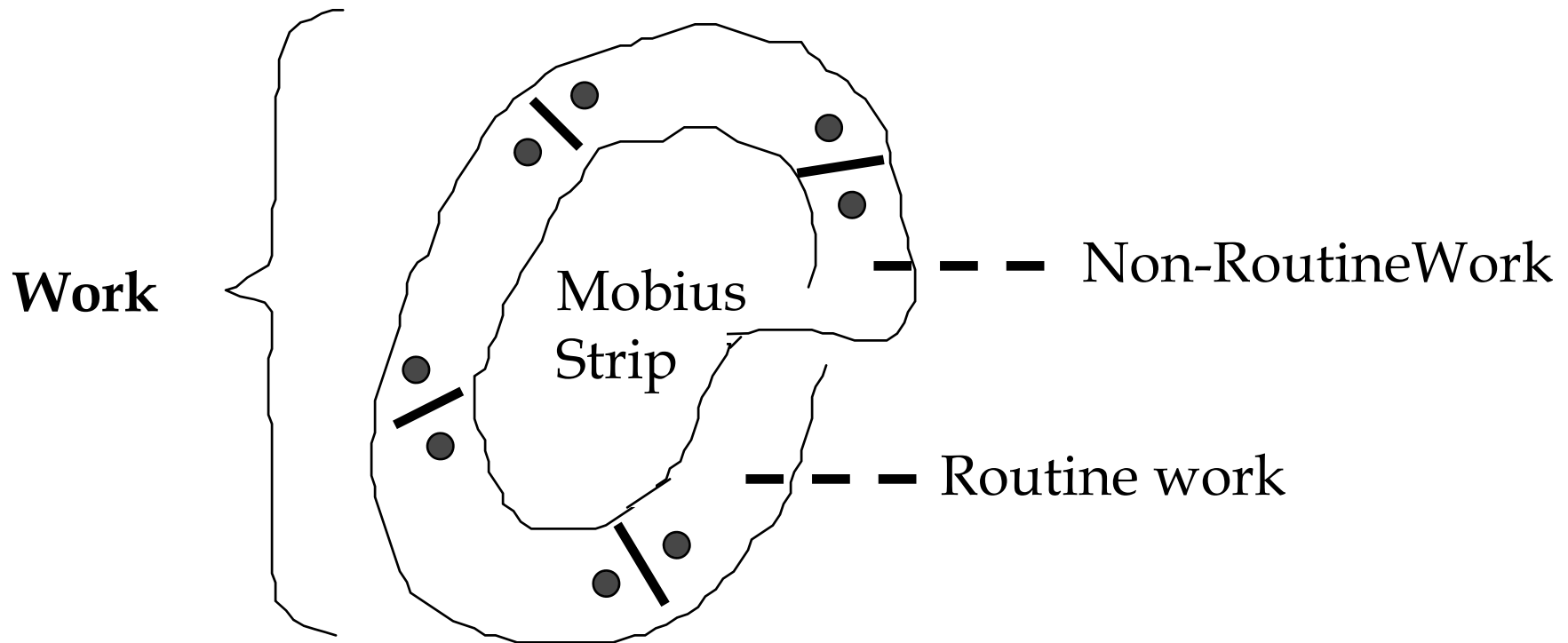
Non-routine Work

expert
mostly non-manual
highly context dependent
iterative and recursive

Non-Routine work . . .

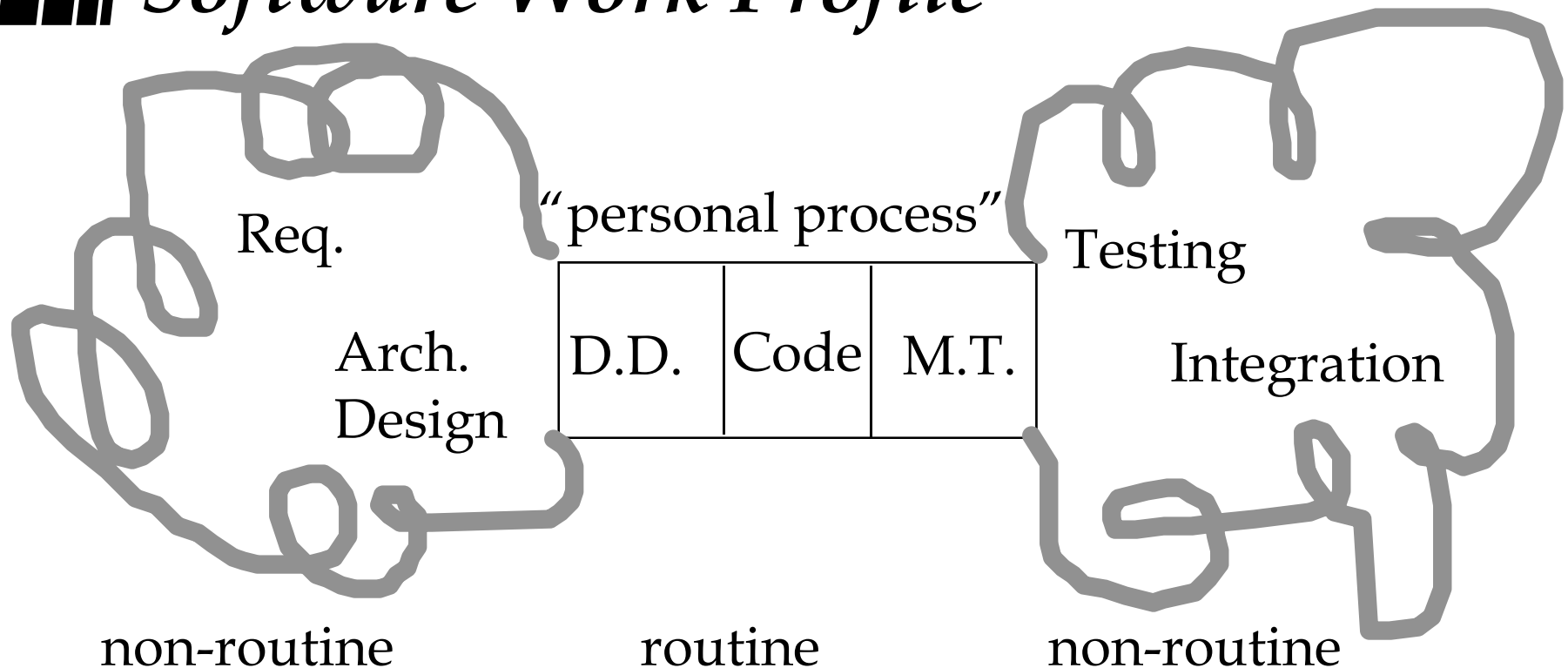
- ❑ Appears in office work but is a high percentage of engineering work
- ❑ Difficult to quantify but qualitatively different categories of work
- ❑ What makes it difficult to consider work as a system or to have a flow that can be measured

Impossible to Distinguish or Decide Completely



- ❑ Non-routine work causes the de-routinization of work
- ❑ Routine work is constantly rechanneled

Software Work Profile



- ❑ The essential transformations of the software process have different degrees of “non-routine work”
- ❑ The work upstream and downstream from implementation is more non-routine

Estimate of Routine Component

<u>SOFTWARE</u>	Routine part	%
☐ Requirements	20%	-- 9%
☐ Design	20%	-- 10%
☐ Implementation	80%	-- 12%
☐ Integration	20%	-- 15%
☐ Test	30%	-- 15%
☐ Prototyping	10%	-- 2%
☐ Reuse	30%	-- 1%

	Routine part	%
☐ Planning	60%	-- 5%
☐ Control	50%	-- 5%
☐ Metrics Collection	70%	-- 1%
☐ Config. Mgmt.	80%	-- 3%
☐ Sub-contracts	40%	-- 1%
☐ Quality Eng.	60%	-- 3%
☐ Process Improvement	30%	-- 3%
☐ Training	70%	-- 1%
☐ Tech. Mgmt.	10%	-- 1%
☐ Environ. Support	50%	-- 2%
☐ Estimation	40%	-- 1%
☐ Review	70%	-- 5%
☐ Documentation	60%	-- 5%

46.3 Routine

53.7 Non-routine

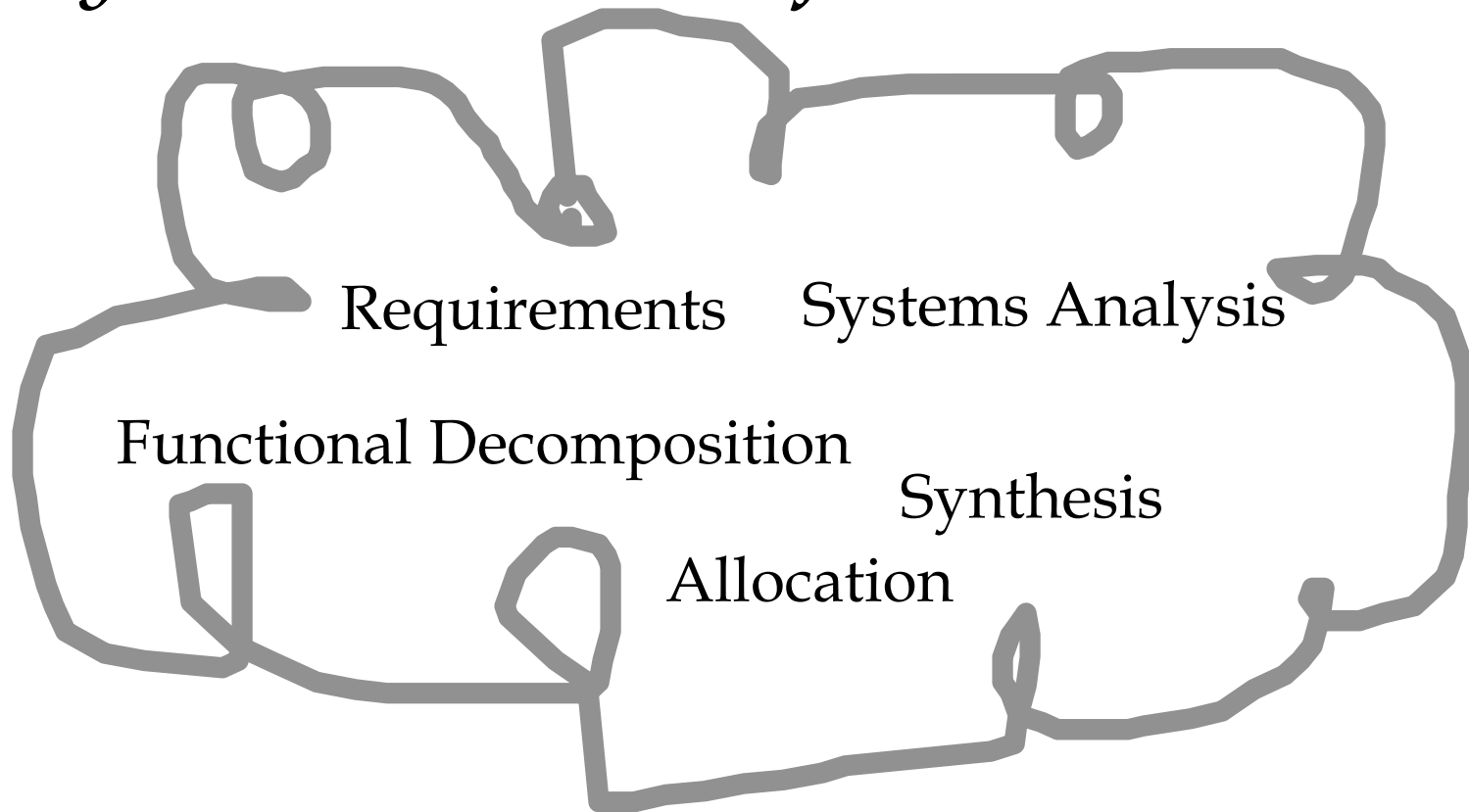
mean 45% Routine

sd 23%

for all the work with
each kind of work
contributing its part

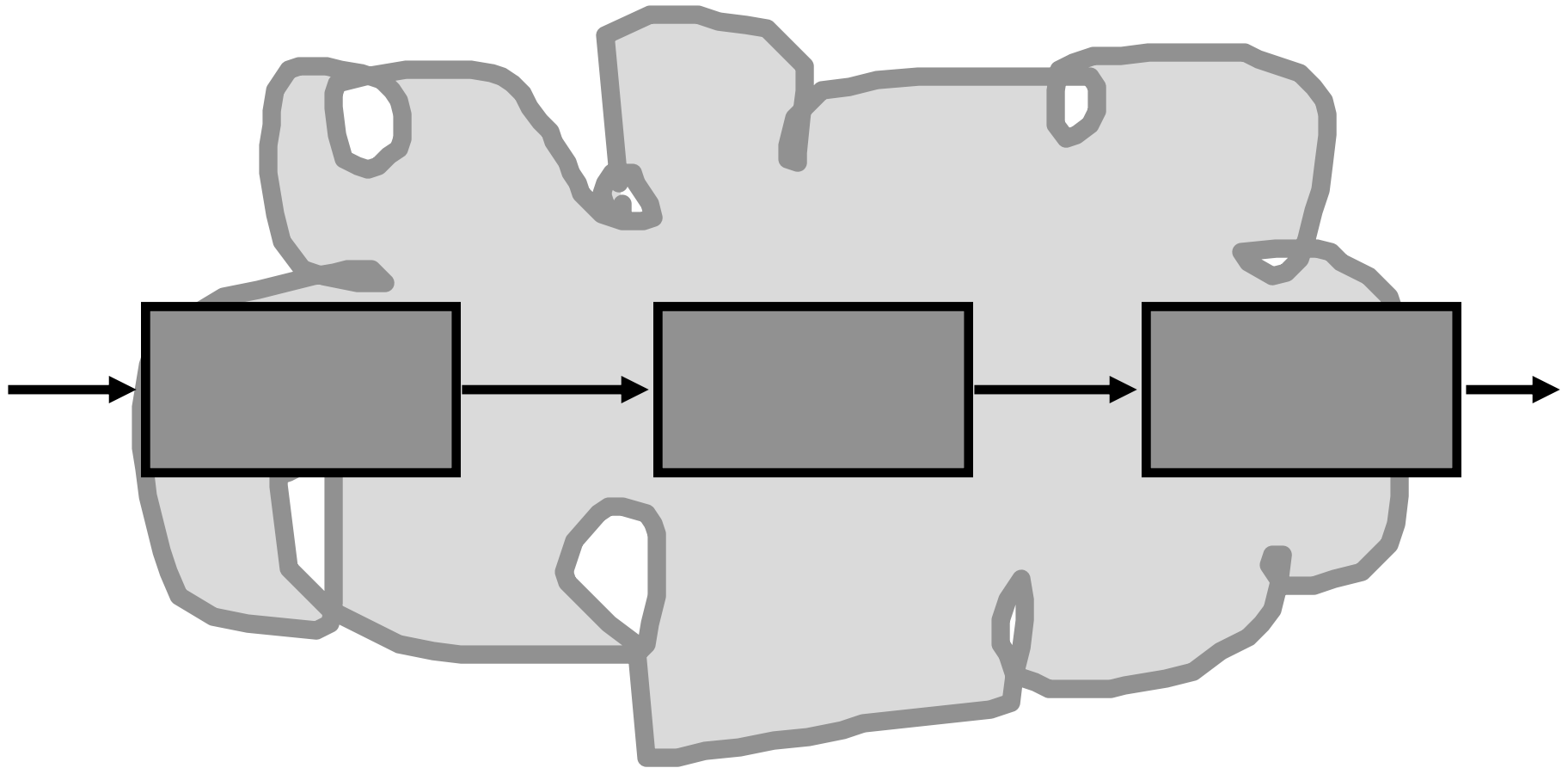
per kind
of work

Systems Work Profile



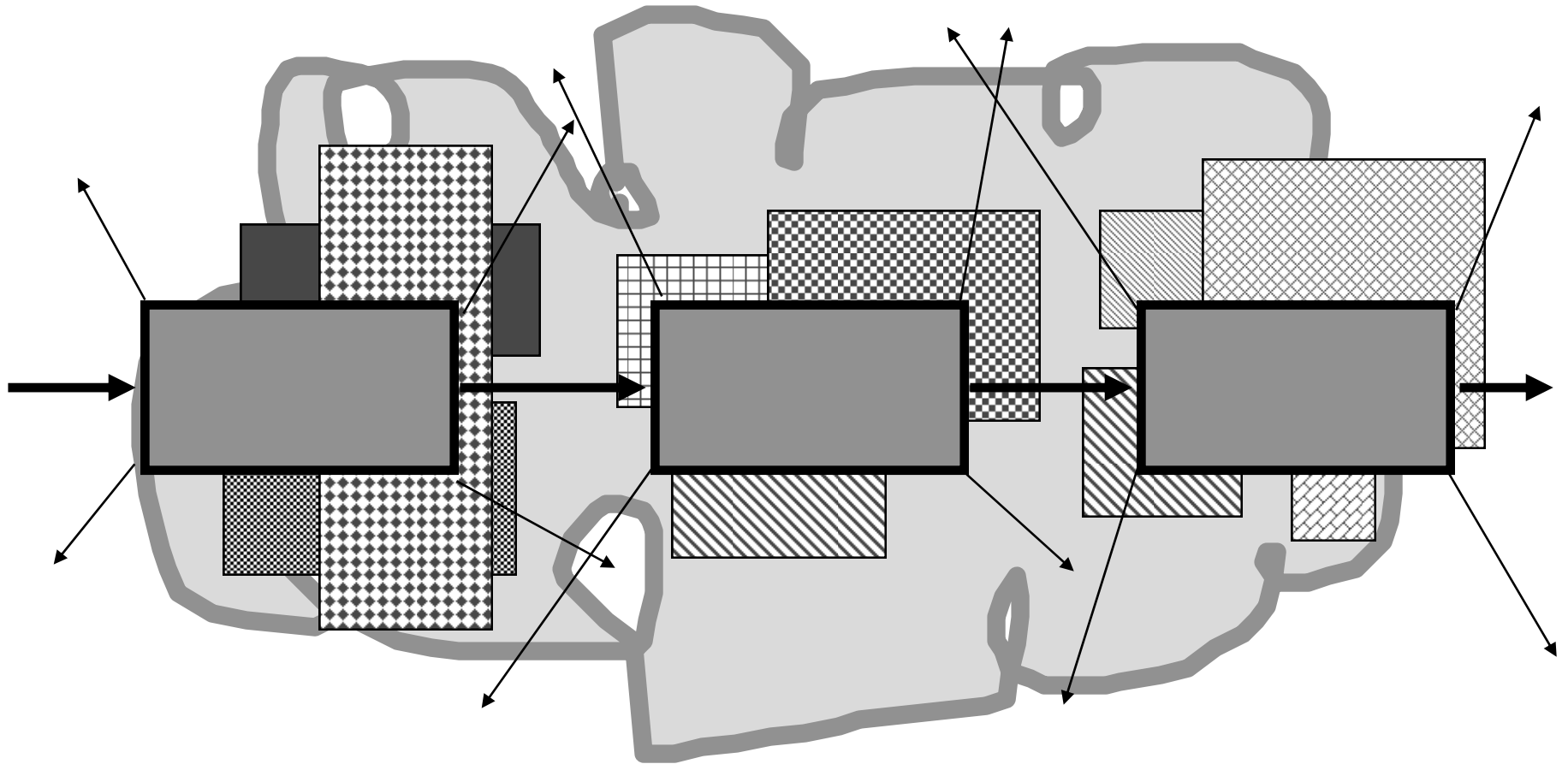
- ❑ Systems Engineering has a very high proportion of non-routine work among its essential transformations
- ❑ No routine work core to discipline as in Software Engineering

■■■■ The Problem



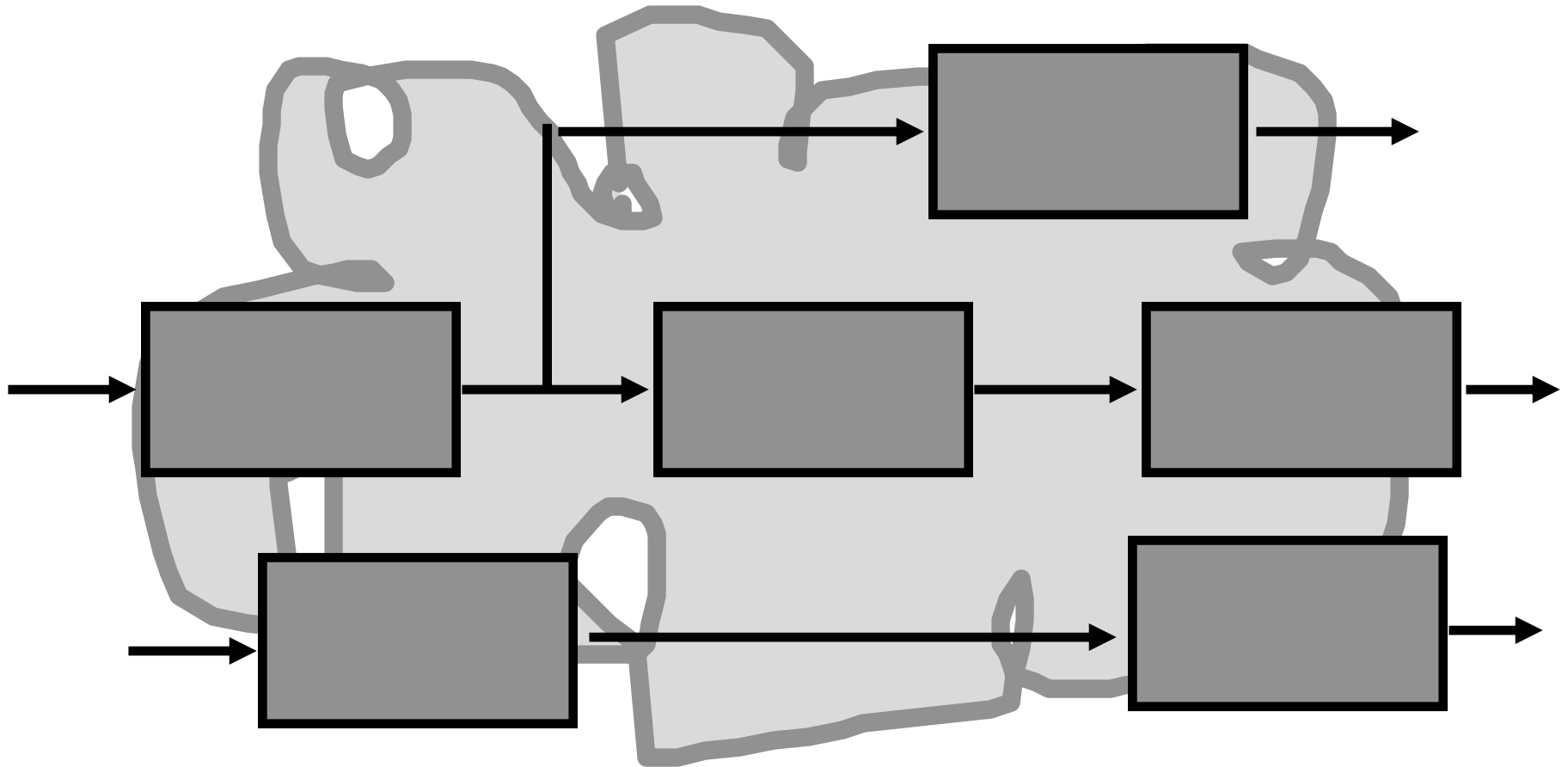
- Everything that cannot be reduced to discrete flows is invisible to the routinized process

Endless Variability of Contexts of Action



- Need to add “play” to the descriptions in order for them to operate in multiple contexts

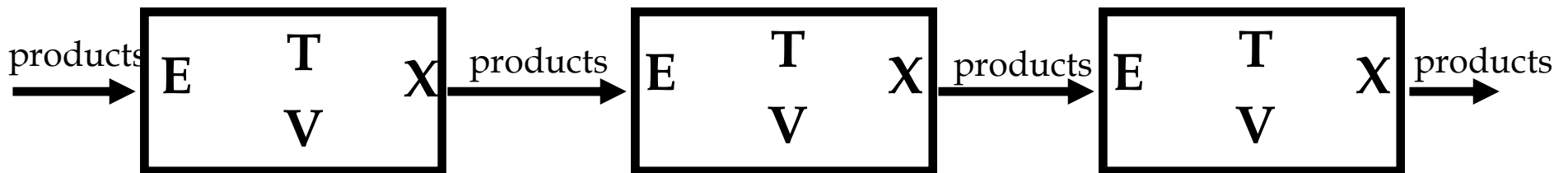
■■■■ The Actual Flows Are Never Static



- ❑ Flows multiply as new work is discovered in process
- ❑ Like a river changing its course continually

Standard Process Description

Non-routine work cannot be captured by this kind of description.



What this formalism of work does:

- ❑ Explicit descriptions of inputs and outputs with validation guards
- ❑ Explicit decomposition, sequence, and causality
- ❑ Describes simple routine work very well
- ❑ Excellent for control of precedent sensitive operations in process

The problem with these formalisms:

- ❑ Meta-formalisms do not describe meta-work
- ❑ Meta-formalisms describe the formalisms themselves

Process Descriptions Need More “Play”

- ❑ Freedom to explore multiple contexts
- ❑ Freedom to change course as the situation evolves
- ❑ Freedom to discover new ways of doing things

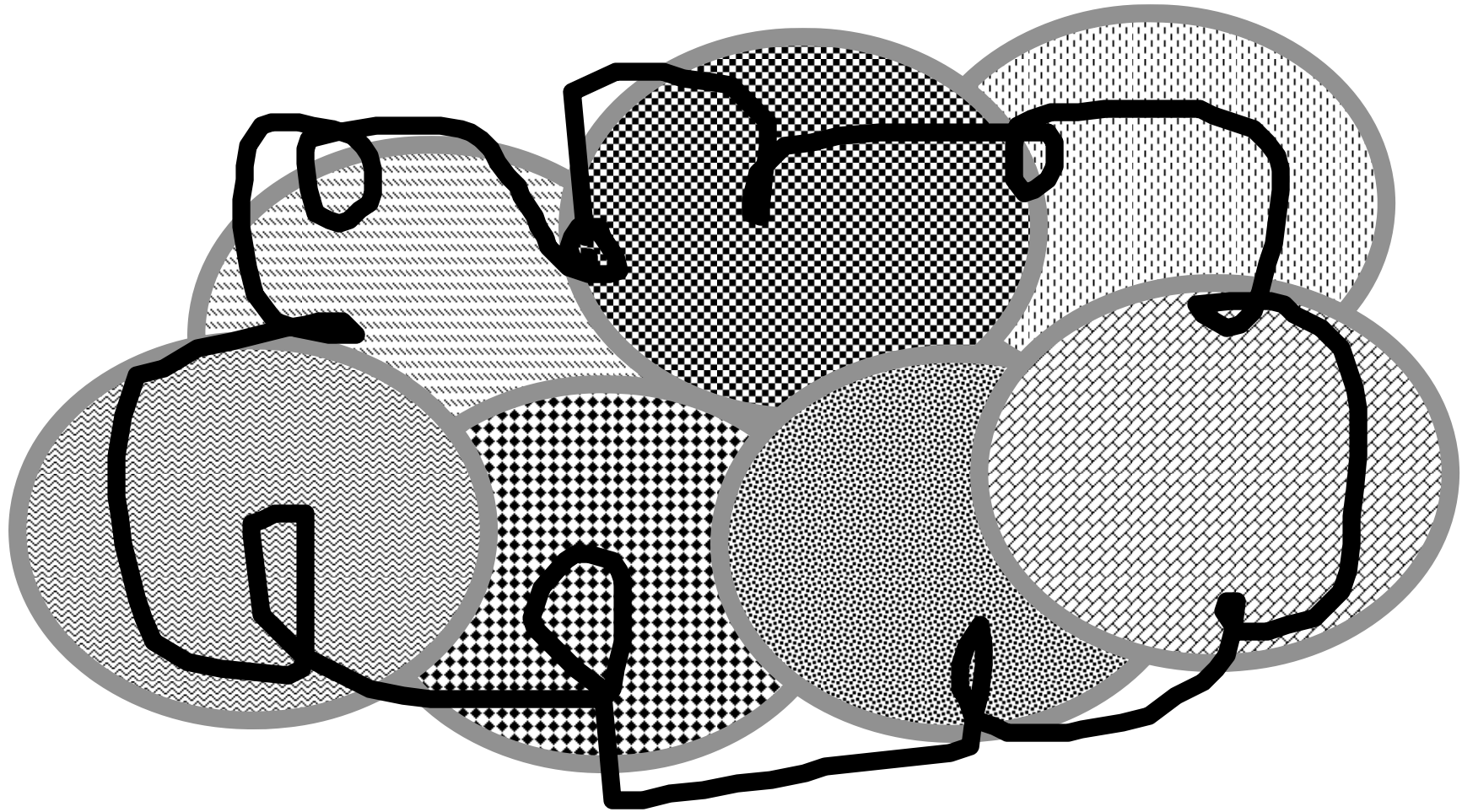
FREEDOM needs to be encoded into our process descriptions

- ❑ Non-routine work brings the dimension of play into process
- ❑ Without this crucial characteristic of play:
 - ❑ We are locked into blindly doing things
 - ❑ Descriptions can never emulate what is actually done
 - ❑ Open to work-to-rule problems

Freedom and Constraint

- Freedom and Constraint are complementary
 - A fine balance between these must be maintained
 - What we need is just the right amount and kind of each
 - It is difficult to determine that balance beforehand
- Only processes that are created “just in time” can ever hope to have the right balance for a given situation
 - The “give” or “play” in a situation is a variable like the weather; it is continually changing.
 - The constraints that come to bear on a situation likewise change constantly
- Because there is an over-emphasis on control in many process proscriptions, we emphasize the need for freedom
 - What we are really advocating is balance between freedom and constraint

Key Challenge



- Understanding Non-routine meta-work within processes

■■■■ *Non-Routine Meta-Work Is . . .*

- ❑ creativity
- ❑ innovation
- ❑ expertise
- ❑ wisdom
- ❑ intuition
- ❑ insight
- ❑ integrity
- ❑ response to the unexpected
- ❑ overcoming obstacles against the odds
- ❑ using one's imagination
- ❑ *art*

Artfulness

- ❑ All work can be artful
- ❑ The reward of artful work is in the doing
- ❑ The ambition of artful work is joy
- ❑ All work is spiritual work
- ❑ To be artful I must own my work process
- ❑ Artful work requires the use of the self
- ❑ As the artist creates the work the work creates the work

Dick Richards

Artful Work

(Berret Koehler, San Francisco 1995)

■■■■ *The Key Distinction in Gaming*

Routine Work

non-expert
mostly manual
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causal

Non-routine Work

expert
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iterative and recursive

Playing the Game

Lower meta-level

Making up the rules

Higher meta-level

- ❑ Making up the rules takes place on a meta-level higher than playing the game
- ❑ It can mean designing the game for others, or creating exceptions

■■■■ The Usefulness of the Gaming Metaphor

- Meta-games describe meta-work very well
 - the meta-game produces games
 - the meta-work structures the routine work
 - Where meta-formalisms for formalisms of routine work diverged from the description of work, meta-games do not diverge in the same way but allow our analogy between process and games to hold at higher meta-levels
 - The same is not true for Statistical Process Control
 - The meta system here is the discipline of measurement
 - The same is not true for socio-technical systems
 - The meta-system here is general systems theory
- *Having a metaphor that allows us to climb the series of meta-levels is an important advance*

▀▀▀▀▀ *Levels of Play*

Designing the process (non-routine work)

Process meta-game at org. level (routine work)

Work making up the rules at project level (non-routine work)

Work by the rules at project level (routine work)

- ❑ Every project instantiates the meta-game of process
- ❑ The organization plays the meta-game of process
- ❑ Designing the meta-game is the responsibility of the process group
- ❑ Making up the rules of the project game is the role of those engaged in non-routine meta-work on the project
- ❑ Practitioners play by the rules made up in non-routine meta-work

■■■■ *Playing the Game*

- ❑ Procedure = Play
- ❑ Method = Play Sequence
- ❑ Process = Game Plan
- ❑ Meta-process = working out the best game plan

- ❑ What plays we use depend on what our opponent is doing in the midst of the game
- ❑ Each team comes to the game with a game plan in mind
 - Modifies game plan based on the plays made by the opponent
 - Modifies game plan based on opponent's responses to one's own plays
- ❑ In work the entire situation can be seen as our opponent
 - We must adapt to the situation flexibly based on our testing and discoveries of what plays work.

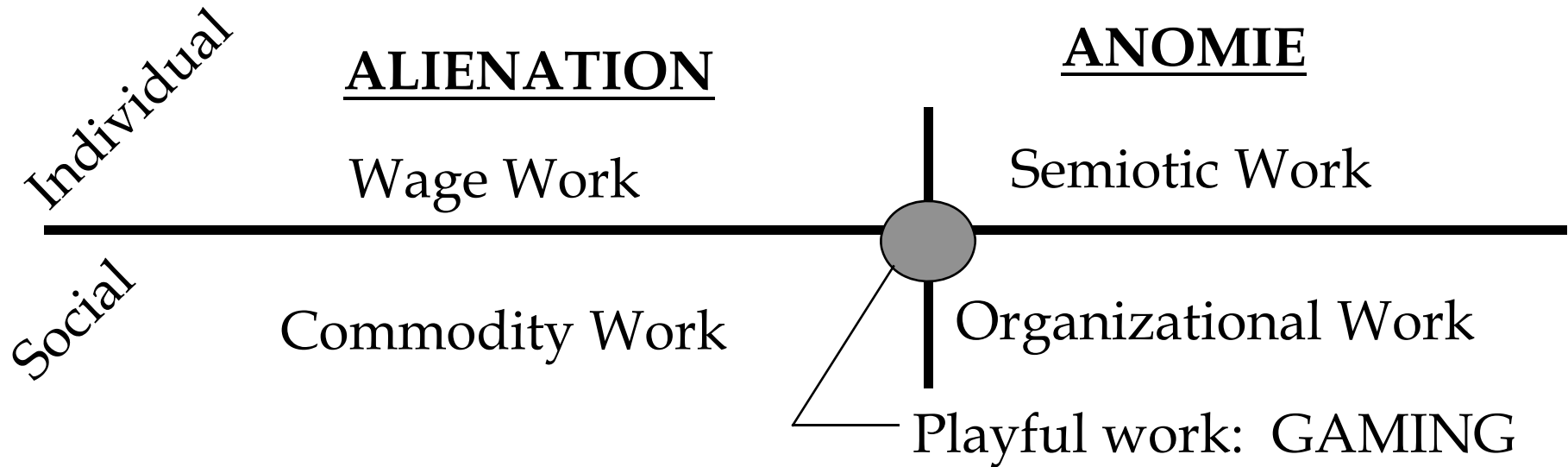
■■■■ *Serious Gaming*

- ❑ Both Socio-technical Systems and Statistical Process Control consider the work process as something “real” and in some sense immutable
 - They represent reified and objectified views of human action which is ultimately alienating
- ❑ Process gaming adds an important dimension to work process improvement
 - Games parallel the reality of work, offering an alternative view
 - We know we make up the rules and can change the rules so it is never reified or objectified, but always remains part of us
 - Construing the process as a game does not necessarily detract from its seriousness -- in fact, it is really only serious to the extent we consider it a game
 - Work and play become unified instead of separated as every action functions in the designated-as-real realm of work, as well as in the process game

Alienation and Anomie

- ☯ *Alienation is the divorce between the individual and his own action*
- ☯ *Anomie is the loss of meaning for the individual*
- ☐ Process considered as S-T S or SPC may serve to further both alienation and anomie
 - Focus is placed at the global or local levels instead of in a human context
 - Metaphors are not human centered but technological
- ☐ Alienation and Anomie are debilitating diseases within our organizations and society
 - They arise from the split necessity of wage labor and disinterest in the work performed on the part of the individual
 - They arise due to the feelings of loss of control of the individual within the organization
 - They arise from the cultural preference of product over the producer
 - They arise because semiotic systems become disconnected from the lifeworld
- ☐ Alienation and Anomie come from our very definitions of work

Play Unifies the Definitions of Work



- ❑ If all the contexts of work are seen as aspects of a game
 - then the social and individual levels are unified
 - then the action and meaning sides of are unified
- ❑ Wholeness of work is achieved in a human context
 - Commodities cannot be separated from their semiotic values
 - Wages cannot be separated from the organizational context
 - Commodities cannot be separated from their organizational context
 - Wages cannot be separated from their semiotic values

■■■■ *Applying the Theory of Games to Process*

- Game theory has been developed in order to aid decision making in economic and strategic contexts
 - This theory focuses on the potential of gain and loss in various restricted situations
- But games do not have to be construed so narrowly
 - We are talking here about multi-person games aimed at mutual gain and avoidance of mutual loss rather than games of conflicting interest
- There is a vast literature on game theory to draw upon as a background for developing processes based on gaming

Game Theory

- ❑ Considers probabilities of outcomes based on choices of players in conflict
- ❑ Cooperative game theory is a new development
 - Considers coalitions of players and their differential rewards
 - Considers idealized voting schemes
- ❑ Extends utility theory to group from individualistic games
 - Considers equality between players
 - considers maximization of reward for coalitions
- ❑ Two views of games
 - Strategic tree form of game plays
 - Matrix of game outcomes

■■■■ Cooperative Game Theory

- Arrow Theorem -- Social Welfare Function
 - “By a social welfare function will be meant a process or rule which, for each set of individual orderings R_1, R_2, \dots, R_n for alternative social states (one ordering for each individual), states a corresponding social ordering of alternative social states, R ” (Arrow 1951 p. 23)

- Characteristic Function -- Preferences of all coalitions 2^n-1

- Core -- Games in which all coalitions can be satisfied at once
 - These games do not tend toward conflict

Game Theory limitations

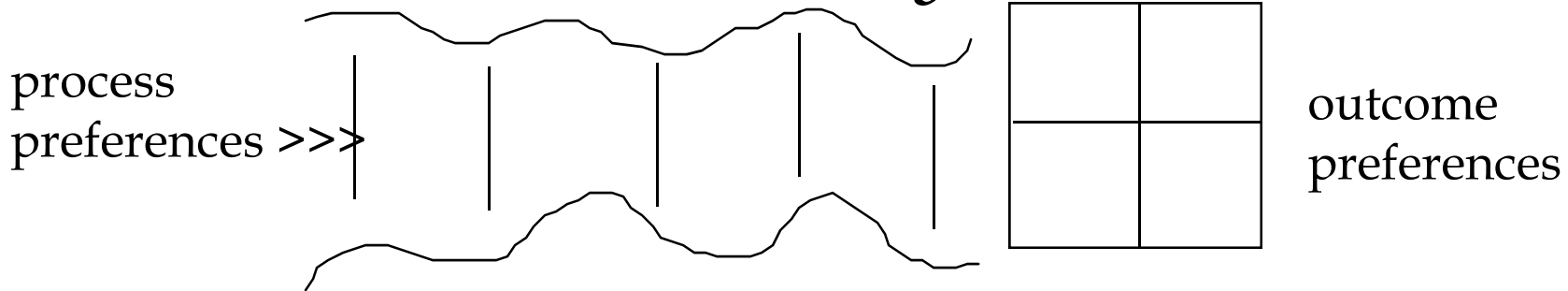
GAME THEORY

- ❑ Rules of game
- ❑ External symmetry
- ❑ No social conditioning
- ❑ No role playing
- ❑ Fixed well-defined payoffs
- ❑ Perfect intelligence
- ❑ No learning
- ❑ No coding problems
- ❑ Primarily static

BEHAVIORAL THEORIES

- ❑ Laws and customs of society
- ❑ Personal detail
- ❑ Socialization assumed
- ❑ Role playing
- ❑ Payoffs difficult to define (change)
- ❑ Limited intelligence
- ❑ Learning
- ❑ Coding problems
- ❑ Primarily dynamic

Social Game Theory

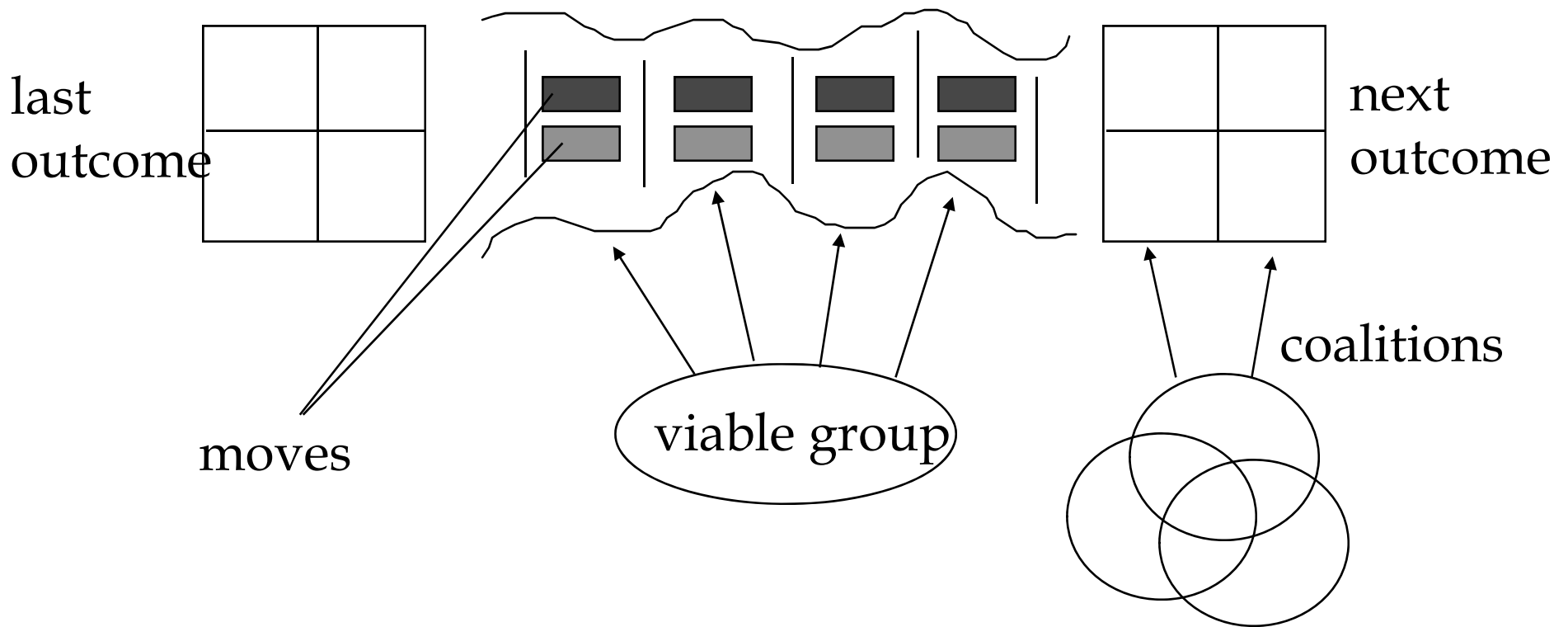


- ❑ Differentiates outcomes from process preferences
- ❑ Inverts coalition hierarchy and sees social group as an active player that differentiates into individuals
- ❑ Applies theory of moves giving significance to the order of moves by players
- ❑ Models the change and learning at various meta-levels
- ❑ Models role playing as agents perform different kinds of work together
- ❑ De-emphasizes utility theory and instead focuses on viability

▀▀▀▀ *Viable Systems*

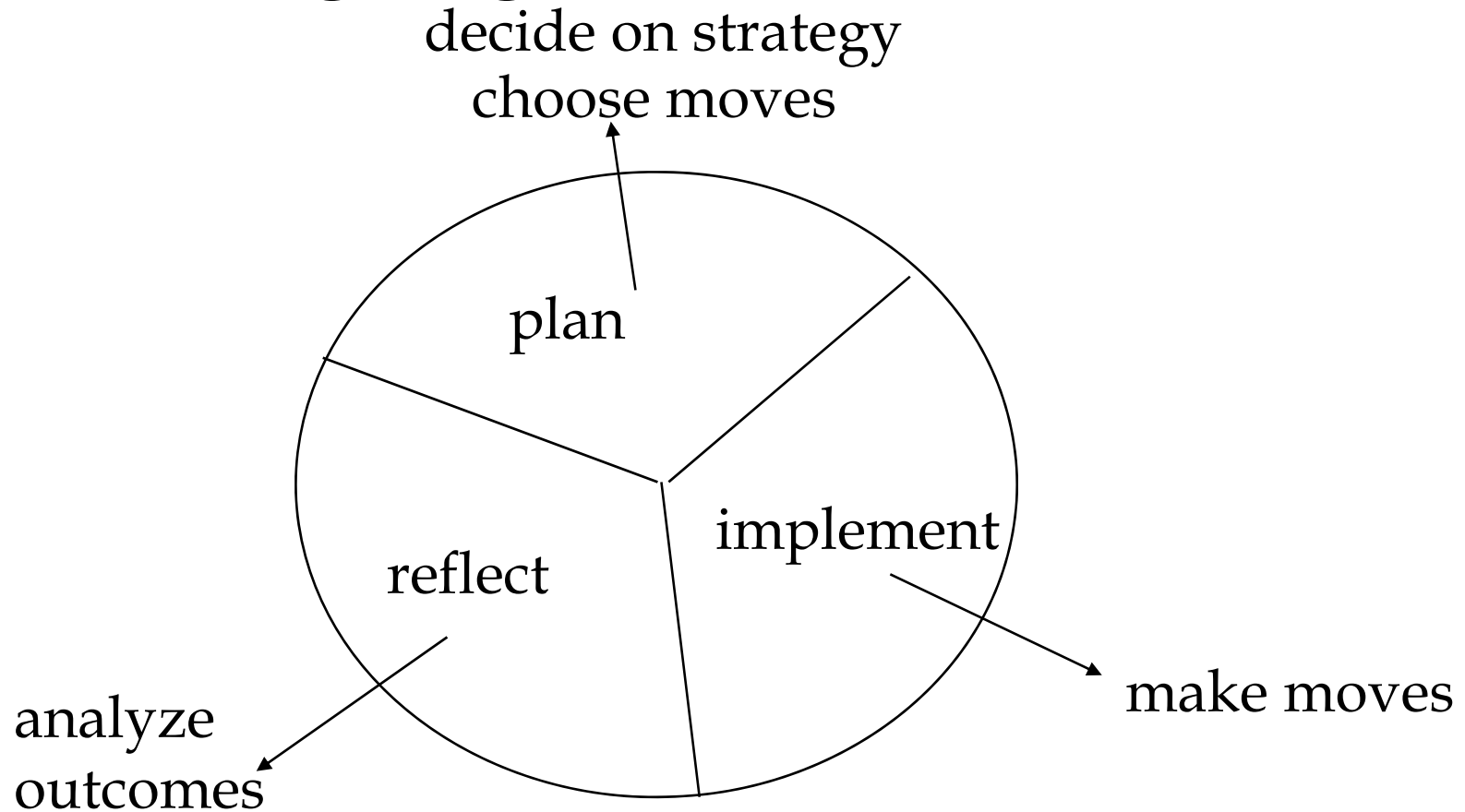
- ❑ Stanford Beer describes a model of viable organizations
 - A viable system is one which can continue to exist independently within an environment
- ❑ Based on Ashby's Law of Requisite Variety
 - A system's states must mirror the complexity of the states of the environment in variety
- ❑ A viable system is not necessarily elegant
 - Unnecessary variety abounds in the continual adaptation to a changing environment
- ❑ Social game theory has viability as its goal
 - Viability concerns may contrast with individual utilities
 - Group choices maximize viability

■■■■ Social Game Theory Model



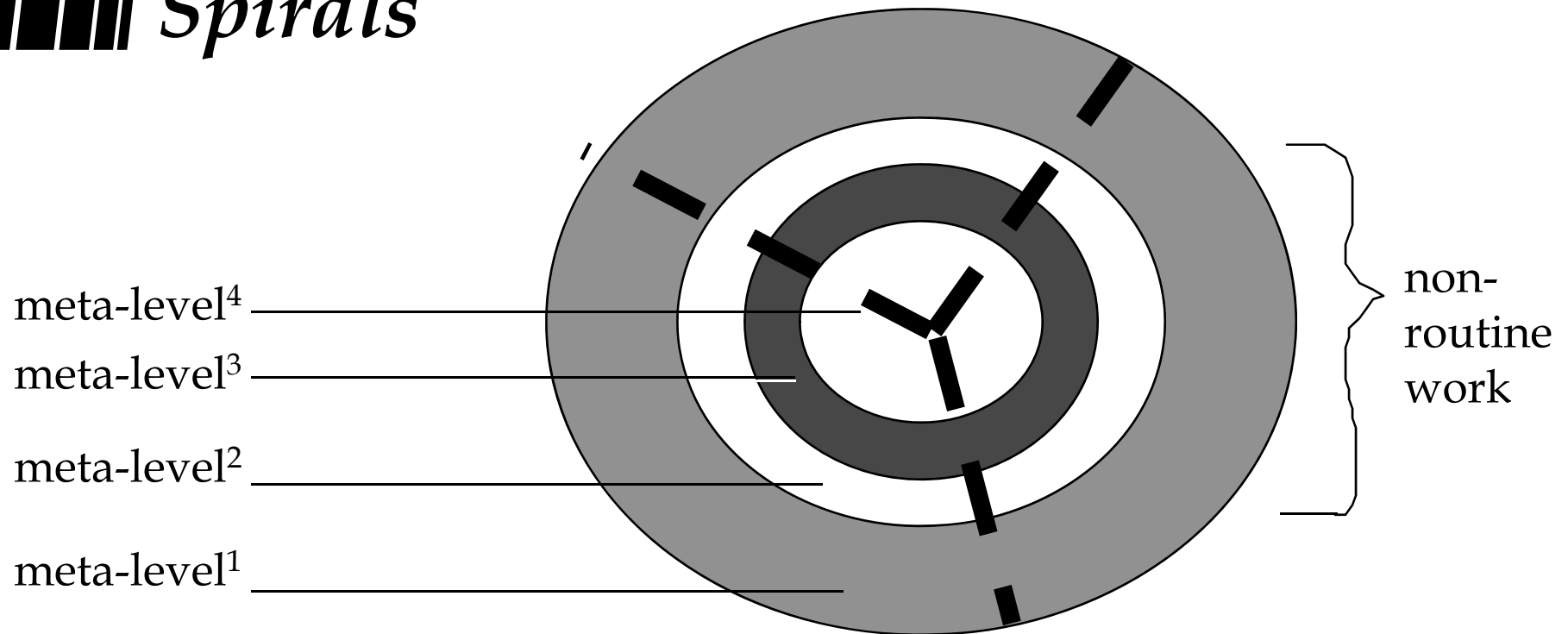
- Group determines process preferences while coalitions determine outcomes
- Theory of moves determines ordering of steps in process

Learning Organizations



- Combine learning with change agency in a cyclical process that is always learning and always changing

|||| Spirals

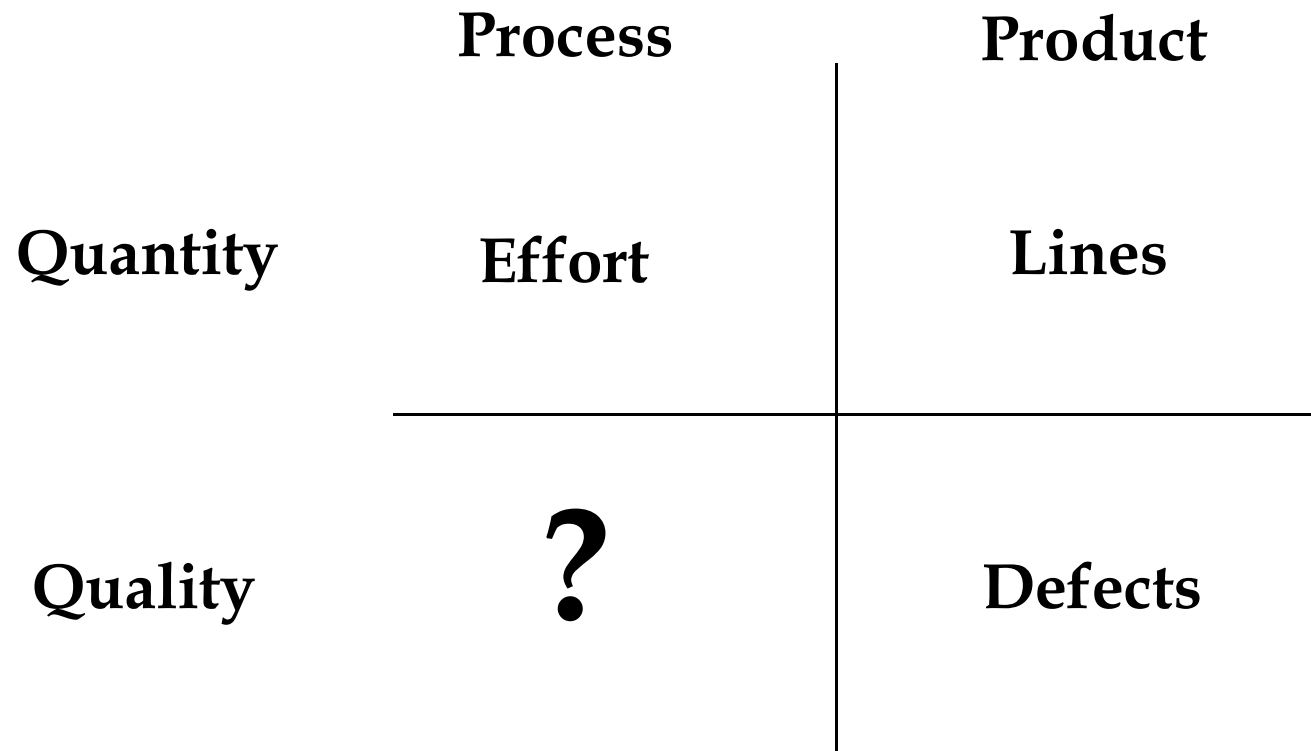


- ❑ Cycles occur at all the meta-levels of change/learning
- ❑ Cycles at different meta-levels interact to form spirals
- ❑ Non-routine work grows out of routine work attempting to deal with the environment within which the viable system operates

Gaming the Organization's Meta-system

- ❑ Enactment needs to be viewed as participating in the “game” of process simultaneously with doing the necessary work on the project.
- ❑ Subgame:
 - Each project has its own cooperative sub-game where it competes against itself to improve as it does the work on the project
- ❑ Meta-Game:
 - Each project competes with other projects within the organizational meta-game for points
- ❑ Scoring:
 - The points a project won in the meta-game would be directly related to their process improvement
 - The metrics collection and analysis would serve also as the scoring mechanism
 - Scores would be made public and where each project was within the game would have to be continuously available

■■■■ *Keeping Score*



- What is the nature of Process Quality?

Possible Answers . . .

- ❑ Efficiency (industrial engineering)
- ❑ Standardization (DOD)
- ❑ Regulation (ISO, SEI)
- ❑ Systematic (Soft-systems approach)
- ❑ Constantly improving (TQM, ISO, SEI)
- ❑ Effective (commercial businesses)
- ❑ Homeostatic (Statistical Process Control)
- ❑ Customer complaints (pragmatic approach)

**Many answers are possible,
No single answer has achieved wide acceptance**

The gaming measure of process quality

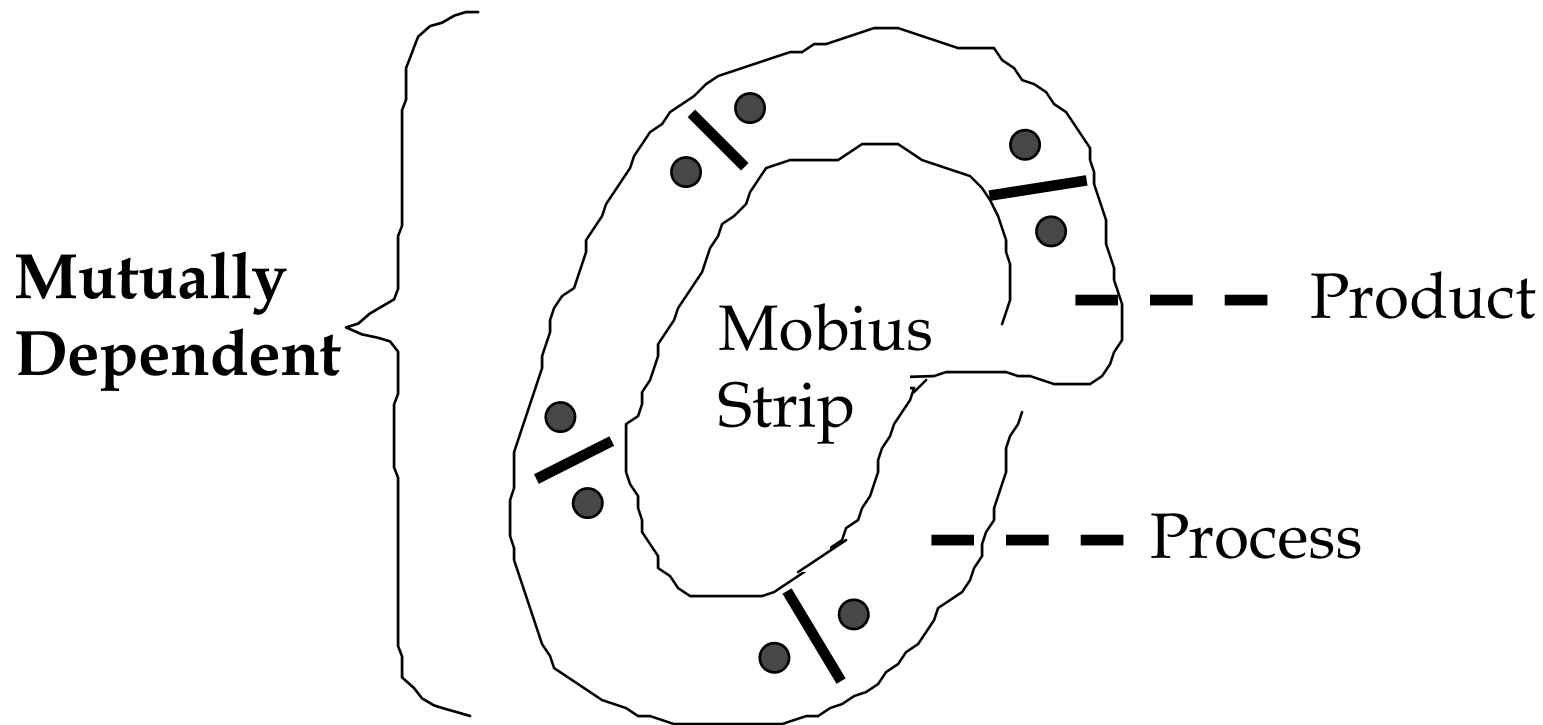
- ❑ Gaming demands an easily understood scoring mechanism
- ❑ We need an overall measure of process quality
- ❑ The measure needs to be sufficiently separated from the results of work
- ❑ Needs to be isolatable
- ❑ Needs to be something directly connected to our humanity
- ❑ Needs to be something we can indeed control

Many measures would probably fulfill these criteria

■■■■ *Process Quality = Reduced Noise*

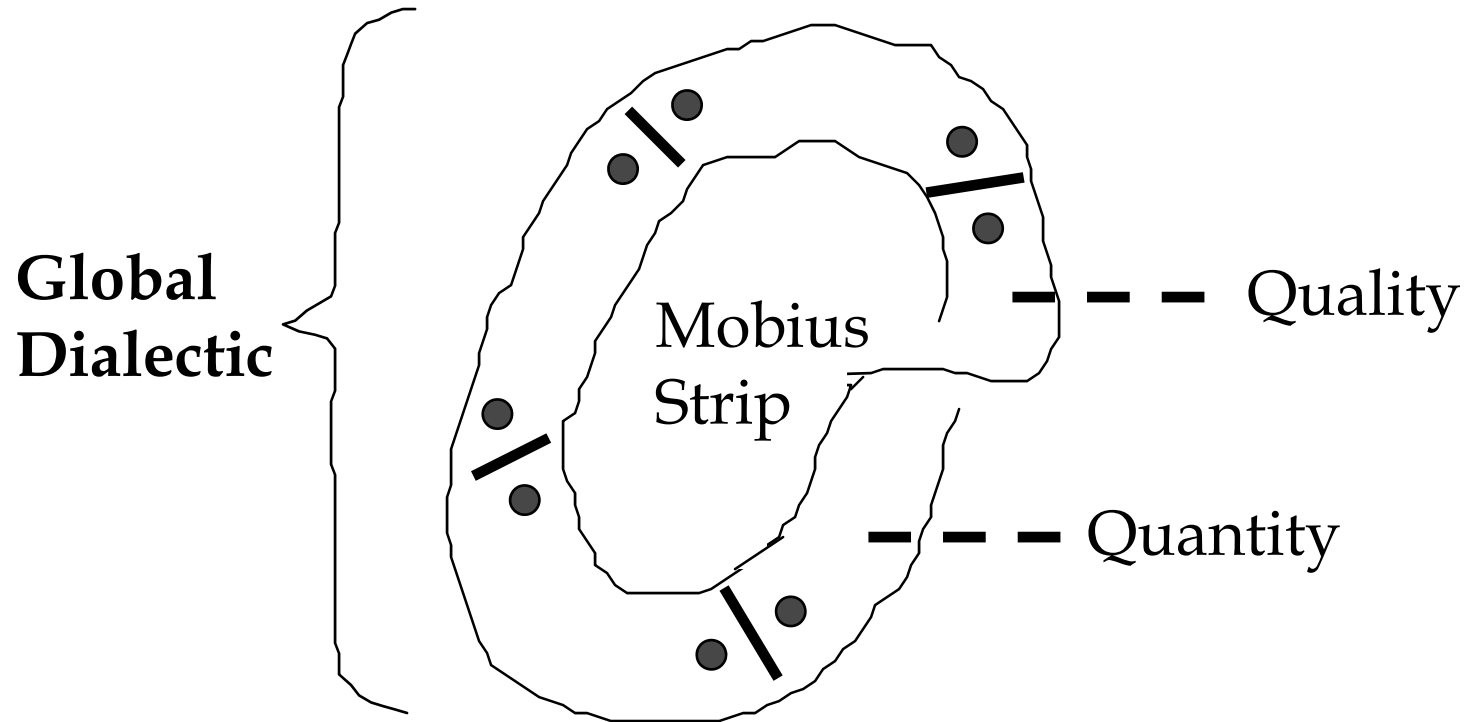
- Noise is defined as unnecessary variety
- Humans naturally produce variety
 - It is expensive to produce unnecessary variety
- We must continually strive for appropriate variety
 - We must attempt to create variety in the right things in the right way
 - We need to move from negative quality view to a positive quality view
- Reduction of unnecessary variety is a universal measure of process quality
 - The “name of the game” is how little unnecessary variety can we create
 - Playing the game means justifying variety injected by the process, so that only necessary variety is produced.

Product / Process Duality



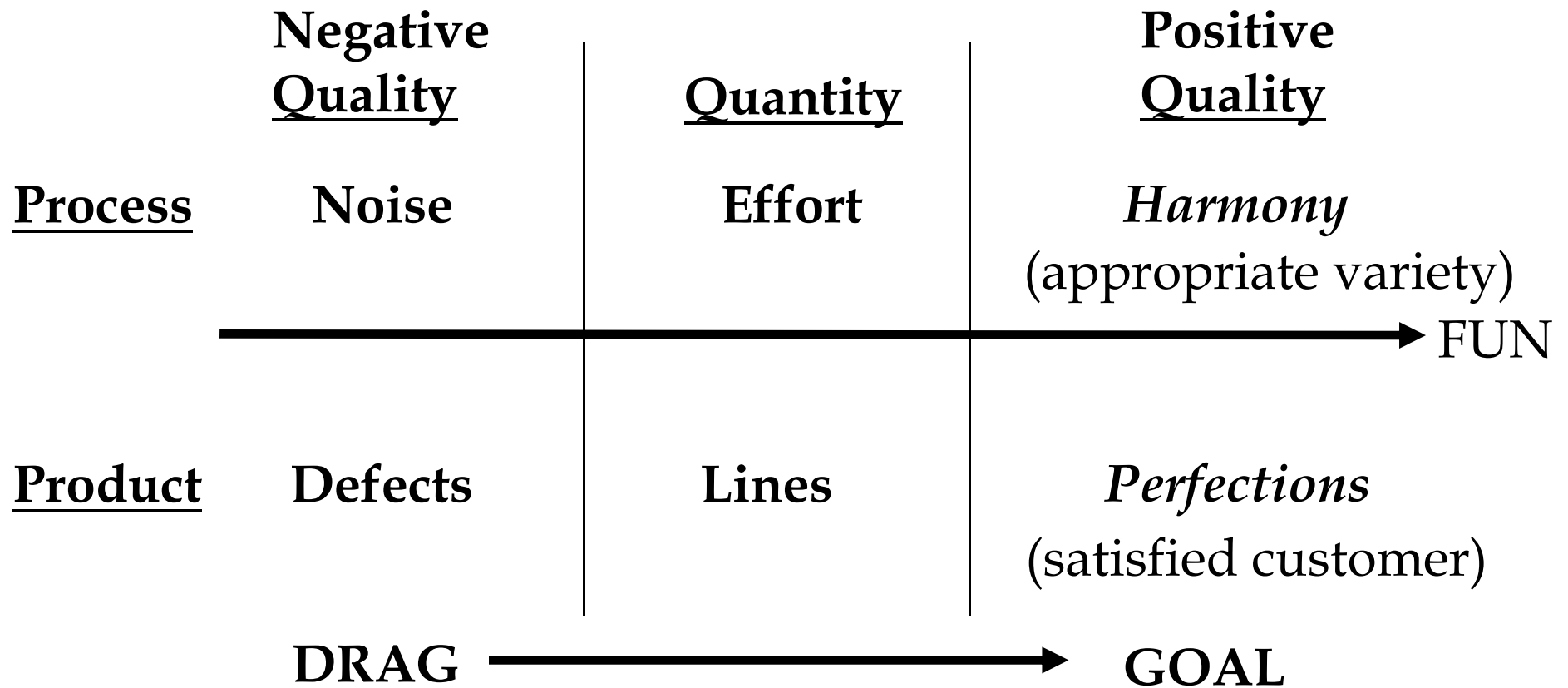
- Variety in intermediary products makes necessary variety in processes and vice versa

Quality / Quantity Duality



- ❑ Increased quantity changes the quality
- ❑ Increased quality differentiates quantity

■■■■ The Inversion of Quality Factors



- Need to stop characterizing quality only in negative terms

Positive Quality View

- Keeps the global relations in view
 - mutual dependence between process and product
 - dialectical relations between quality and quantity
- Allows for the expression of human potential
 - Attempts to reach the twin goals
 - Appropriate variety
 - Satisfaction of customer
 - Fun is an indication of the correct balance between work and play
- Produces a realm in which the gaming metaphor can operate
 - Play tends to produce harmony as a natural outgrowth
 - Play allows for imagination of perfections within reality of imperfection
 - Play allows for the variations that are necessary to find the appropriate variety
 - Play gives a context for the pursuit of the impossible in tandem with the pursuit of the realistic
 - Play allows us to be self-conscious of our work in the midst of the work

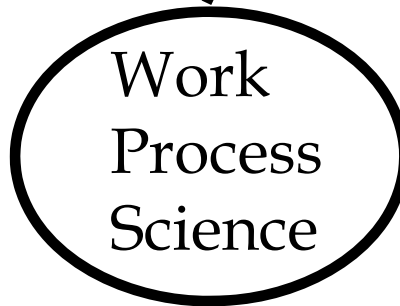
■■■■ *The Future of Process . . .*

**Work Product
Engineering**

Conscious

Discipline

Paradigmatic



**Work Process
Engineering**

Self-conscious

Meta-discipline

Epistemic

- We need to develop explicit theories of work and apply our measurements to those theories instead of indulging in naive positivism
- We need to develop other metaphors for process which challenge our assumed categories and try them out

