

Developing Workplace Critical Thinking (DWC)

BMSK5001

Week 5
Lecture 1

Aim session

- Critical Thinking Summarized
- Systems Theory
- Exercise: putting theory into practice

Beliefs

A belief is an internal feeling that something is true, even though that belief may be unproven or irrational. e.g. I believe that walking under a ladder brings bad luck, or I believe that there is life after death (Anderson & De Silva, 2009).

Values

A value is a measure of the worth or importance a person attaches to something; our values are often reflected in the way we live our lives e.g. I value freedom of speech, or I value my family, morals (Anderson & De Silva, 2009).

Attitudes

An attitude is the way a person expresses or applies their beliefs and values, and is expressed through words and behaviour. eg I get really upset when I hear about cruelty to children and animals, or I hate school (Anderson & De Silva, 2009)

Emotions

Emotions are intense, relatively short-lived feelings

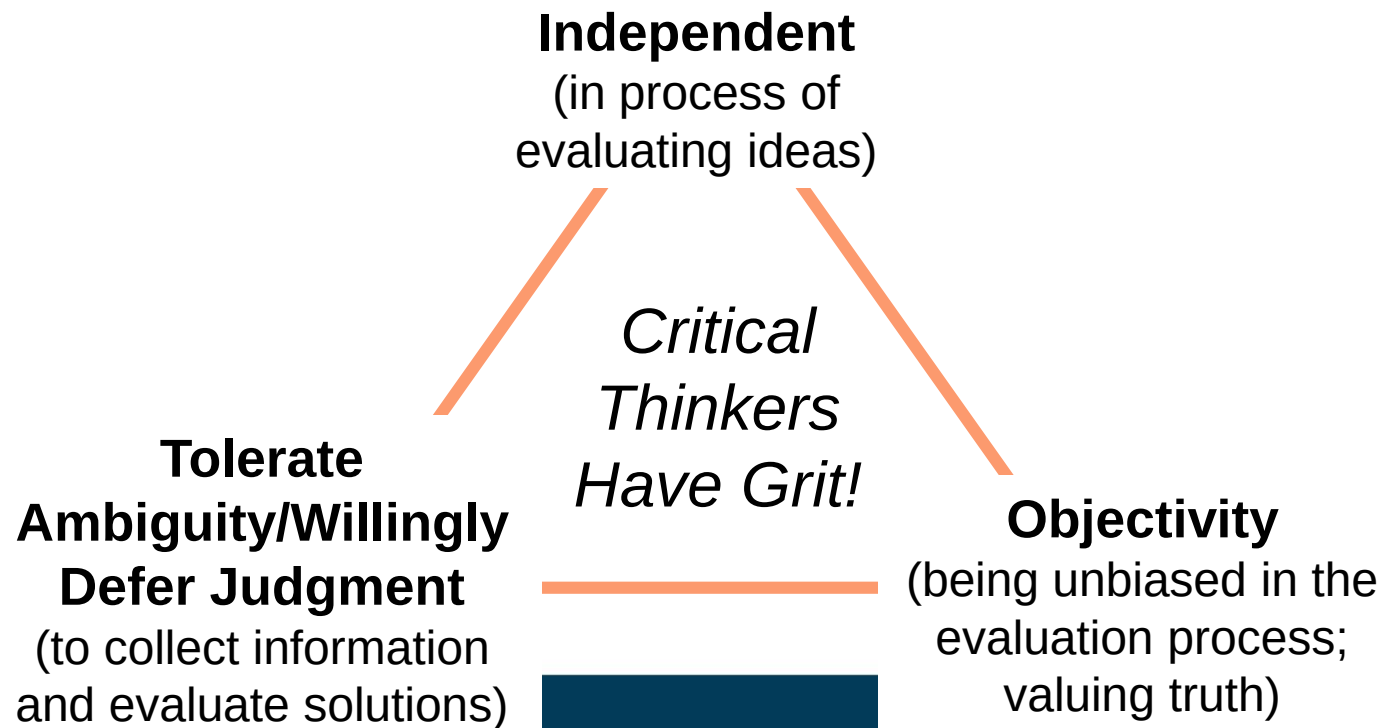
(Clay-Warner & Robinson, 2008)

Critical Thinking (CT)

- Is an activity which entails more than the skills of logic analysis
- It involves questioning the assumptions underlying customary, habitual ways of thinking and acting
- Then being ready to act and think differently on the basis of this critical questioning (in problem solving/ decision making, etc.)

Critical Thinking (CT)

- Critical thinking is the process that evaluates the ideas generated by creative thinking.

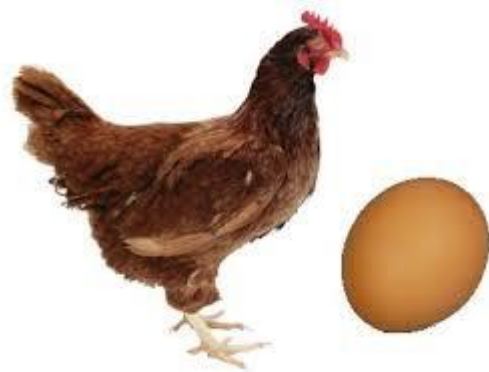


Critical Thinking (CT)



In pairs of 2 – 3 discuss, making use of CT

- Which came first the bird or the egg?



Systems Theory

Background of the theory

- Proposed in the 1940s by biologist Ludwig von Bertalanffy
- It was furthered by Ross Ashby in 1964
- Ludwig von Bertalanffy reacted against reductionism

General Systems Theory

- We all work within and between a variety of systems: structural systems (a road network), functional systems (academic department), social system (work group), information system (a class or course).

What is a system?

- A system is a set of objects or elements that interact to achieve a specific goal.
- A system is more than the sum of its parts; its properties emerge from the relationship among its parts and from the system's relationship to its environment
- Systems are arranged hierarchically, so every system is a super system for systems contained within it and a subsystem for systems containing it
- All systems are more or less similar
- E.g. A tree is a system of leaves, branches, fruits, interact through photosynthesis to provide outcomes larger than what individual parts would produce. The tree is part of a larger system e.g. forest, ecosystem

Description of Systems Theory

- Goal: to systematically discover a system's dynamics, constraints, conditions and explaining principles (purpose, measure, methods, tools, etc.) that can be discerned and applied to systems at every level and in every field for achieving optimized equifinality (a given end state in an open system)
- Departments, work groups, business units, facilities, and individual employees all can be viewed as subsystems of the organization

Description of Systems Theory

- Provides an approach to understand, analyse and think about organizations.
- Views an organization as an organism made up of numerous parts (subsystems) that must work together in harmony for the larger system to function effectively.

Description of Systems Theory

Believes that organizational success relies on:

- Synergy (combined effects of > 2 outputs)
- Interdependence between subsystems
- Interconnections
 - Within the organization
 - Between the organization and the environment

What do systems do?

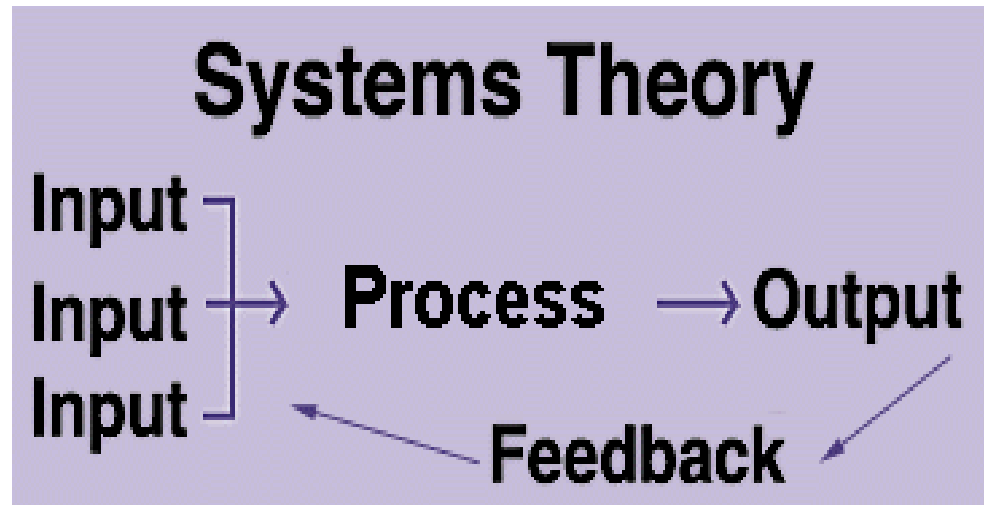
- The function of a system is to convert **information**, energy, or materials into a planned outcome or product for use within the system, outside the system or both.

Types of systems

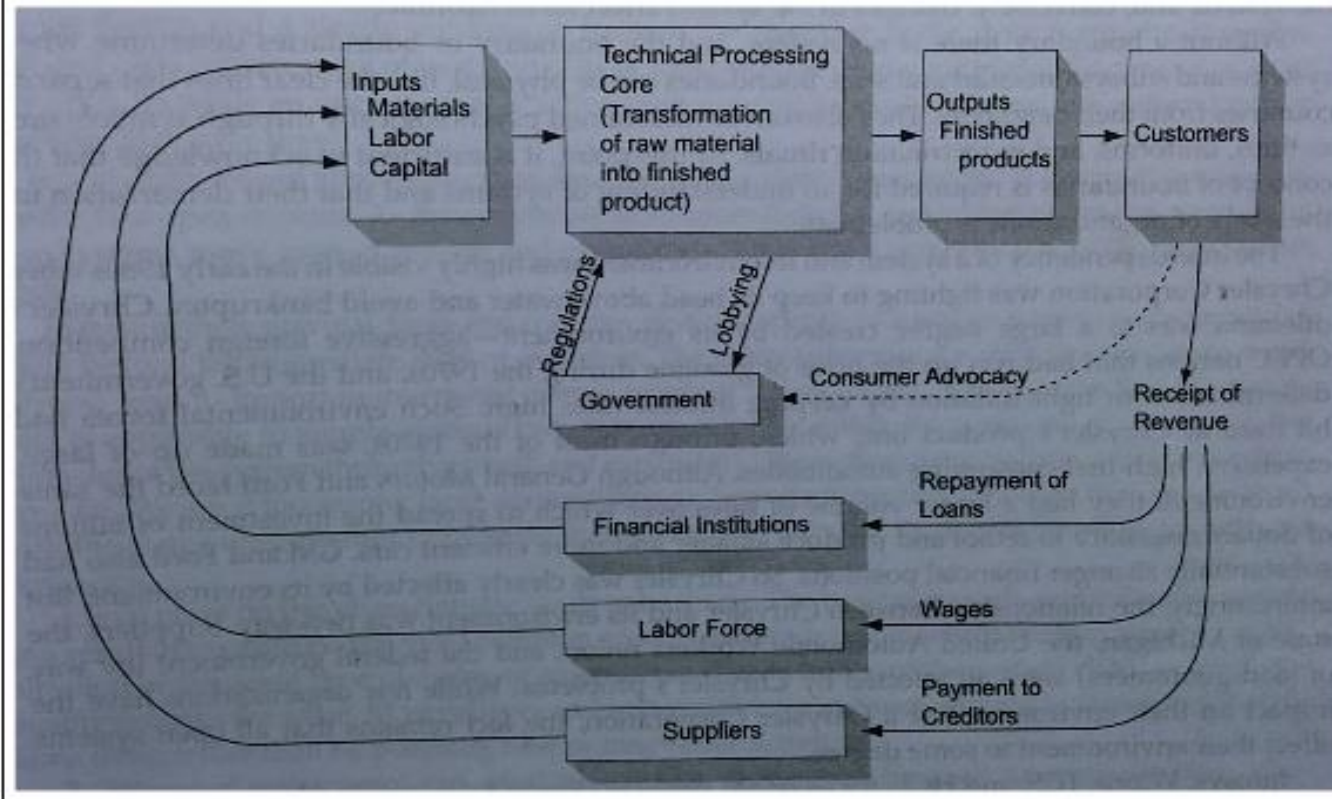
- Systems differ from each other related to degree of self-sufficiency, complexity, and adaptability.
- **Closed systems** have fixed relationships among system components and no interaction with the environment
- **Open systems** interact with their environment, have dynamic interaction of components, and can be self-regulating.

What are the basic elements of any system?

- goal
- environment
- control
- input
- process
- output
- feedback.



An Industrial Organization as an Open System



<https://www.slideshare.net/SoumyaChoudhary/systems-approach-theory-with-case-study>

Characteristics of Systems Theory

Communication

- Communication mechanisms must be in place for organizational systems to exchange relevant information with its environment
- Provides for the flow of information among the subsystems

Characteristics of Systems Theory

Systems, subsystems and supersystems

- Systems: set of interrelated parts that turn inputs into outputs through processing
- Subsystem: do the processing
- Supersystems: are other systems in the environment that affect the organization (PESTLE)

Characteristics of Systems Theory

Boundaries separates systems from its environment. The boundary of a system consists of features which define and delineate the system

Four types:

- Physical boundary – prevents access (security system)
- Linguistic boundary – specialized language (jargon)
- Systematic boundary – rules that regulate interaction (title)
- Psychological boundary - restricts

Characteristics of Systems Theory

Boundary and Environment

- The boundary of a system consists of features which define and delineate the system.

Environment

- The environment is everything that does not belong to the system, yet still interacts with the system.
- The system is inside the boundary the environment is outside the boundary.

Characteristics of Systems Theory

Interface

- The area of contact between one system boundary and another is called an interface.
- For example, the finance department will have an interface with the sales department, the production department and the R&D department.

Characteristic of Systems Theory

Goal directedness

- Systems are goal oriented and engage in feedback in order to meet the goals of organisations

Characteristics of Systems Theory

Holistic view

- Systems Theory focuses on the arrangement of and relating between the parts that connect them into a whole
- The mutual interaction of the parts makes the whole bigger than the parts themselves.

System hierarchies and Sub-systems

- Hierarchies permit complex sets of sub-systems.
- A complex system is difficult to understand as a whole.
- Therefore it is necessary to divide the system into smaller units (decompose or partition it).

Equifinality

- **Equifinality** is the principle by which a system can get to the same end (or goal) from various different routes. That is the same inputs can result in the same outputs by different processes.

Example: If you (as a subsystem) are required to obtain a book via input from the environment (the boss has asked you to get a book) you may come to the next meeting with the book (output). You may have picked up at the bookshop or the town library the result is the same.

Balance

- A system must maintain **balance** or homeostasis(stable state internal) if it is to survive. In order to avoid entropy (the fate of a closed system) the system must engage in regulation and control as well as the management of its position in the super-system.

Change and adaptability

- In order to survive in a changing environment the system must be adaptable. There are three types of structural change that a system goes through.
- 1.PROGRESSIVE SEGREGATION is moving toward less interdependence.
- 2.PROGRESSIVE SYSTEMIZATION is moving toward more interdependence.
- 3.PROGRESSIVE (DE)CENTRALIZATION is when one subsystem becomes more important to the system.

Interdependence and Independence

INTERDEPENDENCE

- That is, a change in one part of the system will result in a change in another part of the system (propagation of change).

INDEPENDENCE

- Independence is where a particular part of the system has some responsibility for some functionally related activity.
- Ideally system components should be independent with respect to each other, while being highly interdependent internally.

Systems analysis includes the following 6 dimensions:

- (1) **Goals**—examine clarity-ambiguity, simplicity-diversity, localisation- global
- (2) Degree of **interdependence** of parts of the system
- (3) Degree of **internal structural differentiation**--examine simple to highly complex, centralised to decentralised
- (4) Degree of vulnerability to **outside** pressure (i.e. client/community, customer, political control,..)
- (5) **Time** perspective
- (6) **Stability** and resistance to change

Importance of the Systems Perspective

- For managers- permits seeing the organization as a whole with interdependent parts.
- Prevents lower-level managers from viewing their jobs as static or isolated.
- Encourages managers to identify and understand the environment.
- More effective problem solving
- Satisfaction of all stakeholders

Value to managers

- Managers using systems approach are less prone to look for immediate results.
- Less likely to take decisions that trade off organisations long term health for looking good in short term.
- Managers awareness of interdependency of organisational activities is increased.
- Applicable when end goals are either vague or defy measurement.

Limitations

- Has an intellectual appeal and cannot be applied in practical situations
- Does not offer a tool or technique for analysis

Case study General Motors

- Application of analysis to this the case study of General Motor of this week
- Discuss in groups 3 – 4 the 6 dimensions

Data Flow Diagram

- What is the role of the data flow diagram in systems analysis?

The data flow diagram, DFD, is the primary tool to illustrate the system's processes or functions and the flow of data between the processes.

Data Processes, Stores, Flows

- The DFD consists of
- Context diagram --> Level number 0
- Processes --> numbered rounded boxes.
- External entities --> rounded boxes
- Data Stores --> open boxes
- Data flows --> arrows

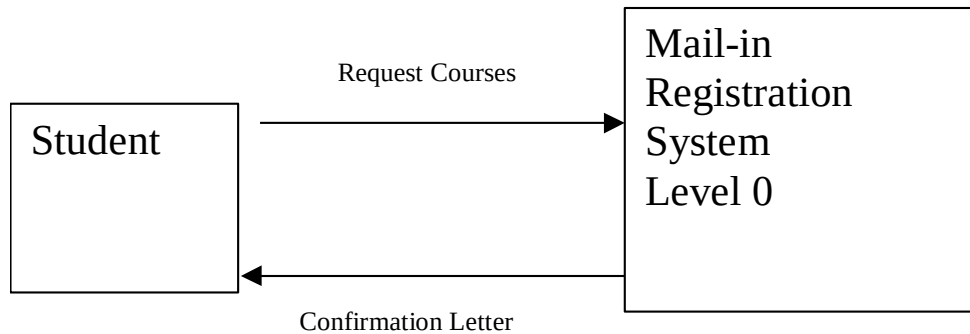
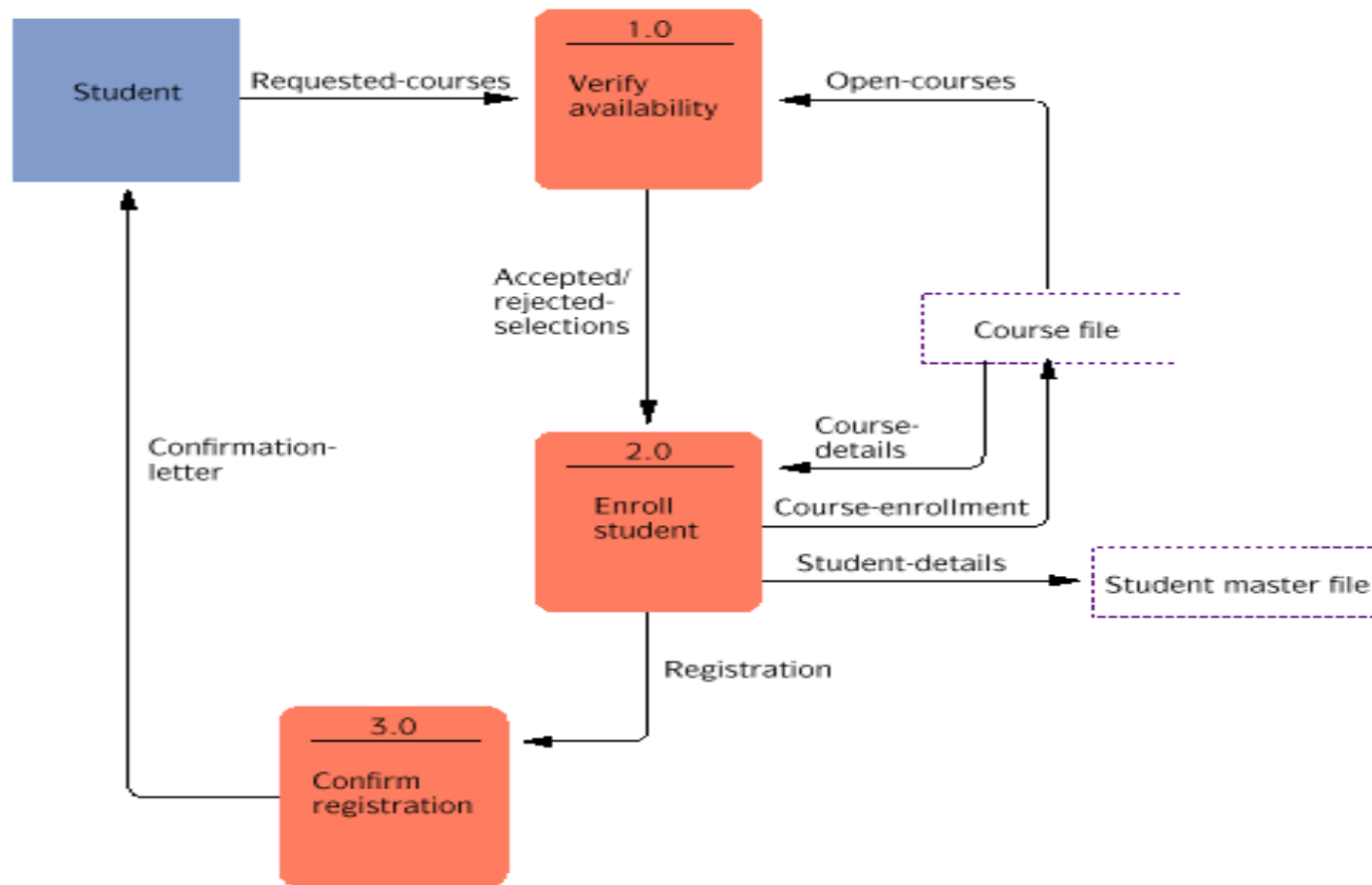


Figure 11.6 Data flow diagram for mail-in university registration



Q/A?

Sources

- Beven, K. (2006). A manifesto for the equifinality thesis. Journal of hydrology, 320(1), 18-36.
- Soumya Choudhary (2014) Systems Approach Theory (With Case Study) accessed on <https://www.slideshare.net/SoumyaChoudhary/systems-approach-theory-with-case-study> on 1 April 2018.