

REC'D
#9205330
NOV.17/93

WORKSHOP

the MPS program

6

The McMaster

Problem Solving Program

Unit 6

ANALYSIS

CLASSIFICATION

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Unit : Analysis: Classification

- ① Given an equation or set of equations, you will be able to create an element-attribute table or structural matrix.
- ② Given a structural matrix, you will be able to use CAE to determine (a) if the set of equations can be solved simultaneously or sequentially; (b) the order to be used in solving the equations. You will be able to represent the results on an operator-on-the-node diagram.
- ③ Given a classification network diagram, you will be able to create a numerical code system and use it to accurately interrelate the components in the classification.
- ④ Given prose, you will be able to identify the structure (classify the components) and represent the interrelationships via a Beetle diagram, classification diagram or coding system.
- ⑤ Given an object and a stated purpose, you will be able to create a classification and represent it by a table, diagram or coding system.
- ⑥ Given a set of actions or given a set of information, you will be able to create a classification as described above.
- ⑦ Given a set of information and the definitions of facts and opinions, you will be able to classify the information into facts, opinions and opinionated facts.
- ⑧ Given a set of information describing a situation and a separate set of isolated statements supposedly extracted from the situation, you will be able to identify which of the statements is accurate and which are inaccurate and why.
- ⑨ Given a situation, you will be able to create a force field diagram to summarize at least five major influences in both directions that influence the situation.
- ⑩ Given a situation, you will be able to accurately decipher or extract the set of information that describes the positive and negative components of the SW's and an H.
- ⑪ Given a set of information that contains at least one element that does not belong or that is missing, you will be able to use some classification technique to correctly identify the redundant, incorrect or missing element(s).
- ⑫ Given a set of at least 50 ideas from a brainstorming session, you will be able to classify them for the purpose of identifying similar types of ideas and be able to identify the wildest and most irrelevant ideas.

6

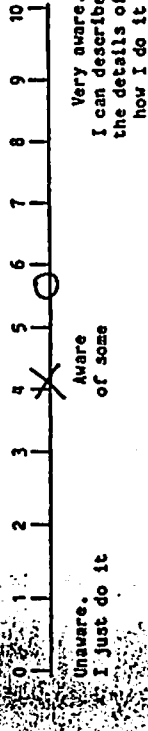
Unit : Analysis: Classification: Pretest

Definition:

Analysis (classification) is the process of breaking a whole into parts based on some stated, or inferred criteria.

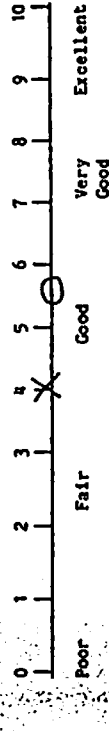
Awareness:

How aware are you of how you apply this skill? Use an "x" to indicate your assessment.



Skills:

How would you rate your skill? Use an "x" to indicate your assessment.



Comments:

Comments section with faint, illegible handwriting.

Römmu

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UNIT 6 →

8/9

electron hitting tv screen

Submarine
shooting torpedos
Projectile
from cliff

all the same → force field has
been changed.
that's all.

look for
conservative
force fields

UNIT 6 → maybe Wed.

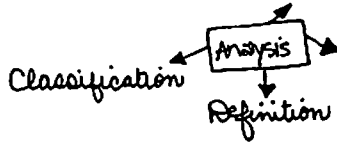
UNIT 12/

UNIT 14.

OBOY

Unit 6

Analysis -



looked at
1st GREEN (600)

flip over:

look at objectives: 1, 2, 3, 4, 5, ...

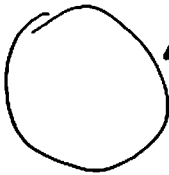
- a richness in ability to come up with so
- ability to classify
- be confident - pick crazy
- bridge with crazy idea

typical exam problem:

- identify so ideas
- those that are core
- use to develop features
- explain process

don't be afraid to use
your craziest ideas

001493
Awareness
Skill



BE SURE
TO MARK
ON ORANGE
SHEET

ANALYSIS: CLASSIFICATION MPS- : 2-4. Create a Classification The manager of the Toronto train station has received the following 24 complaints. Classify these.

1. Luggage was put on the wrong train.
2. Long lineups at the ticket office.
3. The food in the restaurant was poor.
4. The trains were delayed.
5. My luggage was damaged.
6. The train cars are old-fashioned.
7. Luggage was lost between the train and the destination.
8. Not enough timetable information on the notice board.
9. Luggage missed the connecting train.
10. Trains were overcrowded; could never get a seat.
11. My seat reservation was mixed up by the ticket office.
12. I could not find anyone to help me with the luggage.
13. The station restaurant was closed.
14. I could not get any information at the local station.
15. The waiting rooms were shut.
16. The cars had not been cleaned, the seats were dirty.
17. There were no seats on the waiting platform.
18. I was told that the train would be late.
19. The meal on the train was poor.
20. I was asked to leave the sleeping car too early in the trip.
21. Trains missed connections.
22. Heating on the trains was not turned on in the winter.
23. I was directed to the wrong platform for the train.
24. Trains made unscheduled stops.

ANALYSIS: CLASSIFICATION MPS- : 3-1. Organization for Reports Comment on the plan or organization of topics in the following:

- Prob. 1_A
- A. Results of using 2,4-D
 - B. Percentage of weeds affected
 1. Part of weed most affected
 2. Percentage of weeds that recover
 - C. Advantages and disadvantages of using
 1. Advantages
 2. Disadvantages
- (from Sherman)
- Prob. 2_A
- A. Types of 2,4-D used
 1. Stage of growth at which applied
 2. Mixture of materials applied
 3. Rate and pressure of spraying
 4. Amount of 2,4-D applied
 - B. Precautions needed in using 2,4-D
 1. Protection of shrubbery
 2. Protection of flowers
 3. Limitations of 2,4-D

A TYPES
1 MIXING
B. APP. 1. MIXING
2. STAGE OF GROWTH
3. RATE AND PRESSURE OF SPRAYING
4. AMOUNT OF 2,4-D APPLIED
C. PRECAUTIONS NEEDED IN USING 2,4-D
1. PROTECTION OF SHRUBBERY
2. PROTECTION OF FLOWERS
3. LIMITATIONS OF 2,4-D

ANALYSIS: CLASSIFICATION MPS- : 2-1. Incorrect Groupings? Which of the following classifications are correct?

- 2.1 Shoes classified into leather shoes, wooden shoes, cloth shoes, paper shoes, metal shoes, high-heeled shoes, ~~low-heeled shoes~~
- 2.2 Trucks classified into delivery trucks, pickup trucks, dump trucks, trailer trucks, ~~semi-trucks~~
- 2.3 Trains classified into steam, electric, diesel-electric, ~~atomic-steam, gas-steam~~
- 2.4 Canned materials classified into: fruits, ~~meats~~, vegetables, meats, ~~desserts~~
- 2.5 Swimming strokes classified into sidestroke, crawl, backstroke, dogpaddle, breast stroke.
- 2.6 Songs classified into ballads, ~~liberally~~, waltzes and ~~slow time~~
- 2.7 Arts classified into painting, drawing, sculpture, ~~opera~~, drama, the novel, ballet, architecture.
- 2.8 Clouds classified into cumulus, stratus, nimbus, cirrus, ~~cirro-stratus~~, cirro-cumulus and cumulo-stratus.
- 2.9 Soups classified into bird's nest, thousand year old egg soup, ~~hot~~, ~~easy~~, egg drop and chicken.
- 2.10 Animals classified into cats, dogs, mice, ~~vultures~~, ~~goldfish~~, elephants and cows.
- 2.11 Nuts, bolts, washers, screws, glue and clamps.
- 2.12 Multistage extraction equipment classified into spray towers, packed towers, baffle towers, perforated plate towers, pulse towers, agitated counter-current system and ~~centrifugal extractors~~

FS - wrong material (wrong topics under title)

TYPES:

ND → A1 OK B1
A2 B2
A3
A4

B3

ANALYSIS: CLASSIFICATION MPS- : 2-1. Incorrect Groupings?

Which of the following classifications are correct?

2.1 Shoes classified into leather shoes, wooden shoes, cloth shoes, paper shoes, metal shoes, high-heeled shoes, toeless shoes.

2.2 Trucks classified into delivery trucks, pickup trucks, dump trucks, trailer trucks, sand trucks.

2.3 Trains classified into steam, electric, diesel-electric, atomic-steam, coal-steam.

2.4 Canned materials classified into: fruits, Juices, meats, desserts, vegetables.

2.5 Swimming strokes classified into sidestroke, crawl, backstroke, dog-paddle, breast stroke.

2.6 Songs classified into ballads, hilarily, funny, waltzes and slow time.

2.7 Arts classified into painting, drawing, sculpture, music, poetry, drama, the novel, ballet, architecture.

2.8 Clouds classified into cumulus, stratus, nimbus, cirrus, cirro-stratus, cirro-cumulus and cumulo-stratus.

2.9 Soups classified into bird's nest, thousand year old egg soup, hot, tasty, egg drop and chicken.

2.10 Animals classified into cats, dogs, mice, turtles, goldfish, elephants and cows.

2.11 Nuts, bolts, washers, screws, glue and clamps.

2.12 Multistage extraction equipment classified into spray towers, packed towers, baffle towers, perforated plate towers, pulse towers, agitated counter-current system and centrifugal extractors.

towers

Other

ANALYSIS: CLASSIFICATION MPS- : 2-4. Create a Classification

The manager of the Toronto train station has received the following 24 complaints. Classify these.

1. Luggage was put on the wrong train.
2. Long lineups at the ticket office.
3. The food in the restaurant was poor.
4. The trains were delayed.
5. My luggage was damaged.
6. The train cars are old-fashioned.
7. Luggage was lost between the train and the destination.
8. Not enough timetable information on the notice board.
9. Luggage missed the connecting train.
10. Trains were overcrowded; could never get a seat.
11. My seat reservation was mixed up by the ticket office.
12. I could not find anyone to help me with the luggage.
13. The station restaurant was closed.
14. I could not get any information at the local station.
15. The waiting rooms were shut.
16. The cars had not been cleaned, the seats were dirty.
17. There were no seats on the waiting platform.
18. I was not told that the train would be late.
19. The meal on the train was poor.
20. I was asked to leave the sleeping car too early in the trip.
21. Trains missed connections.
22. Heating on the trains was not turned on in the winter.
23. I was directed to the wrong platform for the train.
24. Trains made unscheduled stops.

ANALYSIS: CLASSIFICATION MPS- : 3-1. Organization for Reports

Comment on the plan or organization of topics in the following:

Prob. 1x

- Results of using 2,4-D
- A. Type of 2,4-D used
 1. Stage of growth at which applied
 2. Mixture of materials applied
 3. Rate and pressure of spraying
 4. Amount of 2,4-D applied
 - B. Precautions needed in using 2,4-D
 1. Protection of shrubbery
 2. Protection of flowers
 3. Limitations of 2,4-D
 - C. Advantages and disadvantages of using

Prob. 2x

- (from Sherman)
- A. Application of 2,4-D
 1. Stage of growth...
 2. Rate and pressure of spraying...
 3. Amount of 2,4-D applied...
 4. Precautions needed in using 2,4-D
 1. Protection of shrubbery
 2. Protection of flowers
 3. Limitations of 2,4-D

(Methods of)

B. Application of 2,4-D

1. Stage of growth...
2. Rate and pressure of spraying...
3. Amount of 2,4-D applied...

C. Precautions in using 2,4-D

1. Protection of shrubbery
2. Protection of flowers
3. Limitations of 2,4-D

A. Application of 2,4-D (Copy)

Do Results strengthen weaknesses of 2,4-D? Use (5+1).

2. Limitation of 2,4-D.

IP AP

A-4 Example of External Analysis Problem.

Analyze the following passage and classify it into facts, opinion and opinionated fact (according to the external definitions given on pages A-7 & 8) *Trigger for analysis # 22.*

Here is an accurate account of what happened:

The telephone rang. "Trouble out on the ethylbenzene unit", said Bill. Harry said that he would be right out as he slammed down the phone. As Harry approached the unit Bill came out to meet him and said "I am sure that the heat transfer is insufficient in the reboiler to the product column; I'll show you what I mean".

Harry glanced at the rotameter and saw that the flow to the column was the usual amount of 3000 gpm; the pressure gauge read 150 psig and the bottoms temperature was 140°C. Rounding the column, he saw the liquid level in the bottoms level gauge rising at a rate of about 1 inch a minute. The liquid level disappeared out the top of the gauge. After about two minutes the level reappeared in the level gauge and disappeared out the bottom of the sight gauge within several seconds. "See", said the operator, "we have lost all the bottoms out of the column just like that!" "It's gone off to the storage tank", offered John. "No, it's gone through the reboiler and straight up the column. You can see by the instabilities in the pressure gauges that occur just after the level disappears out the bottom of the level gauge", said Bill.

Facts - <i>obviously</i> <i>100%</i>	Opinion

Opinionated facts:

IP AP

1. Bill said that there was trouble out on the ethylbenzene unit. T F ?
2. Harry said, "I'll be out immediately." T F ?
3. The heat transfer is insufficient. T F ?
4. The trouble is in the reboiler. T F ?
5. The flow to column was 3000 gpm. T F ?
6. The pressure was 150 psig. T F ?
7. The bottoms temperature was 140°C. T F ?
8. The level in the bottom of the column was building up and then suddenly dropping. T F ?
9. John said, "The bottoms have gone off to the storage tank". T F ?
10. When the level in the bottoms of the column drops the pressure gauges show instabilities. T F ?

604

ANAEROBIC TREATMENT OF WASTEWATER

1. ~~INTRODUCTION~~ PRELIMINARY IDEAS OR BACKGROUND
- B. ~~DESCRIPTION OF PROCESSES~~ ~~AREA OF USE~~

2. WHERE ANAEROBIC TREATMENT IS

- A. ^{USED} MUNICIPAL SEWAGE SYSTEM (TREATMENT OF MUNICIPAL WASTE)
- II. USE IN TREATMENT OF INDUSTRIAL WASTE WATERS
 - i) treatment of thermomechanical industrial wastes
 - iii) treatment of food-processing wastes

3. TYPES OF ~~PROCESSES~~ REACTORS

- I USA B REACTORS
- II UPFLOW, FIXED FILM
- III FLUID BED

4. STRENGTHS AND WEAKNESSES OF EACH REACTOR

NEED REVISION.

- i) STRENGTH + WEAKNESSES OF START-UP
- ii) ~~TREATMENT~~ ["] OR REMOVAL OF C.O.D IN WATER
- ~~REMARKS ON EACH REACTOR. IN COMPARISON TO OTHER (AEROBIC) PROCESSES~~

5. ~~STRENGTHS + WEAKNESSES OF ~~ANAEKAS~~~~ ANAEROBIC VS. AEROBIC TREATMENT METHODS

- i) C.O.D REMOVAL
- ii) SIZE OF PLANTS (PROCESSING)
- iii) ^{AUX} COST OF PROCESSES.

6. SUMMARY + CONCLUSIONS ✓

THOUGHTS REFLECTING ON PROCESS

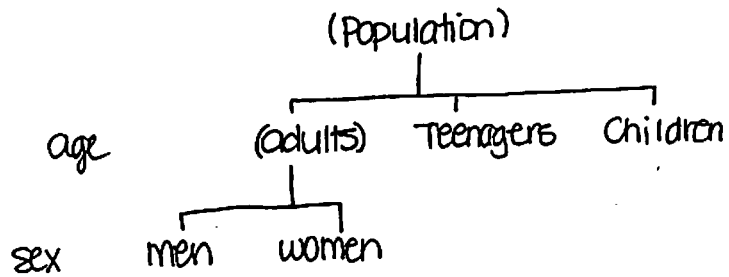
Difficult to get an idea of ~~what~~^{how} this process works as a listener as the time was spent explaining the task of what was necessary to be done to my partner. However, I feel this was crucial to his benefit as he had difficulty using the process of classification, but needed to be able to do this in order to finish his assignment/project write-up for 26². However, I did get a chance to be a listener in explaining the process to him and answering the questions he had.

As the talker, I found that when reading through my outline, out loud there are still areas that I must work on in order that my classification of the discussions within my paper are properly organized. The main problem with this was that I was ~~not~~ unprepared for my outline (i.e. I didn't complete it) and therefore there are still many bugs in it. The listener helped by forcing me to explain what was meant by each sub-topic and therefore, I was able to see that further or alternate classifications are needed until the outline is complete.

Good

Principles of Classification →

- TO INFORM



∴ Saying Men, women & Children is
FAULTY COORDINATION.

Criteria

- overall name
- why? purpose
- name components
- for each level of classification use one criteria or "basis" of classification.

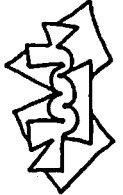
DO 2.2 down to 2.11

602 - FINISH ON OWN

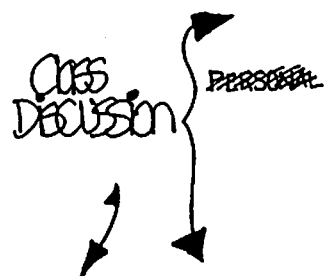
- 2.2. SAND TRUCKS ← too explicit
- 2.3. FAULTY SUBORDINATION - steam & electric - others just subheadings
- 2.4. Juices → can be made from veggies & fruits / desserts: not a main food group - others are
- 2.5. dog-paddle - not a stroke
- 2.6
- 2.7
- 2.8
- 2.9
- 2.10 categorize → legs/no legs → male/female names (cats, dogs) ↔ (turtle, fish)
→ land animal/water animal (ex. p. mice, cow)
- 2.11 centrifugal extractors have moving parts / other parts don't

A DESSERT
COULD BE ANY
ONE OF OTHER GR
TIME THINGS. WHEN d.
- appetizer
- main course

Right hand side of 602
Classifications



- In 2P
- Luggage 1,5
 - Personal Inconvenience
 - Restaurant (Food) 3,
 - Inept Staff 1,7,9
 - Maintenance 6



THEY'RE WHAT

WHERE? (all but Luggage/Food)
Where isn't necessarily a good
basis of classification

Faulty Subordination
Coordination

not a single thing that makes them all seem different

- (1) PERSONAL COMPLAINTS (LUGGAGE)
- (2) TICKET OFFICE
- (3) TRAIN
- (4) STATION
- (5) FOOD
- (6) OTHER

- (1) LUGGAGE SERVICE
- (2) DELAYS IN SERVICE
- (3) HOSPITALITY SERVICES
- (4) INFORMATION TRANSFER SERVICE
- (5) CONVENIENCE SERVICE

F.S./F.C. → take basis of services in train station - Good
are all the complaints? service complaints?

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602 - Problem 2A

See 602 :

• Brandon's Ideas:

PROTECTION OF SHRUBBERY

- How ?
- When ?
- why(not)?

- no faulty subordination
f coordination
- enrichment → parallelism

PROTECTION OF FLOWERS

- How ?
- When ?
- why(not)?

• Joe's Ideas:

A. TYPES

1. Mixture of materials

B. VARIABLES ← Maybe methods of applications

1. Stage of growth at which applied
2. Rate and pressure of spraying
3. Amount of 2,4-D applied

- C SHOULD HAVE BEEN BEFORE B
- better organization



C. PRECAUTIONS

1. Protection of Shrubbery
2. Protection of flowers

D. LIMITATIONS OF 2,4-D

Should have been :

A. TYPES

1. Mixtures
2. Concentrations

B. APPLICATIONS

1. Stage of growth of application
2. Rate and pressure of application
3. Amount of 2,4-D applied

C. PRECAUTIONS

1. Protection of Shrubbery
2. Protection of flowers

D. LIMITATIONS

IP
AP

A-4 Example of External Analysis Problem.

Analyze the following passage and classify it into facts, opinion and opinionated fact (according to the external definitions given on pages A-14 ff. *Diagnose for analysis # 22*)

Here is an accurate account of what happened:

The teleptoms rang; "Trouble out on the ethylbenzene unit", said Bill. Harry said that he would be right out as he slammed down the phone. As Harry approached the unit Bill came out to meet him and said "I am sure that the heat transfer is insufficient in the reboiler to the product column; I'll show you what I mean".

Harry glanced at the rotameter and saw that the flow to the column was the usual amount of 3000 gpm; the pressure gauge read 150 psig and the bottoms temperature was 140°C. Rounding the column, he saw the liquid level in the bottoms level gauge rising at a rate of about 1 inch a minute. The liquid level disappeared out the top of the gauge. After about two minutes the level reappeared in the level gauge and disappeared out the bottom of the sight gauge within several seconds. "See", said the operator, "we have lost all the bottoms out of the column just like that!" "It's gone off to the storage tank", offered John. "No, it's gone through the reboiler and straight up the column. You can see by the instabilities in the pressure gauges that occur just after the level disappears out the bottom of the level gauge", said Bill.

Opinion

Facts

Bill said, "Trouble out on the ethylbenzene unit."

flow to column → 3000 gpm
the gauge pressure read 150 psig

Bill said "I'm sure ... what I mean."

Opinionated facts:

IP
AP

1. Bill said that there was trouble out on the ethylbenzene unit. T (F) ?
2. Harry said, "I'll be out immediately." T F ? CAN'T TELL
3. The heat transfer is insufficient. T (F) ?
4. The trouble is in the reboiler. T F ?
5. The flow to column was 3000 gpm. T (T) F ?
6. The pressure was 150 psig. (T) F ?
7. The bottoms temperature was 140°C. (T) F ?
8. The level in the bottom of the column was building up and then suddenly dropping. (T) F ?
9. John said, "The bottoms have gone off to the storage tank". T (F) ?
10. When the level in the bottoms of the column drops the pressure gauges show instabilities. T (F) ?

604

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2E2 OUTLINE DISCUSSION.

Wimbeey Pair - Adam Smith

Reflection → thoughts on the process.

I felt it was a bit difficult to be the Wimbeey Pair listener in this case because encouragement felt awkward. What I mean is that after Adam discussed the Intro I felt shy saying "Great Job!" "You're on a roll!" I still need a bit of work on this I guess. It was good for me, not necessarily as a Wimbeey Pair listener, but as a student who is designing an outline, to see what ~~the~~ someone else was working with. It gave me the opportunity to be objective about someone's work and really concentrate on faulty subordination and faulty coordination.

Talker →

This was extremely helpful. I had thought my outline "flowed" nicely but when I began talking about it out loud I began to notice flaws. When Adam would ask something about the relativity of the topic or how each one related to the others, I discovered that I had much faulty coordination and subordination. He suggested moving headings around, switching orders etc and I found my outline was much improved.

202 Outline

1. Introduction

- 1.1 Definition of Adhesive
- 1.2 Definition of Water Based Adhesive
 - 1.2.1 Principal Water Based Adhesives

2. Theories of Adhesion

- 2.1 Mechanical Theory
- 2.2 Adsorption Theory

3. Adhesive Bonding Process

- 3.1 Surface preparation
- 3.2 Stresses
- 3.3 Wetting
- 3.4 Solidification
- 3.5 Adhesive & Cohesive failure

4. Applications of Water Based Adhesives

- 4.1 Paper Industry
- 4.2 Woodwork Application
- 4.3 Textiles
- 4.4 Latex Paints
- 4.5 Footwear Trade
- 4.6 Pressure Sensitive Tapes
- 4.7 Removable Adhesives

5. ADVANTAGES OF H₂O BASED ADHESIVES

- 5.1 Production Cost
- 5.2 Safety and Environment Considerations
 - 5.2.1 Flammability
 - 5.2.2 Toxicology
 - 5.2.3 Effluent Control

6. DISADVANTAGES OF WATER BASED ADHESIVES

6.1 Storage Properties

6.2 Drying Properties

6.3 Water Resistance

6.4 Electrical Properties

7. Water-Based Adhesive Industry

7.1 3M

7.2 Johnson and Johnson

8. Summary