FLIPPED CLASSROOM ACTIVITY – USING EXISTING CONTENT

About Me

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Topic: Minimize the variation in Manufacturing process

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BASIC CONCEPTS OF VARIATION

TYPES OF VARIATION

SIX SIGMA

2nd YEAR PG STUDENTS

THIAGARAJAR COLLEGE OF ENGINEERING, MADURAI, TAMIL NADU, INDIA

Out-of-class Activity Design -1

Learning Objective(s) of Out-of-Class Activity

At the end of watching the videos students should be able to

1. Explain how to identify the variation in Manufacturing process
2. Identify various types of variation.
3. Identify the tools required to minimize the variation in Manufacturing Process

Key Concept(s) to be covered

1. Control Chart
2. Cause and Effect Diagram
3. Histogram

Videos on Variation

- The basic concepts of variation can be understood by the following videos which are available with Creative Commons license
  - https://youtu.be/FjTkFJvYqE4
  - https://youtu.be/AKf51o8YxOs
  - https://youtu.be/bIahniFW5AQ
  - https://youtu.be/EMNLN8eSi68

Out-of-class Activity Design - 2

Main Video Source URL https://youtu.be/cCqtzSNGkFo

License of Video Creative Commons License

Mapping Concept to Video Source

CONCEPT	VIDEO SEGMENT	DURATION (in min)
Definition of Variation	V1 – 0.00-0.49	0.49
Basic Concepts of Variation	V2 – 0.50 -1.64	1.07
Causes of Variation	V3 – 1.65 – 4.23	2.58
Types of Variation	V4 – 4.24 -6.69	2.46

TOTAL DURATION 6.69 Minutes

Out-of-class Activity Design - 3

Aligning Assessment with Learning Objective

Learning Objective	Assessment Strategy	Expected duration (in min)	Additional Instructions (if any)
1. Explain how to identify the variation in Manufacturing process	Q1. Explain the basic Concept of Variation? Q2. List the types of definition of Variation	10 Min.	Watch V1 and answer Q1 and Q2
2. Identify various types of variation	Q1. List the various Types of Variation Q2. Name the different tools to measure the variation	10 Min.	Watch V2 and answer Q1 and Q2

Out-of-class Activity Design - 3

Aligning Assessment with Learning Objective

Learning Objective	Assessment Strategy	Expected duration (in min)	Additional Instructions (if any)
3. Identify the tools required to minimize the variation in Manufacturing Process	Q1. Explain the basic tools to minimize the variation? Q2. Explain the various methods of Manufacturing Process?	10 Min.	Watch V3 & V4 and answer Q1 and Q2 Submit answers to these questions before coming to class.

Expected activity duration 30 Min

In-class Activity Design -1

Learning Objective(s) of In - Class Activity

At the end of the class, students will be able to,

1. How to identify the variation in Manufacturing process (Apply Level)
2. Implement Suggest and analyze to minimize the variation in Manufacturing process. (Analyze Level)

Key Concept(s) to be covered

1. Control Chart
2. Cause and Effect Diagram
3. Histogram

In-class Activity Design -2

Active Learning activity(ies) that you plan to do

for identify the variation in Manufacturing process

- **Think-Pair-Share**

Concept of Variation

- **Peer Instruction**

Explain the strategy by giving details of

1. **What the teacher will do?**

- **Peer Instruction -** The teacher will ask multiple choice questions and ask the students to come out with answers
- **Think-Pair-Share** – The teacher will pose the premise and questions to the students and ask them to think on the video shared and make pairs to discuss about it and finally ask the students to share their results

2. **What Student will do?**

- **Peer Instruction –** The students will individually vote and then discussion with peers will take place and finally, the instructor will provide a summary to come to a final conclusion**.**
- **Think-Pair-Share -** Students will **think, pair and share** over the concept **to answer the question** posed by the teacher based on the video. During share session if a student could not apply the concept, **peer instruction** can be used for concept clarification. Also, teacher can finally provide a feedback to come to a conclusion.

Justify why the above is an active learning strategy

1. Information transfer happens outside the classroom
2. Assimilation takes place inside the classroom by active students involvement

In-class Activity Design -2

Peer Instruction Strategy – What Teacher Does

Pose the two PI questions at the start of the class and provide summary of various types of variation and their relationships

. Q1. A process is in-control and stable. Describe the type of variation that exists in the process.

A. Special Cause variation

B. Natural Variation

C. Out-the-ordinary variation

D. Non-random variation

In-class Activity Design -2

Peer Instruction Strategy – What Teacher Does

Q2. Sigma standard implies a defect level of:

A. 4.3 ppm

B. 6.6 %

C. 3.4 ppm

D. 3.4%

In-class Activity Design -2

Peer Instruction Strategy – What Student Does

- For each question they will first vote individually.
  - In the given question, the students are asked to vote using either their fingers or by means of papers folded with options written over them.
- Then they will discuss with peers and come to consensus.
  - Peer discussion will be done based on their answers
- Listen to instructors explanation.
  - Finally, feedback from instructor on the answers discussed and presented will be a clarification to the students on the topic.
  - **Summary**
  - For Q1 – The answer is Option B. Because, the variation is in manufacturing is inevitable and naturable.
  - For Q2 – The answer is Option C. Because, the level of Statistical data is optimal.

In-class Activity Design -2

TPS Strategy – What Instructor does

First provide a premise to reduce variations

> All variations must be put in writing, and agreed to in writing by you and the contractor, before work commences. The only exception is if the work is required urgently and it is not practical to produce a variation document before work commences. If there is a disagreement about the amount of a variation and it has not been put in writing and agreed to in writing by both parties, the contractor cannot force you to pay for the variation. This does not mean the contractor is not entitled to payment. I

In-class Activity Design -2

TPS Strategy – What Instructor does

Think (~2 minutes)

Instruction: Assuming that we have a different classification or domain interest students for this requirement,

Think individually and identify the interested students to do the project in their domain area.

In-class Activity Design -2

TPS Strategy – What Instructor does

Pair (~5 minutes)

Instruction: Now pair up and compare your answers. Agree on one final answer.

While students are pairing and discussing, instructor goes to 2~3 sections to see

what they are doing.

Now assuming that, the students were able to identify to form the group based on their interest of his/her domain / theme area of the department.

Then they should be able to find their uses of formation group to do the research project in focused or specific area.

Finally they will get more knowledge, skill and attitude on their focused or specific area by the formation of group.

In-class Activity Design -2

TPS Strategy – What Instructor does

Share (~8 minutes)

Instructor asks a group to share their answer with class and see whether there are different answers.

After sharing is done, instructor gives feedback on the correct solution and how classes and relationships among classes gives the complete solution in an Object Oriented manner.

•Summary by the Instructor

By applying Quality Control tools to reduce the variations in Manufacturing process. This is a precedent variation agreement between two parties, used to document changes to an original contract between the same parties. Optional drafting is provided for any consent which may be required to be given to the variation by a guarantor. This precedent is a short form letter of variation between two parties, used to vary an original contract between the same parties. Optional drafting is provided for any consent which may be required to be given to the variation by any third party guarantor.

In-class Activity Design -2

Justify why the above is an active learning strategy

•In both the above strategies, students are required to go beyond mere listening and execution of prescribed steps.

•They are required to think deeply about the content they were familiarized in out-of-class and do higher order thinking.

•There is also feedback provided either through peer discussion or instructor summary at the end of each activity.

Thank You