# DATA SCIENCE IN QUALITY IMPROVEMENT

John Wong

# QUESTION

Can data science be used in quality improvement?

Quality ———— Actual versus Expected

Poor Quality ———— Actual worse than Expected

Quality
Improvement ———— Change Actual to be better than Expected
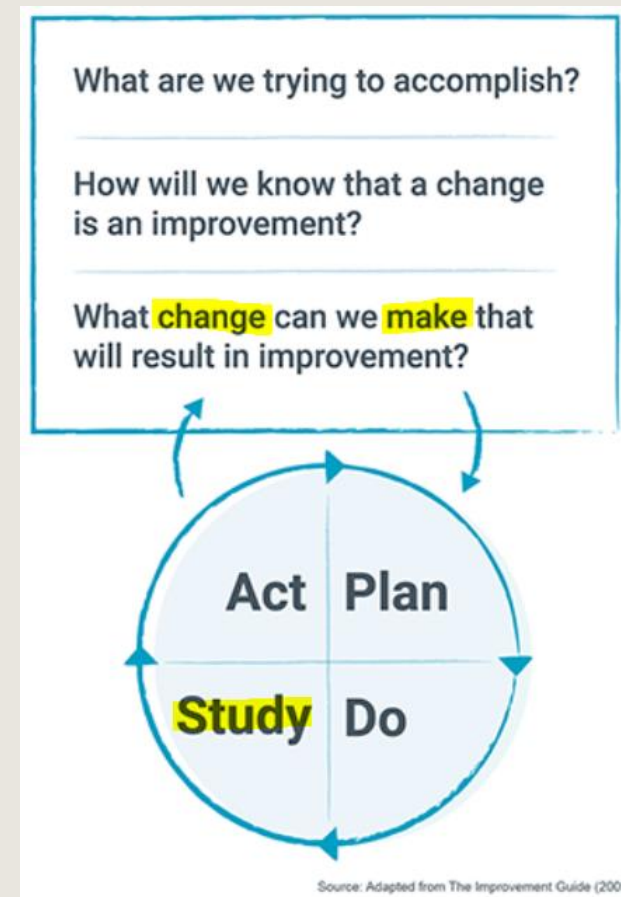
Method ———— **Model for Improvement**

# FIRST PRINCIPLES ...

# MODEL FOR IMPROVEMENT

## Question 3

- Make change
- Study change with **data**

https://www.ihi.org/resources/how-to-improve
https://www.apiweb.org/

What are we trying to accomplish?

How will we know that a change is an improvement?

What change can we make that will result in improvement?

Act | Plan

Study | Do
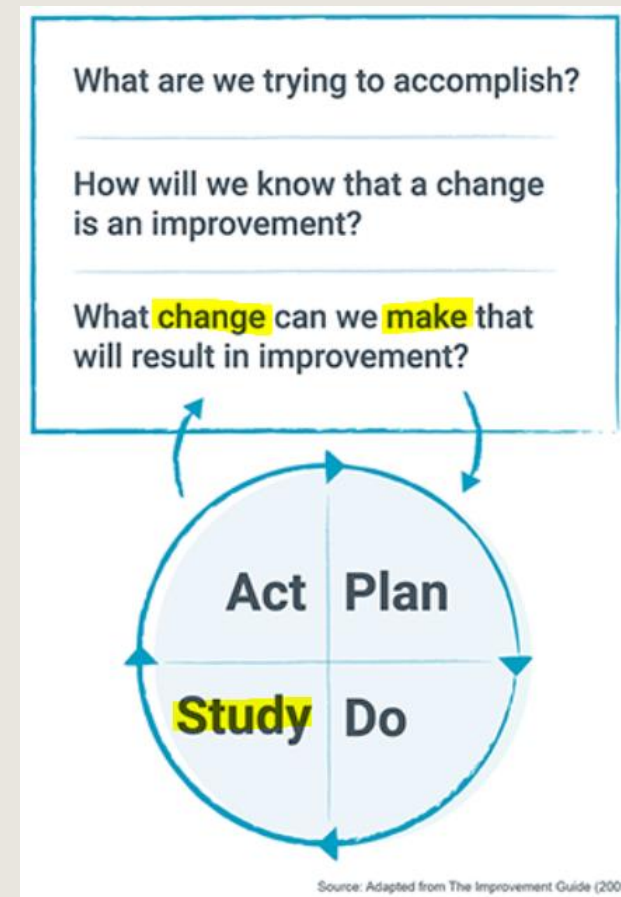
Source: Adapted from The Improvement Guide (2009)

# QUALTY IMPROVEMENT

## NOTE THIS

- To improve, we must make changes

- However, changes we made may not result in improvement

- Hence "Plan, Do, Study, Act Cycle" is used to check result of changes made

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https://www.apiweb.org/



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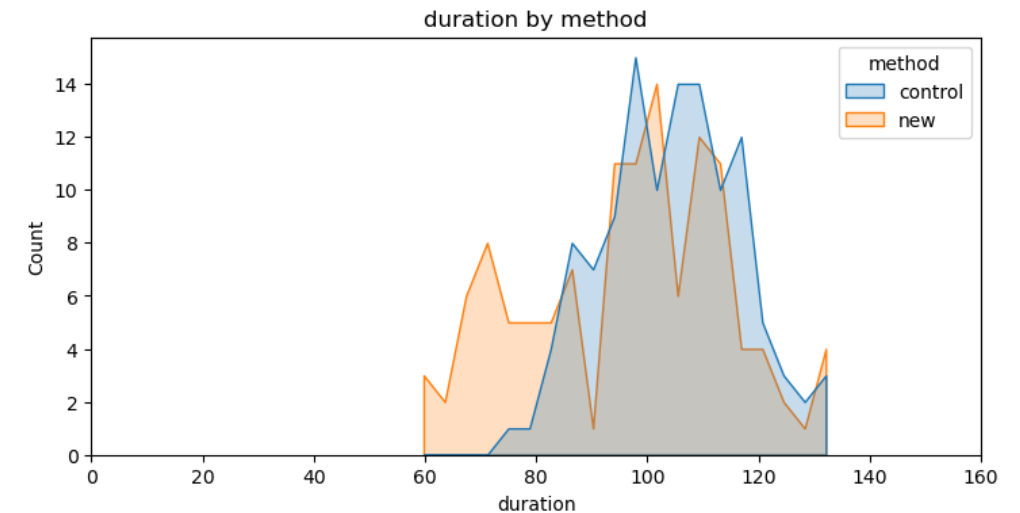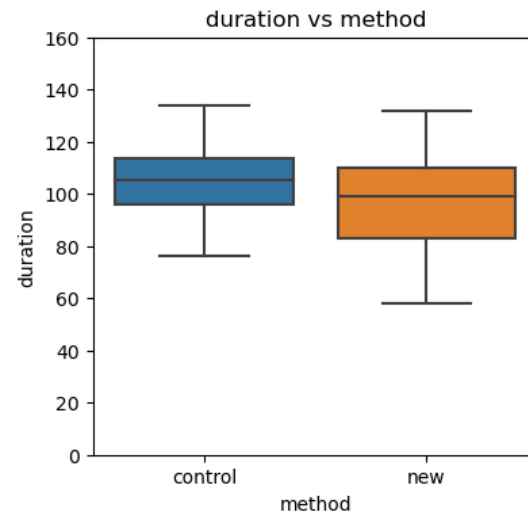
# DATA SCIENCE IN QUALITY IMPROVEMENT

## OBJECTIVE

Reduce duration of task

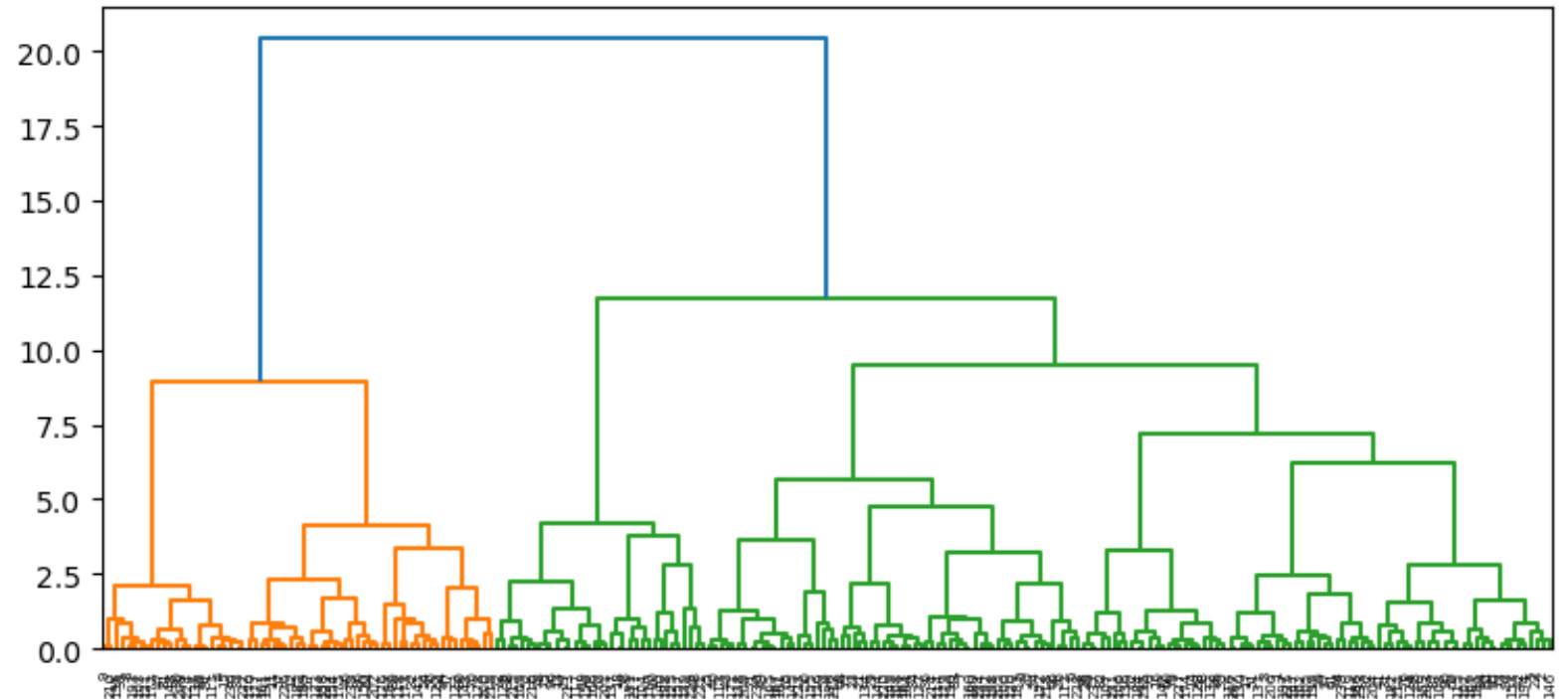# DATA SCIENCE IN QUALITY IMPROVEMENT

## WHAT HAPPENED?

Task was changed but duration did not reduce. **Why**?

# DATA SCIENCE IN QUALITY IMPROVEMENT

## DATA SCIENCE
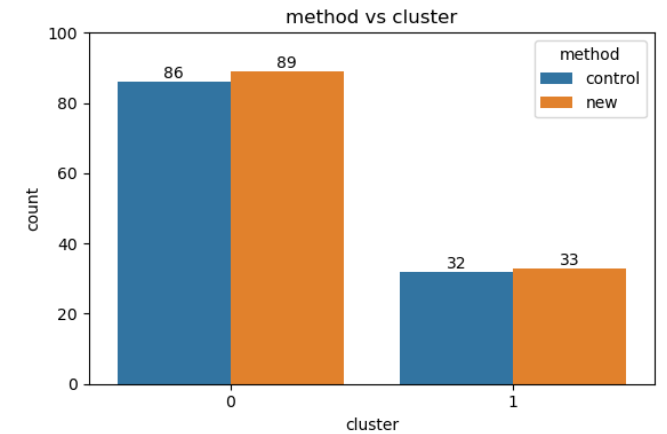
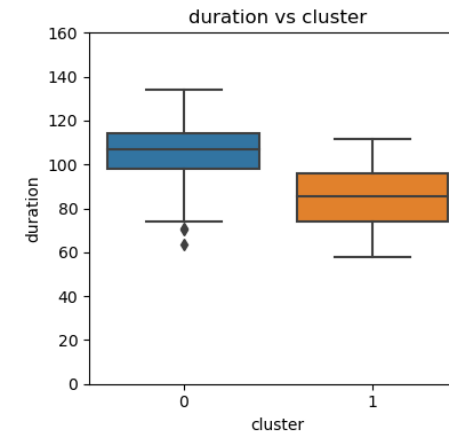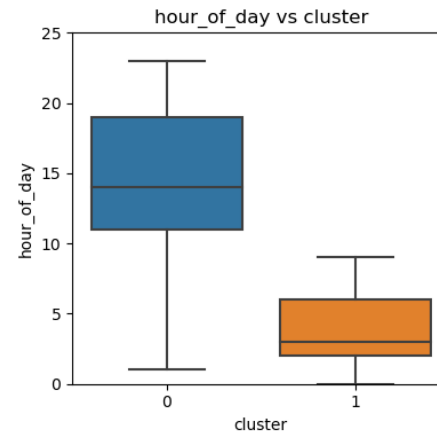Hierarchical Clustering was used to find **why**

# DATA SCIENCE IN QUALITY IMPROVEMENT

## DATA SCIENCE

Hierarchical Clustering was used to find why

Duration was shorter in early hours in Cluster 1

**Clue**: Plot duration by hours and method

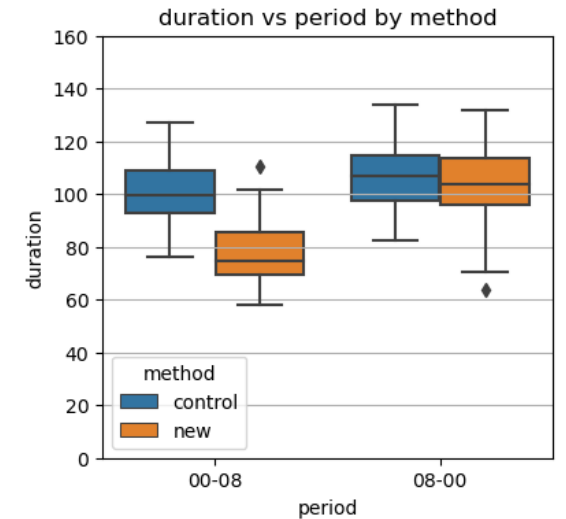# DATA SCIENCE IN QUALITY IMPROVEMENT
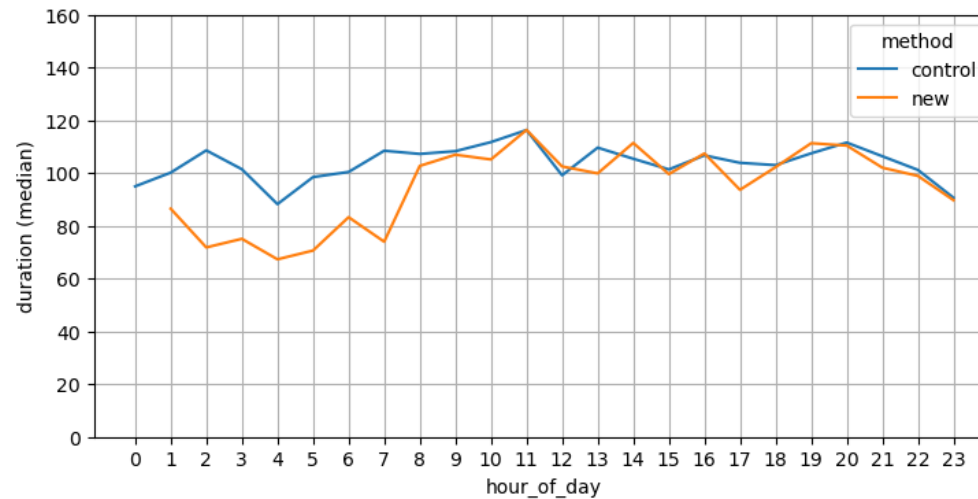
## DATA SCIENCE

Hierarchical Clustering was used to find why

Duration was shorter in early hours in Cluster 1

Clue: Plot duration by hours and method

**Clue**: New method may be done differently in early hours

**Benefit**: Team can now zoom into finding why faster

# DATA SCIENCE IN QUALITY IMPROVEMENT

## QUESTION

Can data science be used in quality improvement?

## ANSWER

Yes

## HOW

Gives quick clues to why changes made did not result in improvements

Reduce time spent in learning from failures

# HOPE YOU FIND THIS USEFUL
# VISIT MY GITHUB FOR THE CODES

https://github.com/johnwck/my_da_ds_work/tree/master/my_projects_github_pages/hierarchical_clustering