

**GOVT. HOLKAR (MODEL AUTONOMOUS)
SCIENCE COLLEGE, INDORE**



(An ISO 9001:2015 & ISO 14001:2015 Certified Institution)



SSR DOCUMENT

2017-18 TO 2021-22

CRITERION – 6

Governance, Leadership and Management

Metric No.: 6.5.2

Document Title:
Sample Proof of using Innovation Pedagogy

* Computer Science Department

Subject: Data Science

Topic: Analysis of Data

Pedagogy with

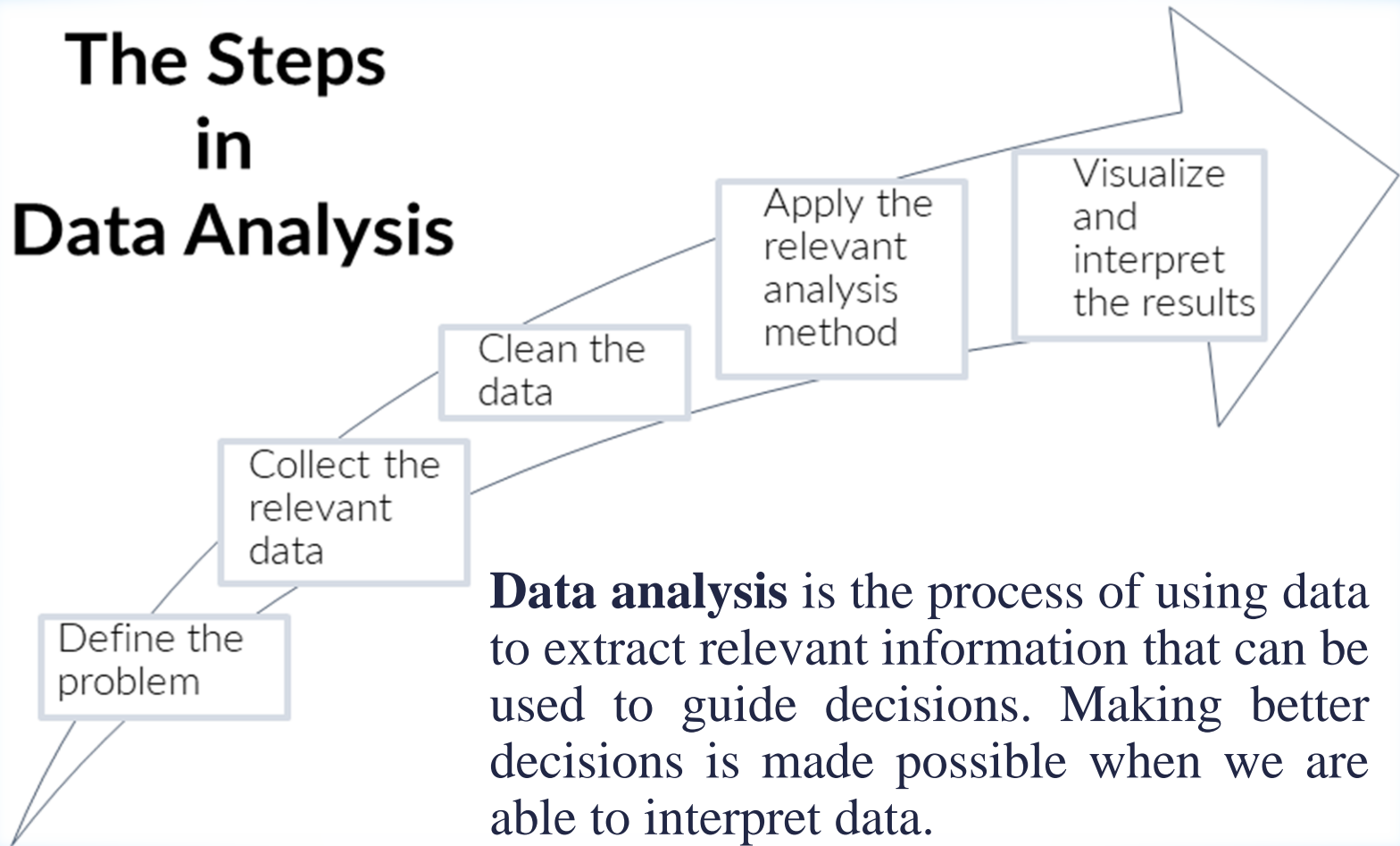
Problem Solving (Design Thinking)

* Why ?

- Every time we make a decision in our daily lives, we consider what happened previously or what would happen if we make that particular choice. This is a straightforward example of data analysis.
- Analyzing our past or future and making judgments in light of it is all this is.
- Data analytics is important because it aids in performance optimization. Implementing it into the model means trying to identify more efficient ways of doing work.

* Introduction

The Steps in Data Analysis



Data analysis is the process of using data to extract relevant information that can be used to guide decisions. Making better decisions is made possible when we are able to interpret data.

* WHAT IS DESIGN THINKING?

- Design thinking is a user-centric, solutions-based approach to problem-solving that can be described in stages:



* Stages of Design Thinking

- Empathize: research your users' needs.
- Define: state your users' needs and problems.
- Ideate: challenge assumptions and create ideas.
- Prototype: start to create solutions.
- Test: try your solutions out.

* Learning Outcomes

Define

Definition and concept of the data and data set

Explain

Explain various types of data and different ways of collecting data.

Apply

Applying various processes of cleansing and converting data for the preparation of a data set.

Analysis

Analysis of the prepared data set to extract information

Implement

Implement code in R that analyses a given data set.

* Problem Solving based Pedagogy in Teacher Learning Process

Enhance their visualization

Promote Self- Learning

Develop Transferable Skills

Improve Teamwork Abilities

Impact Solving their Real World Problem

4 QUALITY
EDUCATION



* Progression in Learning

```
1 library(dplyr)
2
3
4 #importing dataset
5 house_rent_data<-read.csv('House_Rent_Dataset.csv')
6 head(house_rent_data)
7 attach(house_rent_data)
8
9 boxplot(Rent ~ Size)
10
11 #removing missing values
12 house_data<-na.omit(house_rent_data)
13
14 boxplot(Rent ~ Size)
15
16 #analyzing data
17 dim(house_data)
18 summary(house_data)
19 str(house_data)
20 sum(is.na(house_data))
21
22
23 #checking relation between columns
24 cor_matrix<-cor(house_data[,c(2,8,4,11)])
25 cor_matrix
```



Progression in Learning(Cont.)

```
26
27 #Counting number of houses on the basis of BHK value
28 BHK_count<-house_data%>%group_by(BHK)%>%summarise(Count = length(BHK))
29 BHK_count
30 png(file = "house_per_bhk.png")
31 hist(BHK)
32 dev.off()
33
34
35 #Most common house sizes
36 house_size<-house_data%>%group_by(Size)%>%summarise(Count = length(Size))%>%top_n(8)
37 head(house_size)
38 png(file = "house_per_size.png")
39 hist(Size)
40 dev.off()
41
42
43 #average size per BHK
44 avg_size_BHK<-house_data%>%group_by(BHK)%>%summarise(Avg_size = mean(Size))
45 avg_size_BHK
46
47
48 #average rent per BHK
49 avg_rent_BHK<-house_data%>%group_by(BHK)%>%summarise(Avg_rent = mean(Rent))
50 avg_rent_BHK
```



Progression in Learning(Cont.)

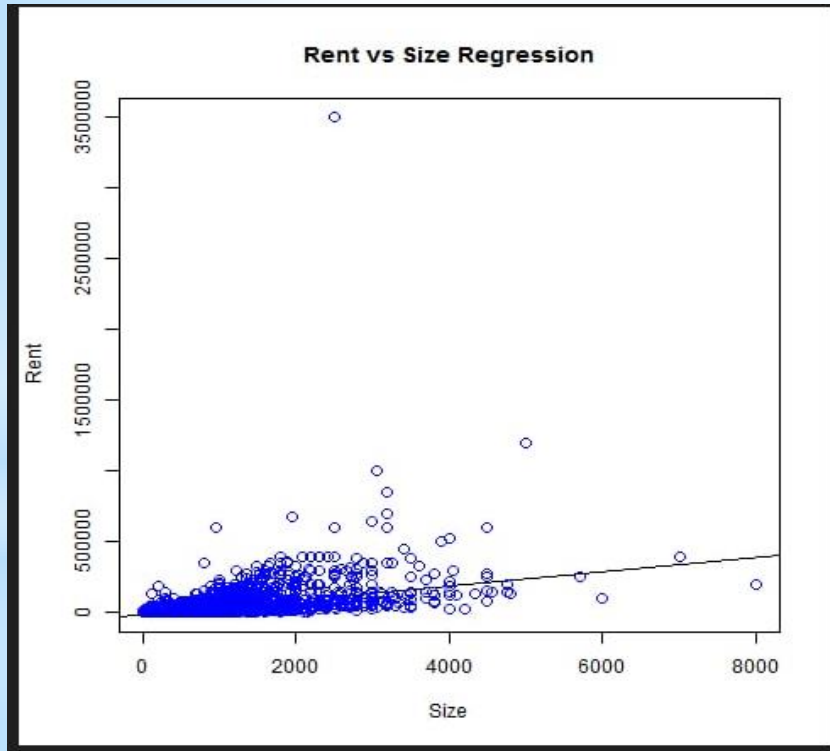
```
53 #tenant type
54 house_tenant_type<-house_data%>%group_by(Tenant.Preferred, BHK)%>%summarise(Count=length(BHK))
55 house_tenant_type
56
57
58 #splitting data in 80:20 ratio for training and testing
59 split=sample.int(n=nrow(house_data), size=floor(0.8*nrow(house_data)))
60 train=house_data[split,]
61 test=house_data[-split,]
62 head(test)
63 head(train)
64
65
66 model<-lm(Rent ~ Size, data=train)
67 summary(model)
68 test$predicted_rent<-predict(model,test)
69 head(test)
70
71 plot(Size, Rent, col="blue", main = "Rent vs Size Regression",
72 abline(lm(Rent~Size)),cex=1.3, xlab="Size", ylab="Rent")
```



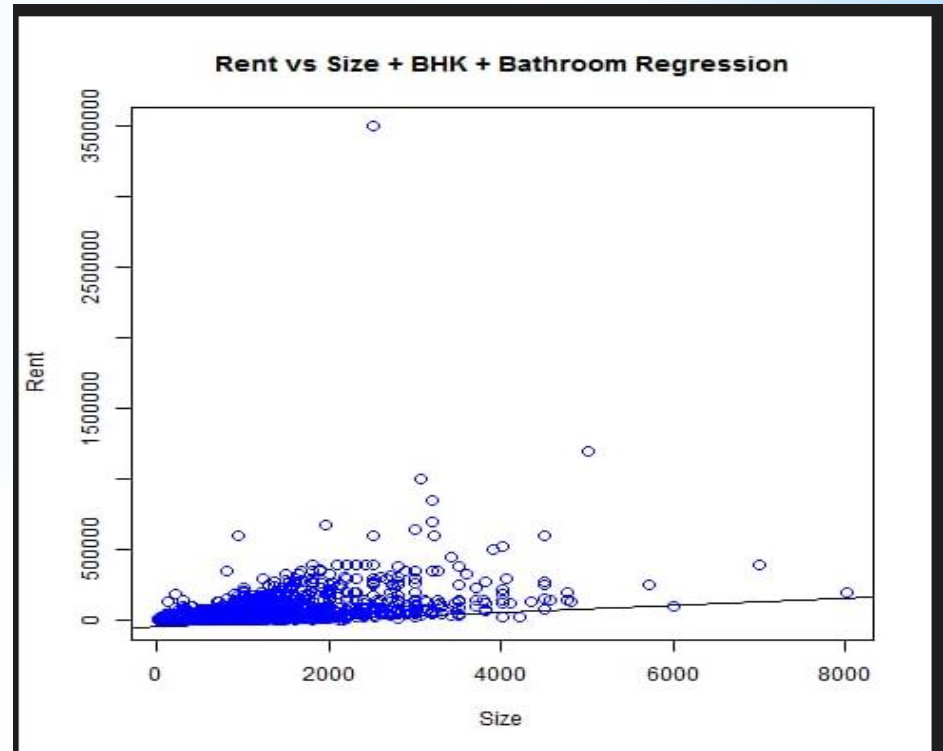
Progression in Learning(Cont.)

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* Progression in Learning(Cont.)



Linear Regression



Multiple Regression

* **Assessment for Learning**

- Based on Work done by student.
- Explanation of Algorithm that applied for analysis of Data.
- Implementation of Code in R.
- Percentage of Accuracy of the Result.



Govt. Holkar (Model, Autonomous) Science College,
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Department of Forensic Science
Session - 2021-22



Problem Solving Pedagogy based on Treasure Hunt Activity



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Concept Line

- Introduction
- Pedagogy used
- Learning outcomes
- Progression in learning
- Sports pedagogy in Teaching- learning process
- Assessment method for learning

Introduction

Forensic Scientist plays a crucial role in the Criminal Justice System. He/she observe the crime scene, identify and collect the evidences which link the relationship between suspect, victim and crime scene. Exactly in the same way treasure hunt activity is played.

In Treasure hunt activity, items/clues are hidden in a specific area for participants who decode the clues and find the treasure. It's aim to get group to try to complete challenges by working as a team and utilising their problem solving skills to come up with strategic plans to help complete the challenges with limited time throughout the activity.

Pedagogy used

Problem Solving, Sports Integration (Experiential Learning).

Learning Outcomes

- It enhance the good observational skills.
- It also help to analyse, Understand, Discover, Explore, Solve problems, Co-operation and Teamwork.
- It develops Patience, Listening skills and Concentration power.

Sports Pedagogy in Teaching- learning process

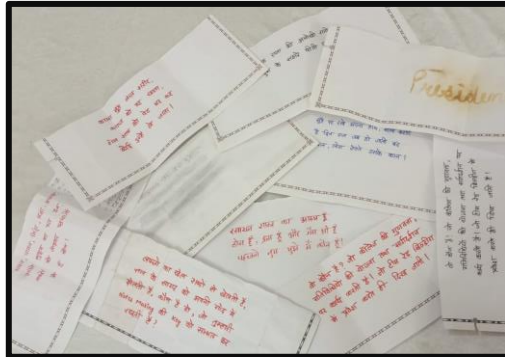
- Treasure hunt activity enhance the psycho-motor capabilities.
- Boost the self- confidence of the participants.
- It teaches them to interact with each other, understand what the other is saying and try to solve the clues together to win the game as a team.

Progression in learning

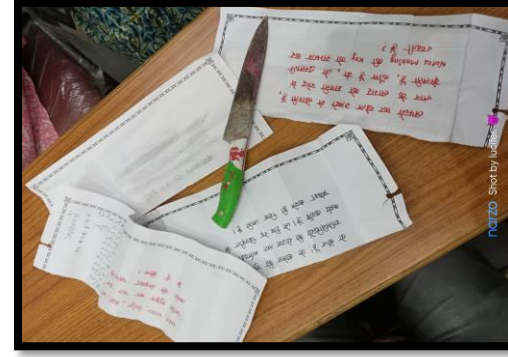
Two Teams were formed namely Team A (M.Sc. Final Year) and Team B (M.Sc. Previous Year). The Activity started from the mysterious crime scene where initial clue were given to the teams. By solving the given clue, they jumped to the next clue. And then gradually with progression of activity, both the teams reached at the final level which was of reasoning/logical query. By solving the last clue, Team A won.



Starting point -Crime Scene



Clues - Decode by Team A & B



Final Clue - Weapon



Team A Won the activity

Assessment method for learning

- **Assessment of the Activity** was done on the basis of time evaluation where team A was ahead with time from beginning and won the activity.
- **Assessing the Team work** : Given the task of searching by hiding the separate clues at different location.
- **Evaluation of Critical Thinking** : By assigning the clues in the form of puzzles/riddles.
- **Reflection of Intellectual/Problem Solving Skills** : By resolving the difficulties given in the activity.