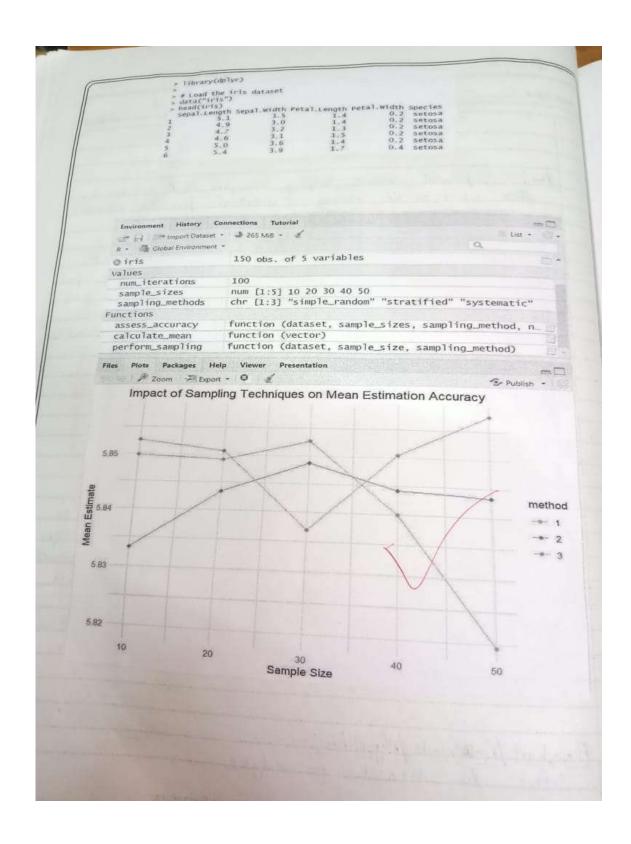
Exp	ot. NamePage No
	EXPERIMENT - 8
_	ALTINIEN - 8
	Aim: Implement voxious sampling transiques in R and assess their impact on the accuracy of statistical parameter estimation
	Introduction: The aim of this experiment is to implement
	on the according of statistical parameter estimation. The gra
+	is to understand how different compling methods influence the precision of reliability of estimated performance precision in startistical applications
	in startistical analysis.
1	annuals.
+	
	R Startictical Software
2.	R Studio
+	
R	elevence of Experiment: - Simpling is a fundamental dep in
_	statistical analysis and the choice of combine technic
5	an significantly affect the accuracy of Parameter confi
	This exp. is relevant for individuals implied in date analysis, research, and decision-making, as it provides
	insights into the impact of sampling method of influe
-	the accuracy and precision of parameter estimates.
CI	and at 18 and a 100 and a
13	solect the dataset for analysis.
	The smagner,
	Teacher's Signature:

```
Aim: - Implement various sampling techniques in R and assess their impact on the accuracy of statistical parameter estimation.
          1 # Load required libraries
2 library(dplyr)
        d # Load the iris dataset
5 data("iris")
6 head(iris)
           7
8 # Function to calculate mean of a vector
9 - calculate mean <- function(vector) {
0    return(mean(vector))</pre>
    mean_estimate mean_mean_estimates)
result data.frame_sample_size sample_size, mean_estimate mean_estim
results results, result)
             mean_estimate
    45
45
    45 return results
  # Plotting the results
library(ggplot2)
library(tidyr)
60
61
62
63
64
65
66
      accuracy_df <- bind_rows(accuracy_results, .id = "method")
ggplot(accuracy_df, aes(x = sample_size, y = mean_estimate, color = method)) *

geom_line() +
geom_point() +
labs(title = "Impact of Sampling Techniques on Mean Estimation Accuracy",
theme_minimal()</pre>
```

2. Chaose the Sampling techniques to implement 2. Teaplanent the selected sampling techniques in R. 4. Estimate the desired statistical parameters for each 5. Compare the parameter estimates across different sampling techniques. 6. Assess the impact of sampling methods on the accuracy and precision of parameter estimation.  Learning actionses: 1. Understanding the importance of sampling in addition analysis. 2. Perficiency in implementing various sampling technique in R. Ability to estimate statistical parameters using different samples. Comparing and interpreting the impact of sampling methods on parameters estimation accuracy. Gaining insights into when to use specific sampling techniques based on the nature of the data.		Expt. No.
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Compare the parameter estimates across different campling techniques.  Assess the import of sampling anothered on the accuracy and precision of parameter estimation.  Learning actuames:  1. Understanding the importance of sampling in statistics analysis.  2. Proficiency in implementing various sampling technique in R.  Ability to estimate statistical parameters using difference samples.  Comparing and interpreting the impact of sampling methods on parameters estimation accuracy.  Comparing insights into when to use specific sampling techniques based on the nature of the data.		
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Proficiency in implementing various sampling technique in R.  Ability to estimate statistical parameters using different sampler.  Comparing and interpreting the impact of campling methods on parameters estimation accuracy.  Gaining insights into when to use specific sampling techniques based on the nature of the data.		
Proficiency in implementing various sampling technique in R.  Ability to estimate statistical parameters using different samples.  Comparing and interpreting the impact of campling methods on parameters estimation accuracy.  Gaining insights into when to use specific sampling techniques based on the nature of the data.	1' Understanding the importan	ce of sampling in statistics
her ficiency in implementing various sampling technique in R.  Ability to estimate statistical parameters using different samples.  Comparing and interpreting the impact of campling methods on parameters estimation accuracy.  Gaining insights into when to use specific sampling techniques based on the nature of the data.	- CARCILLOS	
Ability to estimate statistical parameters using different surplies.  Comparing and interpreting the impact of campling methods on parameters estimation accuracy.  Gaining insights into when to use specific sampling techniques based on the nature of the data.	- Proficiency in implemento	ng various sampling technique
Comparing and interpreting the impact of campling methods on parameters estimation accuracy.  Gaining insights into when to use specific sampling techniques based on the nature of the data.	III K	
Comparing and interpreting the impact of campling methods on parameters estimation accuracy.  Gaining insights into when to use specific sampling techniques based on the nature of the data.	Ability to estimate statis	tical parameters using differen
	Comparing and introperting	the impact of campling
	methods on parameters of	ofmotion accuracy.
	· Gaining insights into whe	n to use specific sampling
	techniques based on the	nature of the data.
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Toucharla Cignatura:		
Teacher's Cignature:		
Topobovia Cignotiura:		
Teacher's Cignoture:		
Tanaharia Signatura:		
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reacher's Signature.		Teacher's Signature:



## **SCREENSHOTS:**

```
1 # Load required libraries
2 library(dplyr)
 # Load the iris dataset
data("iris")
head(iris)
  8 # Function to calculate mean of a vector
9 calculate_mean <- function(vector) {
10    return(mean(vector))
11 }</pre>
 12
# Function to perform sampling and estimate mean
14 perform_sampling <- function(dataset, sample_size, sampling_method) {
15 if (sampling_method == "simple_random") {</pre>
         sampled_data <- dataset[sample(nrow(dataset), sample_size, replace = FALSE),
} else if (sampling_method == "stratified") {</pre>
 17 -
           sampled_data <- dataset %>%
group_by(Species) %>%
 18
 19
 20
               sample_n(sample_size, replace = FALSE)
        } else if (sampling_method == "systematic") {
# Selecting every nth observation
 21 -
 22
 23
           n <- nrow(dataset)
 24
           k <- sample_size</pre>
 25
           start <- sample(1:k, 1)
indices <- seq(start, n, by = k)
sampled_data <- dataset[indices, ]</pre>
 26
 28 -
        } else
           stop("Invalid sampling method.")
 29
 32
        return(calculate_mean(sampled_data$Sepal.Length))
 33 ^ }
 35 # Function to assess impact on accuracy of mean estimation
 36 assess_accuracy <- function(dataset, sample_sizes, sampling_method, num_iterations) {
    results <- data.frame(sample_size = numeric(), mean_estimate = numeric())</pre>
 38
 39 +
        for (sample_size in sample_sizes) {
 40
           mean_estimates <- replicate(num_iterations, perform_sampling(dataset, sample_size, sampling_method))</pre>
> library(dplyr)
> # Load the iris dataset
> data("iris")
> head(iris)
   Sepal.Length Sepal.Width Petal.Length Petal.Width Species
                                                                           0.2 setosa
                 5.1
                                   3.5
                                                        1.4
2
                 4.9
                                    3.0
                                                        1.4
                                                                           0.2 setosa
                                                                           0.2 setosa
0.2 setosa
3
                 4.7
                                    3.2
                                                        1.3
                                    3.1
4
                 4.6
                                                        1.5
                                                                           0.2 setosa
0.4 setosa
5
                 5.0
                                    3.6
                                                        1.4
6
                 5.4
                                    3.9
                                                        1.7
```

```
mean_estimate <- mean(mean_estimates)
41
        result <- data.frame(sample_size = sample_size, mean_estimate = mean_estima
42
43
        results <- rbind(results, result)
44 -
45
46
      return(results)
47 - }
48
49 # Define parameters
50 sample_sizes <- c(10, 20, 30, 40, 50)
51 num_iterations <- 100
    sampling_methods <- c("simple_random", "stratified", "systematic")</pre>
52
53
54
   # Assess accuracy for each sampling method
55 - accuracy_results <- lapply(sampling_methods, function(method) {
56
      assess_accuracy(iris, sample_sizes, method, num_iterations)
57 - })
58
59
    # Plotting the results
    library(ggplot2)
library(tidyr)
60
61
62
    accuracy_df <- bind_rows(accuracy_results, .id = "method")</pre>
63
     ggplot(accuracy_df, aes(x = sample_size, y = mean_estimate, color = method)) +
64
65
       geom_line() +
       geom_point() +
labs(title = "Impact of Sampling Techniques on Mean Estimation Accuracy",
    x = "Sample Size", y = "Mean Estimate") +
66
67
68
69 theme_minimal()
```

