

**SHETH L.U.J AND SIR M.V COLLEGE  
PRACTICAL NO - 13 ,14,15  
SUBJECT - DATA ANALYSIS**

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## AIM - Performing linear regression analysis using lm() (R).

The figure shows a screenshot of the RStudio interface. The left pane displays an R script with the following content:

```
RStudio
File Edit Code View Plots Session Build Debug Profile Tools Help
Source
R > R 4.5.2 - ~/ ...
> library(tidyverse)
> library(readr)
>
> data <- read_csv("student_learning_trajectory.csv")
> Rows: 9776 Columns: 13
-- column specification
Delimiter: ","
dbl (13): student_id, week, study_hours, sleep_hours, stress_level, attendance_rate, ...
use `spec()` to retrieve the full column specification for this data.
Specify the column types or set `show_col_types = FALSE` to quiet this message.
> data_30 <- data[1:30, ]
>
> model1 <- lm(performance_index ~ study_hours, data = data_30)
>
> summary(model1)

Call:
lm(formula = performance_index ~ study_hours, data = data_30)

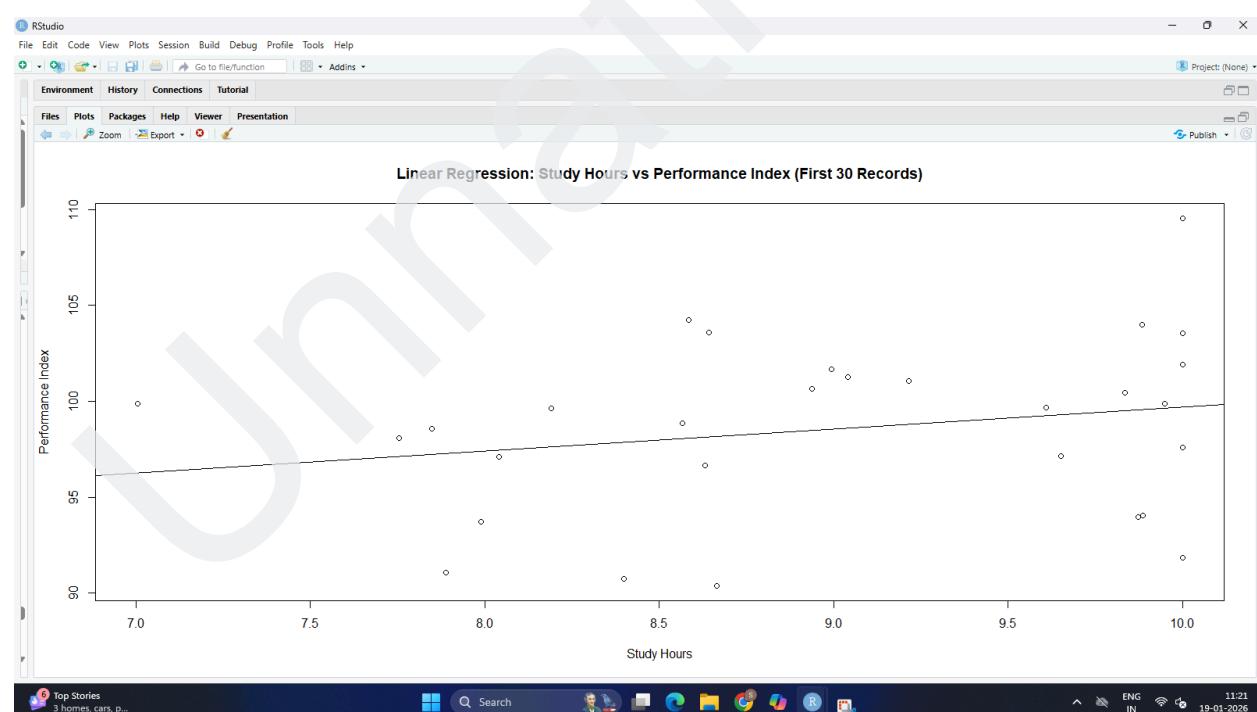
Residuals:
    Min      1Q  Median      3Q     Max 
-7.8900 -2.1700  0.8551  2.5428  9.8207 

Coefficients:
            Estimate Std. Error t value Pr(>|t|)    
(Intercept) 88.2197   8.5100 10.367 4.32e-11 ***
study_hours  1.1497   0.9374  1.226    0.23    
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Residual standard error: 4.449 on 28 degrees of freedom
Multiple R-squared:  0.05098, Adjusted R-squared:  0.01709 
F-statistic: 1.504 on 1 and 28 DF, p-value: 0.2302

> plot(data_30$study_hours, data_30$performance_index,
+       xlab = "Study Hours",
+       ylab = "Performance Index",
+       main = "Linear Regression: Study Hours vs Performance Index (First 30 Records)")
>
> abline(model1)
> |
```

The right pane shows a scatter plot titled "Linear Regression: Study Hours vs Performance Index (First 30 Records)". The x-axis is labeled "Study Hours" and ranges from 7.0 to 10.0. The y-axis is labeled "Performance Index" and ranges from 90 to 110. A positive linear regression line is plotted through the data points.

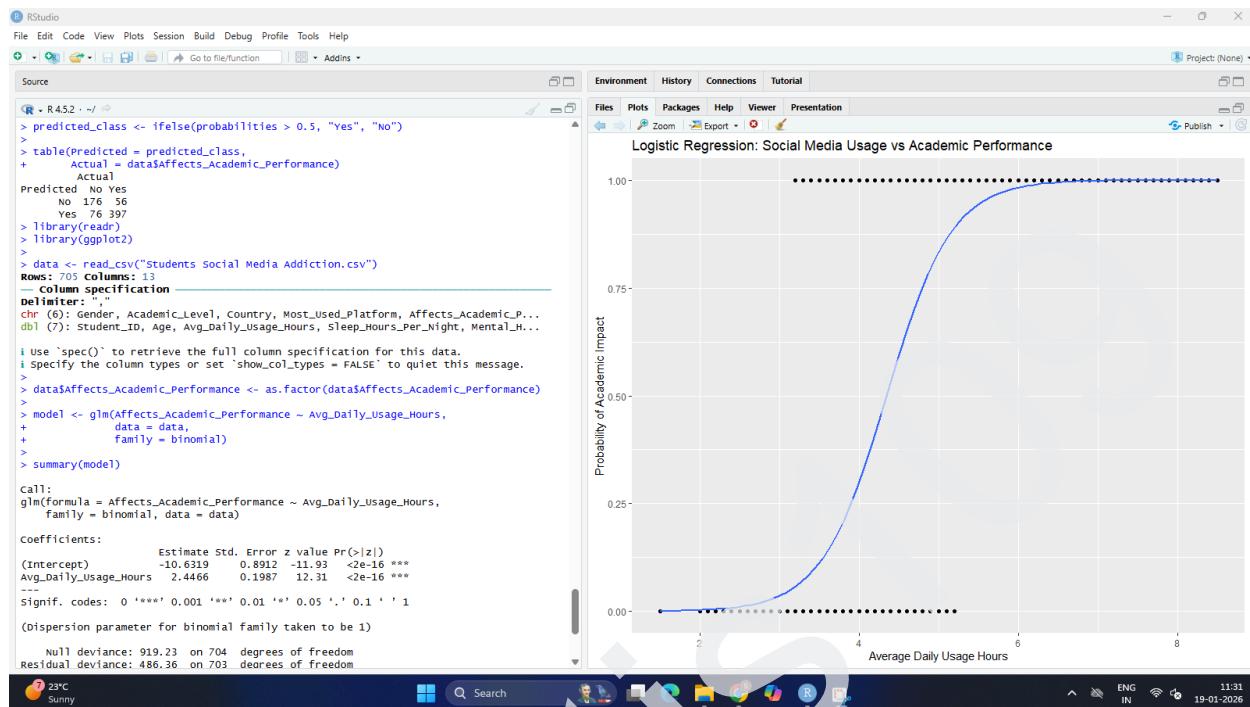


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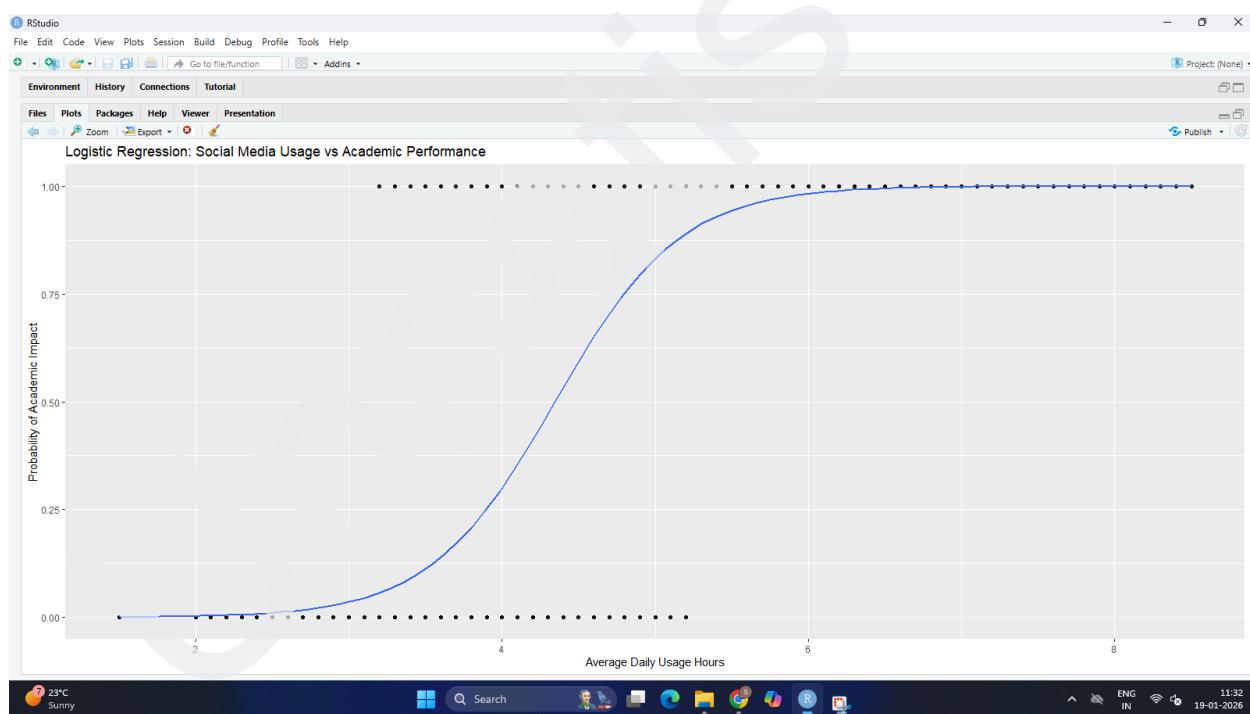
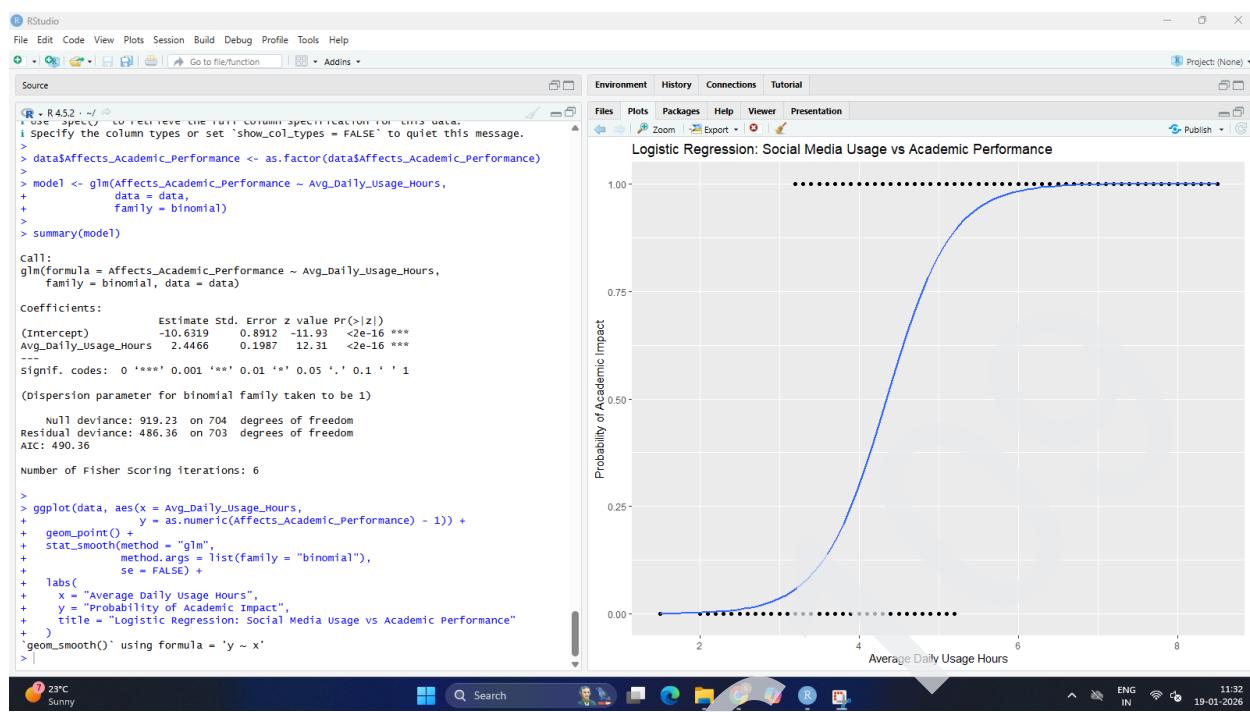
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AIM- Performing logistic regression using `glm()` ®



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PRAC 15

AIM - Exporting results into external files (Excel, CSV, PDF) using `write.csv()` and `writexl (R)`.

RStudio  
File Edit Code View Plots Session Build Debug Profile Tools Help  
Source  
R - R4.5.2 : ~/r  
Content type: application/zip length: 193200 bytes (193 KB)  
downloaded 193 KB

```
package 'rwriteXl' successfully unpacked and MD5 sums checked

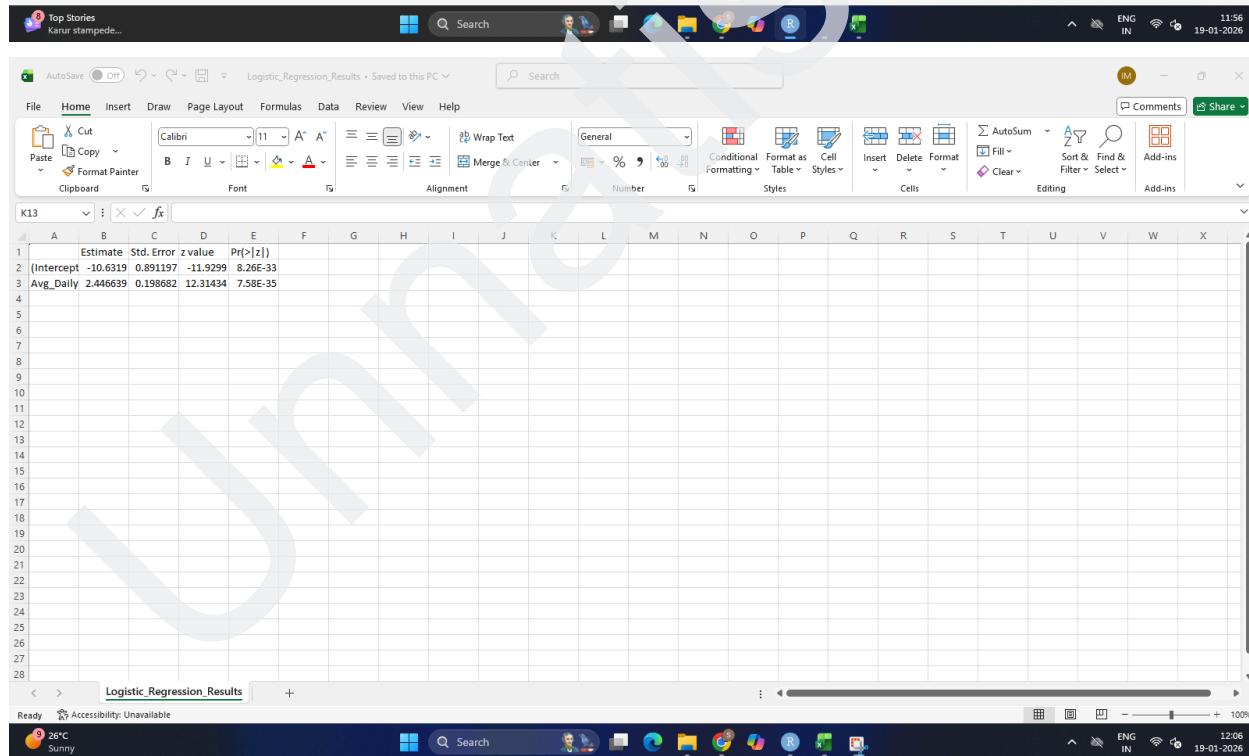
The downloaded binary packages are in
  C:\Users\itlab\AppData\Local\Temp\Rtmpoelev\downloaded_packages
> library(readxl)
> library(rwriteXl)
> library(ggplot2)
> data <- read.csv("Students_Social_Media_Addiction.csv")
Rows: 705 Columns: 13
-- Column specification --
delim: ","
chr (6): Gender, Academic_Level, Country, Most_Used_Platform, Affects_Academic_Performance, Relationsh...
dbl (7): Student_ID, Age, Avg_Daily_Usage_Hours, Sleep_Hours_Per_Night, Mental_Health_Score, Conflicts...

i Use `spec()` to retrieve the full column specification for this data.
i Specify the column types or set `show_col_types = FALSE` to quiet this message.
> data$Affects_Academic_Performance <- as.factor(data$Affects_Academic_Performance)

> model <- glm(Affects_Academic_Performance ~ Avg_Daily_Usage_Hours,
+                 data = data,
+                 family = binomial)
> results <- as.data.frame(summary(model)$coefficients)
> write.csv(results,
+            "Logistic_Regression_Results.csv",
+            row.names = TRUE)
> write_xlsx(results,
+             "Logistic_Regression_Results.xlsx")
> pdf("Logistic_Regression_Plot.pdf")
>
> ggplot(data, aes(x = Avg_Daily_Usage_Hours,
+                   y = as.numeric(Affects_Academic_Performance) - 1)) +
+   geom_point() +
+   stat_smooth(method = "glm",
+               method.args = list(family = "binomial"),
+               se = FALSE)
`geom_smooth()` using formula = 'y ~ x'
>
> dev.off()
RStudioGD
2
|
```

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