2347126 Individual-work (Team-13)

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setwd("C:/Users/ASUS/Desktop/2nd-trimester/R")  
std\_data=read.csv("13-Influence of AI TOOLS on Student's Learning Process.csv",header=T)  
  
#Dropping unwanted columns and cleaning the dataset  
drop=c("Timestamp","Username","Any.Comments..Review")  
std\_data= std\_data[,!(names(std\_data) %in% drop)]  
  
#change column\_names  
colnames(std\_data)=c("ar","g","e","freq","access","sat\_per","impt","recall","mot\_ler","sat\_info","sat","anx","prcy","saw","p\_att","flex","under","i\_feed","m\_obj","p\_alter","add\_s","l\_exp")  
str(std\_data)

## 'data.frame': 158 obs. of 22 variables:  
## $ ar : chr "18-24" "18-24" "18-24" "18-24" ...  
## $ g : chr "Male" "Male" "Male" "Male" ...  
## $ e : chr "Postgraduate" "Postgraduate" "Postgraduate" "Undergraduate" ...  
## $ freq : chr "Strongly agree" "Agree" "Strongly agree" "Agree" ...  
## $ access : chr "Strongly agree" "Agree" "Strongly agree" "Agree" ...  
## $ sat\_per : chr "Strongly agree" "Agree" "Strongly agree" "Strongly agree" ...  
## $ impt : chr "Strongly Agree" "Agree" "Agree" "Neutral" ...  
## $ recall : chr "Strongly Agree" "Agree" "Agree" "Agree" ...  
## $ mot\_ler : chr "Strongly Agree" "Agree" "Neutral" "Neutral" ...  
## $ sat\_info: chr "Strongly Agree" "Agree" "Disagree" "Agree" ...  
## $ sat : chr "Strongly Agree" "Agree" "Strongly Agree" "Agree" ...  
## $ anx : chr "Strongly Agree" "Agree" "Strongly Agree" "Agree" ...  
## $ prcy : chr "Neutral" "Agree" "Disagree" "Disagree" ...  
## $ saw : chr "Agree" "Agree" "Neutral" "Agree" ...  
## $ p\_att : chr "Neutral" "Agree" "Agree" "Neutral" ...  
## $ flex : chr "Disagree" "Agree" "Disagree" "Agree" ...  
## $ under : chr "Agree" "Agree" "Strongly Disagree" "Agree" ...  
## $ i\_feed : chr "Strongly Agree" "Agree" "Disagree" "Agree" ...  
## $ m\_obj : chr "Strongly Agree" "Agree" "Strongly Agree" "Agree" ...  
## $ p\_alter : chr "Strongly Agree" "Agree" "Strongly Agree" "Agree" ...  
## $ add\_s : chr "Strongly Agree" "Agree" "Disagree" "Agree" ...  
## $ l\_exp : chr "Strongly Agree" "Agree" "Agree" "Agree" ...

summary(std\_data)

## ar g e freq   
## Length:158 Length:158 Length:158 Length:158   
## Class :character Class :character Class :character Class :character   
## Mode :character Mode :character Mode :character Mode :character   
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## Length:158 Length:158 Length:158 Length:158   
## Class :character Class :character Class :character Class :character   
## Mode :character Mode :character Mode :character Mode :character   
## mot\_ler sat\_info sat anx   
## Length:158 Length:158 Length:158 Length:158   
## Class :character Class :character Class :character Class :character   
## Mode :character Mode :character Mode :character Mode :character   
## prcy saw p\_att flex   
## Length:158 Length:158 Length:158 Length:158   
## Class :character Class :character Class :character Class :character   
## Mode :character Mode :character Mode :character Mode :character   
## under i\_feed m\_obj p\_alter   
## Length:158 Length:158 Length:158 Length:158   
## Class :character Class :character Class :character Class :character   
## Mode :character Mode :character Mode :character Mode :character   
## add\_s l\_exp   
## Length:158 Length:158   
## Class :character Class :character   
## Mode :character Mode :character

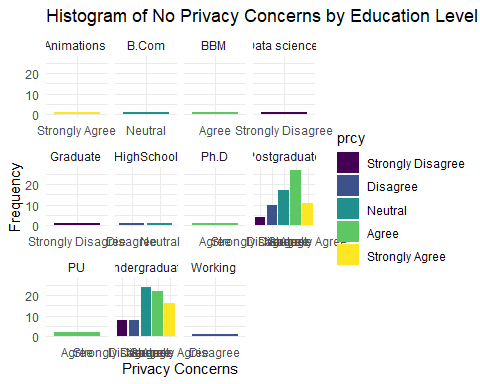
ar=factor(std\_data$ar)  
g=factor(std\_data$g)  
e=factor(std\_data$e)  
  
#Graph-1  
library(ggplot2)  
library(dplyr)

##   
## Attaching package: 'dplyr'

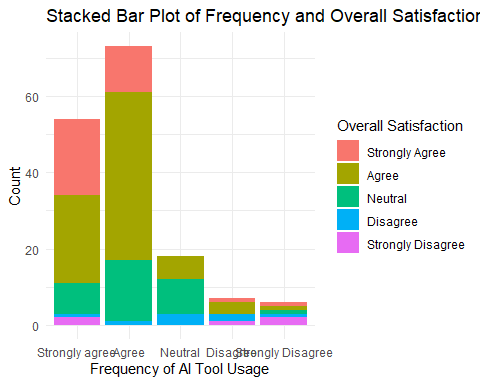
## The following objects are masked from 'package:stats':  
##   
## filter, lag

## The following objects are masked from 'package:base':  
##   
## intersect, setdiff, setequal, union

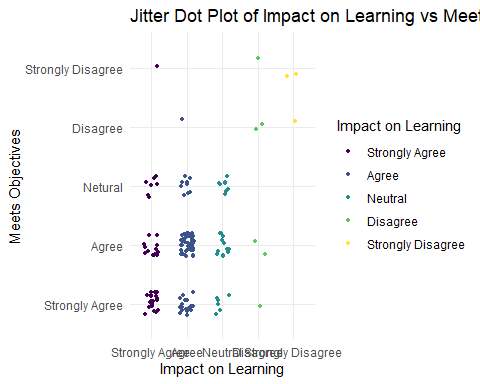
std\_data$prcy <- factor(std\_data$prcy, ordered = TRUE,  
 levels = c("Strongly Disagree", "Disagree", "Neutral", "Agree", "Strongly Agree"))  
ggplot(std\_data, aes(x = prcy, fill = prcy)) +  
 geom\_bar(position = "stack") +  
 facet\_wrap(~ e, scales = "free\_x") +  
 labs(title = "Histogram of No Privacy Concerns by Education Level",  
 x = "Privacy Concerns",  
 y = "Frequency") +  
 theme\_minimal()



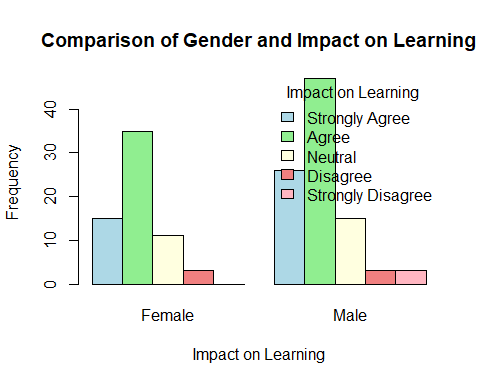
#UNDERSTANDING THE GRAPH - 1  
# The maximum number of responses are from respondents who are Undergraduates or Postgraduates.  
# Most of the respondants who frequently use AI Tools have less privacy concerns(Agree), whereas few have no Privacy concerns(Strongly Agree)  
  
  
  
  
  
#Graph-2  
std\_data$freq <- factor(std\_data$freq, ordered = TRUE, levels = c("Strongly agree", "Agree", "Neutral", "Disagree", "Strongly Disagree"))  
std\_data$sat <- factor(std\_data$sat, ordered = TRUE, levels = c("Strongly Agree", "Agree", "Neutral", "Disagree", "Strongly Disagree"))  
count\_data <- as.data.frame(table(std\_data$freq, std\_data$sat))  
colnames(count\_data) <- c("Frequency", "Overall\_Satisfaction", "Count")  
ggplot(count\_data, aes(x = Frequency, y = Count, fill = Overall\_Satisfaction)) +  
 geom\_bar(stat = "identity", position = "stack") +  
 labs(title = "Stacked Bar Plot of Frequency and Overall Satisfaction",  
 x = "Frequency of AI Tool Usage",  
 y = "Count",  
 fill = "Overall Satisfaction") +  
 theme\_minimal()



#UNDERSTANDING THE GRAPH - 2  
#Most users who use Ai Tools Frequently are overall satisfied with the services provided  
#Anyhow very few who use the AI tools are not satisfied   
  
  
  
#Graph-3  
std\_data$impt <- factor(std\_data$impt, ordered = TRUE, levels =c("Strongly Agree", "Agree", "Neutral", "Disagree", "Strongly Disagree"))  
std\_data$m\_obj <- factor(std\_data$m\_obj, ordered = TRUE, levels = c("Strongly Agree", "Agree", "Netural", "Disagree", "Strongly Disagree"))  
ggplot(std\_data, aes(x = impt, y = m\_obj, color = impt)) +  
 geom\_jitter(position = position\_jitter(width = 0.2, height = 0.2), size = 1) +  
 labs(title = "Jitter Dot Plot of Impact on Learning vs Meets Objectives",  
 x = "Impact on Learning",  
 y = "Meets Objectives",  
 color = "Impact on Learning") +  
 theme\_minimal()



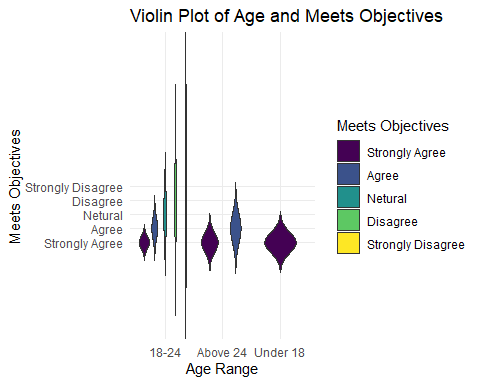
#UNDERSTANDING THE GRAPH - 3  
#Meeting the objectives of the query plays a important role in impacting the user learning experience  
#Better the Response of the AI Tools leads to Better Learning experience of the User  
  
  
  
  
  
  
#Graph-4  
barplot(t(table(std\_data$g, std\_data$impt)), beside = TRUE,  
 col = c("lightblue", "lightgreen", "lightyellow", "lightcoral", "lightpink"),  
 main = "Comparison of Gender and Impact on Learning",  
 xlab = "Impact on Learning",  
 ylab = "Frequency",  
 names.arg = levels(std\_data$g),  
 legend.text = levels(std\_data$impt),  
 args.legend = list(x = "topright", bty = "n", title = "Impact on Learning")) +  
 theme(legend.position = "bottom") # Adjust legend position



## NULL

#UNDERSTANDING THE GRAPH - 4  
#The respondents have a positive impact on their learning by using AI tool  
#Very few respondents disagree that the AI tools impact their learning   
  
  
  
  
  
#Graph-5  
std\_data$ar <- factor(std\_data$ar)  
std\_data$m\_obj <- factor(std\_data$m\_obj, ordered = TRUE, levels = c("Strongly Agree", "Agree", "Netural", "Disagree", "Strongly Disagree"))  
ggplot(std\_data, aes(x = ar, y = m\_obj, fill = m\_obj)) +  
 geom\_violin(trim = FALSE) +  
 labs(title = "Violin Plot of Age and Meets Objectives",  
 x = "Age Range",  
 y = "Meets Objectives",  
 fill = "Meets Objectives") +  
 theme\_minimal()

## Warning: Groups with fewer than two data points have been dropped.  
## Groups with fewer than two data points have been dropped.  
## Groups with fewer than two data points have been dropped.  
## Groups with fewer than two data points have been dropped.



#UNDERSTANDING THE GRAPH - 5  
#Teenagers(Under-18) and above-24 aged people who use AI tools gets their responses which meets the objectives of their query  
#For the people who are aged between 18-24 AI have met most of the objectives but still few people are not satisfied with the response  
  
  
  
#converting the columns into relevant datatype  
std\_data$g<-factor(std\_data$g)  
std\_data$ar<-factor(std\_data$ar)  
std\_data$e<-factor(std\_data$e)  
  
library(dplyr)  
  
map\_scale\_values <- function(value) {  
 case\_when(  
 as.character(value) %in% c("Strongly Agree", "Strongly agree") ~ 5,  
 as.character(value) %in% c("Agree") ~ 4,  
 as.character(value) %in% c("Neutral","Netural") ~ 3,  
 as.character(value) %in% c("Disagree") ~ 2,  
 as.character(value) %in% c("Strongly Disagree") ~ 1,  
 TRUE ~ NA\_real\_ # for any other cases  
 )  
}  
convert\_columns=c("freq","access","sat\_per","impt","recall","mot\_ler","sat\_info","sat","anx","prcy","saw","p\_att","flex","under","i\_feed","m\_obj","p\_alter","add\_s","l\_exp")  
  
# Apply the mapping function to specified columns  
std\_data <- std\_data %>%  
 mutate\_at(vars(convert\_columns), ~map\_scale\_values(.))

## Warning: Using an external vector in selections was deprecated in tidyselect 1.1.0.  
## ℹ Please use `all\_of()` or `any\_of()` instead.  
## # Was:  
## data %>% select(convert\_columns)  
##   
## # Now:  
## data %>% select(all\_of(convert\_columns))  
##   
## See <https://tidyselect.r-lib.org/reference/faq-external-vector.html>.  
## This warning is displayed once every 8 hours.  
## Call `lifecycle::last\_lifecycle\_warnings()` to see where this warning was  
## generated.

std\_data

## ar g e freq access sat\_per impt recall mot\_ler  
## 1 18-24 Male Postgraduate 5 5 5 5 5 5  
## 2 18-24 Male Postgraduate 4 4 4 4 4 4  
## 3 18-24 Male Postgraduate 5 5 5 4 4 3  
## 4 18-24 Male Undergraduate 4 4 5 3 4 3  
## 5 18-24 Male Undergraduate 5 5 4 4 4 4  
## 6 18-24 Male Undergraduate 4 4 4 4 3 4  
## 7 18-24 Male Postgraduate 3 3 3 3 3 3  
## 8 18-24 Female Postgraduate 4 4 4 3 3 2  
## 9 18-24 Female Undergraduate 5 5 5 5 5 5  
## 10 Under 18 Male Undergraduate 5 5 5 5 5 4  
## 11 18-24 Male Undergraduate 4 5 5 4 3 4  
## 12 18-24 Male Undergraduate 5 5 4 4 3 4  
## 13 18-24 Male Postgraduate 5 5 1 4 3 3  
## 14 18-24 Male Undergraduate 3 5 5 4 3 4  
## 15 18-24 Male Undergraduate 5 5 5 5 4 5  
## 16 18-24 Male Undergraduate 5 4 2 4 5 5  
## 17 Above 24 Male Postgraduate 4 4 5 4 4 4  
## 18 18-24 Female Undergraduate 5 5 5 4 4 4  
## 19 18-24 Female Postgraduate 5 5 5 5 5 5  
## 20 18-24 Male Undergraduate 1 3 1 1 1 1  
## 21 Above 24 Female Postgraduate 4 4 3 4 4 4  
## 22 18-24 Female Undergraduate 4 4 3 4 3 4  
## 23 18-24 Female Undergraduate 5 5 5 5 5 5  
## 24 18-24 Female Undergraduate 2 3 3 2 2 2  
## 25 18-24 Male Data science 5 4 4 3 3 3  
## 26 18-24 Male Postgraduate 4 4 4 3 3 2  
## 27 18-24 Male Undergraduate 4 4 4 4 4 4  
## 28 18-24 Male Postgraduate 4 3 4 4 3 4  
## 29 18-24 Male Undergraduate 4 3 3 4 4 3  
## 30 18-24 Male Undergraduate 4 5 5 5 5 4  
## 31 18-24 Male Undergraduate 5 3 5 5 5 5  
## 32 18-24 Female Undergraduate 5 4 4 5 4 5  
## 33 18-24 Male B.Com 3 3 3 3 3 3  
## 34 18-24 Male Undergraduate 5 5 3 4 4 3  
## 35 18-24 Female Undergraduate 4 5 4 4 4 4  
## 36 18-24 Male Undergraduate 4 4 4 4 4 3  
## 37 18-24 Male Undergraduate 4 4 4 4 4 4  
## 38 18-24 Female Postgraduate 4 5 4 5 4 3  
## 39 18-24 Male Undergraduate 4 4 3 4 4 4  
## 40 18-24 Female Undergraduate 4 3 4 3 3 2  
## 41 18-24 Male Postgraduate 4 3 3 4 3 3  
## 42 Under 18 Male Postgraduate 5 3 4 5 2 4  
## 43 18-24 Female Postgraduate 2 2 2 3 3 3  
## 44 18-24 Male Undergraduate 4 4 4 5 4 5  
## 45 Above 24 Male Postgraduate 3 5 5 5 4 4  
## 46 18-24 Female Postgraduate 4 4 4 5 5 5  
## 47 18-24 Female Undergraduate 4 3 3 4 5 4  
## 48 18-24 Female Postgraduate 3 3 4 5 4 4  
## 49 Above 24 Female Undergraduate 4 4 4 4 3 4  
## 50 18-24 Female Postgraduate 4 4 4 4 3 4  
## 51 18-24 Female Undergraduate 5 5 5 5 5 5  
## 52 18-24 Female Undergraduate 4 5 4 4 3 3  
## 53 Under 18 Male PU 4 5 4 3 4 5  
## 54 Above 24 Female Undergraduate 4 4 3 4 3 3  
## 55 18-24 Female Undergraduate 3 4 4 4 4 4  
## 56 Above 24 Male Graduate 3 4 4 4 5 3  
## 57 18-24 Female Undergraduate 3 4 4 4 4 4  
## 58 18-24 Male Undergraduate 4 4 3 3 2 3  
## 59 Above 24 Female Ph.D 3 4 2 4 3 2  
## 60 Above 24 Male Animations 4 4 4 4 5 3  
## 61 18-24 Male Undergraduate 5 4 4 4 5 4  
## 62 Above 24 Female Postgraduate 3 4 4 4 3 3  
## 63 18-24 Female Undergraduate 5 5 5 4 5 5  
## 64 18-24 Male Undergraduate 5 5 4 4 4 4  
## 65 18-24 Female Undergraduate 4 3 5 2 3 1  
## 66 18-24 Male Postgraduate 1 2 2 5 5 5  
## 67 18-24 Female Postgraduate 5 4 3 5 4 5  
## 68 18-24 Male Postgraduate 4 4 4 4 4 4  
## 69 Above 24 Male Postgraduate 2 4 4 5 5 5  
## 70 18-24 Female Undergraduate 4 3 4 4 3 4  
## 71 18-24 Male Postgraduate 5 4 3 5 4 3  
## 72 Above 24 Female BBM 4 3 4 4 5 4  
## 73 18-24 Female Undergraduate 5 4 5 4 5 3  
## 74 18-24 Female Postgraduate 4 4 4 4 4 4  
## 75 18-24 Male Undergraduate 4 4 1 4 3 2  
## 76 18-24 Female Undergraduate 4 4 4 4 4 4  
## 77 18-24 Male Undergraduate 5 5 5 5 5 5  
## 78 18-24 Male Undergraduate 4 4 3 5 4 3  
## 79 18-24 Male Undergraduate 5 4 3 5 4 5  
## 80 18-24 Male Undergraduate 4 3 3 4 4 4  
## 81 18-24 Female Undergraduate 3 4 3 3 3 3  
## 82 18-24 Male Undergraduate 5 5 5 5 5 5  
## 83 Under 18 Male PU 5 5 5 4 3 3  
## 84 18-24 Male Undergraduate 4 5 4 5 5 5  
## 85 18-24 Male Postgraduate 5 5 3 4 5 3  
## 86 18-24 Female Postgraduate 2 4 3 4 3 4  
## 87 18-24 Female Undergraduate 5 4 4 4 5 4  
## 88 18-24 Female Postgraduate 4 5 4 4 4 4  
## 89 18-24 Female Postgraduate 5 5 4 5 3 4  
## 90 18-24 Female Undergraduate 4 4 2 3 4 4  
## 91 Above 24 Male Postgraduate 5 5 5 4 4 5  
## 92 Above 24 Male Postgraduate 4 4 4 5 5 4  
## 93 Above 24 Female Undergraduate 3 5 4 4 2 3  
## 94 18-24 Female Undergraduate 4 4 4 5 3 4  
## 95 18-24 Male Postgraduate 4 4 4 4 4 4  
## 96 18-24 Male Undergraduate 1 5 5 3 3 3  
## 97 18-24 Male Postgraduate 4 3 5 4 3 4  
## 98 18-24 Male Postgraduate 5 4 3 2 3 4  
## 99 18-24 Female Postgraduate 4 5 4 5 4 5  
## 100 18-24 Male Postgraduate 4 4 4 4 4 4  
## 101 18-24 Male Postgraduate 5 4 3 4 3 3  
## 102 18-24 Male Postgraduate 5 4 3 3 2 1  
## 103 18-24 Male Postgraduate 4 5 4 3 4 3  
## 104 18-24 Male Postgraduate 2 1 3 2 1 3  
## 105 18-24 Female Postgraduate 4 3 5 4 3 2  
## 106 18-24 Male Undergraduate 1 4 4 5 4 3  
## 107 18-24 Female Undergraduate 1 3 1 3 1 2  
## 108 Above 24 Male Working 4 5 4 5 4 4  
## 109 Under 18 Female HighSchool 5 5 3 4 4 4  
## 110 18-24 Female Undergraduate 3 3 3 3 3 2  
## 111 Above 24 Male Postgraduate 2 4 3 4 3 4  
## 112 18-24 Female HighSchool 5 5 3 4 4 4  
## 113 18-24 Female Undergraduate 4 5 5 5 4 5  
## 114 18-24 Female Undergraduate 3 3 3 4 3 4  
## 115 18-24 Male Postgraduate 5 4 4 4 3 3  
## 116 18-24 Female Undergraduate 5 5 4 4 3 3  
## 117 18-24 Female Postgraduate 5 5 4 5 5 3  
## 118 18-24 Male Undergraduate 4 4 4 4 2 3  
## 119 18-24 Male Undergraduate 5 5 5 5 5 5  
## 120 18-24 Female Undergraduate 4 4 3 4 4 5  
## 121 18-24 Male Undergraduate 5 5 5 5 5 5  
## 122 18-24 Male Postgraduate 5 5 4 4 5 4  
## 123 18-24 Male Postgraduate 5 5 5 5 5 5  
## 124 18-24 Male Undergraduate 5 5 5 5 5 5  
## 125 18-24 Female Undergraduate 4 4 4 4 4 4  
## 126 18-24 Female Postgraduate 4 4 4 4 4 4  
## 127 18-24 Female Undergraduate 4 4 4 3 3 4  
## 128 18-24 Male Postgraduate 4 4 4 4 4 4  
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## 130 18-24 Female Undergraduate 3 3 3 3 3 3  
## 131 18-24 Male Undergraduate 5 4 3 1 2 3  
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## 133 18-24 Female Undergraduate 2 2 2 2 2 2  
## 134 18-24 Male Postgraduate 5 5 5 5 5 5  
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## 137 18-24 Male Postgraduate 4 4 4 4 4 4  
## 138 18-24 Female Undergraduate 5 5 3 5 3 5  
## 139 Above 24 Male Postgraduate 5 4 5 4 4 4  
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## 141 18-24 Male Postgraduate 4 4 3 3 4 4  
## 142 Above 24 Male Postgraduate 4 5 4 5 4 5  
## 143 18-24 Male Postgraduate 3 3 3 3 4 2  
## 144 18-24 Female Postgraduate 4 4 4 4 4 3  
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## 146 18-24 Male Postgraduate 4 4 4 4 4 3  
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## 151 18-24 Male Postgraduate 4 4 4 3 2 2  
## 152 18-24 Female Postgraduate 4 4 4 3 3 2  
## 153 18-24 Female Postgraduate 3 3 3 4 3 3  
## 154 18-24 Male Postgraduate 3 4 3 2 2 2  
## 155 18-24 Male Postgraduate 5 5 2 4 1 5  
## 156 18-24 Male Postgraduate 4 5 4 4 2 3  
## 157 18-24 Male Postgraduate 4 5 5 3 3 4  
## 158 18-24 Male Undergraduate 5 5 5 5 3 3  
## sat\_info sat anx prcy saw p\_att flex under i\_feed m\_obj p\_alter add\_s l\_exp  
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## 3 2 5 5 2 3 4 2 1 2 5 5 2 4  
## 4 4 4 4 2 4 3 4 4 4 4 4 4 4  
## 5 5 5 5 5 4 3 2 4 3 4 5 4 3  
## 6 4 4 4 5 5 3 4 4 3 4 4 3 4  
## 7 3 3 5 3 1 3 3 3 3 3 3 4 3  
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## 9 5 5 5 5 5 5 5 5 5 5 5 5 5  
## 10 4 5 4 5 4 4 4 4 5 5 4 3 5  
## 11 4 4 4 4 4 4 3 4 4 4 4 3 4  
## 12 4 4 4 3 3 5 3 4 4 4 4 4 4  
## 13 4 4 4 4 3 4 2 1 3 5 3 4 3  
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## 15 5 5 5 1 4 4 3 4 4 5 5 5 5  
## 16 4 4 4 4 4 4 4 4 4 4 4 4 4  
## 17 4 4 5 4 4 4 4 4 4 5 5 5 4  
## 18 4 3 4 3 3 4 4 4 4 4 4 4 4  
## 19 4 3 3 3 3 4 3 3 3 3 3 3 3  
## 20 1 1 1 1 1 1 1 1 1 1 1 1 1  
## 21 4 4 4 4 4 4 4 4 4 4 4 4 4  
## 22 3 3 4 3 4 4 4 4 4 4 4 4 4  
## 23 5 5 5 5 5 5 5 5 5 5 5 5 5  
## 24 5 2 2 2 2 3 4 2 2 4 2 4 3  
## 25 2 2 3 1 2 3 4 2 1 5 4 5 4  
## 26 2 4 2 2 2 2 2 2 2 4 4 2 5  
## 27 4 5 5 4 5 4 4 5 4 5 4 4 4  
## 28 3 4 4 2 2 3 2 3 4 4 4 5 4  
## 29 4 4 4 3 3 3 4 4 4 4 4 4 4  
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## 32 5 4 4 4 5 4 4 4 5 4 5 5 4  
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## 34 4 3 3 4 5 5 4 4 3 4 4 4 4  
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## 37 4 4 4 4 4 4 4 4 4 4 4 4 4  
## 38 2 4 2 2 3 4 2 4 2 4 4 4 4  
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## 41 5 5 4 4 3 5 4 4 5 4 5 4 4  
## 42 5 3 4 3 2 5 3 4 3 3 4 1 3  
## 43 3 4 2 2 4 3 3 4 3 4 3 4 4  
## 44 4 4 4 3 4 4 3 4 4 4 4 3 4  
## 45 4 4 4 3 3 4 4 4 4 4 4 4 4  
## 46 4 4 4 4 4 4 4 4 4 3 3 4 4  
## 47 4 4 3 4 4 4 5 5 5 4 4 5 4  
## 48 5 4 3 4 4 5 4 5 4 4 3 5 4  
## 49 4 4 3 4 4 4 4 4 4 4 4 3 4  
## 50 4 4 4 4 4 4 3 4 4 4 4 4 4  
## 51 5 5 5 5 5 5 5 5 5 5 5 5 5  
## 52 3 2 3 4 3 4 4 3 4 3 4 5 4  
## 53 5 4 5 4 4 5 5 5 4 5 4 5 5  
## 54 4 3 4 1 4 4 4 4 4 4 4 3 4  
## 55 3 4 3 3 3 4 3 4 4 3 4 4 4  
## 56 2 2 2 1 1 2 3 3 3 4 4 4 3  
## 57 3 3 3 3 3 4 4 4 4 4 4 4 4  
## 58 3 3 3 1 1 3 3 3 4 4 3 3 3  
## 59 5 3 3 4 3 4 4 5 5 3 4 4 3  
## 60 4 4 4 5 5 5 5 4 5 4 4 4 4  
## 61 5 4 3 4 4 5 4 4 5 4 4 4 4  
## 62 4 3 3 3 4 4 4 3 4 4 4 5 4  
## 63 5 5 4 5 4 5 5 5 5 5 5 5 5  
## 64 4 5 5 4 3 3 2 5 5 5 4 4 5  
## 65 3 3 4 2 2 4 1 4 3 4 4 3 5  
## 66 4 5 5 4 5 5 4 5 4 5 5 4 4  
## 67 4 4 5 5 4 4 5 1 4 1 3 5 4  
## 68 4 4 3 3 3 3 3 4 4 4 4 3 4  
## 69 4 5 4 3 3 2 4 5 4 4 4 4 4  
## 70 4 4 3 3 3 3 3 4 3 4 3 3 3  
## 71 5 4 3 4 5 4 3 5 3 5 4 3 4  
## 72 4 3 5 4 4 5 4 4 5 5 5 4 4  
## 73 3 3 4 4 4 4 3 4 5 5 4 5 4  
## 74 3 4 4 3 4 4 3 5 4 4 4 3 4  
## 75 4 4 3 3 4 3 4 3 4 3 4 3 4  
## 76 4 4 4 4 4 4 4 4 4 4 4 4 4  
## 77 5 5 5 5 5 5 5 5 5 5 5 5 5  
## 78 2 4 3 5 4 4 5 4 4 4 4 5 3  
## 79 3 4 4 3 4 5 4 4 4 4 4 5 4  
## 80 4 4 4 4 4 4 4 4 4 4 4 4 4  
## 81 4 3 3 3 3 3 3 3 3 3 3 3 3  
## 82 5 5 5 3 4 5 3 5 5 5 5 5 5  
## 83 3 4 5 4 5 4 3 3 4 5 5 5 5  
## 84 4 4 5 4 4 5 3 4 2 3 4 4 4  
## 85 3 4 5 5 4 3 3 4 3 5 5 4 3  
## 86 4 4 3 4 4 4 4 4 4 4 3 3 4  
## 87 5 5 4 5 4 4 4 4 5 4 5 4 4  
## 88 4 4 5 5 5 5 5 5 5 4 4 4 4  
## 89 2 4 3 4 3 3 3 4 5 4 4 5 4  
## 90 3 4 4 3 2 4 1 2 3 3 3 3 3  
## 91 5 4 4 5 4 5 4 5 5 5 5 4 4  
## 92 5 4 5 5 4 4 4 5 5 4 5 5 4  
## 93 3 4 2 4 2 4 4 5 4 4 5 5 4  
## 94 5 5 3 1 5 5 5 5 5 5 5 5 5  
## 95 4 4 4 4 4 4 4 4 4 4 4 4 4  
## 96 3 3 3 3 2 2 2 2 2 3 3 4 3  
## 97 4 3 5 3 5 3 4 5 4 4 4 4 5  
## 98 5 4 3 3 4 5 4 3 4 5 4 3 4  
## 99 3 5 4 4 4 4 5 5 4 5 5 4 4  
## 100 4 4 4 4 4 4 4 4 4 4 4 4 4  
## 101 2 4 4 4 4 4 4 4 4 5 4 4 4  
## 102 5 1 3 4 2 5 3 2 2 4 3 3 1  
## 103 4 4 4 3 3 4 3 3 4 4 4 4 4  
## 104 2 1 1 1 2 3 2 2 1 1 2 1 2  
## 105 4 3 3 1 2 2 1 2 1 4 4 4 4  
## 106 3 4 5 5 3 4 4 4 3 4 5 3 4  
## 107 4 2 1 1 1 3 4 4 2 3 3 2 2  
## 108 4 4 3 2 4 3 4 4 4 4 4 3 4  
## 109 4 3 3 3 3 4 3 4 4 4 4 3 4  
## 110 4 4 4 3 4 4 3 3 3 4 3 4 4  
## 111 5 4 3 2 4 4 4 5 5 4 4 3 4  
## 112 3 5 4 2 3 4 4 5 3 5 5 4 4  
## 113 5 5 5 2 4 2 2 4 4 4 5 5 5  
## 114 3 3 4 3 3 4 3 3 3 3 4 4 4  
## 115 4 4 3 2 4 3 3 3 3 5 4 4 3  
## 116 3 3 3 3 2 3 2 2 3 4 4 3 3  
## 117 5 4 5 3 5 5 5 5 4 5 4 5 4  
## 118 3 5 5 3 3 5 4 4 5 4 4 3 4  
## 119 5 5 5 5 5 5 5 5 5 5 5 5 5  
## 120 5 4 2 1 4 4 4 5 5 4 4 4 5  
## 121 5 5 5 5 5 5 5 5 5 5 5 5 5  
## 122 3 4 4 4 4 3 3 3 3 4 4 4 5  
## 123 5 5 5 5 5 5 5 5 5 5 5 5 5  
## 124 5 5 5 5 5 5 5 5 5 5 5 5 5  
## 125 4 4 4 4 4 4 4 4 4 4 4 4 4  
## 126 2 3 3 2 4 3 3 4 3 4 4 3 3  
## 127 3 4 4 3 3 4 3 4 3 4 3 3 3  
## 128 4 4 4 5 5 4 4 4 5 4 4 4 4  
## 129 3 4 4 4 4 4 4 4 4 4 4 4 4  
## 130 3 3 3 3 3 3 3 3 3 3 3 3 3  
## 131 3 4 2 5 1 2 2 5 4 2 3 4 1  
## 132 4 5 3 3 3 3 3 4 4 5 4 4 4  
## 133 2 2 2 2 2 2 2 2 2 2 2 2 2  
## 134 5 5 5 5 4 4 4 4 5 5 5 5 5  
## 135 4 4 5 5 5 5 3 3 4 5 5 5 5  
## 136 4 4 4 4 4 4 4 4 4 4 4 4 4  
## 137 4 4 4 4 4 4 4 4 4 4 4 4 4  
## 138 2 3 5 3 1 4 3 3 1 3 4 4 3  
## 139 4 4 4 4 4 4 4 5 5 5 5 4 4  
## 140 1 1 1 1 1 1 1 1 1 1 1 1 1  
## 141 3 5 4 3 4 4 4 4 4 5 4 5 4  
## 142 5 5 5 5 5 5 5 5 5 4 4 4 4  
## 143 4 2 5 4 5 5 4 5 5 5 4 5 5  
## 144 2 4 4 4 4 4 3 3 4 4 4 4 4  
## 145 4 3 4 4 3 3 4 3 4 4 3 4 3  
## 146 4 3 3 4 4 3 3 3 3 3 3 3 3  
## 147 4 4 3 4 4 3 2 3 3 3 4 5 5  
## 148 5 3 4 1 3 4 3 4 4 4 4 4 3  
## 149 5 4 5 4 5 4 5 4 5 4 5 4 5  
## 150 5 5 4 5 4 4 5 4 5 5 4 5 4  
## 151 3 3 3 3 3 3 4 3 3 3 4 4 4  
## 152 2 3 3 2 4 3 2 3 4 4 3 2 4  
## 153 3 3 4 3 4 4 3 3 3 3 4 4 4  
## 154 2 2 4 2 2 2 2 2 2 2 2 2 2  
## 155 2 1 4 1 1 1 1 4 4 2 4 3 3  
## 156 2 3 2 4 4 5 3 5 3 4 4 5 3  
## 157 3 4 5 5 4 5 3 5 5 5 5 5 5  
## 158 4 5 5 4 5 5 5 5 5 5 5 5 5

section\_2\_columns=c("freq", "sat", "sat\_per")  
section\_3\_columns=c("impt", "recall", "mot\_ler")  
section\_4\_columns=c("sat", "anx", "prcy", "saw", "p\_att", "flex")  
section\_5\_columns=c("under", "i\_feed", "m\_obj", "p\_alter", "add\_s", "l\_exp")  
# Summative score calculation  
std\_data$section\_2\_score <- rowSums(select(std\_data,section\_2\_columns), na.rm = TRUE)

## Warning: Using an external vector in selections was deprecated in tidyselect 1.1.0.  
## ℹ Please use `all\_of()` or `any\_of()` instead.  
## # Was:  
## data %>% select(section\_2\_columns)  
##   
## # Now:  
## data %>% select(all\_of(section\_2\_columns))  
##   
## See <https://tidyselect.r-lib.org/reference/faq-external-vector.html>.  
## This warning is displayed once every 8 hours.  
## Call `lifecycle::last\_lifecycle\_warnings()` to see where this warning was  
## generated.

std\_data$section\_3\_score <- rowSums(select(std\_data,section\_3\_columns), na.rm = TRUE)

## Warning: Using an external vector in selections was deprecated in tidyselect 1.1.0.  
## ℹ Please use `all\_of()` or `any\_of()` instead.  
## # Was:  
## data %>% select(section\_3\_columns)  
##   
## # Now:  
## data %>% select(all\_of(section\_3\_columns))  
##   
## See <https://tidyselect.r-lib.org/reference/faq-external-vector.html>.  
## This warning is displayed once every 8 hours.  
## Call `lifecycle::last\_lifecycle\_warnings()` to see where this warning was  
## generated.

std\_data$section\_4\_score <- rowSums(select(std\_data,section\_4\_columns), na.rm = TRUE)

## Warning: Using an external vector in selections was deprecated in tidyselect 1.1.0.  
## ℹ Please use `all\_of()` or `any\_of()` instead.  
## # Was:  
## data %>% select(section\_4\_columns)  
##   
## # Now:  
## data %>% select(all\_of(section\_4\_columns))  
##   
## See <https://tidyselect.r-lib.org/reference/faq-external-vector.html>.  
## This warning is displayed once every 8 hours.  
## Call `lifecycle::last\_lifecycle\_warnings()` to see where this warning was  
## generated.

std\_data$section\_5\_score <- rowSums(select(std\_data,section\_5\_columns), na.rm = TRUE)

## Warning: Using an external vector in selections was deprecated in tidyselect 1.1.0.  
## ℹ Please use `all\_of()` or `any\_of()` instead.  
## # Was:  
## data %>% select(section\_5\_columns)  
##   
## # Now:  
## data %>% select(all\_of(section\_5\_columns))  
##   
## See <https://tidyselect.r-lib.org/reference/faq-external-vector.html>.  
## This warning is displayed once every 8 hours.  
## Call `lifecycle::last\_lifecycle\_warnings()` to see where this warning was  
## generated.

# Display the updated data frame with the summative score  
head(std\_data)

## ar g e freq access sat\_per impt recall mot\_ler sat\_info sat  
## 1 18-24 Male Postgraduate 5 5 5 5 5 5 5 5  
## 2 18-24 Male Postgraduate 4 4 4 4 4 4 4 4  
## 3 18-24 Male Postgraduate 5 5 5 4 4 3 2 5  
## 4 18-24 Male Undergraduate 4 4 5 3 4 3 4 4  
## 5 18-24 Male Undergraduate 5 5 4 4 4 4 5 5  
## 6 18-24 Male Undergraduate 4 4 4 4 3 4 4 4  
## anx prcy saw p\_att flex under i\_feed m\_obj p\_alter add\_s l\_exp  
## 1 5 3 4 3 2 4 5 5 5 5 5  
## 2 4 4 4 4 4 4 4 4 4 4 4  
## 3 5 2 3 4 2 1 2 5 5 2 4  
## 4 4 2 4 3 4 4 4 4 4 4 4  
## 5 5 5 4 3 2 4 3 4 5 4 3  
## 6 4 5 5 3 4 4 3 4 4 3 4  
## section\_2\_score section\_3\_score section\_4\_score section\_5\_score  
## 1 15 15 22 29  
## 2 12 12 24 24  
## 3 15 11 21 19  
## 4 13 10 21 24  
## 5 14 12 24 23  
## 6 12 11 25 22

#1.One Sample T-Test  
df=data.frame(std\_data)  
prcymean=mean(std\_data$prcy)  
# Null Hypothesis (H0):  
# The mean of the variable 'prcy' in section-4 is equal to the hypothesized population mean.  
# Mathematically: ?\_prcy = 3.386076 (where ? represents the population mean)  
  
# Alternative Hypothesis (Ha or H1):  
# The mean of the variable 'prcy' in section-4 is not equal to the hypothesized population mean.  
# Mathematically: ?\_prcy ??? 3.386076 (where ? represents the population mean)  
  
t.test(std\_data$prcy, mu = prcymean)

##   
## One Sample t-test  
##   
## data: std\_data$prcy  
## t = 0, df = 157, p-value = 1  
## alternative hypothesis: true mean is not equal to 3.386076  
## 95 percent confidence interval:  
## 3.201145 3.571007  
## sample estimates:  
## mean of x   
## 3.386076

# The p-value of 1 is greater than any common significance level (e.g., 0.05), indicating that there is no significant difference between the mean of the 'prcy' variable in the dataset and the hypothesized population mean of 3.386076. Therefore, we do not have enough evidence to reject the null hypothesis.  
# there is no statistically significant difference between the mean of 'prcy' in the dataset and the hypothesized population mean of 3.386076.  
  
  
  
#2. Two sample T-test  
# Null Hypothesis (H0):  
# There is no significant difference in the mean satisfaction scores (sat\_per) between undergraduate and postgraduate students.  
# Mathematically: ?(undergrad)=?(postgrad) (where ?? represents the population mean).  
#   
# Alternative Hypothesis (Ha or H1):  
# There is a significant difference in the mean satisfaction scores (sat\_per) between undergraduate and postgraduate students.  
# Mathematically: ?(undergrad)????(postgrad) (where ?? represents the population mean).  
mean(df$e=="Undergraduate")

## [1] 0.4936709

mean(df$e=="Postgraduate")

## [1] 0.4367089

undergrad\_data <- std\_data$sat\_per[std\_data$e == "Undergraduate"]  
postgrad\_data <- std\_data$sat\_per[std\_data$e == "Postgraduate"]  
t\_test\_result <- t.test(undergrad\_data, postgrad\_data)  
print(t\_test\_result)

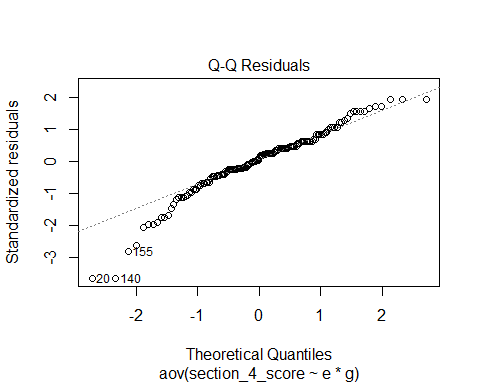
##   
## Welch Two Sample t-test  
##   
## data: undergrad\_data and postgrad\_data  
## t = 0.14766, df = 144.28, p-value = 0.8828  
## alternative hypothesis: true difference in means is not equal to 0  
## 95 percent confidence interval:  
## -0.2899636 0.3367864  
## sample estimates:  
## mean of x mean of y   
## 3.820513 3.797101

# The p-value of 0.8828 is greater than common significance levels (e.g., 0.05), indicating that there is insufficient evidence to reject the null hypothesis. Therefore, based on this test, we do not have enough evidence to conclude that there is a significant difference in the mean satisfaction scores between undergraduate and postgraduate students.  
  
  
  
#3. Performing one-way ANOVA  
# Null Hypothesis (H0):  
#   
# There is no significant difference in the mean satisfaction scores (sat\_per) among different education levels.  
# Mathematically: ?1=?2=...=?k (where ?? represents the population mean for each education level, and kk is the number of education levels).  
#   
# Alternative Hypothesis (Ha or H1):  
#   
# There is a significant difference in the mean satisfaction scores (sat\_per) among at least two education levels.  
# Mathematically: At least one ?i is different (where ii represents each education level).  
anova\_result <- aov(sat\_per ~ e, data = std\_data)  
print(anova\_result)

## Call:  
## aov(formula = sat\_per ~ e, data = std\_data)  
##   
## Terms:  
## e Residuals  
## Sum of Squares 6.37239 137.14660  
## Deg. of Freedom 10 147  
##   
## Residual standard error: 0.9659038  
## Estimated effects may be unbalanced

#The p-value associated with the F-statistic from the ANOVA test is not provided in the output.  
#Without the exact p-value, it's not possible to determine the statistical significance of the ANOVA test. If we have the p-value, we can compare it to the chosen significance level to make a conclusive decision.  
  
#4. Two-way ANOVA test  
mod <- aov(section\_4\_score ~ e \* g,  
 data = std\_data)  
  
plot(mod, which = 2)

## Warning: not plotting observations with leverage one:  
## 25, 33, 56, 59, 60, 72, 108



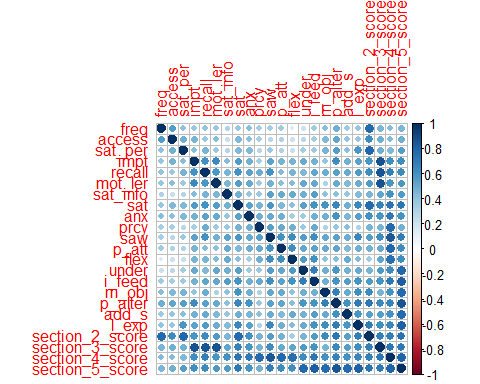
summary(mod)

## Df Sum Sq Mean Sq F value Pr(>F)  
## e 10 270.9 27.09 1.254 0.262  
## g 1 52.0 51.96 2.406 0.123  
## e:g 1 10.9 10.85 0.502 0.480  
## Residuals 145 3131.2 21.59

#The p-value for 'e' is 0.262, which is greater than the significance level of 0.05. Therefore, we fail to reject the null hypothesis. There is no significant evidence to conclude that education level has a significant effect on 'section\_4\_score'.  
#The p-value for 'g' is 0.123, which is greater than 0.05. We fail to reject the null hypothesis, indicating no significant evidence that gender has an effect on 'section\_4\_score'.  
#The p-value for the interaction term 'e:g' is 0.480, which is greater than 0.05. We fail to reject the null hypothesis, suggesting no significant evidence of an interaction effect between education level and gender on 'section\_4\_score'.  
#Based on the analysis, there is no significant evidence to suggest that education level, gender, or their interaction has a significant effect on 'section\_4\_score' at a 0.05 significance level. Therefore, we do not have enough evidence to reject the null hypotheses for any of the factors or their interaction.  
  
  
#5. Corelation plot  
library("corrplot")

## corrplot 0.92 loaded

d = subset(std\_data, select = -c(ar,e,g) )  
M=cor(d)  
corrplot(M,method="circle")



#The above corelation plot displays the connection between each column in the dataset.  
#There seems to be no negative co-relations in the dataset.  
#There is very weak co-relation between many columns in the dataset.  
#Each Section summative score seems to have normal positive corelation with each other column