High School Students' Perceptions of using AI for Learning

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```
# Load necessary libraries
library(readxl)
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
```

```
library(ggplot2)
library(scales)
library(tidyr)
library(stringr)

# Read the Excel file
dataset <- read_excel('/Users/Tendai/Downloads/dataset.xlsx', sheet = 'Form responses 1')

# Select only the first 8 columns because column 9 is an open-ended question
dataset <- dataset[, 1:8]

# Display the structure of the dataset
str(dataset)
```

```
## tibble [57 x 8] (S3: tbl_df/tbl/data.frame)
##  $ (1) What grade / year group are you currently in?                          : chr [1:57] "year 10
##  $ (2) How often do you use AI in your schoolwork?                            : chr [1:57] "Never"
##  $ (3) Which AI tools / brands do you use for your schoolwork?                : chr [1:57] "None" "
##  $ (4) Why do you use AI tools for your schoolwork? (select all that apply)   : chr [1:57] "I dont"
##  $ (5) What specific tasks do you use your AI for? (select all that apply)    : chr [1:57] "None" "
##  $ (6) How do you feel about the ethics of using AI in schoolwork?            : chr [1:57] "I think
##  $ (7) Do you think using AI tools hinders the quality of your education?     : chr [1:57] "No, I d
##  $ (8) Do you believe all students have equal access to AI tools for education?: chr [1:57] "I'm not
```

```r
# Show a summary of the dataset
summary(dataset)
```

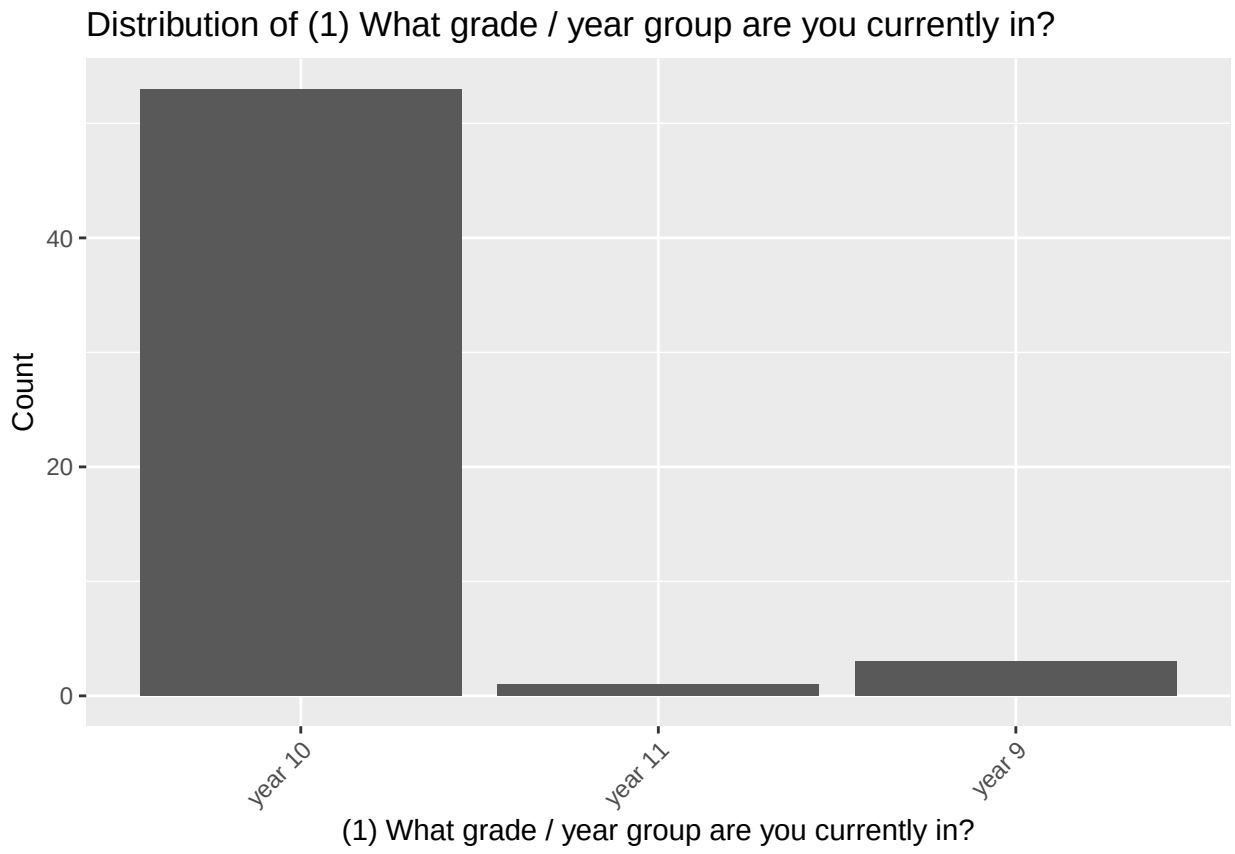
```
##  (1) What grade / year group are you currently in?
##  Length:57
##  Class :character
##  Mode  :character
##  (2) How often do you use AI in your schoolwork?
##  Length:57
##  Class :character
##  Mode  :character
##  (3) Which AI tools / brands do you use for your schoolwork?
##  Length:57
##  Class :character
##  Mode  :character
##  (4) Why do you use AI tools for your schoolwork? (select all that apply)
##  Length:57
##  Class :character
##  Mode  :character
##  (5) What specific tasks do you use your AI for? (select all that apply)
##  Length:57
##  Class :character
##  Mode  :character
##  (6) How do you feel about the ethics of using AI in schoolwork?
##  Length:57
##  Class :character
##  Mode  :character
##  (7) Do you think using AI tools hinders the quality of your education?
##  Length:57
##  Class :character
##  Mode  :character
##  (8) Do you believe all students have equal access to AI tools for education?
##  Length:57
##  Class :character
##  Mode  :character
```

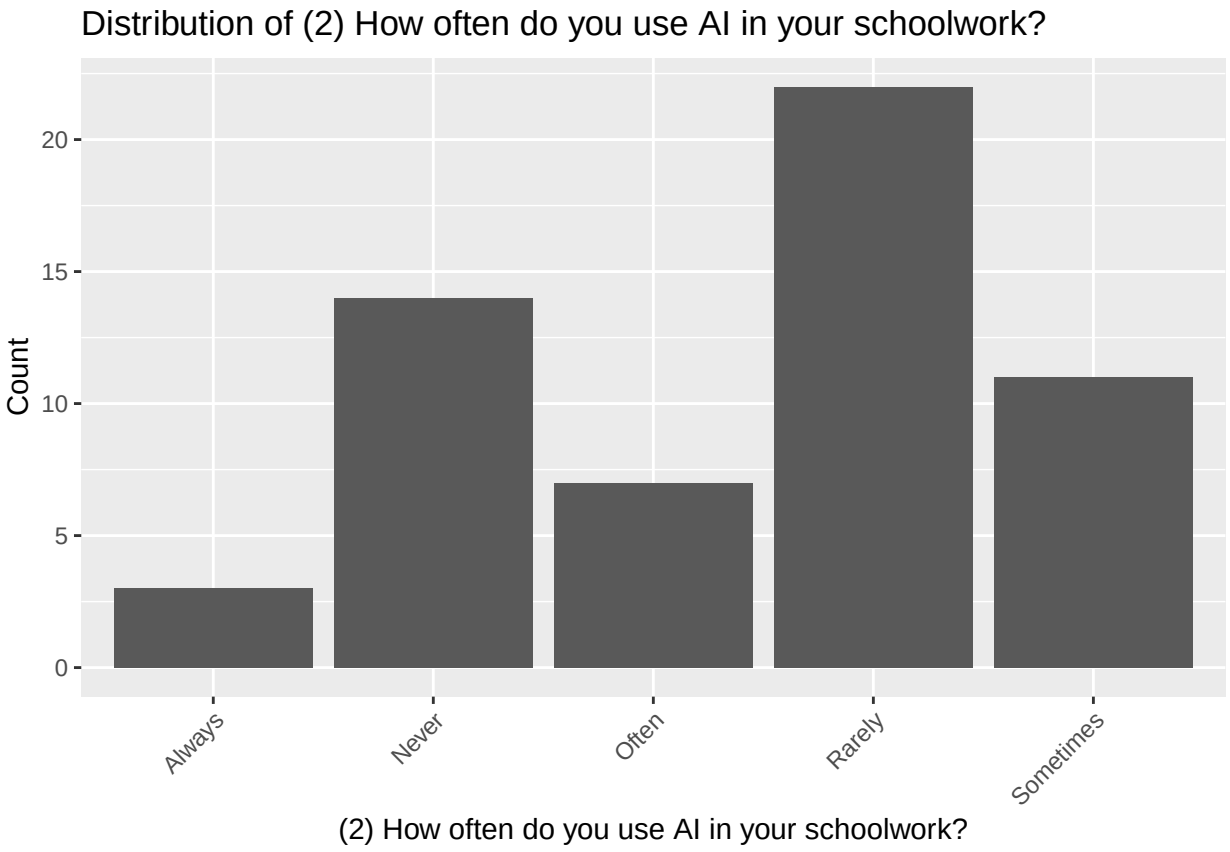
```r
# Display the first few rows
head(dataset)
```

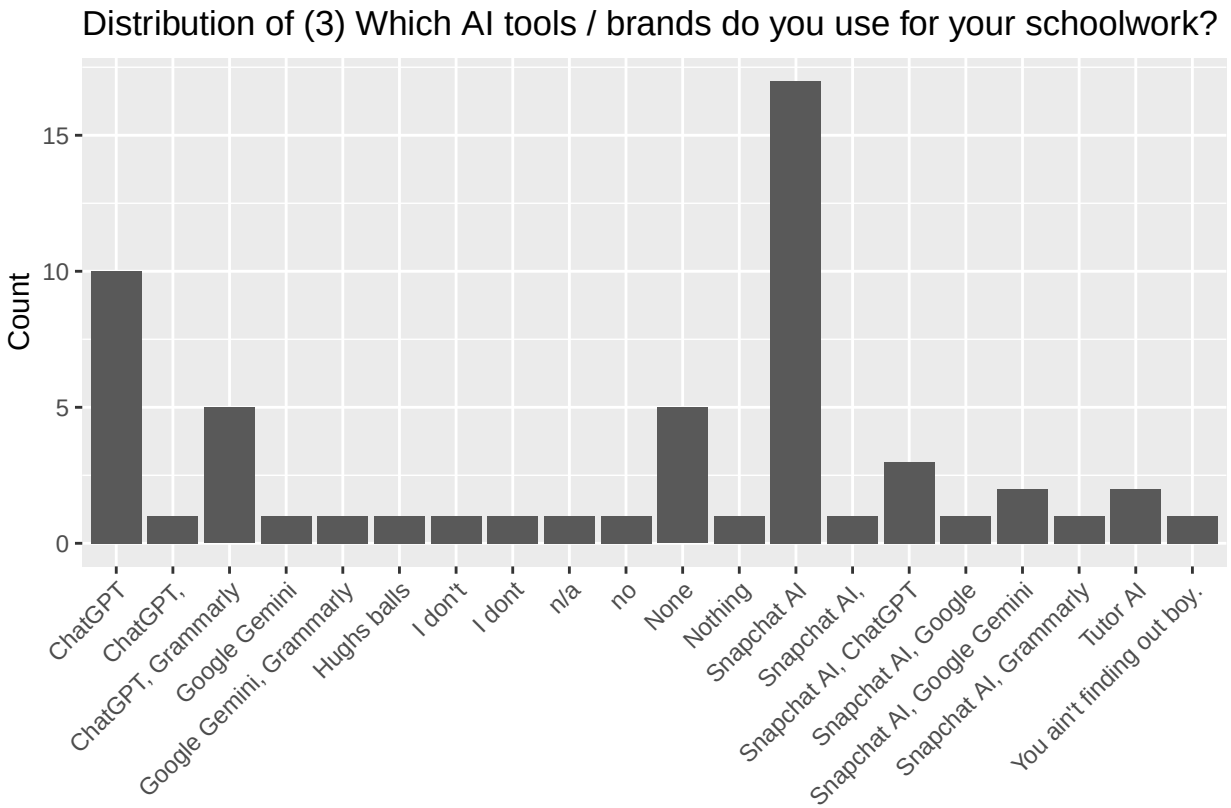
```
## # A tibble: 6 x 8
##   (1) What grade / year group ar~1 (2) How often do you~2 (3) Which AI tools /~3
##   <chr>                            <chr>                  <chr>
## 1 year 10                          Never                  None
## 2 year 10                          Often                  ChatGPT
## 3 year 10                          Never                  ChatGPT
## 4 year 10                          Often                  Snapchat AI, Google G~
## 5 year 10                          Sometimes              Snapchat AI
## 6 year 10                          Always                 ChatGPT
## # i abbreviated names: 1: `(1) What grade / year group are you currently in?`,
## #   2: `(2) How often do you use AI in your schoolwork?`,
## #   3: `(3) Which AI tools / brands do you use for your schoolwork?`
## # i 5 more variables:
## #   `(4) Why do you use AI tools for your schoolwork? (select all that apply)` <chr>,
```

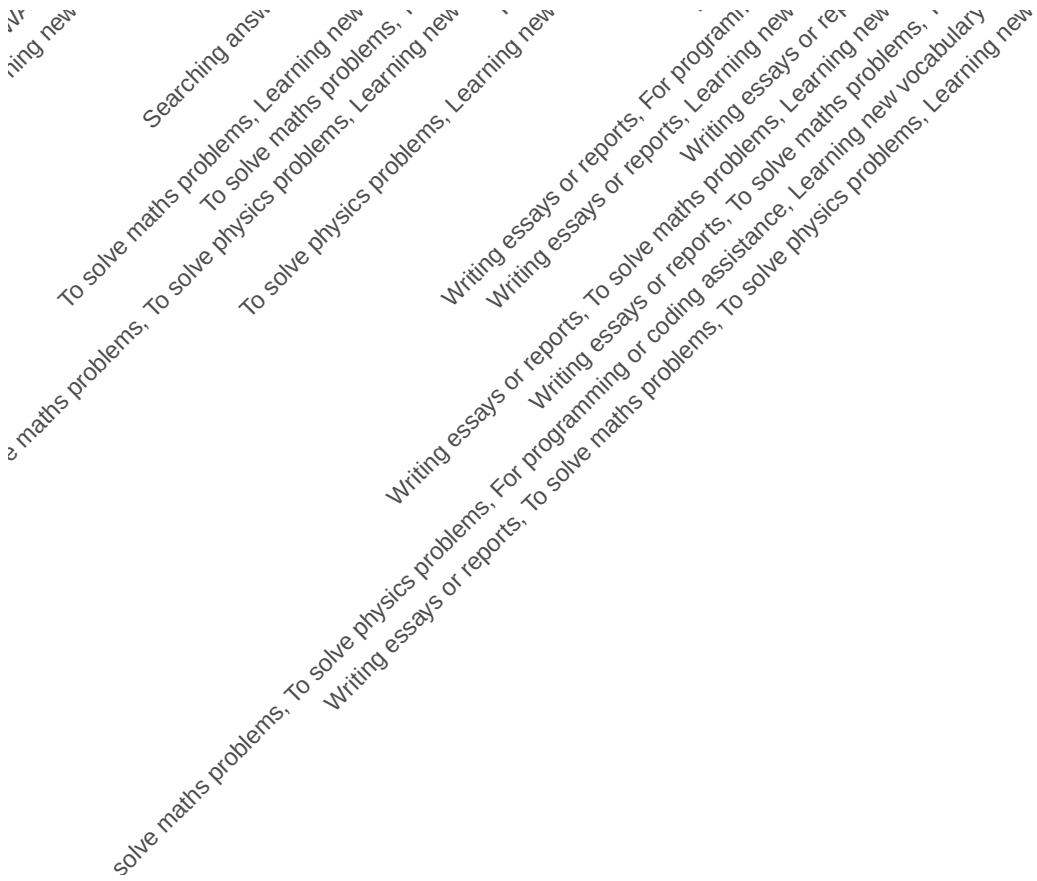
```
## #   `(5) What specific tasks do you use your AI for? (select all that apply)` <chr>,
## #   `(6) How do you feel about the ethics of using AI in schoolwork?` <chr>, ...
```

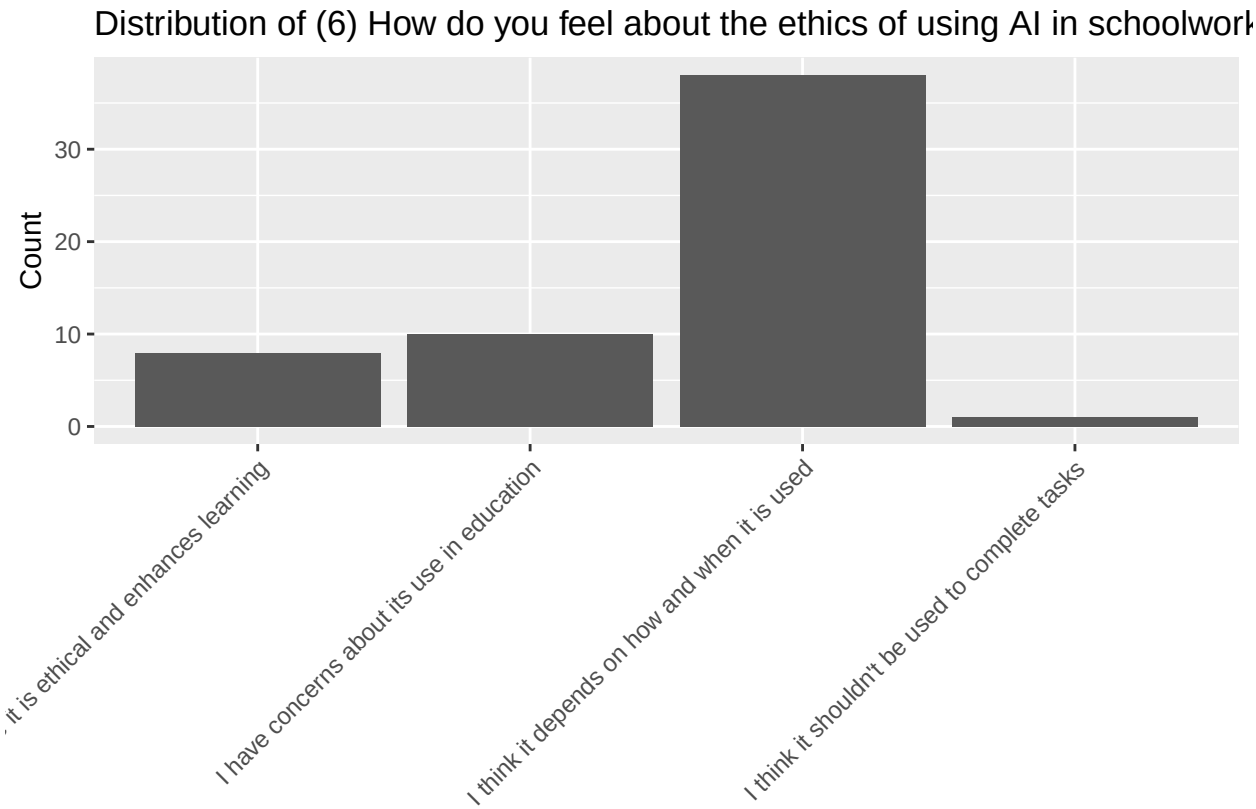
```r
# Function to create a bar plot for a categorical variable
create_bar_plot <- function(data, column_name) {
  ggplot(data, aes(x = !!sym(column_name))) +
    geom_bar() +
    theme(axis.text.x = element_text(angle = 45, hjust = 1)) +
    labs(title = paste("Distribution of", column_name),
         x = column_name,
         y = "Count")
}

# Create bar plots for each variable
plots <- lapply(names(dataset), function(col) create_bar_plot(dataset, col))

# Print the plots
for (i in seq_along(plots)) {
  print(plots[[i]])
}
```



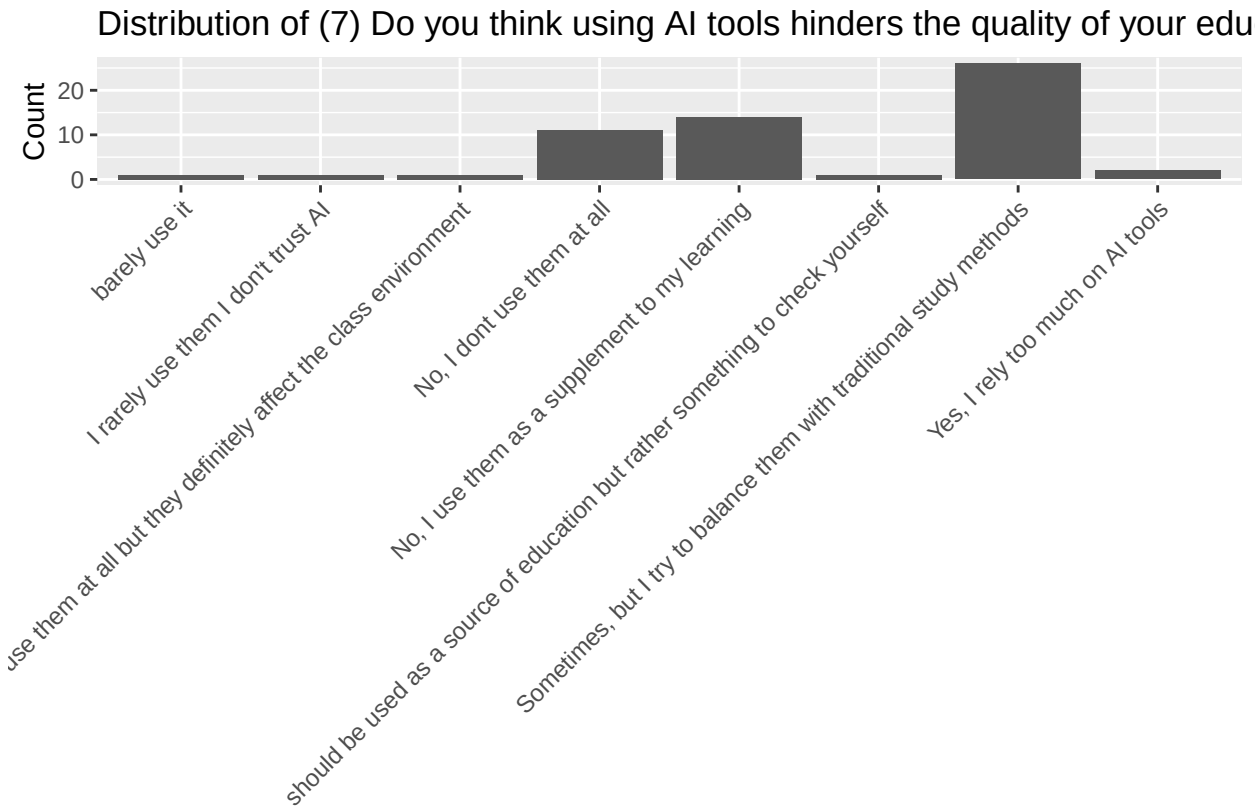

Distribution of (2) How often do you use AI in your schoolwork?
Count
20
15
10
5
0
Always
Never
Often
Rarely
Sometimes
(2) How often do you use AI in your schoolwork?


Distribution of (3) Which AI tools / brands do you use for your schoolwork?
Count
15
10
5
0
ChatGPT
ChatGPT,
ChatGPT, Grammarly
Google Gemini
Google Gemini, Grammarly
Hughs balls
I don't
I dont
n/a
no
None
Nothing
Snapchat AI
Snapchat AI,
Snapchat AI, ChatGPT
Snapchat AI, Google
Snapchat AI, Google Gemini
Snapchat AI, Grammarly
Tutor AI
You ain't finding out boy.
(3) Which AI tools / brands do you use for your schoolwork?

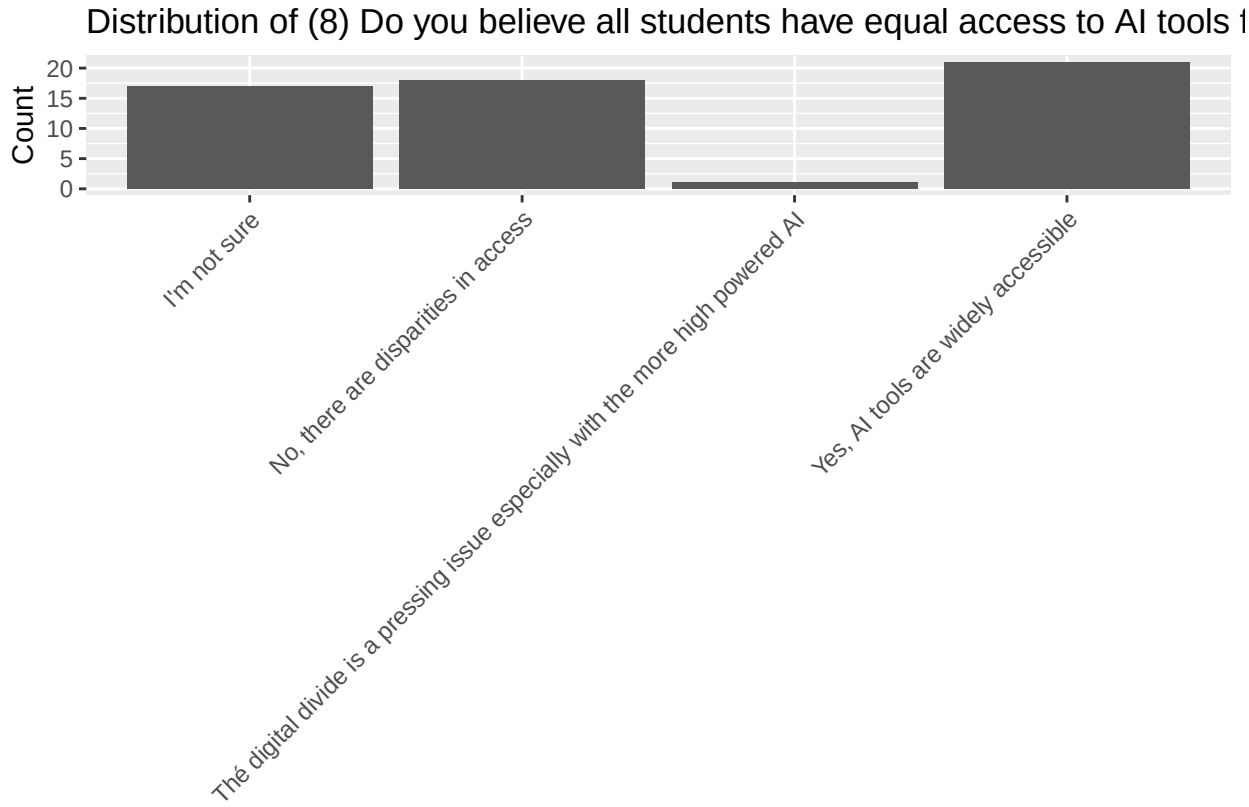

Searching ans
To solve maths problems, Learning new
To solve maths problems, Learning new
To solve maths problems, To solve physics problems, Learning new
To solve physics problems, Learning new
To solve physics problems, Learning new
Writing essays or reports, For program
Writing essays or reports, Learning new
Writing essays or reports, Learning new
Writing essays or reports, To solve maths problems, Learning new
Writing essays or reports, To solve maths problems, Learning new
Writing essays or reports, To solve maths problems, For programming or coding assistance, Learning new vocabulary
Writing essays or reports, To solve maths problems, To solve physics problems, Learning new



(6) How do you feel about the ethics of using AI in schoolwork?



(7) Do you think using AI tools hinders the quality of your education?




```
# Calculate and print the frequency tables for each variable
for (col in names(dataset)) {
  cat("\
Frequency table for", col, ":\
")
  print(table(dataset[[col]]))
}
```

```
##
## Frequency table for (1) What grade / year group are you currently in? :
##
## year 10 year 11  year 9
##      53       1       3
##
## Frequency table for (2) How often do you use AI in your schoolwork? :
##
##    Always     Never     Often    Rarely Sometimes
##         3        14         7        22        11
##
## Frequency table for (3) Which AI tools / brands do you use for your schoolwork? :
##
##                     ChatGPT                   ChatGPT,
##                          10                          1
##         ChatGPT, Grammarly              Google Gemini
##                           5                          1
##   Google Gemini, Grammarly                Hughs balls
```

```
##                         1                         1
##                     I don’t                     I dont
##                         1                         1
##                       n/a                        no
##                         1                         1
##                      None                    Nothing
##                         5                         1
##                Snapchat AI               Snapchat AI,
##                        17                         1
##       Snapchat AI, ChatGPT        Snapchat AI, Google
##                         3                         1
## Snapchat AI, Google Gemini     Snapchat AI, Grammarly
##                         2                         1
##                   Tutor AI You ain’t finding out boy.
##                         2                         1
##
## Frequency table for (4) Why do you use AI tools for your schoolwork? (select all that apply) :
##
##
##
##                                                                                                For tutoring o
##
##                                                                  For tutoring or revision assistance, To improve grammar
##
##
##
##
##
##
##
##
##
##
##
##
##
##
##
##
##
##
##
##
##
##             To generate ideas or brainstorm, For tutoring or revision assistance, To improve grammar
##
##                                                                                      To generate ideas or brainsto
##
##                                                                                                   To generat
##
##                                                                                 To generate ideas or brainstorm, To i
##
##                                                                To generate ideas or brainstorm, To improve grammar
##
```

```
##                                                                                                       To ge
##
##
##
##                                                                                          To generate ideas o
##
##
##
##
##
##                                      To get answers for homework questions, For tutoring or revisio
##
## To get answers for homework questions, To generate ideas or brainstorm, For tutoring or revision ass
##
##     To get answers for homework questions, To generate ideas or brainstorm, For tutoring or revisio
##
##          To get answers for homework questions, To generate ideas or brainstorm, To improve grammar
##
##                                                                                To get answers for homework que
##
##                                          To get answers for homework questions, To generate ideas o
##
##                                                         To get answers for homework questions, To i
##
##                                                                                 To get answers for homework qu
##
##
##
##                                                                                      To get answers for homewo
##
##
##
##                                                                                                        To i
##
##
##
##
##
##
##
##
## Frequency table for (5) What specific tasks do you use your AI for? (select all that apply) :
##
##
##
##
##
##
##
##
##
##
##
##
```

```
##
##
##
##
##
##
##
##
##
##
##                                                                                To solve maths problems
##
##
##
##
##
##
##
##
##
##
##
##
##
##
##
##
##                                                                                Writing essays or repor
##
##                                                                                            Writing essa
##
## Writing essays or reports, To solve maths problems, To solve physics problems, For programming or co
##
##                                                  Writing essays or reports, To solve maths problems
##
##
## Frequency table for (6) How do you feel about the ethics of using AI in schoolwork? :
##
##  I believe it is ethical and enhances learning
##                                              8
##     I have concerns about its use in education
##                                             10
##  I think it depends on how and when it is used
##                                             38
## I think it shouldn't be used to complete tasks
##                                              1
##
## Frequency table for (7) Do you think using AI tools hinders the quality of your education? :
##
##                                                                  barely use it
##                                                                              1
##                                             I rarely use them I don't trust AI
```

```
##                                                                                 1
##    No I don't use them at all but they definitely affect the class environment
##                                                                                 1
##                                                        No, I dont use them at all
##                                                                                11
##                                    No, I use them as a supplement to my learning
##                                                                                14
## should be used as a source of education but rather something to check yourself
##                                                                                 1
##            Sometimes, but I try to balance them with traditional study methods
##                                                                                26
##                                                  Yes, I rely too much on AI tools
##                                                                                 2
##
## Frequency table for (8) Do you believe all students have equal access to AI tools for education? :
##
##                                                                        I'm not sure
##                                                                                  17
##                                                  No, there are disparities in access
##                                                                                  18
## Thé digital divide is a pressing issue especially with the more high powered AI
##                                                                                   1
##                                                  Yes, AI tools are widely accessible
##                                                                                  21
```

```r
# Function to perform chi-square test and return formatted results
perform_chi_square <- function(data, var1, var2) {
  # Create contingency table
  cont_table <- table(data[[var1]], data[[var2]])

  # Perform chi-square test
  chi_test <- chisq.test(cont_table)

  # Format results
  result <- paste0(
    "Chi-square test between '", var1, "' and '", var2, "':\n",
    "X-squared = ", round(chi_test$statistic, 3), "\n",
    "df = ", chi_test$parameter, "\n",
    "p-value = ", format(chi_test$p.value, digits = 3), "\n\n"
  )

  return(result)
}

# List of variable pairs to test
var_pairs <- list(
  c("(2) How often do you use AI in your schoolwork?", "(6) How do you feel about the ethics of using AI
  c("(2) How often do you use AI in your schoolwork?", "(7) Do you think using AI tools hinders the qual
  c("(3) Which AI tools / brands do you use for your schoolwork?", "(5) What specific tasks do you use y
  c("(4) Why do you use AI tools for your schoolwork? (select all that apply)", "(6) How do you feel abo
  c("(7) Do you think using AI tools hinders the quality of your education?", "(8) Do you believe all st
)

# Perform chi-square tests
```

```r
results <- sapply(var_pairs, function(pair) perform_chi_square(dataset, pair[1], pair[2]))
```

```
## Warning in chisq.test(cont_table): Chi-squared approximation may be incorrect
## Warning in chisq.test(cont_table): Chi-squared approximation may be incorrect
## Warning in chisq.test(cont_table): Chi-squared approximation may be incorrect
## Warning in chisq.test(cont_table): Chi-squared approximation may be incorrect
## Warning in chisq.test(cont_table): Chi-squared approximation may be incorrect
```

```r
# Print results
cat(unlist(results))
```

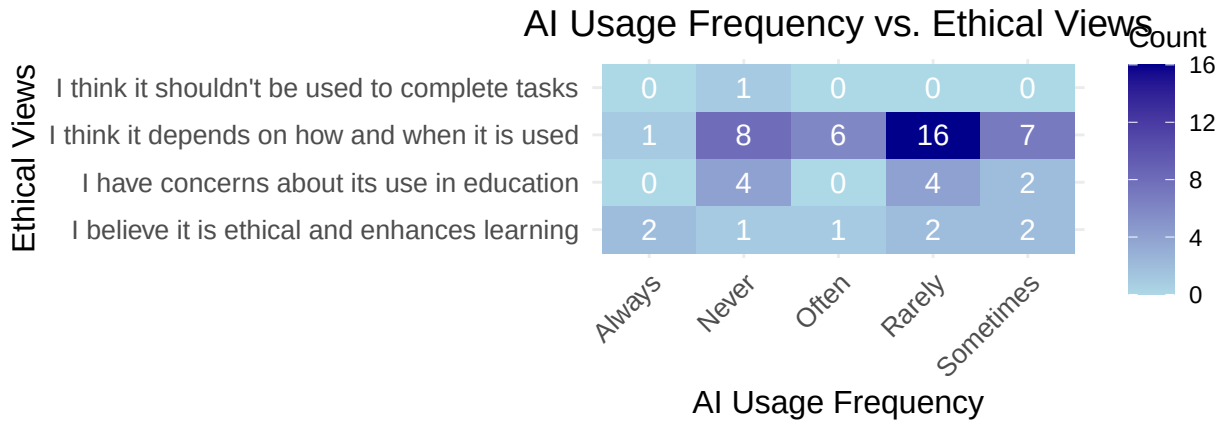
```
## Chi-square test between '(2) How often do you use AI in your schoolwork?' and '(6) How do you feel ab
## X-squared = 13.925
## df = 12
## p-value = 0.306
##
##  Chi-square test between '(2) How often do you use AI in your schoolwork?' and '(7) Do you think usin
## X-squared = 46.447
## df = 28
## p-value = 0.0157
##
##  Chi-square test between '(3) Which AI tools / brands do you use for your schoolwork?' and '(5) What
## X-squared = 522.355
## df = 437
## p-value = 0.00307
##
##  Chi-square test between '(4) Why do you use AI tools for your schoolwork? (select all that apply)' a
## X-squared = 107.038
## df = 111
## p-value = 0.589
##
##  Chi-square test between '(7) Do you think using AI tools hinders the quality of your education?' and
## X-squared = 76.642
## df = 21
## p-value = 2.92e-08
```

```r
# Create a contingency table
cont_table <- table(dataset$`(2) How often do you use AI in your schoolwork?`,
                    dataset$`(6) How do you feel about the ethics of using AI in schoolwork?`)

# Print the contingency table
print(cont_table)
```

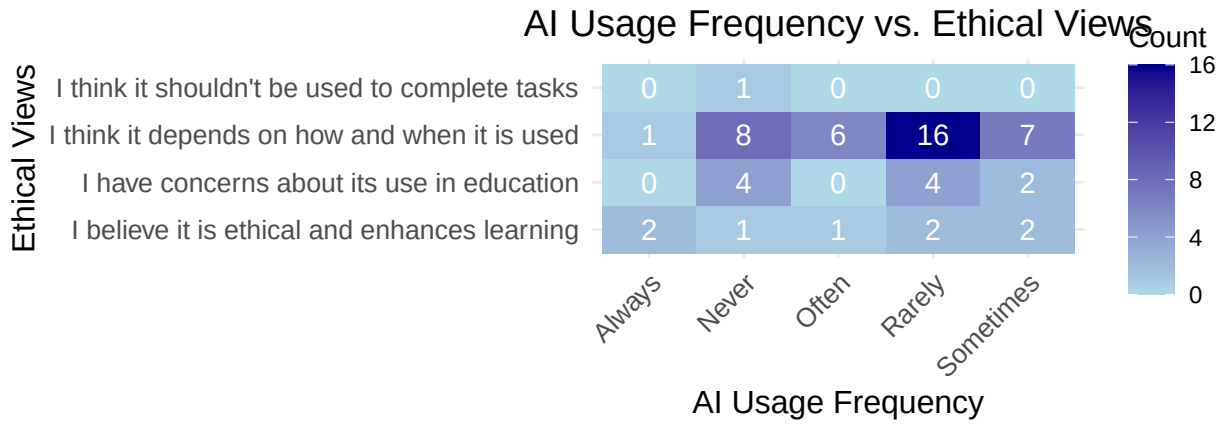
```
##
##             I believe it is ethical and enhances learning
##   Always                                                2
##   Never                                                 1
##   Often                                                 1
##   Rarely                                                2
##   Sometimes                                             2
##
##             I have concerns about its use in education
```

```
##   Always                                                0
##   Never                                                 4
##   Often                                                 0
##   Rarely                                                4
##   Sometimes                                             2
##
##             I think it depends on how and when it is used
##   Always                                                  1
##   Never                                                   8
##   Often                                                   6
##   Rarely                                                 16
##   Sometimes                                               7
##
##             I think it shouldn't be used to complete tasks
##   Always                                                  0
##   Never                                                   1
##   Often                                                   0
##   Rarely                                                  0
##   Sometimes                                               0
```

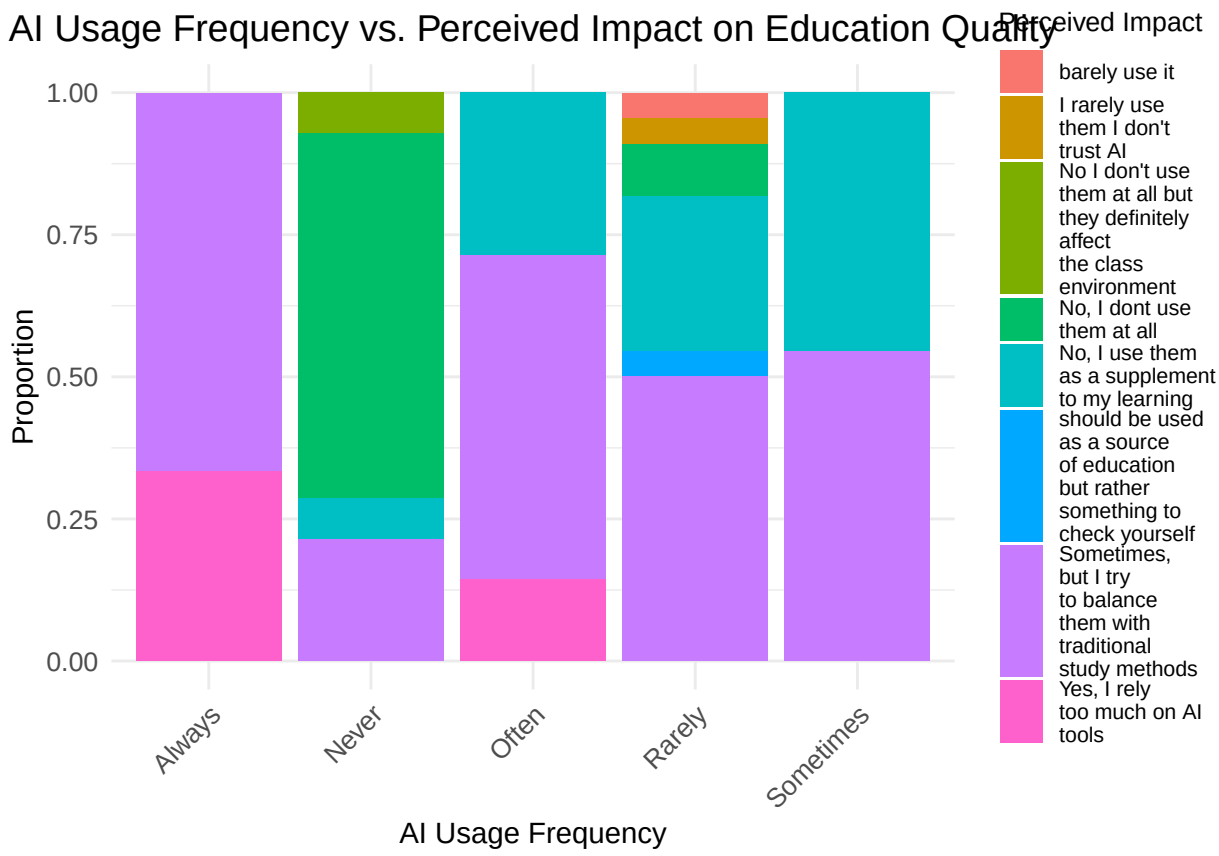
```r
# Convert the table to a data frame for ggplot
df <- as.data.frame(as.table(cont_table))
colnames(df) <- c("Frequency", "Ethics", "Count")

# Create the plot
ggplot(df, aes(x = Frequency, y = Ethics, fill = Count)) +
  geom_tile() +
  geom_text(aes(label = Count), color = "white", size = 4) +
  scale_fill_gradient(low = "lightblue", high = "darkblue") +
  theme_minimal() +
  theme(
    axis.text.x = element_text(angle = 45, hjust = 1, size = 10),
    axis.text.y = element_text(size = 10),
    plot.title = element_text(hjust = 0.5, size = 14),
    axis.title = element_text(size = 12)
  ) +
  labs(
    title = "AI Usage Frequency vs. Ethical Views",
    x = "AI Usage Frequency",
    y = "Ethical Views",
    fill = "Count"
  ) +
  coord_fixed(ratio = 0.5)  # Adjust this value to change the aspect ratio of the plot
```



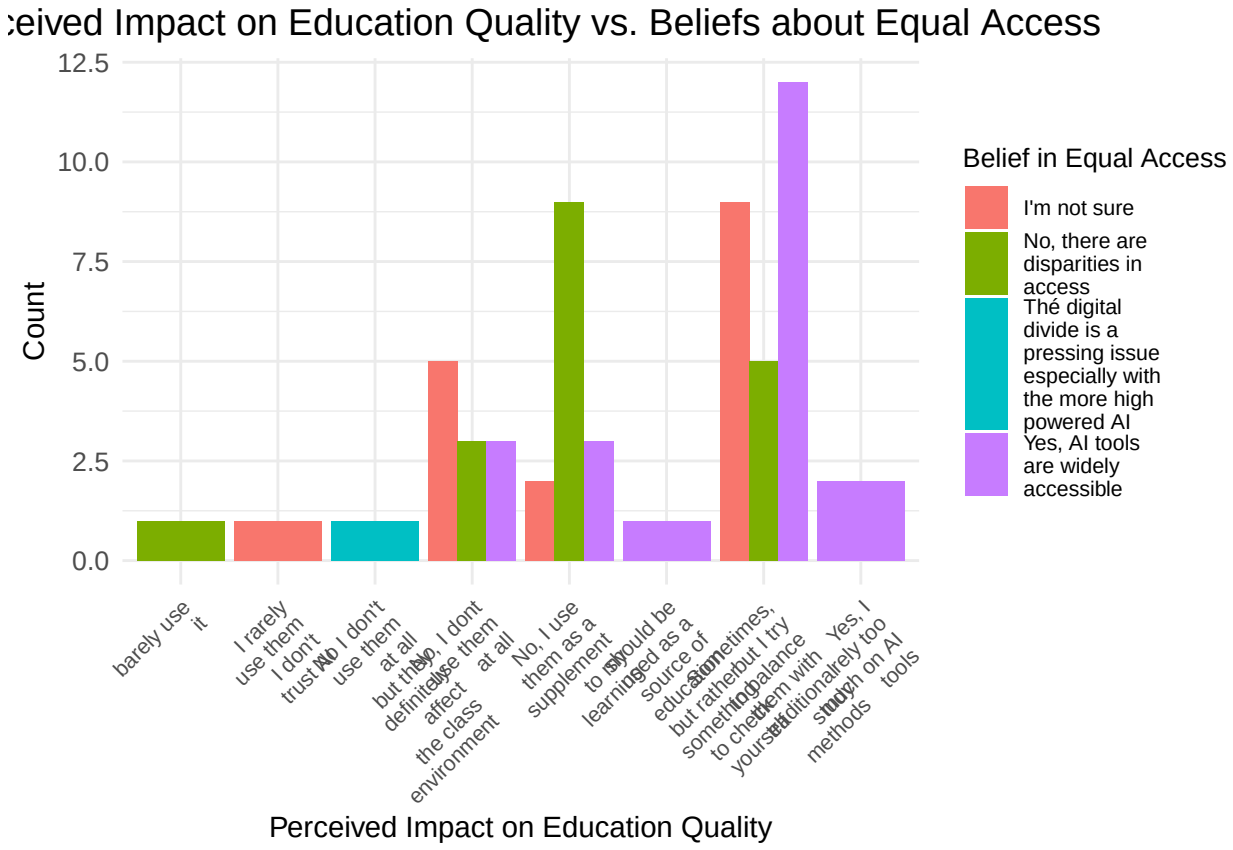

```
# Display the plot
print(last_plot())
```




```r
# Stacked Bar Chart for AI Usage Frequency vs. Perceived Impact on Education Quality
# Prepare the data
impact_data <- dataset %>%
  select(`(2) How often do you use AI in your schoolwork?`,
         `(7) Do you think using AI tools hinders the quality of your education?`) %>%
  na.omit()

# Create the plot
ggplot(impact_data, aes(x = `(2) How often do you use AI in your schoolwork?`,
                        fill = `(7) Do you think using AI tools hinders the quality of your education?`)) +
  geom_bar(position = "fill") +
  theme_minimal() +
  labs(title = "AI Usage Frequency vs. Perceived Impact on Education Quality",
       x = "AI Usage Frequency",
       y = "Proportion",
       fill = "Perceived Impact") +
  theme(axis.text.x = element_text(angle = 45, hjust = 1, size = 10),
        axis.text.y = element_text(size = 10),
        legend.text = element_text(size = 8),
        legend.title = element_text(size = 10),
        plot.title = element_text(hjust = 0.5, size = 14)) +
  scale_x_discrete(labels = function(x) str_wrap(x, width = 10)) +
  scale_fill_discrete(labels = function(x) str_wrap(x, width = 15))
```




```r
# Grouped Bar Chart for Perceived Impact on Education Quality vs. Beliefs about Equal Access
# Prepare the data
impact_access <- dataset %>%
  select(`(7) Do you think using AI tools hinders the quality of your education?`,
         `(8) Do you believe all students have equal access to AI tools for education?`) %>%
  na.omit() %>%
  count(`(7) Do you think using AI tools hinders the quality of your education?`,
        `(8) Do you believe all students have equal access to AI tools for education?`)

# Create the plot
ggplot(impact_access, aes(x = `(7) Do you think using AI tools hinders the quality of your education?`,
                          y = n,
                          fill = `(8) Do you believe all students have equal access to AI tools for edu
  geom_bar(stat = "identity", position = "dodge") +
  theme_minimal() +
  theme(axis.text.x = element_text(angle = 45, hjust = 1, size = 8),
        axis.text.y = element_text(size = 10),
        legend.text = element_text(size = 8),
        legend.title = element_text(size = 10),
        plot.title = element_text(hjust = 0.5, size = 14)) +
  labs(title = "Perceived Impact on Education Quality vs. Beliefs about Equal Access",
       x = "Perceived Impact on Education Quality",
       y = "Count",
       fill = "Belief in Equal Access") +
  scale_x_discrete(labels = function(x) str_wrap(x, width = 10)) +
  scale_fill_discrete(labels = function(x) str_wrap(x, width = 15))
```


ceived Impact on Education Quality vs. Beliefs about Equal Access
12.5
10.0
7.5
5.0
2.5
0.0
Count
barely use it
I rarely use them
I don't trust AI
No I don't use them at all
No, I dont but they definitely affect the class environment
No, I use them as a supplement to my learning
I should be used as a source of education
Sometimes, but rather but I try something to balance them with yourself
Yes, I additionalrely too much on AI tools
methods
Perceived Impact on Education Quality
Belief in Equal Access
I'm not sure
No, there are disparities in access
Thé digital divide is a pressing issue especially with the more high powered AI
Yes, AI tools are widely accessible