SECI2143

PROBABILITY AND STATISTICAL DATA ANALYSIS

PROJECT 1:
A STUDY ON MUSIC BEHAVIOR TO THE STUDENTS' ACADEMIC PERFORMANCES

NAMA PENSYARAH: Dr. Aryati binti Bakri

NO.	NAME	MATRIC NUMBER
1.	MUHAMMAD NUR SOLIHIN BIN MALIK RADZUAN	A21EC0089
2.	SARAH FARHANA BINTI SALLEH	A21EC0226
3.	NORAIN BINTI MOHD SULAIMAN	A21EC0106
4.	MOHAMAD SYAFIQ FIRDAUS BIN ABDUL AZIZ	A21EC0055

TABLE OF CONTENTS

1.0 Background of the study

1.1 Introduction

The term "music" refers to a collection of synchronized sounds or sounds. Making music is the process of arranging sounds and tones in a coherent piece, which typically involves merging them. People who compose music use their imagination to arrange sounds to achieve a certain effect, such as a Beethoven symphony or a Duke Ellington jazz song. Music is made up of noises, vibrations, and quiet moments, and it doesn't have to be pleasant or beautiful all of the time. It can be used to portray a wide range of emotions, events, and settings. Teenagers, on the other hand, used music to aid them in focusing on their studies, and this action has become a requirement in our daily lives due to its distinctiveness and ability to simplify many of our routines.

We can see how all teenagers and adults, including students, around the world appreciate various types of music in their daily lives. Most teenagers, for example, have at least one song on their phones, laptops, or iPods. We conducted a survey to acquire data from our sample of Malaysian students in order to see and comprehend the effect of music behavior on kids' academic achievement. This study will collect data from each Malaysian student in order to observe and draw conclusions on how music influences academic performance and why students believe that music is the best way to relieve stress or maintain focus while doing anything in their everyday lives. We can also learn the number of kids who have been exposed to different types of music at different ages from the inquiry, and this data can be used to continue future research on the same topic.

We will present the facts in this report using various sorts of graphs based on the findings that we acquired from a survey about their most liked types of music, as well as statistics on how students in Malaysia used music.

1.2 Purpose of Study

1. To study the familiarity of students with the music in their lives
2. To interpret the data gathered using various types of graphs and do conclusions based on the findings
3. To find the relationship between the usage of music with its behavior as time spent and the purpose of the kinds of music' in students' lives
4. To explain the interaction of the students to the music and how music affects their academic performances

1.3 Method of Data Analysis

To begin, we created a Google Form with all of the questions we required in order to continue with our research, which is a study of the impact of music on students' academic performance. To obtain responses, we next publish the form on social media platforms like WhatsApp, Telegram, and even Instagram. This report is accompanied by a copy of the questionnaire.

2.0 Data Collection

Population: Malaysian University students

Sample: UTM students

| Variables	Type Of Variable	Level of Measurement	Representation
Gender	Qualitative	Nominal	Pie Chart
Age	Quantitative	Ratio	Dot Plot
Faculty	Qualitative	Nominal	Pie Chart
CGPA	Quantitative	Ratio	Histogram
Types of music preferred	Qualitative	Nominal	Bar Chart
Duration on hearing the music per Week	Quantitative	Ratio	Histogram
Actions that need to have music	Qualitative	Nominal	Bar Chart
Preferred time of studying	Quantitative	Ratio	Histogram
Way of enjoying the music	Qualitative	Ordinal	Bar Chart
Preference of using headphone	Qualitative	Ordinal	Pie Chart
Preferred music volume	Qualitative	Ordinal	Bar Chart
Does music affects the emotions (related to academic)	Qualitative	Ordinal	Pie Chart
Preferred emotions that required music	Qualitative	Nominal	Bar Chart
Does music help to focus while studying ?	Qualitative	Ordinal	Pie Chart

3.0 Data Analysis

3.1 Gender

Gender
93 responses
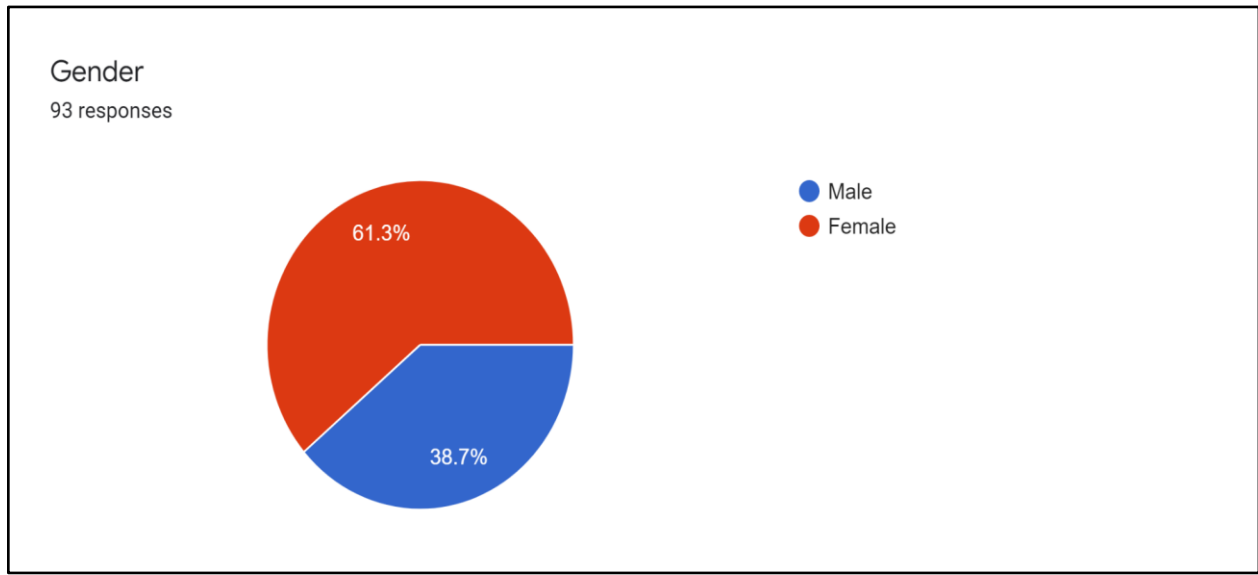
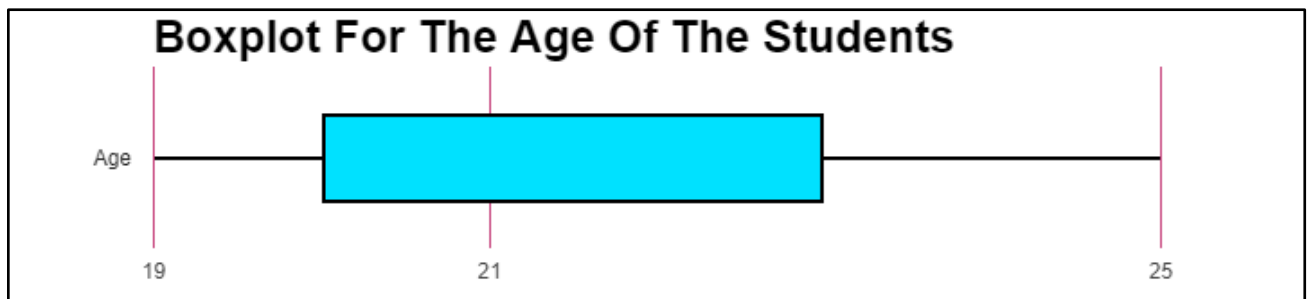| Gender	Value	Percentage
Male	36	38.7%
Female	57	61.3%
TOTAL	93	100%

Explanation:

In this survey, there are a total of 93 responses, from that, we can know that there are 36 male students (38.7%) and a total of 57 female students (61.3%) that took the survey.

3.2 Age

Dot plot Graph For The Age Of The Students
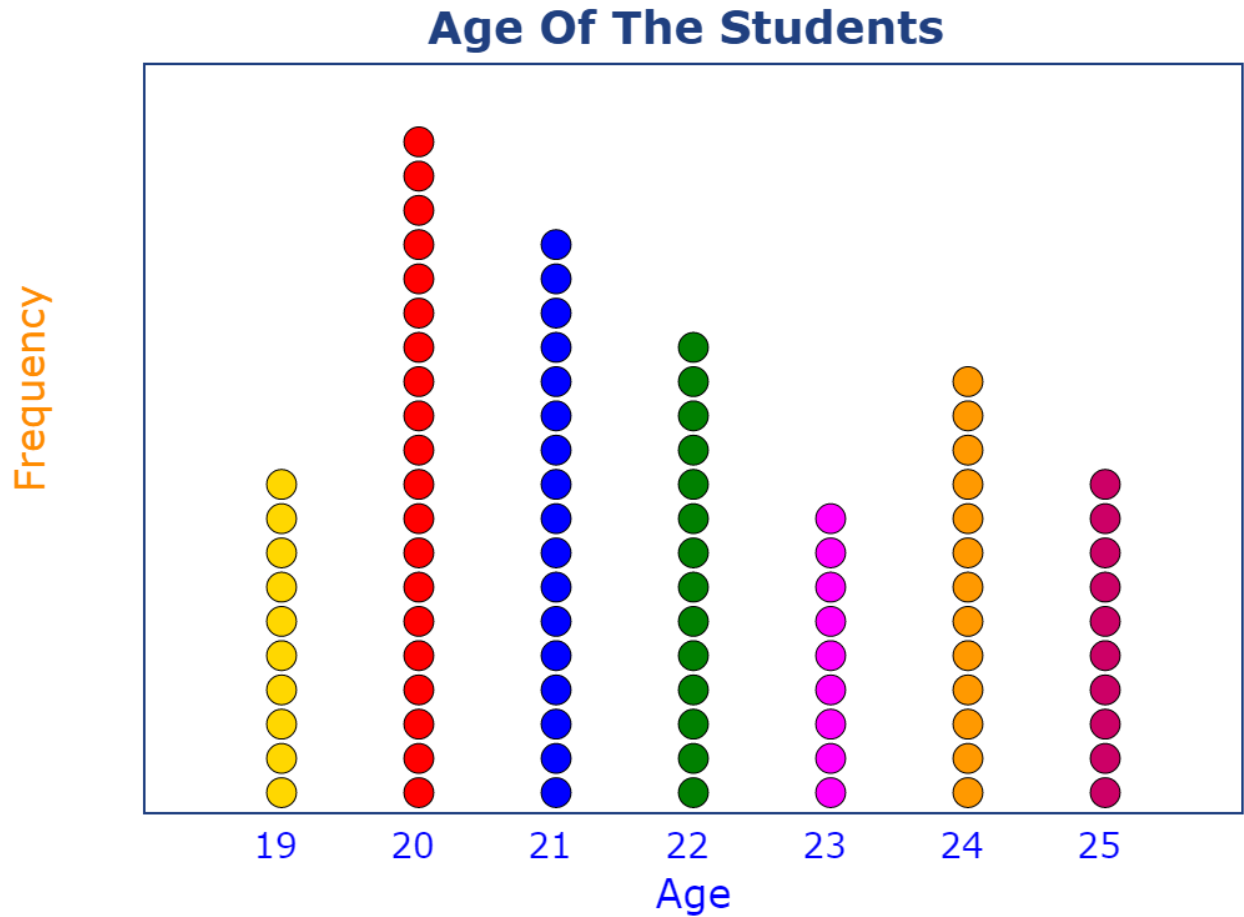
Boxplot For The Age Of The Students

Data Analysis For Age

Based on the boxplot, we can know the value of 1st quartile, 3rd quartile, median, maximum and minimum data. All the data mentioned have been tabulated.

Mean	21.76
Median	21
1st Quartile	20
3rd Quartile	23
Maximum Data	25
Minimum Data	19

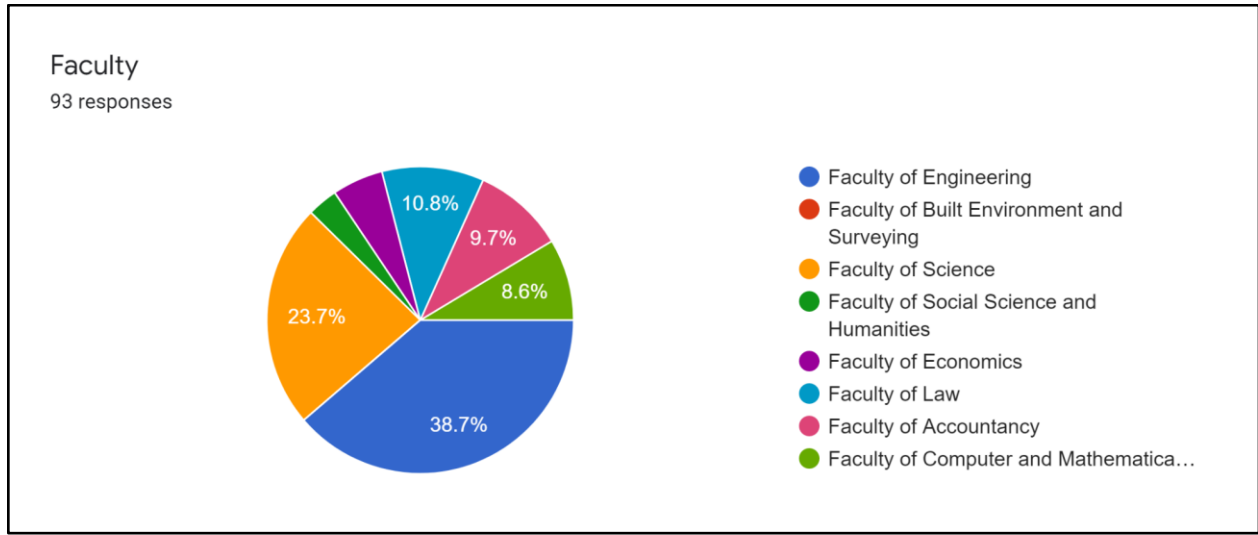| Age	Value	Percentage
19	10	10.8%
20	20	21.5%
21	17	18.3%
22	14	15.1%
23	9	9.7%
24	13	14.0%
25	10	10.8%
TOTAL	93	100%

Explanation :

The data indicates that there are 10 respondents(10.8%) who are 19 years old, 20 respondents(21.5%) who are 20 years old, 17 respondents (18.3%) who are 21 years old, 14 respondents(15.1%) who are 22 years old, 9 respondents (9.7%) who are 23 years old, 13 respondents (14.0%) who are 24 years old and 10 respondents (10.3%) who are 25 years old. Thus we can conclude that most of the respondents are 20 years old students while the least of the respondents are 23 years old students.

From another perspective, we can also know the value of the median, first quartile, and third quartile from the boxplot constructed based on the data collected. Based on the boxplot, the value of mean is 21.76, the value of median is 21, the value of the first quartile is 20 and the value of the third quartile is 23. Other than that, we can conclude that the skewness of the data for the age of the students is potentially symmetrical since the skewness value is 0.27998 and it is near the value of 0, which means that its mean, median, and mode fall at the same point.

3.3 Faculty

Faculty
93 responses

Faculty	Value	Percentage
Faculty Of Engineering	36	38.70 %
Faculty Of Built Environment And Surveying	0	0.00 %
Faculty Of Science	22	23.70 %
Faculty Of Social Science And Humanities	3	3.20 %
Faculty Of Economics	5	5.40 %
Faculty Of Law	10	10.80 %
Faculty Of Accountancy	9	9.70 %
Faculty Of Computer and Mathematics	8	8.60 %
TOTAL	93	100%

Explanation:

From the result, there are 36 respondents (38.70%) who are from the Faculty Of Engineering, 0 respondents (0.00%) from the Faculty Of Built Environment And Surveying, 22 respondents (23.70%) from the Faculty Of Science, 3 respondents (3.20 %) from Faculty Of Social Science And Humanities, 5 respondents (5.40%) from Faculty Of Economics, 10 respondents (10.80%) from Faculty Of Law, 9 respondents (9.70%) from Faculty Of Accountancy and 8 respondents (8.60%) from Faculty Of Computer and Mathematics.

3.4 CGPA Of The Students

Class Interval	Frequency	Cumulative Frequency	x	x^2	fx
0.00 - 1.79	1	1	0.90	0.81	0.90
1.80 - 1.99	0	1	1.90	3.61	0.00
2.00 - 2.19	0	1	2.10	4.41	0.00
2.20 - 2.39	1	2	2.30	5.29	2.30
2.40 - 2.59	0	2	2.50	6.25	0.00
2.60 - 2.79	1	3	2.70	7.29	2.70
2.80 - 2.99	5	8	2.90	8.41	14.50
3.00 - 3.19	0	8	3.10	9.61	0.00
3.20 - 3.39	10	18	3.30	10.89	33.00
3.40 - 3.59	17	35	3.50	12.25	59.50
3.60 - 3.79	25	60	3.70	13.89	92.50
3.80 - 4.00	33	93	3.90	15.21	128.70
				Total	334.10

Data Analysis for CGPA of the students

Median	3.687
Mean	3.592
Sample Variance	11.61
Sample Standard Deviation	3.41

Median

$$median = L + \frac{\frac{N}{2} - cf_p}{f_{med}}(W)$$

$$median = (3.60) + \frac{\frac{93}{2} - 35}{25}(0.19)$$

$$median = 3.60 + 0.0874$$

$$median = 3.6874$$

___

Mean

$$mean, \acute{x} = \frac{\sum fx}{n}$$

$$mean, \acute{x} = \frac{334.10}{93}$$

$$mean, \acute{x} = 3.592$$

___

Sample Variance

$$variance = \frac{\sum_{i=1}^{12}(x_i - \tilde{x})}{n-1}$$

$$\sum_{i=1}^{12}(x_i - x)^2 = \underline{\quad}(0.90 - 3.592)^2 + (1.90 - 3.592)^2 + (2.10 - 3.592)^2$$

$$+ (2.30 - 3.592)^2 + (2.50 - 3.592)^2 + (2.70 - 3.592)^2$$

$$+ (2.90 - 3.592)^2 + (3.10 - 3.592)^2 + (3.30 - 3.592)^2$$

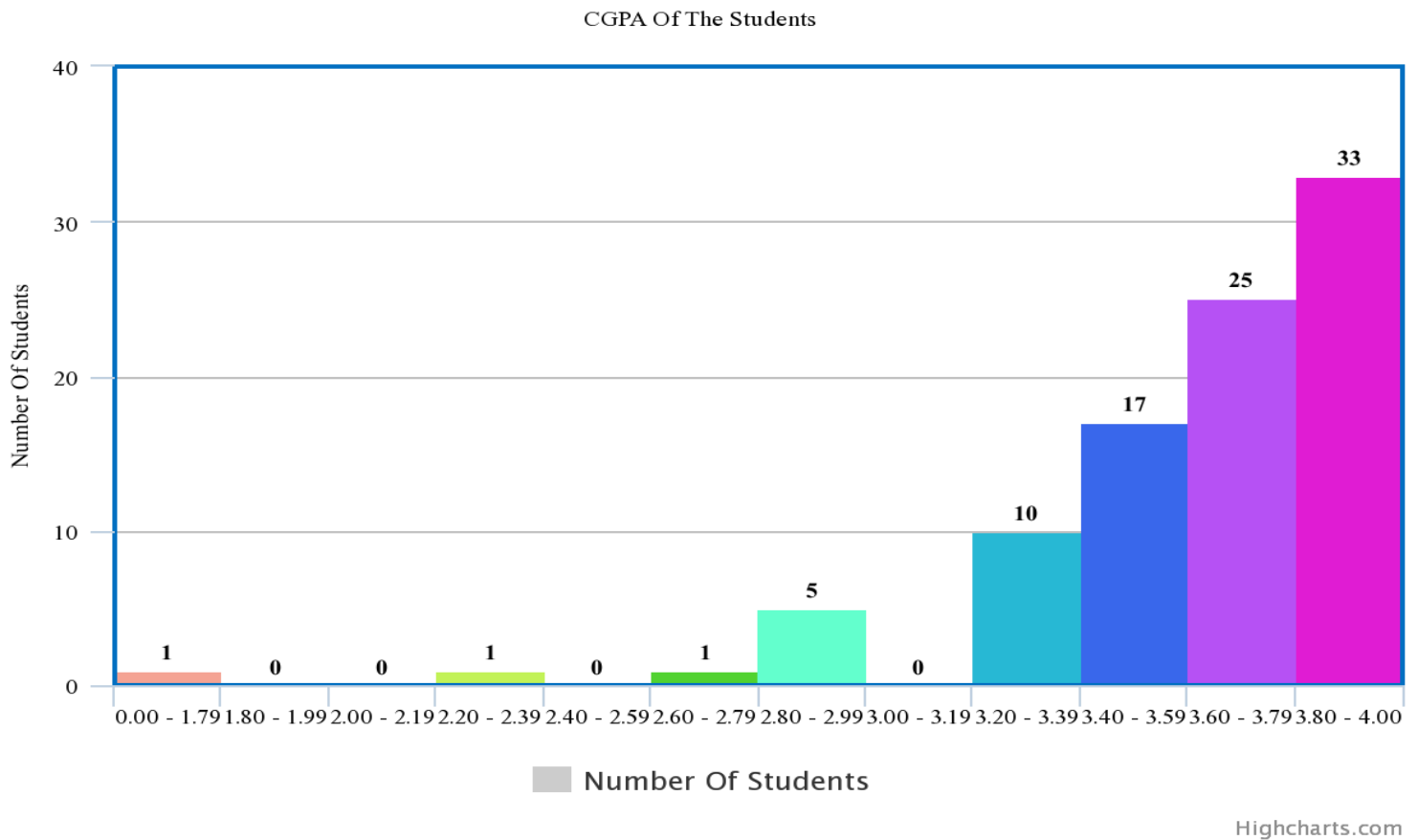$$+ (3.50 - 3.592)^2 + (3.70 - 3.592)^2 + (3.90 - 3.592)^2$$

= 1068.17544

= 1068.17544 / (93-1)

= 11.61

Sample Standard Deviation =

$$\sqrt{11.6106}$$

= 3.41

Histogram

Explanation

Based on the data collected through questionnaire, there is only 1 student who got CGPA (0.00 - 1.79), CGPA (2.20 -2.39), and CGPA (2.60 - 2.79)while 0 student for CGPA (1.80 - 1.99),CGPA (2.00 - 2.19),CGPA (2.40 - 2.59), and CGPA (3.00 - 3.19). Other than that, there are 5 students who have a CGPA (2.80 - 2.99), 10 students have a CGPA (3.20 - 3.39), 17 students have a CGPA (25) and 33 students have a CGPA (3.80 - 4.00).

3.5 Types of music preferred

What kind of music you would prefer? (Please choose 3)

93 responses
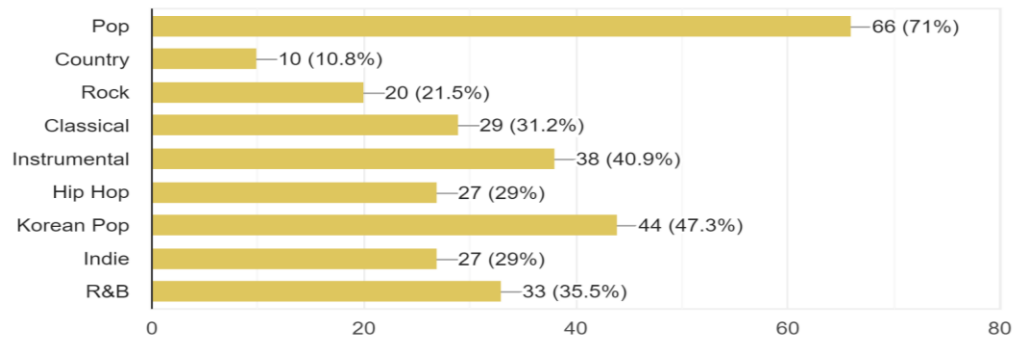
Music Genres	Frequency	Percentage
Pop	66	71.0%
Country	10	10.8%
Rock	20	21.5%
Classical	29	31.2%
Instrumental	38	40.9%
Hip Hop	27	29.0%
Korean Pop	44	47.35&
Indie	27	29.0%
R&B	33	35.5%

Explanation:

This survey resulted in 66 respondents (71.0%) listen to Pop genre music, 10 respondents (10.8%) listen to Country music, 20 respondents (21.5%) listen to Rock music, 29 respondents (31.2%) listen to Classical music, 38 respondents (40.9%) listen to Instrumental music, 27 respondents (29.0%) listen to Hip Hop genre music, 44 respondents (47.35%) listen to Korean Pop genre, 27 respondents (29.0%) listen to Indie music and 33 respondents (35.5%) listen to R&B genre music. We can conclude that most of the respondents like to listen to Pop genre music (71.0%), while the least music genre that the respondents prefer was Country music (10.8%).
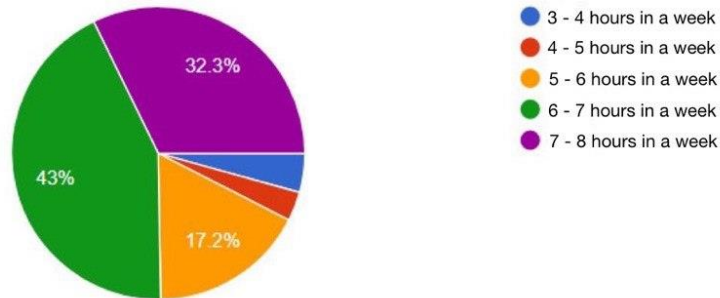
3.6 Duration on hearing the music per Week

How long do you usually hear the songs ?

93 responses

[] Copy

- 3 - 4 hours in a week
- 4 - 5 hours in a week
- 5 - 6 hours in a week
- 6 - 7 hours in a week
- 7 - 8 hours in a week

32.3%
43%
17.2%

Class Interval	Class Frequency, f	Class Cumulative Frequency , cf	Class Midpoint, x	x^2	F (x)
3 - 4	4	4	3.5	12.25	49.00
4 - 5	3	7	4.5	20.25	60.75
5 - 6	16	23	5.5	30.25	484.00
6 - 7	40	63	6.5	42.25	1690.00
7 - 8	30	93	7.5	56.25	1687.50
Total					3971.25

Median	6.588
Mean	42.700
Sample Variance	17.419
Sample Standard Deviation	4.174

Histogram

Duration on hearing the music per Week

Duration (hour)

Highcharts.com
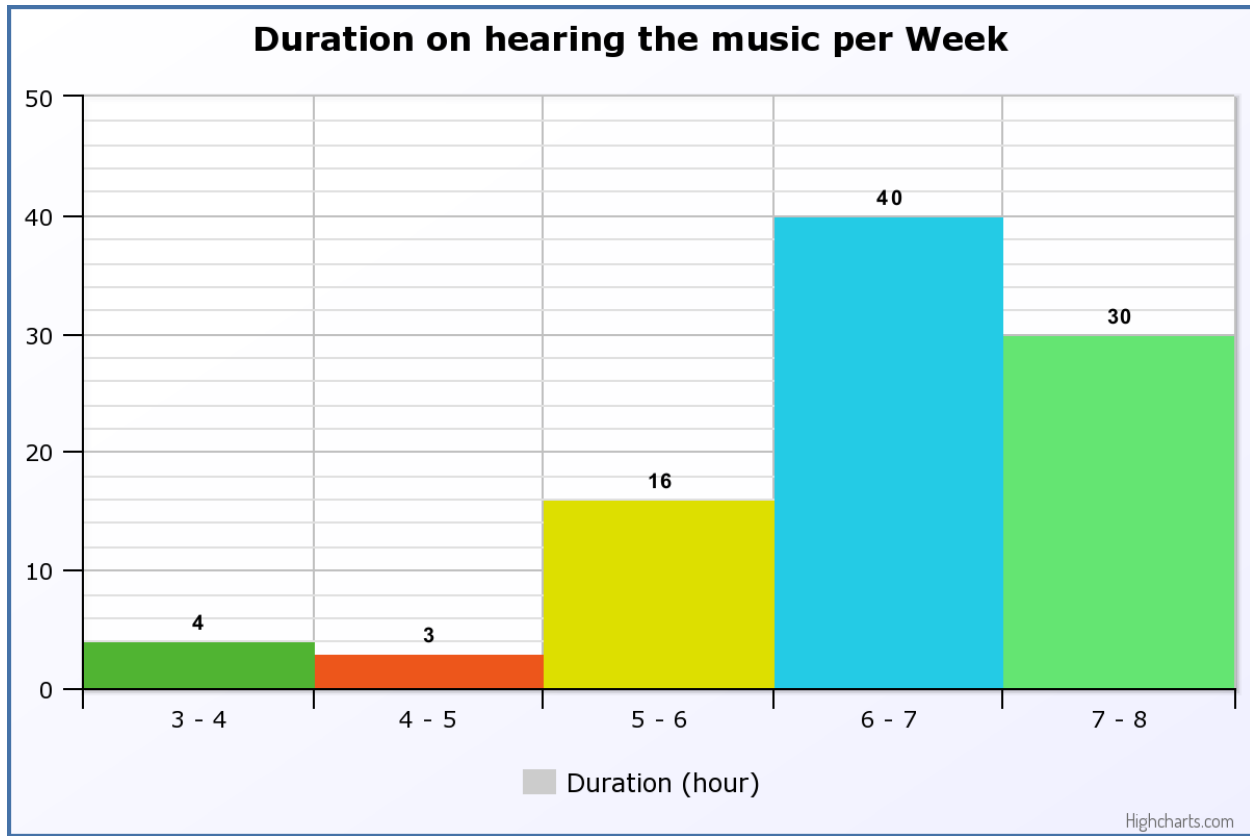
Calculations

Median

$$median = L + \frac{\frac{N}{2} - cf_p}{f_{med}} (w)$$

$$median = 6 \cdot 0 + \frac{\frac{93}{2} - 23}{40} (1)$$

$$median = 6 \cdot 0 + 0 \cdot 5875$$

$$median = 6 \cdot 5875$$

Mean

$$\text{mean}, \bar{x} = \frac{\sum fx}{n}$$

$$\text{mean}, \bar{x} = \frac{3971.25}{93}$$

$$\underline{\text{mean}, \bar{x} = 42.70}$$

Mode

$$\text{mode} = L + \left(\frac{f_1 - f_0}{2f_1 - f_0 - f_2}\right) \times h$$

$$\text{mode} = 6.0 + \left(\frac{40 - 16}{80 - 16 - 30}\right) \times 1$$

$$\text{mode} = 6.0 + 0.706$$

Sample Variance

$$Variance = \frac{\sum_{i=1}^{12}(x_i - \bar{x})}{n-1}$$

$$= \frac{(12.25-42.70)^2 + (20.25-42.70)^2 + (30.25-42.70)^2 + (42.25-42.70)^2 + (56.25-42.70)^2}{92}$$

$$= \frac{1602.56}{92}$$

$$= 17.419$$

$$Sample\ Standard\ Deviation = \sqrt{17.419}$$

$$= 4.174$$

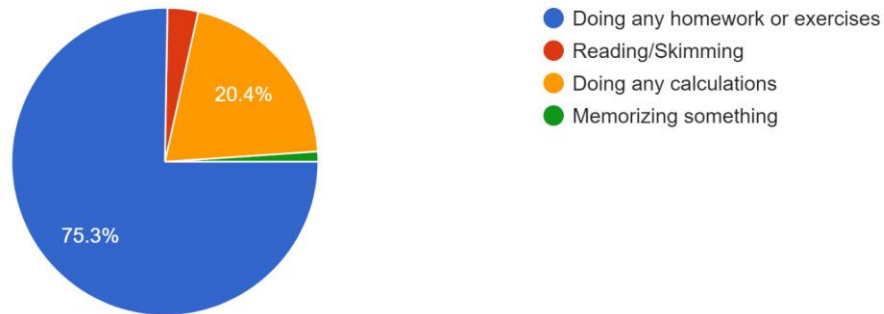**Explanation:**

From the data, we find that 4.3% of the students have a duration of hearing the music of 3 to 4 hours per week, 3.2% of the students have a duration of hearing the music of 4 to 5 hours per week, 17.2% of the students have a duration on hearing the music of 5 to 6 hours per week, 43% of the students have a duration on hearing the music of 6 to 7 hours per week, 32.3% of the students have a duration on hearing the music of 7 to 8 hours per week. Our data for the duration of hearing music per week is represented by a histogram. Here we calculate much statistical data such as mean, mode, and median to make an analysis of the data. We also determine the sample variance and sample standard deviation.

3.7 Actions that need to have music

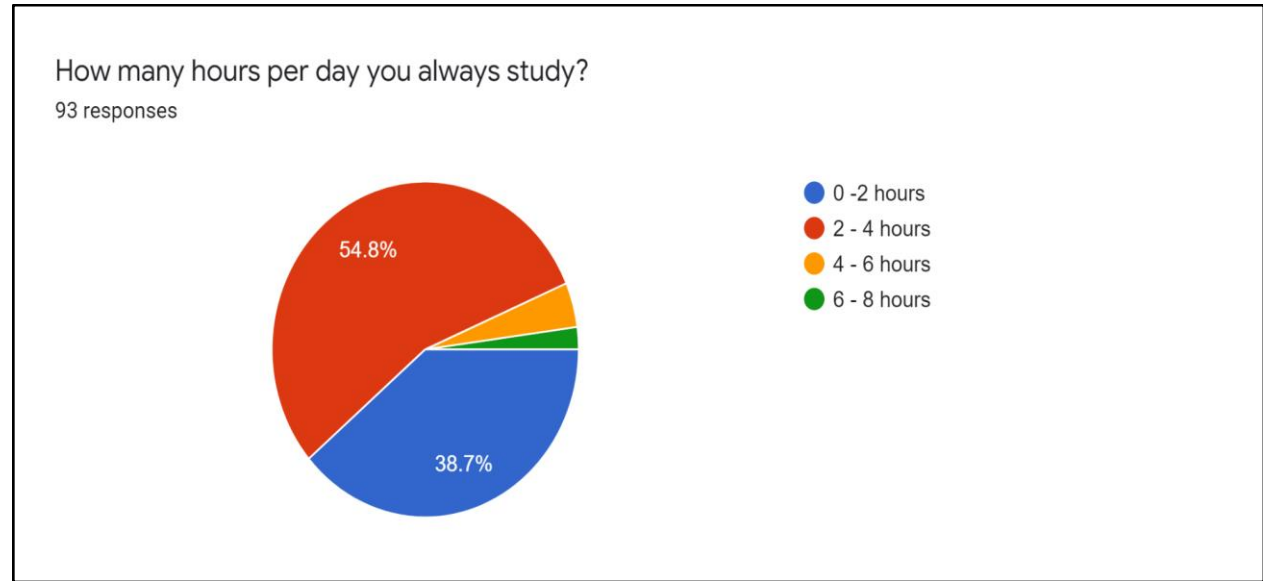When is the specific actions that you would prefer hearing the music ?
93 responses

| Actions	Value	Percentage
Doing homework	70	75.3%
Reading / Skimming	3	3.2%
Doing any calculations	19	20.4%
Memorizing something	1	1.1%
TOTAL	93	100%

Explanation:

Based on the survey we conducted, there were 70 respondents (75.3%) preferred to listen to music while doing homework, 3 respondents (3.2%) preferred to listen to music while reading or skimming, 19 respondents (20.4%) preferred to listen to music while doing any calculations and 1 respondents (1.1%) preferred to listen to music while memorizing. We can conclude that most of the respondents would rather listen to music while doing homework instead of reading or skimming, doing any calculations, and memorizing.

3.8 Hours

How many hours per day you always study?
93 responses

- 0 -2 hours
- 2 - 4 hours
- 4 - 6 hours
- 6 - 8 hours

54.8%
38.7%

Class Interval	Frequency, f	Cumulative Frequency, cf	Midpoint, x	x^2	Fx	Fx^2
0 - 2	36	36	1	1	36	36
2 - 4	51	87	3	9	153	459
4 - 6	4	91	5	25	20	100
6 - 8	2	93	7	49	14	98
TOTAL					223	693

Mean	2.3978
Median	2.4117
Mode	2.4838
Sample Variance	1.9274
Standard Deviation	1.3883

Cumulative Frequency
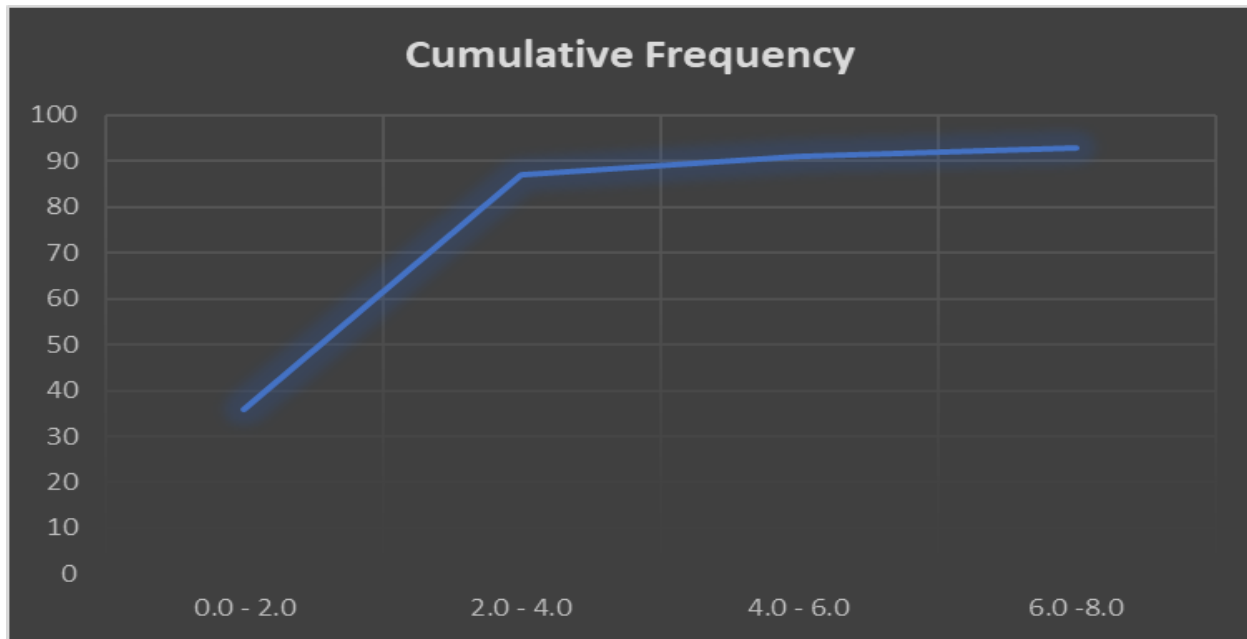
Calculation Of The Data

Median Class = 93/2

              = 46.5

              = 47

              = 2 - 4

Median = (2) + ((93/2 - 36)/51)(2)

         = 2 + 0.4117

  = 2.4117

Mean = 223 / 93

       = 2.3978

Mode = 2 + ((51 - 36)/(2(51)-36-4)(2))

       = 2 + 0.4838

       = 2.4838

Sample Variance = [1 / (93-1)]*[223 − (693 / 93)^2]

                = (0.01086) (177.4734)

                = 1.927361

Standard Deviation = √1.927361

                   = 1.38829

Explanation

Based on the data that has been collected for preferred hours that the students always study, we can know that 36 students prefer to study 0 to 2 hours, 51 students prefer to study 2 to 4 hours, 4 students prefer to study 4 to 6 hours and 2 students prefer to study 6 to 8 hours. A total of 93 respondents responded to our questionnaire. From these data, we also did some calculations and find the value of the mode, mean, and median of the data. The value of mode is 2.4838, the value of median is 2.4117, and the value of mean is 2.3978. From these values, we conclude that the skewness of our data is potentially symmetrical since all of the values for mean, median, and mode fall at the same point. We used a cumulative frequency graph to represent the data that has been collected. We also calculated the value of variance and the standard deviation for the data that we already gathered the value of variance is 1.93 and the value of standard deviation is 1.39. Based on the value of standard deviation, we know that the data is spread out and not clustered on around the mean.

3.9 Way of enjoying the music
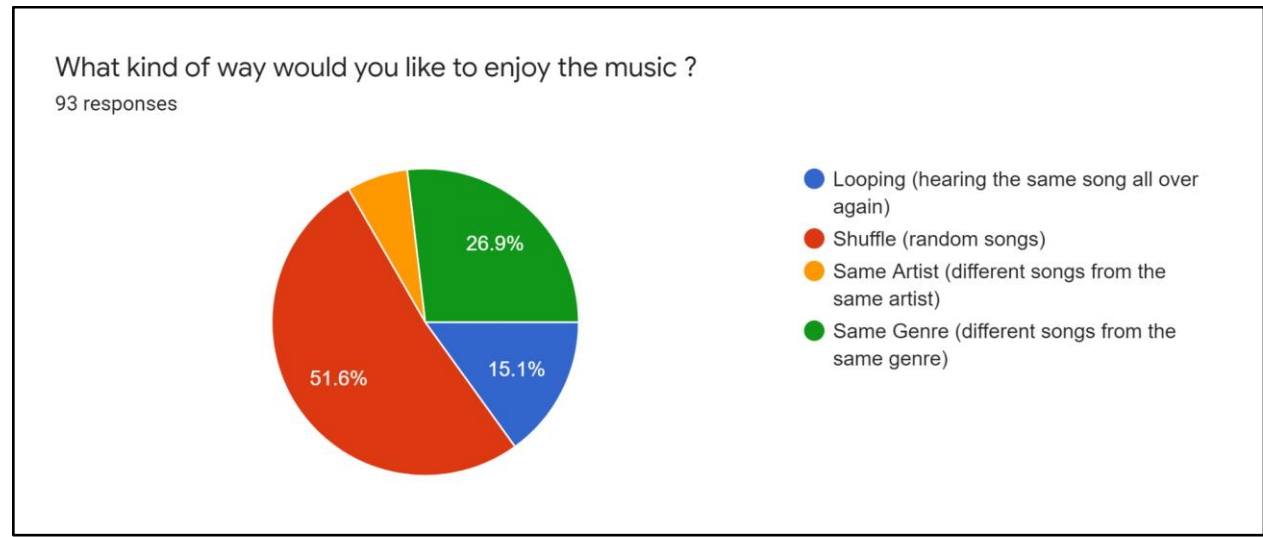
Ways of enjoying the music	Value	Percentage
Looping	14	15.1%
Shuffle	48	51.6%
Same Artist	6	6.4%
Same Genre	25	26.9%
TOTAL	93	100%

Explanation:

The survey depicts that 14 respondents (15.1%) chose to loop, which means hearing the same song repeatedly as their way of enjoying the music and 48 respondents (51.6%) chose shuffle, which random song to enjoy the music. 6 respondents (6.4%) chose the same artist which means different songs from a singer while 25 respondents (26.9%) chose the same genre, which means different songs from the same genre as their way of enjoying the music. Thus, we can conclude that the majority of the respondents chose shuffle as their way of enjoying the music while the least preferred the same artist to enjoy the music.
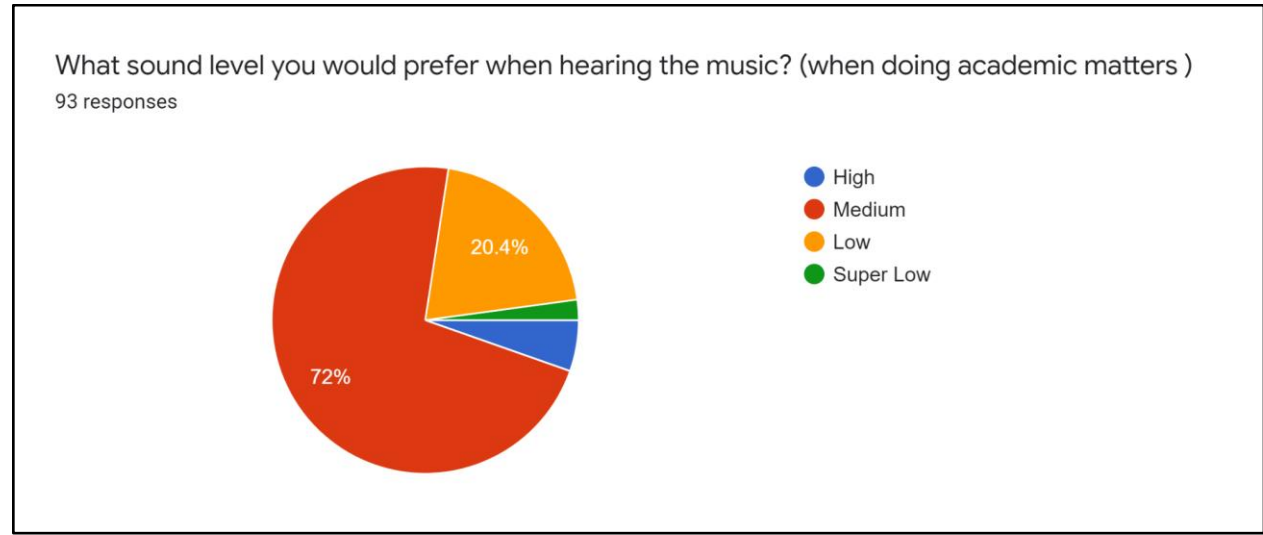
3.9.1 Preference of using headphone

What do you think about wearing headphones when listening to music?
93 responses
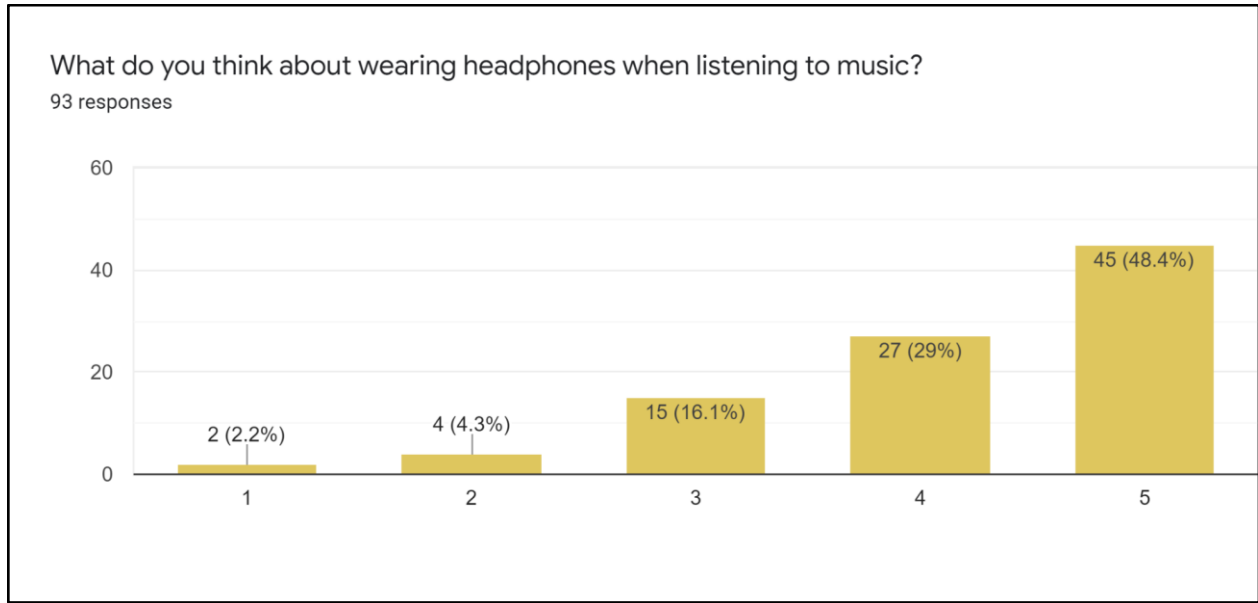
Preferable	Value	Percentage
5 (most preferable)	45	48.4%
4	27	29.0%
3	15	16.1%
2	4	4.3%
1 (least preferable)	2	2.2%
TOTAL	93	100%

Explanation:

From the survey we have conducted, there are 45 respondents (48.4%) chose 5 which mean most preferable to wear a headphone while listening to music, 27 respondents (29.0%) chose 4 which mean more preferable to wear headphones while listening to music, 15 respondents (16.1%) chose 3 which mean they will partially choose to wear headphones to listen to music, 4 respondents (4.3%) chose 2 which mean less preferred to use headphones and 2 respondents (2.2%) chose 1 which mean least preferred to wear headphones while listening to music. With that being said, the majority of the respondents chose 5 most preferred to wear headphones when listening to music.

3.9.2 Preferred music volume

What sound level you would prefer when hearing the music? (when doing academic matters)

93 responses

Volume Level	Value	Percentage
High	5	5.4%
Medium	67	72.0%
Low	19	20.4%
Super Low	2	2.2%
TOTAL	93	100%

Explanation:

This survey resulted in 5 respondents (5.4%) chose High as their preferred volume when listening to music, 67 respondents (72.0%) chose Medium for their music volume, 19 respondents (20.4%) chose Low as their preferred volume and 2 respondents (2.2%) chose Super Low as their preferred volume to listen to music. From this data, we can conclude that most of the respondents prefer Medium volume while listening to music rather than Super Low.

### 3.9.3 Does music affects the emotions (related to academic)

Does listening to music affects your emotion or get rid of any discomfort feelings related to academic matters?
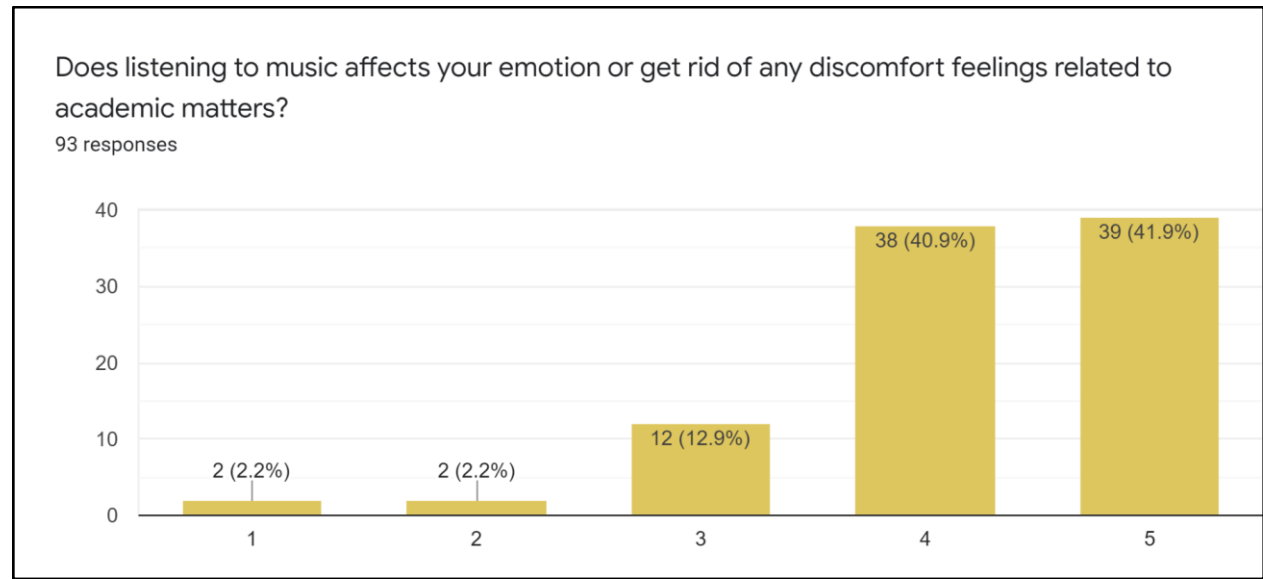
93 responses

Preferable	Value	Percentage
5 (strongly agree)	39	41.9%
4	38	40.9%
3	12	12.9%
2	2	2.2%
1 (strongly disagree)	2	2.2%
TOTAL	93	100%

Explanation:

From the data we achieved, majority of the responses with 39 respondents (41.9%) strongly agree that music can affects the people's emotions or get rid of any discomfort feelings related to academic matters followed with 38 respondents (40.9%) agree, 12 respondents (12.9%) partially agree, 2 respondents (2.2%) disagree and 2 respondents (2.2%) strongly disagree. This shows that our bad emotions and discomforts regarding academic matters can be healed with music.
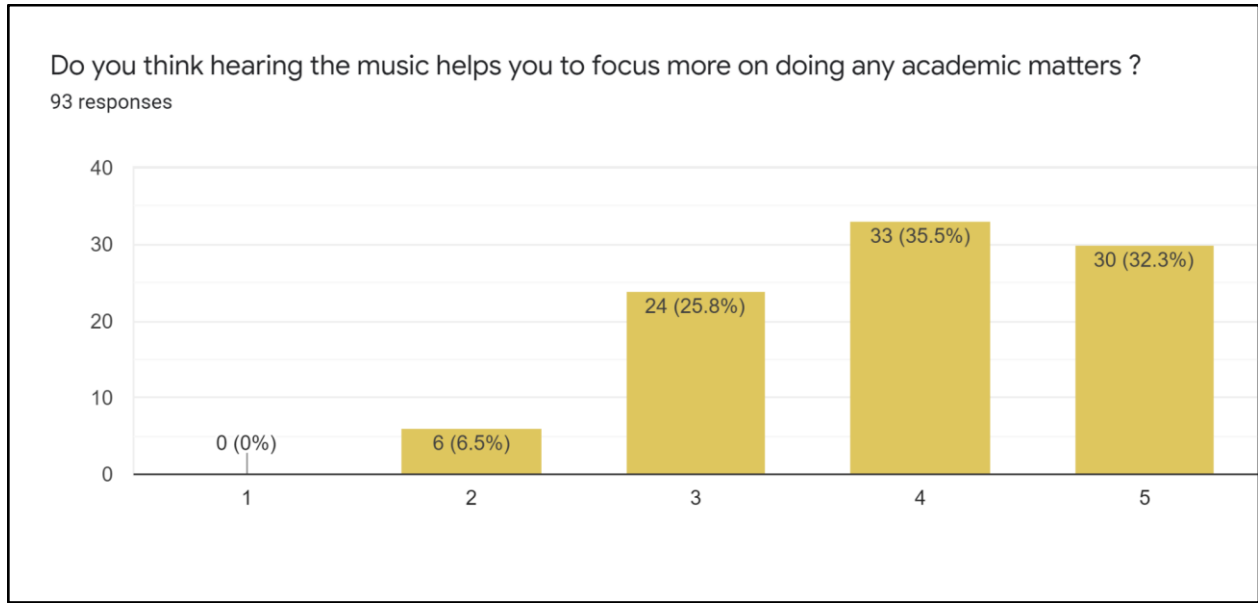
3.9.4 Preferred emotions that required music

What are your exact emotions that you would need music?
93 responses
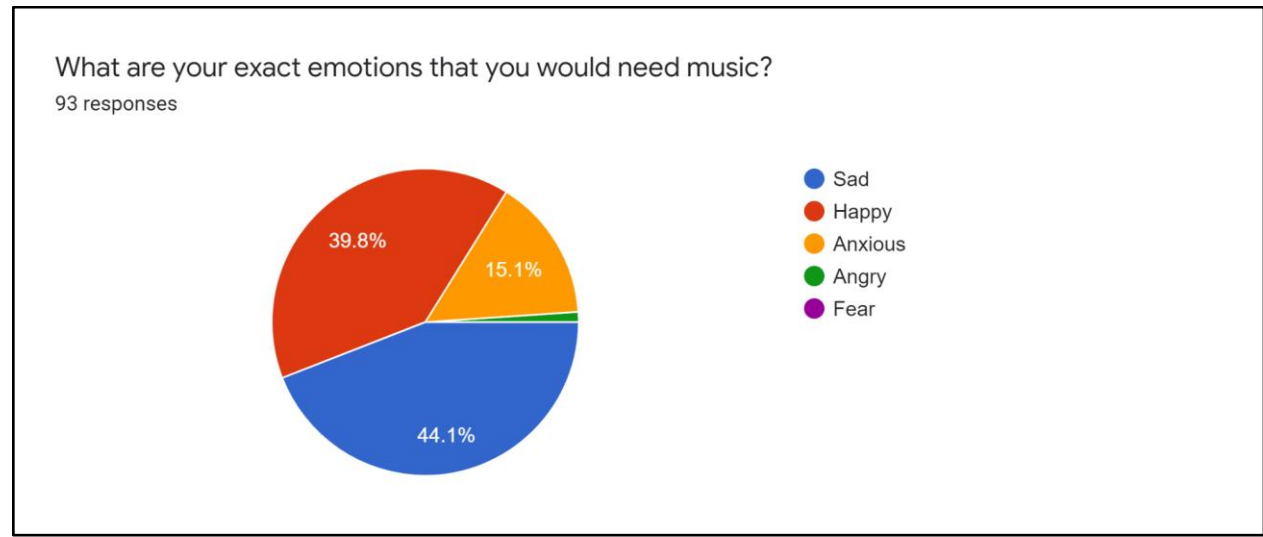
Emotion	Value	Percentage
Sad	41	44.1%
Happy	37	39.8%
Anxious	14	15.1%
Angry	1	1.0%
Fear	0	0.0%
TOTAL	93	100%

Explanation:

The survey indicates that 41 respondents (44.1%) needed music when they felt sad, 37 respondents (39.8%) needed music when they felt happy, 14 respondents (15.1%) needed music when they felt anxious, 14 respondents (1.0%) needed music when they felt angry and no one (0.0%) chose fear. We can summarize the results by saying that most of the respondents needed music when they were sad and none of the respondents would listen to music when they felt frightened.

3.9.5 Does music help to focus while studying

Do you think hearing the music helps you to focus more on doing any academic matters ?
93 responses

Preferable	Value	Percentage
5 (strongly agree)	30	32.3%
4	33	35.5%
3	24	25.8%
2	6	6.5%
1 (strongly disagree)	0	0.0%
TOTAL	93	100%

Explanation:

From the data collected, 33 respondents (35.5%) agreed that music helps them to focus more on doing any academic matters, followed by 30 respondents (32.3%) strongly agreed, 24 respondents (25.8%) partially agreed, 6 respondents (6.5%) disagree and none of them strongly disagreed.

CONCLUSION

Based on the survey we conducted, 93 students from University Technology Malaysia participated in the survey, aged between 19-25 years old and most of them are 20 years old students. We found out that the majority of the students listen to music when they are doing their homework and assignments to avoid boredom. On top of that, most of them agree that they need music when they feel sad. With that being said, the analysis also resulted in the majority of the students strongly agreeing that music affects their emotions. Out of various genres of music in this world, the respondents tend to listen to pop genres followed by Korean pop music. From the analysis, we can say that the estimated hours they listen to music are between 6 to 7 hours per week while the duration they study is between 2-4 hours per day. Lastly, we can summarize that almost all of the respondents agree that music can help them focus more while doing academic matters supported by the CGPA data which resulted in the majority of the respondents getting 3.8 to 4.0 CGPA.

Other than that, we also can do various different ways of analyzing the data that has been collected throughout this project. For example, we did create a boxplot, dot plot, histogram, calculation of mean, calculation of median, calculation of mode, calculation of variance, and calculation of standard deviation for both grouped data and non-grouped data.

Based on the use of technology in approaching the respondents to get the data, we would say that it is very easy since we just need to create a Google Form and distribute it to the respondents. Based on our observation, the modernization of the world makes human work much easier and it is indeed really helpful to do research on any relevant topics. For example, researchers back then need to distribute the question one by one to the person physically and the process of getting the result will be much more complicated since they need to count it without the bits of help of technology, we can say that their data will be much easier to have any error since the process of completing any research done by a human. Nowadays, we have a computer that can easily summarize the data without any errors. Hence, the accuracy of today's study or any research will be much more reliable to come out with any conclusion.

QUESTIONNAIRE

1. Gender
   - o Male
   - o Female

2. Age

3. Faculty

   - o Faculty of Engineering
   - o Faculty of Built Environment and Surveying
   - o Faculty of Science
   - o Faculty of Social Science and Humanities
   - o Faculty of Economics
   - o Faculty of Law
   - o Faculty of Accountancy
   - o Faculty of Computer and Mathematical Sciences

4. CGPA

   - o 3.80 - 4.0
   - o 3.60 - 3.79
   - o 3.40 - 3.59
   - o 3.20 - 3.39
   - o 3.00 - 3.19
   - o 2.80 - 2.99
   - o 2.60 - 2.79
   - o 2.40 - 2.59
   - o 2.20 - 2.39
   - o 2.00 - 2.19
   - o 1.70 - 1.19
   - o 1.70 and below

5. What kind of music you would prefer? (Please choose 3)
   o Pop
   o Country
   o Rock
   o Classical
   o Instrumental
   o Hip Hop
   o Korean Pop
   o Indie
   o R&B

6. How long do you usually hear the songs in a week?
   o 3 - 4 hours in a week
   o 4 - 5 hours in a week
   o 6 - 7 hours in a week
   o 8 - 9 hours in a week

7. When is the specific actions that you would prefer hearing the music?
   o Doing any homework or exercises
   o Reading/Skimming
   o Doing any calculations
   o Memorizing something

8. How many hours per day do you always study?
   o 0 -2 hours
   o 2 - 4 hours
   o 4 - 6 hours
   o 6 - 8 hours

9. What kind of way would you like to enjoy the music?
   o Looping (hearing the same song all over again)
   o Shuffle (random songs)
   o Same Artist (different songs from the same artist)
   o Same Genre (different songs from the same genre)

10. What do you think about wearing headphones when listening to music?
    o 1 (Least preferable)
    o 2
    o 3
    o 4
    o 5 (Most preferable)

11. What sound level you would prefer when hearing the music? (when doing academic matters)
    o High
    o Medium
    o Low
    o Super Low

12. Does listening to music affects your emotion or get rid of any discomfort feelings related to academic matters?
    o 1 (Strongly Disagree)
    o 2
    o 3
    o 4
    o 5 (Strongly Agree)

13. What are your exact emotions that you would need music?
    o Sad
    o Happy
    o Anxious
    o Angry
    o Fear

14. Do you think hearing the music helps you to focus more on doing any academic matters?
    o 1 (Strongly Disagree)
    o 2
    o 3
    o 4
    o 5 (Strongly Agree)

Response

(include the excel that have all the data)