Topic: Gender barriers in campus environments

Part 1: Overview

Part 2: Introduction

(1) Research Motivation:

Our research motivation stems from the gender barriers we observed in our campus life. Campus gender barriers refer to difficulties, discrimination, unfairness related to gender that occur within the school environment. For example, discrimination or bullying due to sexual orientation, stereotypes about females and males, or unfair treatment based on gender. This prompted us to think about the causes of gender barriers. To explore this, we conducted extensive literature reviews .

Subsequently, we referred to those studies and designed a questionnaire to investigate gender barriers on campus. Our questionnaire included a series of questions about the use of campus spaces to study whether there are gender barriers in these spaces. Additionally, we explored our research topic through various other methods, such as the influence of social media and regular classroom interactions. Through this survey and subsequent statistical analysis, we hope to understand whether college students feel gender equality on campus and how related issues impact their academic and social lives.

(2) Purpose:

Despite the increasing attention and emphasis on gender equality education in Taiwan, its actual implementation still faces many challenges. Therefore, through this survey and research, we aim to explore whether genuine gender equality has been achieved on campuses. We hope that by gaining a deeper understanding of gender barriers in Taiwan’s campuses, we can collaboratively create a more open, respectful, and diverse campus environment.

Part 3: Introducing Dataset

We used Google forms to collect the data for this report. The questions in the form were mainly divided into five categories, and each of it has several corresponding questions.

1.Basic information of the interviewee

- Biological sex at birth
- Grade
- (former) Department
- Age
- Gender identity
- Sexual orientation

2.Gender attitudes

- Do you think gender should be multifaceted and fluid?
- Do you think the rights of the LGBTI+ community are respected in society?
- Do you think "patriarchal society" has an impact on your life?
- Do you agree that in an intimate relationship, the male party should bear more financial pressure?
- Are there any decisions in your life that are influenced by your "gender temperament"?
- You believe everyone should have the freedom to dress.
- Do you think "sex" is an easy topic to talk about?

3.Space

- Which corners of the school are occupied by "women" and make it inconvenient for "boys" ?
- Which corners of the school are occupied by "men" and make it inconvenient for "girls" ?
- Do you think there is a need for "gender-friendly toilets"?
- Do you use gender-friendly restrooms?
- Have you ever felt uncomfortable because of the gender of a cleaning staff member?
- Have you ever been criticized for your clothing or hair accessories?

4.Class interaction

- Professors/TAs have had different teaching attitudes because of your gender.
- Professors/TAs have had different grading standards based on your gender (except for PE).
- Professors/TAs have ever interfered with your class participation because of your gender.
- You feel uncomfortable because of gender-related comments in class.

5.Gender concerns

- Where do you usually receive information related to gender issues?
- From which online platforms do you usually receive information related to gender issues?
- Do you post / retweet / pay attention to gender issues?
- When was the last time you encountered gender issues?

The publicity methods of the form were mainly divided into four categories.

- Facebook

- Instagram
- Line
- Dcard

In the end, we received 483 replies (sample size) from students at Sun Yat-sen University (population). Then conduct random sampling and analyze the data to see if the results are consistent with some previous conjectures or literature data, and draw conclusions from them.

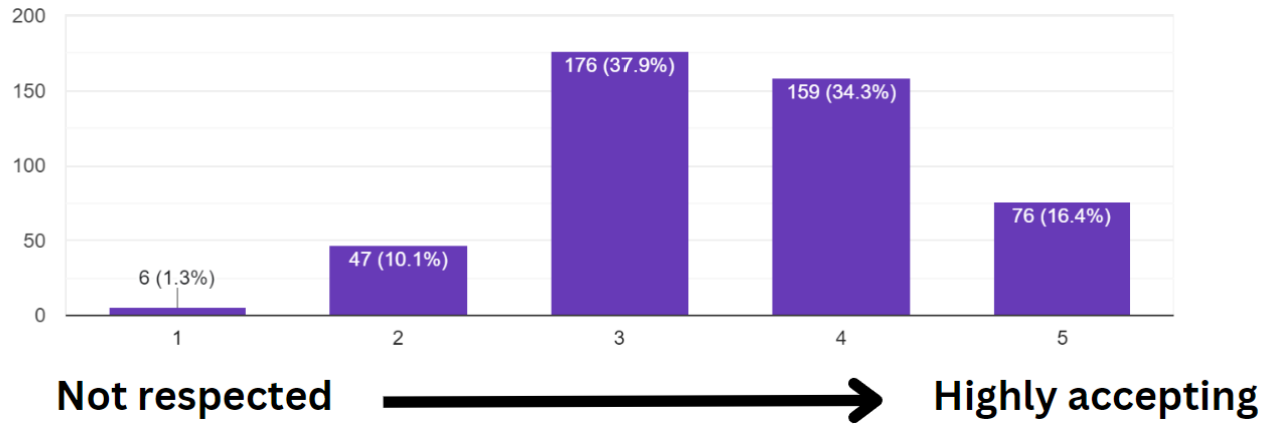
Part 4:Data Analysis

Section A: Attitude to Gender

In this section, we will explore the connection between attitude with gender.

Q1:Do you think the rights of diverse gender identities（LGBTI+) are respected in society?

解釋問題:你認為多元性別社群（LGBTI+)的權益，在社會上有受到尊重。



Based on the plot above, we can observe that the majority of people think the rights of diverse gender identities are being respected, while only a minority believe they are not being respected.

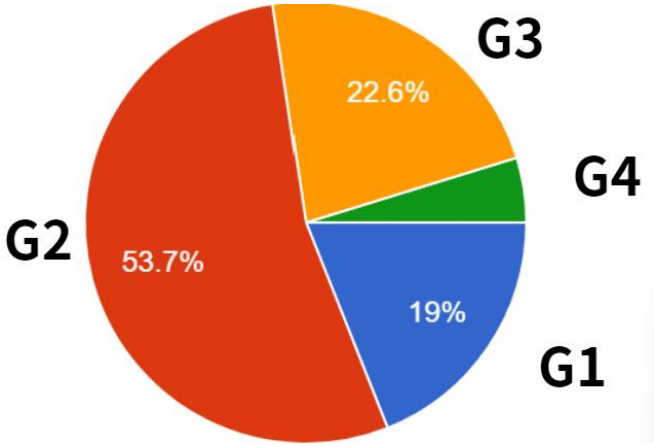
Q2:Do you think sex is an easy topic to talk about?

G1:Partially agree, won't bring it up but can respond if asked.

G2:Disagree, I find it awkward/rarely discussed.

G3:Partially disagree, only discuss with close relationships.

G4:Disagree, I don't see talking about sex as a big deal.



Based on the plot above, we can observe that the majority of people think that sex is awkward or rarely discussed，while only a minority do not think talking about sex is a big deal.

Q3:Gender are associated with 'gender should be multifaceted and fluid'？

解釋問題:你認為性別應該多面向、且具流動性的。

The null hypothesis and alternative hypothesis:

H0: Gender is independent of 'gender should be multifaceted and fluid'.

HA: Gender is not independent of 'gender should be multifaceted and fluid'.

contingency table

	1	2	3	4	5
生理女性	5	14	32	79	119
生理男性	24	15	32	56	73

Comparing the proportion between the two group， with a significance level of 0.05, the chi-squared test X-squared = 24.397, df = 4 and p-value =6.65e-05, because the p-value is less than 0.05，there is sufficient evidence to reject the null hypothesis. There is significant association between gender and gender should be multifaceted and fluid.

Marascuilo Procedure

	|pi-pj|	CVij	significant if |pi - pj| >CVij
G1 - G2	0.05887097	0.03972796	significant
G1 - G3	0.14387097	0.05317204	significant
G1 - G4	0.26387097	0.06417161	significant
G1 - G5	0.34887097	0.06853886	significant
G2 - G3	0.10354839	0.05836540	significant
G2 - G4	0.22354839	0.06853648	significant
G2 - G5	0.30854839	0.07264179	significant
G3- G4	0.15096774	0.07491979	significant
G3 - G5	0.23596774	0.07869279	significant
G4 - G5	0.04645161	0.08839804	no significant

G1:Strongly Disagree G2:Partially disagree G3:Neutral G4:Partially agree G5:Strongly Agree There. The only no significant difference was found between Partially Agree and Strongly Agree There, while all other factors showed significant differences.

Q4Gender are associated with the response of 'influence of patriarchal society on your life'?

解釋問題:你認為「父權社會」對你的生活有影響嗎?

Example:The man goes out to work while the woman stays at home.

The null hypothesis and alternative hypothesis:

H0: Gender and 'influence of patriarchal society ' is independent.

HA: Gender and 'influence of patriarchal society ' is not independent.

contingency table

	Never → Always				
	1	2	3	4	5
Female	14	45	56	106	27
Male	16	32	60	65	27

Comparing the proportion between two groups, with a significance level of 0.05, the chi-squared test X-squared = 7.2367 df = 4 p-value = 0.1239> 0.05, because the p-value is big than 0.05, there is insufficient evidence to reject the null hypothesis. There is no significant association between gender and the influence of patriarchal society on your life.

Q5:Gender are associated with 'men should bear more financial responsibility in relationship'?

The null hypothesis and alternative hypothesis:

H0: Gender and 'men bear more financial responsibility in relationships' are independent.

HA: Gender and 'men bear more financial responsibility in relationships' are not independent

contingency table

	female	male
It's okay if one pays more	140	138
Money should be separate	36	25
Roles should rotate	65	32
It's a matter of course	7	5

Comparing the proportion between two groups, with a significance level of 0.05, the chi-squared test X-squared = 8.513 df = 3 p-value = 0.03652 < 0.05, because the p-value is less than 0.05, there is sufficient evidence to reject the null hypothesis. There is a significant association between gender and men should bear more financial responsibility in relationships.

Marascuilo Procedure

	|pi-pj|	CVij	significant if |pi - pj| >CVij
G1 - G2	0.05887097	0.03972796	significant
G1 - G3	0.14387097	0.05317204	significant
G1 - G4	0.26387097	0.06417161	significant
G1 - G5	0.34887097	0.06853886	significant
G2 - G3	0.10354839	0.05836540	significant
G2 - G4	0.22354839	0.06853648	significant
G2 - G5	0.30854839	0.07264179	significant
G3- G4	0.15096774	0.07491979	significant
G3 - G5	0.23596774	0.07869279	significant
G4 - G5	0.04645161	0.08839804	no significant

G1:It's okay if one pays more

G2:Money should be separate

G3:Roles should rotate

G4:It's a matter of course

The only no significant difference was found between Money should be separate and Roles should rotate, while all other factors showed significant differences.

Q6:Gender are associated with 'decisions influenced by gender traits in your life'?

解釋問題:你生活中有為了符合「性別氣質」而影響你的決定嗎？

性別氣質：特定文化背景下與某種性別相關的人的行為、舉止、興趣和外觀方面，特別是與女性氣質或男性氣質有關

The null hypothesis and alternative hypothesis:

H0: Gender is independent of being influenced by gender traits.

HA: Gender is not independent of being influenced by gender traits.

contingency table

		female	male
Always	5	16	27
↑	4	105	70
	3	58	59
	2	48	24
Never	1	21	20

Comparing the proportion between the two groups, with a significance level of 0.05, the chi-squared test X-squared = 12.852 df = 4 p-value = 0.01202 <0.05, because the p-value is less than 0.05, there is sufficient evidence to reject the null hypothesis. There is a significant association between gender and decisions influenced by gender traits in your life.

Marascuilo Procedure

	|pi-pj|	CVij	significant if |pi - pj| >CVij
G1 - G2	0.05887097	0.03972796	significant
G1 - G3	0.14387097	0.05317204	significant
G1 - G4	0.26387097	0.06417161	significant
G1 - G5	0.34887097	0.06853886	significant
G2 - G3	0.10354839	0.05836540	significant
G2 - G4	0.22354839	0.06853648	significant
G2 - G5	0.30854839	0.07264179	significant
G3- G4	0.15096774	0.07491979	significant
G3 - G5	0.23596774	0.07869279	significant
G4 - G5	0.04645161	0.08839804	no significant

G1:Strongly Disagree G2:Partially disagree G3:Neutral G4:partially agree G5:Strongly Agree No significant difference was found between (1)Strongly Disagree-Partially disagree (2)Strongly Disagree-Strongly Agree (3)Partially disagree-Strongly Agree, others factors showed significant differences.

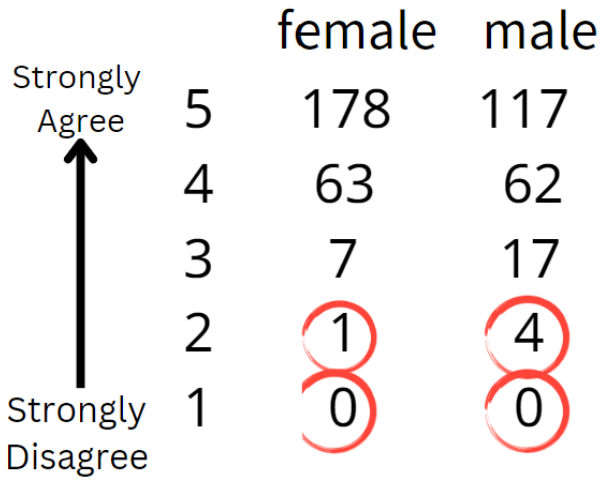
Q7:Gender are associated with your belief that everyone should have the freedom to dress as they choose?

The null hypothesis and alternative hypothesis:

H0: Gender is independent of ‘everyone should have the freedom to dress’.

HA: Gender is not independent of ‘everyone should have the freedom to dress’.

contingency table



Comparing the proportion between two groups，with a significance level of 0.05,two-sided test，the Fisher's Exact Test p-value = 0.0008781<0.05,because the p-value is less than 0.05，there is sufficient evidence to reject the null hypothesis.There is significant association between gender and your belief that everyone should have the freedom to dress as they choose

Marascuilo Procedure

	|pi-pj|	CVij	significant if |pi - pj| >CVij
G2 - G3	0.0850000	0.03865032	significant
G2 - G4	0.3100000	0.06409712	significant
G2 - G5	0.5850000	0.06828653	significant
G3- G4	0.2817742	0.06732986	significant
G3- G5	0.5567742	0.07132966	significant
G4 - G5	0.3309677	0.08716856	significant

G2:Partially disagree G3:Neutral G4:partially agree G5:Strongly Agree

All factors show significant differences between each other.

Q8-1:Streams are associated with attitudes towards gender?

Original question: ***You believe that gender should be multifaceted and fluid.***

Score: 1(Strongly disagree.)~5(Strongly agree.)

We further categorized these attitude scores as:

Positive (4~5), neutral(3), and negative(1~2).

In Taiwanese high schools, we often categorize university disciplines into the natural sciences stream and the social sciences(Arts) stream. We have also classified our samples accordingly, as follows:

Arts Stream:

Business Management related, Communication, Arts, and Design related+Social Sciences related

Science Stream:

Engineering and Natural Sciences related, and Medical related

(In this test, we excluded the 'Others' category because it is difficult to classify objectively.)

The null hypothesis and alternative hypothesis:

H0: Stream and attitudes towards gender are independent of each other.

HA: Stream and attitudes towards gender are not independent of each other.

contingency table

	Negative	Neutral	Positive
Art Stream	22	29	186
Science Stream	31	31	93

Comparing the proportion between the two groups, with a significance level of 0.05, chi-squared=16.14, degree of freedom = 2, and p-value = 0.0003<0.05. Because the p-value is less than 0.05, there is sufficient evidence to reject the null hypothesis. There is a significant association between stream and attitudes towards gender.

Marascuilo Procedure

	|pi-pj|	CVij	significant if |pi - pj| >CVij
Positive vs Neutral	0.1833	0.1730	significant
Positive vs Negative	0.2515	0.1794	significant
Neutral vs Negative	0.0682	0.2292	no significant

In the two types of academic streams, there are significant differences in attitudes towards gender between positive and neutral, as well as between positive and negative, but no significant difference between neutral and negative.

It can be observed that there are significant differences in positive gender attitudes between individuals in the natural sciences stream and those in the arts stream, while there are no differences between neutral and negative attitudes.

Q8-2: College attendance categories are associated with decisions influenced by gender traits in your life?

Original Question: ***Are there any decisions in your life that are influenced by your "gender temperament***?

score:1(never)~5(always)

Influence:

High: 4~5, Medium: 3, Low: 1~2

The null hypothesis and alternative hypothesis:

H0: College attendance category is independent of being influenced by gender traits.

HA: College attendance category is not independent of being influenced by gender traits.

contingency table

Influence:	Low	Medium	High
Business Management related	34	33	69
Communication, Arts, and Design related	13	20	26
Engineering and Natural Sciences related	37	37	64
Medical related	11	13	23
Social Sciences related	7	8	27
Others	8	6	7

Comparing different college attendance categories, with a significance level of 0.05, chi-squared = 9.12, degree of freedom = 10, and p-value = 0.52 > 0.05. Because the p-value is larger than 0.05, there is no sufficient evidence to reject the null hypothesis. It means that there is no significant association between college attendance category and decisions influenced by gender traits in your life.

Sexual Orientation

Is the College attendance category associated with sexual orientation?

The null hypothesis and alternative hypothesis:

H0: College attendance category and sexual orientation are independent of each other.

HA: College attendance category and sexual orientation are not independent of each other.

contingency table

	Heterosexual	Non-Heterosexual
Business Management related	111	22
Literature & Arts related	42	20
Engineering & Sciences related	107	30
Social Sciences related	30	13
Medical related	36	11
Others	14	6

Comparing different college attendance categories, with a significance level of 0.05, chi-squared=8.034, degree of freedom = 5, p-value = 0.154 > 0.05. Because the p-value is larger than 0.05, there is no sufficient evidence to reject the null hypothesis. There is no association between college attendance category and sexual orientation.

Conclusion for Section A: Attitude to Gender

This section's questionnaire explicitly surveys whether "patriarchy" affects respondents' lives, with over half of the respondents scoring (4 or above), indicating that "patriarchy" impacts their lives. However, the gender and its identification did not reach a significant level in the tests, meaning that the influence of power is independent of gender. Meanwhile, 50% of the respondents believe that the patriarchal system exists and affects us. The questionnaire then delves into how "dominance," "identification," and "centrism" subjectively influence us.

In terms of "male dominance" (where men hold power and arrange everyone's positions), significant levels were reached in the gender diversity issue tests, indicating differences in views between genders. More men disagreed with gender diversity, believing that gender should be binary. This study suggests that Taiwan's societal construction is based on a "patriarchal system," starting from a male perspective without considering issues of other gender identities, resulting in approximately 20% of men not recognizing gender as diverse and fluid like the "genderbread person." Additionally, about 20% of respondents were unaware or had never heard of "gender-friendly restrooms." It is evident that on gender diversity issues, there is still influence from the patriarchal society, and there is room for improvement.

In the "male identification" aspect, several questionnaire data (including: men should contribute more, personal qualities identification, talking about sex, etc.) showed significant levels, indicating relevance. Men tend to reinforce and display their masculinity to gain recognition of their power, thus exhibiting behaviors such as "men should contribute more" or using "sex" as a topic among peers, and having to disguise their "masculinity."

Regarding "male centrism" (where those arranging things evidently do not consider others' wishes), 93% of respondents believed that everyone has the freedom to dress as they wish. However, in practice, 6% of respondents had experienced comments or strange looks due to their attire or , as traditional dressing norms have been internalized into their values. When women dress too revealing or men dress more femininely, issues still arise. Compared to the 2016 school survey data (我的身體，自己決定！？「制服革命」沒說的事，2016), where nearly 50% of respondents opposed "appearance autonomy," the 8-year-later data shows an 88% drop in opposition. Furthermore, the Ministry of Education revised the 《學校訂定教師輔導與管教學生辦法注意事項》 in 2019, removing regulations on student attire and grooming, representing visible progress in gender equality education.

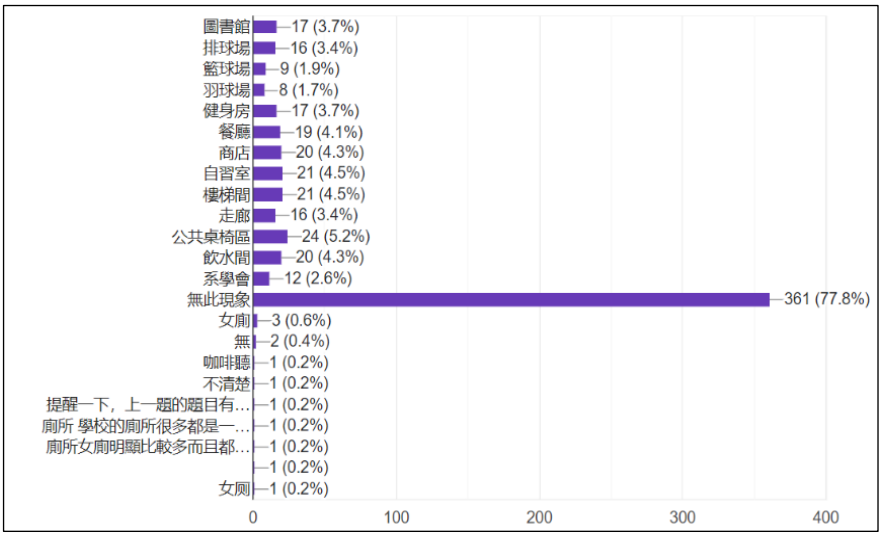
However, in this study, women's awareness of gender equality is significantly higher than men's. On issues such as economic burden and gender diversity, women's responses differ greatly from men's. For instance, regarding men being the economic bearers in a relationship, the proportion of

women who believe roles should rotate is twice as high as men, indicating women's opposition to gender role distribution under the patriarchal system.
accessories, reflecting that although there are clear effects in conceptual and educational training, issues still exist in reality. This study believes this is due to the influence of the patriarchal society

Section B: Space

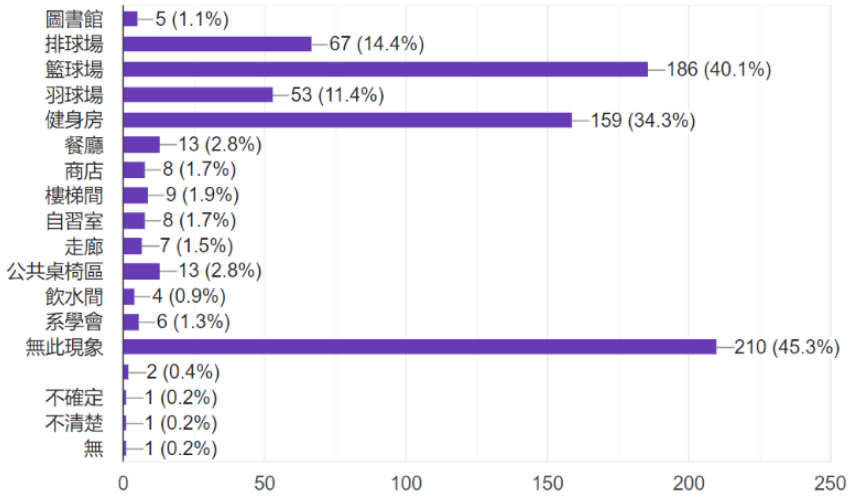
In this section, we will study the relationship between various spaces on campus and gender.

Q1: Which corners of are occupied by「females」and make「males」 inconvenient?



Based on the plot above, we can observe that most of the people think that the males will not be inconvenient in most places in school.

Q2: Which corners of are occupied by「males」and make「females」 inconvenient?



Based on the plot above, we can observe that volleyball court, basketball court, badminton court, and gym room is occupied by males and make females inconvenient.

Q3: Would you use all-gender toilets?

There are three options for this question, including:

A. use in any situation.
B. do not use in any situation.
C. Use only if there were no members of the opposite sex inside.

We are going to study for the difference between the opinion of male and female in these three options separately, and the data will be analysed with comparing proportion of two group, and α=0.05.

- **First, the male and female who will use all gender toilets in any situation**

The null hypothesis and alternative hypothesis:
H0: proportion of male who will use all-gender toilets in any situation are **equal** to female.
HA: proportion of male who will use all-gender toilets in any situation are **not equal** to female.

Comparing the proportion between two group, the X^2 is 23.567, and p-value is 0.00000127, because the p-value is less than 0.025, there is sufficient evidence to reject null hypothesis, there is significant difference between proportion of male and female who will use all-gender toilets in any situation without hesitation.

- **Second, the male and female who will not use all gender toilets in any situation**

The null hypothesis and alternative hypothesis:
H0: proportion of male who will not use all-gender toilets in any situation are **equal** to female.
HA: proportion of male who will not use all-gender toilets in any situation are **not equal** to female.

Comparing the proportion between two group, the X^2 is 0.11789, and p-value is 0.7313, because the p-value is greater than 0.025, there is insufficient evidence to reject null hypothesis, there is not significant difference between proportion of male and female who will not use all-gender toilets in any situation.

- **Last, the male and female who will use all gender toilets only if there were no members of the opposite sex inside**

The null hypothesis and alternative hypothesis:

H0: proportion of male who will use all gender toilets only if there were no members of the opposite sex inside are **equal** to female.

HA: proportion of male who will use all gender toilets only if there were no members of the opposite sex inside are **not equal** to female.

Comparing the proportion between two group, the X^2 is 22.744, and p-value is 0.00000185, because the p-value is less than 0.025, there is sufficient evidence to reject null hypothesis, and there is significant difference between proportion of male and female who will use all gender toilets only if there were no members of the opposite sex inside.

- **Summary for the three options when α=0.05:**

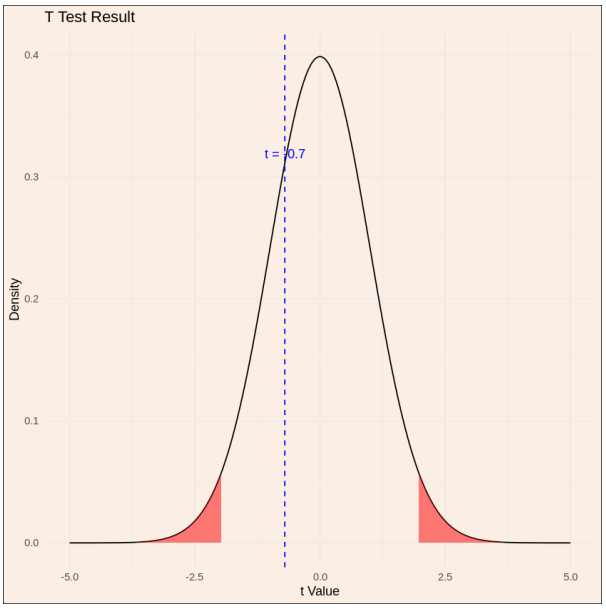
Options	X^2	p- value	Reject H0	Significant Difference
Use (in any situation)	23.567	0.00000127	Yes	Yes
Do not use	0.11789	0.7313	No	No
Use (conditionally)	22.744	0.00000185	Yes	Yes

Q3 additional: Comparing the difference of age between who will use all gender toilets and who will not use

The null hypothesis and alternative hypothesis:
H0: Average age of people will use = people will not use
HA: Average age of people will use ≠ people will not use

We compared the mean of age between the two populations which are people who will use all gender toilets and who will not use. The α use 0.05, t value is 0.7027 in degree of freedom 311, and the p-value is 0.4828, because p-value is greater than 0.025, there is insufficient evidence to reject null hypothesis, there is not significant difference of age between the two populations.

From the plot, we can observe that the t value is not located in the reject area (red area in the curve), so H0 is not rejected.



Q4: Do you feel uncomfortable because of the gender of the restroom cleaning staff?

We compared the proportion of **do not feel uncomfortable** between male and female. The α use 0.05, X^2 is 0.46787, and the p-value is 0.494, because it is greater than 0.025, there is insufficient evidence to reject null hypothesis, there is not significant difference between proportion of male and female who will feel uncomfortable because of the gender of the restroom cleaning staff.

Space conclusion

From what has been discussed above, we can get some conclusions including:

1. **Opinion of definitely not using all-gender toilets is not related on gender.**
2. **Opinion of using all-gender toilets at any situation is related on gender.**
3. **Opinion of using all-gender toilets only no other gender inside is related on gender.**
4. **Opinion of whether using all-gender toilets is not effected by age.**
5. **Whether one will feel uncomfortable because of gender of restroom cleaning staff is not effected by gender.**

Section C: Class Interaction

In this section, we will study gender barriers encountered in classroom experiences.

We have four questions in this part of the survey. They are:

Q1. Have professors/TA ever been influenced in their teaching attitudes because of your gender?
ex. No enthusiasm to specific genders in answering questions.

Q2. Have professors/TA ever affected grading standards because of your gender?
(Except for the PE class)

Q3. Have professors/TA ever affected your classroom participation because of your gender?
ex. Picking only specific genders to answer questions.

Q4. Do you feel uncomfortable with gender-related comments in class?
ex. Dirty jokes, stereotypical comments...

Q5. What is the ratio of male to female teachers in your current department?

We will do Categorical Data Analysis(ex. Chi-Square Test) to see if gender has an impact on the answers to these questions.

Q1: Have professors/TA ever affected teaching attitudes because of your gender?

The null hypothesis and alternative hypothesis:

H0: The teaching attitudes of professors/TA are not influenced by students gender

HA: The teaching attitudes of professors/TA are influenced by students gender

- **the samples are separated into five groups:**

G1: I ~~occasionally~~ ~~feel that my professors/teaching assistants have a better attitude.~~

G2: I occasionally feel that my professors/teaching assistants have a worse attitude.

G3: I always feel that my professors/teaching assistants have a better attitude.

G4: I always feel that my professors/teaching assistants have a worse attitude.

G5: I do not feel any difference.

- **contingency table**

	G1	G2	G3	G4	G5
female	27	8	14	1	195
male	15	26	75	5	146

Because some sample is less than 5, we run Fisher's Exact Test use α=0.05, and the result is p-value = 0.0002909, and it is less than 0.05, there is sufficient evidence to reject the null hypothesis. There is significant association between teaching attitudes of professors/TA and student gender.

Marascuilo Procedure

	|pi - pj|	CVij	significant if |pi - pj| >CVij
G1 - G2	0.07755	0.04418	significant
G1 - G3	0.05528	0.05829	no significant
G1 - G4	0.05306	0.04783	significant
G1 - G5	0.04020	0.04383	no significant
G2 - G4	0.10612	0.03921	significant
G2 - G3	0.05025	0.04179	significant
G2 - G5	0.68571	0.06263	significant
G4 - G3	0.65829	0.07010	significant
G3 - G5	0.02449	0.03587	no significant
G4 - G5	0.09548	0.05230	significant

From the result above, we can observe there are significant differences in most of the groups, only G1 - G3, G1 - G4, and G3 - G5 is do not have significant differences.

Q2: Have professors/TA affected grading standards because of your gender? (except for Physical education classes)

The null hypothesis and alternative hypothesis:

H0: The grading standards of professors/TA are not influenced by student gender.

HA: The grading standards of professors/TA are influenced by student gender.

- **the samples are separated into five groups:**

G1: I occasionally feel that my professor/TA was more lenient with my grades.

G2: I occasionally feel that my professors/TA was more critical with my grades.

G3: I always feel that my professor/TA was more lenient with my grades.

G4: I always feel that that my professors/TA was more critical with my grades.

G5: I do not feel any difference.

- **contingency table**

	G1	G2	G3	G4	G5
female	21	8	1	0	218
male	5	24	2	0	165

Because some sample is less than 5, we run Fisher's Exact Test use α=0.05, and the result is p-value = 2.782e-05, and it is less than 0.05, there is sufficient evidence to reject the null hypothesis. There is significant association between grading standards of professors/TA and student gender.

Marascuilo Procedure

	|pi - pj|	CVij	significant if |pi - pj| >CVij
G1 - G2	0.06557	0.03864	significant
G1 - G3	0.08122	0.05228	significant
G1 - G5	0.80738	0.05127	significant
G2 - G3	0.79695	0.05725	significant
G2 - G5	0.87295	0.04175	significant
G3 - G5	0.71574	0.06746	significant

From the result above, we can observe there are significant differences in all of the groups.

Q3: Have professors/TA affected your classroom participation because of your gender?

The null hypothesis and alternative hypothesis:

H0: The classroom participation is not influenced by student gender.

HA: The classroom participation is influenced by student gender.

- **the samples are separated into five groups:**

G1: I occasionally feel that my professors/TA made me participate more.

G2: I occasionally feel that my professors/TA made me participate less.

G3: I always feel that my professors/TA made me participate more.

G4: I always feel that my professors/TA made me participate less.

G5: I do not feel any difference.

- **contingency table**

	G1	G2	G3	G4	G5
female	11	7	2	1	224
male	10	15	1	1	172

Because some sample is less than 5, we run Fisher's Exact Test use α=0.05, and the result is p-value = 0.1805, and it is less than 0.05, there is insufficient evidence to reject the null hypothesis. There is not significant association between classroom participation and student gender.

Q4: Do you feel uncomfortable with gender-related comments in class?

We would want to study whether there is difference between males and females who will feel uncomfortable with gender-related comments.

First, we will compare it in comparing proportion of two sample:

The null hypothesis and alternative hypothesis:
H0: proportion of male who will feel uncomfortable is equal with female
HA: proportion of male who will feel uncomfortable is not equal with female

We separate the sample in to two group, which is the male who will feel uncomfortable and females who will feel uncomfortable.

Comparing the proportion between two group, the X^2 is 16.439, and p-value is 0.00005025, because the p-value is less than 0.025, there is sufficient evidence to reject null hypothesis, and there is significant difference between proportion of male and female who will feel uncomfortable with gender-related comments in class.

Apart from that, we will compare using Chi-squared test

The null hypothesis and alternative hypothesis:
H0: feeling uncomfortable with gender related comments are not influenced by students gender
HA: feeling uncomfortable with gender related comments are not influenced by students gender

- **the samples are separated into five groups:**

G1: Disagree
G2: Agree
G3: Strongly Disagree
G4: Strongly Agree
G5: I do not feel any difference

- **contingency table**

	G1	G2	G3	G4	G5
female	29	77	23	25	91
male	40	31	34	12	82

We run Pearson's Chi-squared test use α=0.05, and the result is X-squared = 20.082 in degree of freedom=4, p-value = 0.0004811, and it is less than 0.05, there is sufficient evidence to reject the null hypothesis. There is significant association between whether feeling uncomfortable with gender related comments and student gender.

Marascuilo Procedure

	|pi - pj|	CVij	significant if |pi - pj| >CVij
G1 - G2	0.195918367	0.06940131	significant
G1 - G3	0.030150754	0.07485721	no significant
G1 - G4	0.024489796	0.05340689	no significant
G1 - G5	0.045226131	0.07358948	no significant
G2 - G4	0.016326531	0.05432435	no significant
G2 - G3	0.140703518	0.06346536	significant
G2 - G5	0.253061224	0.07132300	significant
G4 - G3	0.211055276	0.08642141	significant
G3 - G5	0.220408163	0.06727588	significant
G4 - G5	0.015075377	0.07116395	no significant

From the result above, we can observe there are significant differences in G1-G2, G2-G3, G2-G5, G4-G3, and G3-G5.

Q5: Is the College attendance category associated with the proportion of teachers in the current department?

The null hypothesis and alternative hypothesis:

H0: College attendance category and the proportion of teachers in the current department are independent of each other.

HA: College attendance category and the proportion of teachers in the current department are not independent of each other.

- **the samples are separated into five groups with their major:**

1. Business Management related
2. Engineering & Sciences related
3. Literature & Arts related
4. Medical related
5. Social Sciences related

- **Contingency Table**

	Male > Female	Same	Female > Male
Business Management related	**14**	**51**	**61**
Engineering & Sciences related	**13**	**17**	**102**
Literature & Arts related	**28**	**15**	**15**
Medical related	**16**	**18**	**9**
Social Sciences related	**10**	**15**	**16**

We run Pearson's Chi-squared test use α=0.05, and the result is X-squared = 96.37 in degree of freedom=8, p-value = 0.000..., and it is less than 0.05, there is sufficient evidence to reject the null hypothesis. There is significant association between college attendance category and the proportion of teachers in the current department.

- **contingency table**

	G1	G2	G3	G4	G5
female	29	77	23	25	91
male	40	31	34	12	82

We run Pearson's Chi-squared test use α=0.05, and the result is X-squared = 20.082 in degree of freedom=4, p-value = 0.0004811, and it is less than 0.05, there is sufficient evidence to reject the null hypothesis. There is significant association between whether feeling uncomfortable with gender related comments and student gender.

Marascuilo Procedure

	|pi - pj|	CVij	significant if |pi - pj| >CVij
G1 - G2	0.195918367	0.06940131	significant
G1 - G3	0.030150754	0.07485721	no significant
G1 - G4	0.024489796	0.05340689	no significant
G1 - G5	0.045226131	0.07358948	no significant
G2 - G4	0.016326531	0.05432435	no significant
G2 - G3	0.140703518	0.06346536	significant
G2 - G5	0.253061224	0.07132300	significant
G4 - G3	0.211055276	0.08642141	significant
G3 - G5	0.220408163	0.06727588	significant
G4 - G5	0.015075377	0.07116395	no significant

From the result above, we can observe there are significant differences in G1-G2, G2-G3, G2-G5, G4-G3, and G3-G5.

Q5.**Is the impression of the gender of department members in academic departments associated with the type of college?**

Impression:

Female > Male: The proportion of female teachers is greater than the proportion of male teachers

Same: The proportion of female teachers is equal to the proportion of male teachers.

Male > Female: The proportion of female teachers is smaller than the proportion of male teachers.

The null hypothesis and alternative hypothesis:

H0: College attendance category and Impressions of the gender of department members in academic departments are independent of each other.

HA: College attendance category and Impressions of the gender of department members in academic departments are not independent of each other.

contingency table

	female > male	same	male > female
Business Management related	14	51	61
Engineering & Sciences related	13	17	102
Literature & Arts related	28	15	15
Medical related	16	18	9
Social Sciences related	10	15	16

Comparing different college attendance categories, with a significance level of 0.05,chi-squared: 96.37, degree of freedom = 8, p-value: 0.000… <0.05. Because the p-value is less than 0.05, There is a significant association between the college attendance category and Impressions of the gender of department members in academic departments.

We can say that students from different departments have different impressions of the gender of their teachers.

linear regression

We believe that the gender barriers encountered in the classroom are age-related,

(See Fanling Chen (2004) for relevant evidence.

《Spaces of Technology? Space of Gender? Space of Education? -A Polytechnic University as an Example of the Direction of Gender Equality Education》. Journal of Liberal Studies, (6))

so we also perform a linear regression on them.

Assumptions:

We make four assumptions associated with the linear regression model.

Linearity: The relationship between X and the mean of Y is linear.
Homoscedasticity: The variance of residual is the same for any value of X.
Independence: Observations are independent of each other.
Normality: For any fixed value of X, Y is normally distributed

We also pre-process the data. Include, remove outliner(Identifying outliers with the 1.5xIQR rule), standardization for age, incorporating qualitative data into regression analysis by turn them into dummy variable.

We linearly regressed the responses to questions one through three (removing question four, gender talk, because her relationship with symbolic barriers was not as strong as other) on age by converting them to dummy variables. Age was used as the dependent variable and the dummy variable was used as the independent variable.

different Classroom Interaction(include Q1 - Q3) on students' age
with the aim of exploring whether there is a significant effect of it on students' age distribution

We fitted the following linear regression model:
$Age=\beta0+\beta1 \cdot Q1\_Dummy+Q2 \cdot Teach2\_Dummy+\beta3 \cdot Q3\_Dummy+\epsilon$

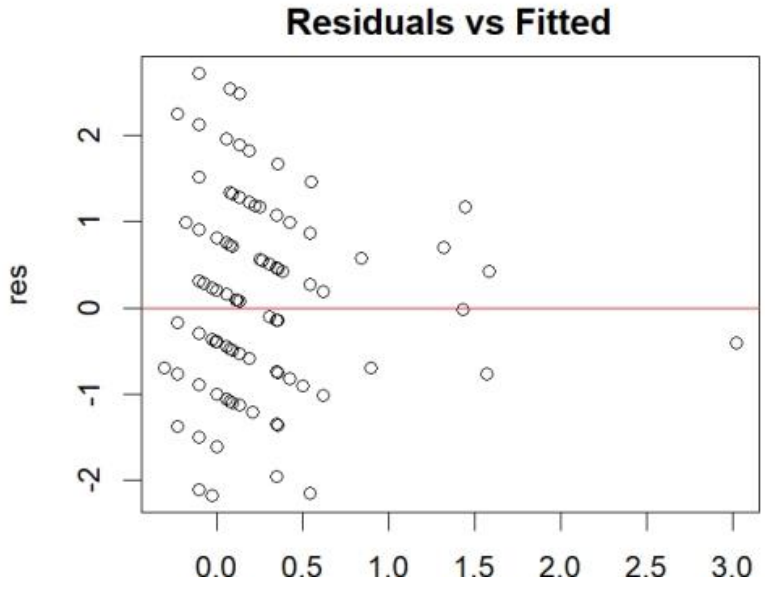
results:

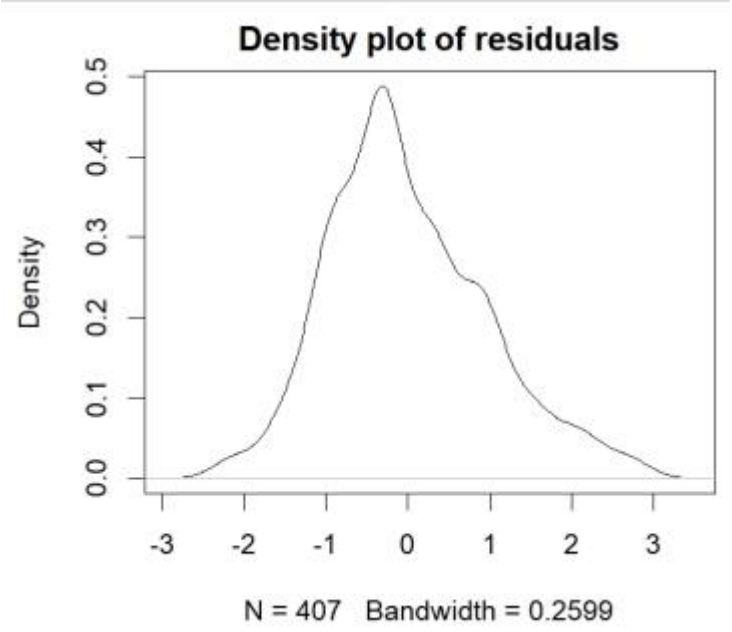
Residual standard error: 0.9737
Multiple R-squared: 0.07752 Adjusted R-squared: 0.05183
F-statistic: 3.018
p-value: 0.0007001

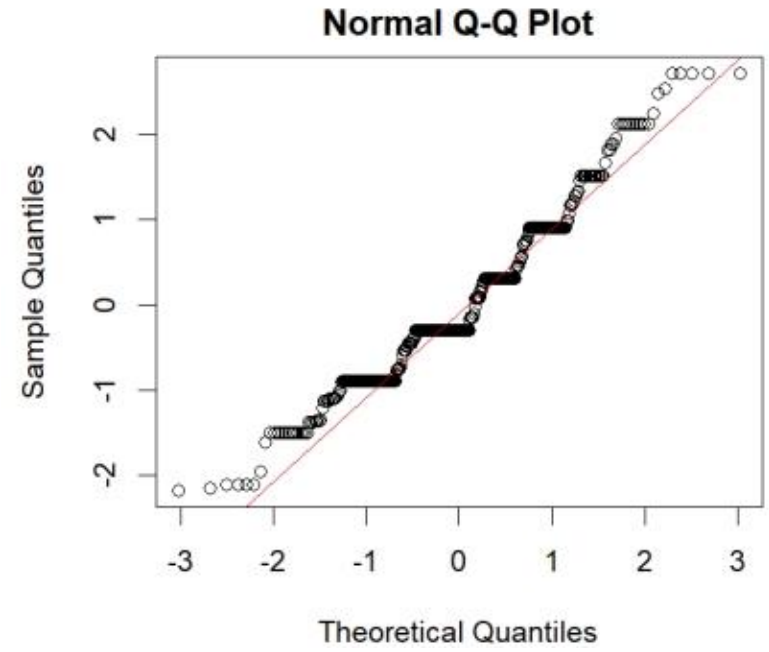
$$y = \beta_0 +\beta_1 X_1+\beta_2 X_2 +\beta_3 X_3 +\beta_4 X_4+\beta_5X_5+\beta_6X_6+\beta_7X_7+\beta_8X_8+\beta_9X_9+\beta_{10}X_{10}+\beta_{11}X_{11}+\epsilon$$

β0（Intercept）：1.1126	β1（Q1G1）：0.2329	β5（Q2G1）：0.2928	β8（Q2G4）：-1.2168
	β2（Q1G2）：0.1549	β6（Q2G2）：-0.1277	β9（Q3G1）：-1.0213
	β3（Q1G3）：0.4561	β7（Q2G3）：1.4548	β10（Q3G1）：-1.1400
	β4（Q1G4）：-0.2731		β11（Q3G1）：0.1856

teaching attitude unfairly grading class participate



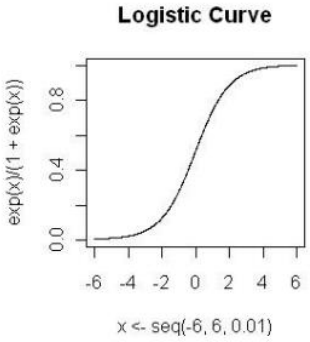

Density plot of residuals
Density
0.0
0.1
0.2
0.3
0.4
0.5
-3
-2
-1
0
1
2
3
N = 407 Bandwidth = 0.2599


Normal Q-Q Plot
Sample Quantiles
-2
-1
0
1
2
-3
-2
-1
0
1
2
3
Theoretical Quantiles

Logistic regression

We have also used gender to make logical regressions for these four questions.

$$\text{logit}(p)=\log\left(\frac{p}{1-p}\right)=\beta 0+\beta 1X1+\beta 2X2+\cdots+\beta nXn$$



We make four assumptions associated with the linear regression model

1. Large sample -> Each independent variable should have at least 10 samples
2. Continuous predictors are linearly related to a transformed version of the outcome (linearity)
3. no perfect multicollinearity
4. observations are independen

Q1 - sex vs. teaching attitudes

$$y = \ln(p/1-p) = -0.5878 + 1.7664 \cdot X1 + (-0.1054) \cdot X2 + 2.1972 \cdot X3 + 0.2984 \cdot X4$$

	Estimate	Std. Error	P (Pr(>|z|))	Significance
(Intercept)	-0.5878	0.3220	0.067963	
occasionally feel a better attitude	1.7664	0.5169	0.000632	Significance
always feel a better attitude	-0.1054	0.5639	0.851785	
always feel a worse attitude	2.1972	1.1418	0.054310	Significance
not feel any difference	0.2984	0.3401	0.380313	

The poorer teaching attitudes (occasionally or always) significantly increases the probability that the student's gender is male.
-> indicate that male are treated less favorably in the class.

Q2 - sex vs. Unfairly grading

$$y = \ln(p/1-p) = 1.5686 + (-2.5337) \cdot X1 + (-0.8755) \cdot X2 + (-1.8472) \cdot X3$$

	Estimate	Std. Error	P (Pr(>|z|))	Significance
Intercept	1.5686	0.4916	0.001418	
occasionally feel more lenient	-2.5337	0.6437	8.27e-05	Significance
always feel more lenient	-0.8755	1.3197	0.507091	
not feel any difference	-1.8472	0.5023	0.000236	Significance

Feeling preferential treatment (occasionally) significantly reduces the probability that a student's gender is male.
-> indicating that male students are less likely to feel this preference

Q3 - sex vs. Class participation

$$y = \ln(p/1-p) = -0.2642 + 1.0263 \cdot X1 + 0.1688 \cdot X2 + (0.2642) \cdot X3 + (-0.4290) \cdot X4$$

	Estimate	Std. Error	P (Pr(>|z|))	Significance
Intercept	-0.2642	0.1014	0.00917	
occasionally made me participate more	1.0263	0.4688	0.02859	Significance
occasionally made me participate less	0.1688	0.4485	0.70660	
always made me participate more	0.2642	1.4178	0.85221	
always made me participate less	-0.4290	1.2289	0.72703	

Less (occasional) classroom participation significantly increased the probability that the gender was male.
-> indicating that male participation is more likely to be affected

Q4 - sex vs. discomfort to gender relate comments

$$y = \ln(p/1-p) = 0.3215 + (-1.1390) \cdot X1 + (-0.0230)X2 + (-1.0555) \cdot X3 + (-0.4257) \cdot X4$$

	Estimate	Std. Error	P (Pr(>|z|))	Significance
Intercept	0.3215	0.24389	0.187318	
agree	-1.1390	0.31919	0.000359	Significance
strongly disagree	-0.0230	0.36772	0.949931	
strongly agree	-1.0555	0.42757	0.013560	Significance
not feel any difference	-0.4257	0.28752	0.138691	

The chance of feel discomfort to gender relate comments indicating agreement or strong agreement significantly reduced the probability that the gender was male.
-> indicating that female students were more susceptible to it.

The explanation we get in the logistic regression model is as same as in the previous chi-square analysis and Fisher's analysis.
However, the model itself is underfitting, and the explanation is not particularly high.
AIC（Akaike Information Criterion）is about 300 - 500

Section D: Gender Concerns

Q1: Channels for obtaining gender related information.

There are five main channels to get **gender related information, including** Peers, Books and Magazines, Social Media, School, and TV News. We are going to study the difference between the age of people obtaining gender related information from these channels.

The null hypothesis and alternative hypothesis:
H0: Average age of people get information from five channels are same
HA: Average age of people get information from five channels are not same

After doing ANOVA test with α=0.05, the F value = 4.363, and p-value = 0.00167. because the p-value < α (0.05), there is sufficient evidence to reject H0, there is significant difference in at least two of the channels.

Tukey test is run to know which channels have significant differences, and the Tukey test results:

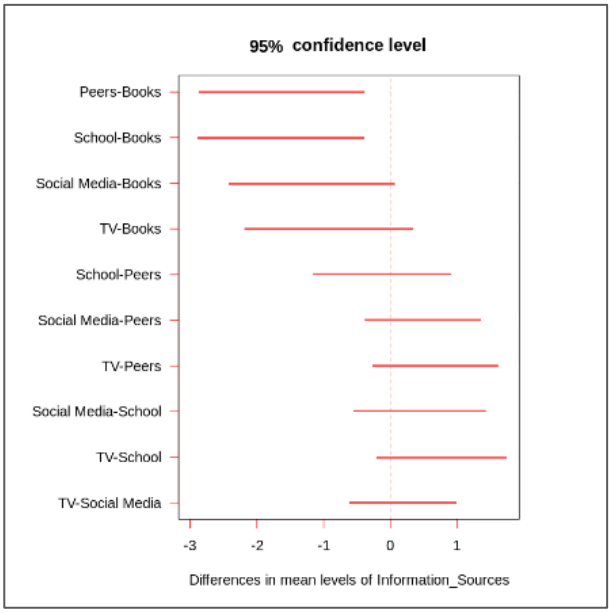
Tukey Test Result

Groups	difference of mean	lower	upper	p-value after adjustment
Peers-Books	-1.6314	**-2.8943**	**-0.3686**	**0.0040**
School-Books	-1.6891	**-2.9829**	**-0.3953**	**0.0035**
Social Media-Books	-1.1029	-2.2805	0.0746	0.0788
TV-Books	-0.9291	-2.1988	0.3406	0.2669
School-Peers	-0.0577	-1.0318	0.9165	0.9998
Social Media-Peers	0.5285	-0.2850	1.3419	0.3886
TV-Peers	0.7023	-0.2396	1.6443	0.2489
Social Media-School	0.5862	-0.2745	1.4468	0.3393
TV-School	0.7600	-0.2230	1.7430	0.2154
TV-Social Media	0.1738	-0.6502	0.9979	0.9785

From the table above, we can discovered that average age of people who obtian gender related information by **peers and books**, **school and books** are significantly different because the **p- value after adjustment is less that α(0.05)**, and **the confidence interval do not include 0**.

There are significant differences in followings groups, which p-value after adjustment is lower than α(0.05), and the confidence intervals do not include 0:

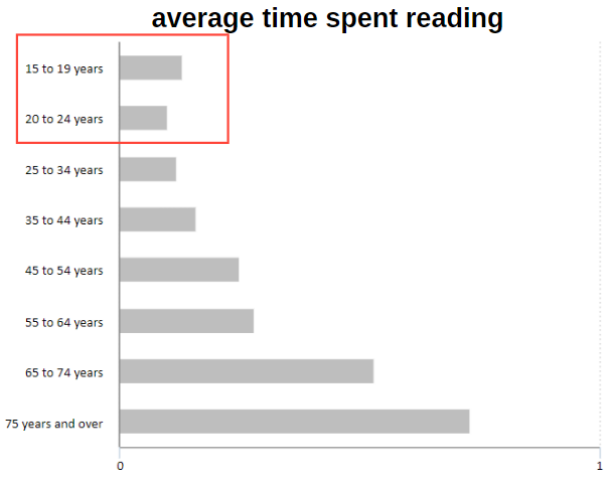
1. Books and Peers
2. Books and School



The plot shows the intervals do not include 0.

According to the research of U.S. Bureau of Labor Statistics, the time spent for reading of teenagers and 20-24 year olds people is far lower than the elder group, we can infer that the elder will be more possible to get information from books and magazines.

From the chart on the right, we can observe that young people spend less time on reading than older people, the 15-19 age group and the 20-24 age group spend much less time reading compared to the group aged 35 and above.



Q2 Online platforms for obtaining gender related information.

We want to know the age of people obtaining gender related information from different online platforms. We selected the four online platforms which most of the people use, and we will analyze the difference of age between these online platforms by ANOVA.

The four online platforms include Facebook, Instagram, Dcard, and News Website

The null hypothesis and alternative hypothesis:
H0: Average age of people get information from four online platforms are same
HA: Average age of people get information from four online platforms are not same

After doing ANOVA test with α=0.05, the F value = 4.41, and p-value = 0.00435, because the p-value < α (0.05), there is sufficient evidence to reject H0, and there is significant difference of the age of people obtaining gender related information in at least two of the online platforms.

Tukey test is run to know which online platforms have significant differences, and the Tukey test results:

Tukey Test Result

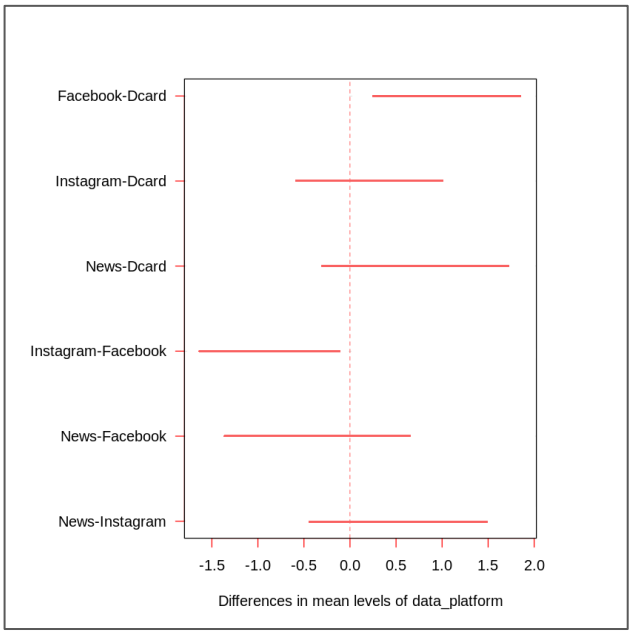
Groups	difference of mean	lower	upper	p-value after adjustment
Facebook-Dcard	1.0540	**0.2257**	**1.8824**	**0.0060**
Instagram-Dcard	0.1741	-0.5654	0.9136	0.9302
News-Dcard	0.6974	-0.3413	1.7362	0.3096
Instagram-Facebook	-0.8799	**-1.6558**	**-0.1040**	**0.0188**
News-Facebook	-0.3566	-1.4216	0.7084	0.8245
News-Instagram	0.5233	-0.4741	1.5208	0.5310

From the table above, we can discovered that average age of people obtaining gender related information in **Facebook and Instagram**, **Facebook and Dcard** are significantly different because the **p- value after adjustment is less that α(0.05)**, and **the confidence interval do not include 0**.

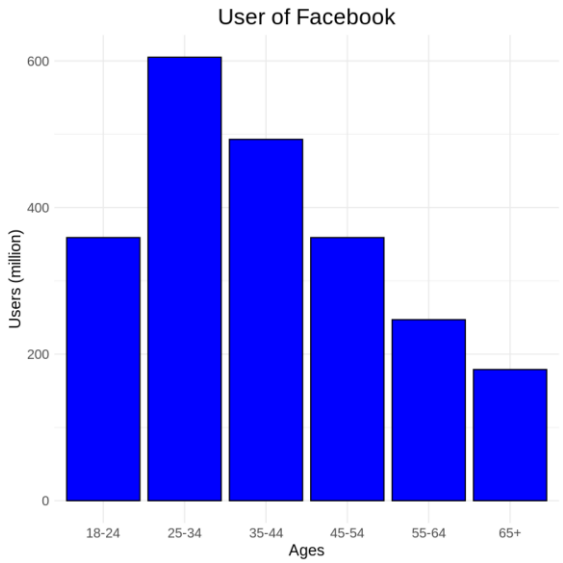
There are significant differences in followings groups, which p-value after adjustment is lower than α(0.05), and the confidence intervals do not include 0.

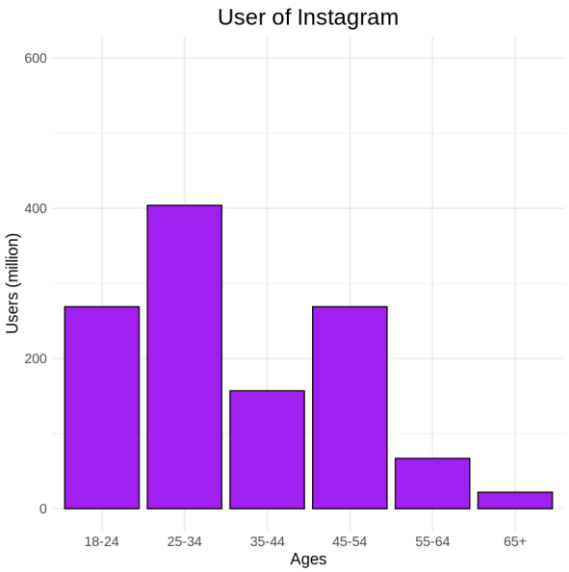
1. Facebook and Instagram
2. Facebook and Dcard

The plot on the right shows the intervals do not include 0.



Based on the statistics data from napoleoncat, we can discovered that majority of the user of Instagram is young, but majority of the user of Facebook is older. From this result, we infer the difference between the average age of people who obtain gender related information from Facebook is older, and from Instagram is younger. The charts below show the trends.





Moreover, the Dcard official news stated the main age range of Dcard user is 18-24 years old, from this information, we can infer that if there is significant difference of age between Dcard and Facebook, the average age of people who obtain gender related information from Dcard may be more young, and from Facebook may be older.

> Dcard, which is widely loved by young people, has 4 million card friends and 1.5 billion monthly traffic. It is the largest young people forum in Taiwan. The main age range of Dcard card friends is 18-24 years old (67.6%). In 2019, card friends produced 2.45 million articles, 25 million comments, and 150 million mood numbers (referring to the emoticons on Dcard). There are nearly 400 billboards on Dcard, including school boards of colleges and universities, current affairs topics, emotions, food, drink, fun, study and work, and other topics that young people care about most.

Hence, from the inference above, we can get a conclusion that there is significant difference between the average age of people who obtain gender related information on Facebook and Dcard as well as on Facebook and Instagram, and the people who is older likely to get the gender related information from Facebook, and the young would like to get gender related information from Dcard and Instagram.

Conclusion of Gender Concerns

From the results wo do, we can get a conclusion that younger is more possible to get gender related information from Dcard, Instagram, School and Peers.

On the other hand, the older is more possible to get gender related information from Facebook and Books

Conclusion

In teaching spaces, the tests on "teaching attitude and grading standards affected by gender" both showed significant results, indicating a correlation between gender and grading, with nearly 10% of respondents believing that teaching attitudes and grading standards are more lenient towards women, while men are judged more harshly. This could be because students cannot change the content and attitude dominated by teachers. Conversely, the test on "class participation affected by gender" did not reach significant results, possibly because students also influence class participation, such as through group discussions and presentations, balancing the teacher's impact. Comparing these results with 2004 data (科技的空間?性別的空間?教育的空間?--以一所理工大學為例談兩性平等教育的方向, 陳芬苓), it is evident that the results align with previous analyses, indicating that the effectiveness of the 《性別平等教育法》 is insufficient.

In campus facilities, nearly 90% of respondents believed there is no phenomenon where "female spaces" occupy "male spaces," causing inconvenience to men. However, only 50% of respondents believed there is no phenomenon where "male spaces" occupy "female spaces," causing inconvenience to women. In areas such as basketball courts, gyms, badminton courts, and volleyball courts, more than 10% of respondents believed there is a disparity, indicating a significant gender inequality in "sports spaces." These findings are consistent with previous research, such as 畢恆達 and 陳芬苓's work, where female students felt that sports fields are the most gender-unequal campus spaces. The difference with 陳芬苓's findings on "staircases" is that "male students often smoke in staircases, making them feel like male spaces," but with the promotion of "smoke-free campuses" (教育部國教署, 2020), this argument no longer holds. However, over the past 20 years, the issue remains largely unchanged, suggesting that the Ministry of Education should further review policies on "sports spaces" and create a non-discriminatory campus environment. This study believes that differences in sports education over the past 15 years have instilled a fear of "sports spaces" in females.

Part 6: Conclusion

Patriarchal society has influenced us for 2 million years, but as gender awareness rises, creating a non-discriminatory, gender-friendly environment (such as outlined in the Convention on the Elimination of All Forms of Discrimination Against Women) has become a critical issue. Therefore, we examined the existence of "patriarchy" on campuses through its definition. In terms of "male dominance," issues like gender diversity and gender-friendly restrooms indicate that binary gender concepts still prevail. Regarding "male identification," most men still agree with statements like "men should contribute more" and use "sex" as a topic, demonstrating "masculinity" to gain recognition. In the aspect of "male centrism," while the Gender Equity Education Act and related amendments have indeed enhanced personal freedom in dress, a minority still faces scrutiny, reflecting that while educational efforts have made progress, issues persist. Thus, we believe that patriarchy remains present on campuses, though improvements have been made.

Over the 20 years since the Gender Equity Education Act was implemented, our research indicates insufficient progress in educational environments and campus spaces. In "teaching spaces," gender biases in teachers' attitudes persist, although students can balance out gender inequalities in the classroom. Compared to six years ago, the issue of gender equality in teaching remains unchanged, indicating insufficient effectiveness. In "campus facilities," we are disappointed to see no improvement compared to six years ago. We believe the Ministry of Education should reassess current policies regarding sports spaces. Therefore, in terms of the educational environment and campus facilities, the efforts so far are merely superficial, failing to achieve true gender equality.

In conclusion, is our campus truly gender equal? Based on the above data and analysis, we see considerable room for improvement. Hence, we propose the following recommendations:

1. Establish more gender equality courses and seminars, and include gender equality in the core curriculum to enhance students' gender awareness and understanding.
2. The Ministry of Education should reassess 12 years of physical education to ensure it does not impart "gender inequality" concepts, such as boys should go to the gym and girls to gymnastics.
3. Organize regular gender equality seminars for teaching staff and reassess teaching performance to ensure gender equality concepts are truly implemented in the classroom.
4. Online platforms have expanded the discussion space for gender issues but may also cause information bias. Students should learn to interpret and handle media information to prevent online gender violence, and schools should strengthen education in this area.

Part 7: Reference

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