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ANALYSING THE UNDERGRADUATE ENROLMENT PATTERN IN MALAYSIAN PUBLIC UNIVERSITIES USING STATISTICAL METHODS

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ABSTRACT

The government is committed to making Malaysia a regional hub for higher education by ensuring excellence in service and quality. Undergraduate enrolment in science fields in Malaysian public universities has recently declined. The gap between men and women regarding higher education has been worldwide attention too. The factors which can attract students to enrol in Malaysian public universities depend on many variables. This study analyses the student's enrolment for the three categories of universities using the ANOVA test and Pearson Correlation Coefficient. The second is to analyse the gender factor of undergraduate enrolment in Malaysian public universities using the Gender Parity Index (GPI). The third is the t-test used to test the significant difference in mean undergraduate enrolment between STEM and non-STEM fields. There is a mean difference between the undergraduate enrollment for three different categories of Malaysian public universities to each other. Only a strong positive correlation exists between focused universities and research universities. Furthermore, the GPI is higher than 1, there is a disparity in favour of females the undergraduate enrolment in Malaysian public universities. Besides, there is a mean difference in enrolment between STEM and non-STEM fields of study in Malaysian public universities. Finally, a highly significant relationship between quality education, learning atmosphere, higher performance, and social influences on undergraduate enrolment in Malaysian public universities. Through this statistical research, there is a need to improve the quantity and quality of inputs and outputs data of public universities in Malaysia.

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INTRODUCTION

Nowadays, the education sector plays a vital role in Malaysia. Higher education covers all post-secondary education in Malaysia, leading to certificates, diplomas, and degrees [24]. The government is committed to making Malaysia a regional hub for higher education by ensuring excellence in service and a reputation for quality [22]. There are currently 20 Malaysian public universities that are divided into three different categories: Research Universities (RU), Focused Universities (FU) and Comprehensive Universities (CU) [37]. Malaysian public universities of different types are generally located in Malaysia and provide additional functions. Universities categorised as research universities must focus primarily on research and innovation activities with a 50-50 ratio

of undergraduate to postgraduate students [22]. RUs attract much funding because of the critical role of research excellence in quality education and innovative thinking leading to social and economic development [2]. The comprehensive universities provide various courses and fields of study, with the number of undergraduate students slightly greater than the postgraduate students who had enrolled. The focused universities are centralised on specific fields related to their establishment, with a ratio of undergraduates to postgraduates one to two [26]. According to the latest census, the gap between men and women in higher education has been worldwide. Women comprise the majority of tertiary students in 93 out of 146 countries examined by the Atlas Gender Equality report [38]. The gender gap is a much more serious concern in Malaysian public universities. The widening gender gap in Malaysian public universities will bring several problems and threats to society and economics in the long term. The gender gap in higher education disproportionately affects males from lower-income backgrounds, as acknowledged in reports from Higher Education Policy Institute (HEPI) [14].

Hence, social policies that target lower-income families and communities should reduce the gender gap in Malaysian public universities. Many fields of study are offered in Malaysian public universities such as General Programmes, Arts and Humanities, Social Science, Business and Law, Services, Education, STEM, Manufacturing and Construction, Agriculture and Veterinary and Health and Welfare [26]. The Energy, Science, Technology, Environment and Climate Change Ministry (MESTECC) is concerned over a declining trend in students opting for Science, Technology, Engineering and Mathematics (STEM) subjects in schools and higher education institutions (IPT) [20]. Recently, undergraduate enrolment in science fields in Malaysian public universities has been very distressing as the percentage of undergraduate enrolment is declining [30]. Malaysia will face a severe shortage of human capital in science fields as the target for students enrolling in the stream is not being met annually at the school and tertiary levels. Due to the decreasing number of students enrolled in STEM programmes, numerous higher learning institutions were impelled to develop initiatives to encourage secondary school students' interest in STEM subjects [34]. The government should also create a fun learning environment in schools for STEM subjects and activities [29]; hence, Malaysian needs to strengthen STEM education to reach a developed nation that can bear the challenges and requirements of the STEM-driven economy [21].

Public universities can provide a platform for community services as universities build bridges internationally, serve as national gateways for the sharing and dissemination of knowledge, and influence society through the ideas and values shaped by the humanities and liberal arts [9]. The crucial variables to attracting students to enrol in Malaysian public universities depend on social influences, reputation, learning atmosphere, quality education, reasonable course fees, high employment opportunity, and higher performance [1]. Meanwhile, the education sector has always enjoyed the highest national development budget, symbolising the Malaysian government's commitment to education [36].

Men have dominated the global higher education landscape for most of recorded history; within the UK, girls were not allowed to enrol on universities until 1920. However, enrolment trends since the 1990s have produced a reverse gender gap globally, with women outnumbering men in almost all Organisation for Economic Co-operation and Development (OECD) countries [40]. The gender gap in Malaysian public universities is comparable to the earlier international trends. The gap began to emerge towards the end of the 1990s and rose quickly in recent years [17]. According to Malaysia's Gender Gap Index report, the combined gross enrolment ratio was in favour of men in 1980 (53%-56.9%) but parity was achieved by 1990; women have had a higher enrolment ratio since 2000, of 65.3%-64.3% [23]. More women are enrolled at universities in the USA and most other highly developed countries than men. Studies have shown that young women have considerably better

examination performances and grades than young men in the past few years. In some branches and regions, women already have more successful career starts, career models, and earning capacities [41].

The Energy, Science, Technology, Environment and Climate Change Ministry (MESTECC) is concerned over a declining trend in students opting for STEM subjects in schools and IPT [20]. Interest in STEM and STEM careers is declining worldwide, including in Malaysia [18]. Reasons for the decline include learning in a silo and not integrated, being unable to see the relevance of science and mathematics in everyday situations, the subject matter being too tricky, and the career being uninteresting [7]. The role model exposure positively affected STEM and non-STEM students' interest in STEM and their perceived identity compatibility between the self and STEM. Role model exposure positively impacted the academic sense of belonging among STEM and non-STEM students and positively impacted academic self-efficacy among STEM students but not non-STEM students [16]. Finally, increased grades and fewer failures significantly impact the pipeline problem.

Statistical methods are mathematical formulas, models, and techniques utilised to analyse raw data. Statistical methods extract information from research data and provide different methods to assess the robustness of analysis outputs. The Analysis of Variance (ANOVA) method assesses the relative size of variance among group means compared to the average variance within groups [12]. The Pearson correlation coefficient measures the strength of linear association between two variables [31]. A t-test is a type of statistical test that is used to compare the means of two groups. It is one of the studies' most widely used statistical hypothesis tests [13]. The method utilised to capture the changing demographics of university enrolment is known as the GPI [17]. The objectives of this study are to analyse the pattern of three different categories of undergraduate enrolment in Malaysian public universities from 2012 until 2020, to analyse the gender factor of undergraduate enrolment in Malaysian public universities using the GPI and to test the significant difference of mean undergraduate enrolment between STEM and non-STEM fields of study.

DATA AND METHODOLOGY

This paper used secondary data from the Ministry of Higher Education's statistics from 2012 until 2020. This study uses data from Malaysian public universities from the Ministry of Higher Education website. The universities included in the study are as follows (Public Institutions of Higher Education, 2016):

Research University (RU): Universiti Malaya (UM), Universiti Kebangsaan Malaysia (UKM), Universiti Putra Malaysia (UPM), Universiti Teknologi Malaysia (UTM) and Universiti Sains Malaysia (USM).

Comprehensive University (CU): Universiti Teknologi MARA (UiTM) and Universiti Islam Antarabangsa Malaysia (UIAM).

Focused University (FU): Universiti Pendidikan Sultan Idris (UPSI), Universiti Malaysia Perlis (UniMAP), Universiti Sains Islam Malaysia, (USIM), Universiti Teknikal Malaysia Melaka (UTeM), Universiti Malaysia Pahang (UMP), Universiti Malaysia Terengganu (UMT), Universiti Sultan Zainal Abidin (UniSZA), Universiti Pertahanan Nasional Malaysia (UPNM), Universiti Tun Hussein Onn Malaysia (UTHM) and Universiti Utara Malaysia (UUM).

Several statistical methods are used in this study: Analysis of variance, Pearson Correlation and t-test. All these methods were run using R programming software.

Analysis of Variance Test

Analysis of Variance (ANOVA) test is used to discover the presence of any significant differences [6] between the means of students' enrolment for three different categories; research universities (RU), focused universities (FU) and comprehensive universities (CU). Use a one-way ANOVA when collecting data about one categorical independent variable and one quantitative dependent variable. The independent variable should have at least three levels (groups/categories) [27]. The independent variable is three categories of Malaysian public universities; the dependent variable is undergraduate enrolment.

A hypothesis stated is to be tested which is to determine the mean difference among the undergraduate enrolment for three different categories of Malaysian public universities:

$H_0 : \mu_1 = \mu_2 = \mu_3$. (There is no mean difference between the undergraduate enrolment for three different categories of Malaysian public universities).

H_1 : Not all μ_i are equal. (There is at least one mean difference between the undergraduate enrolment for three different categories of Malaysian public universities).

The following Table 1 is the ANOVA table for one-way ANOVA:

Table 1: One-way ANOVA table

	Sum of Squares (SS)	**Degrees of Freedom (d.f)**	**Mean Sum of Square (MS)**	**F-ratio (F)**
Treatment	$SST = \sum_{j=1}^{k}(X_j - \bar{X})^2$	(k-1)	$MST = \frac{SST}{(k-1)}$	$F = \frac{MST}{MSE}$
Error	$SSE = \sum_{j=1}^{k}\sum_{j=1}^{l}(X - X_j)^2$	(n-k)	$MST = \frac{SSE}{(n-k)}$	
Total	**SSTO = SSE + SST**			

where:

F = ANOVA Coefficient, $\frac{MST}{MSE}$

MST = Mean sum of squares between the groups, $\frac{SST}{(k-1)}$

MSE = Mean sum of squares within the groups, $\frac{SSE}{(n-k)}$

SSTO = Total sum of squares, SSE + SST

SSE = Sum of squares within the groups, $\sum_{j=1}^{k}\sum_{j=1}^{l}(X - X_j)^2$

SST = Sum of squares between the groups, $\sum_{j=1}^{k}(X_j - \bar{X})^2$

j = Group of samples

X = Each data point in the j^{th} group

$\bar{X_j}$ = Mean of j^{th} group

n = The total number of samples in a population

k = Number of groups

Pearson Correlation Coefficient

Correlation coefficients are indicators of the strength of the linear relationship between two different variables, x and y. A linear correlation coefficient that is greater than zero indicates a positive relationship. A value that is less than zero signifies a negative relationship. Finally, a zero value indicates no relationship between the two variables, x and y [35].

Pearson Correlation test is then applied to investigate the relationship between enrolment in FU, CU and RU.

By rule, positive, zero or negative correlation are the calculation categories of level correlative. The correlation coefficient can be interpreted by calculating based on its value as an essential spectrum of interpreting correlation coefficient [11], as shown in Table 2.

Table 2: Basic spectrum of interpreting correlation coefficient

Size of Correlations		Interpretation
$0.90 < R \leq 1.00$	$(-0.90 > R \geq -1.00)$	Very strong positive (negative) correlation
$0.70 < R \leq 0.90$	$(-0.70 > R \geq -0.90)$	Strong positive (negative) correlation
$0.50 < R \leq 0.70$	$(-0.50 > R \geq -0.70)$	Moderate positive (negative) correlation
$0.30 < R \leq 0.50$	$(-0.30 > R \geq -0.50)$	Weak positive (negative) correlation
$0.00 < R \leq 0.30$	$(0.00 > R \geq -0.30)$	Negligible correlation

For zero correlation, there is no relationship between the variables. The positive correlation means that when one variable changes, the other variables change in the same direction. In contrast, the negative correlation means that when one variable changes, the other variables change in the opposite direction. A statistical hypothesis to be tested is the null hypothesis to help make assumptions about the significance of Pearson's correlation. It can be stated as follow:

H_0: $\rho = 0$, there is no significant correlation between the number of students enrolment into particular types of Malaysian public universities.

H_1: $\rho \neq 0$, there is a significant correlation between the number of students enrolment into particular types of Malaysian public universities.

Gender Parity Index (GPI)

The Gender Parity Index (GPI) was used to measure the relative access to education of gender in Malaysian public universities. The GPI of the Gross Enrolment Ratio (GER) for each level of education is used to standardise the effects of the population structure of the students enrolled in Malaysian Public Universities. To calculate the GER, one must first determine the population of the age for undergraduate enrolment by reference to the theoretical starting ages of the enrolment. Then, the students enrolled are divided by the official age population for that education level, and the result is multiplied by 100. The GER for males and females are calculated separately were the data obtained from the MoHE (Ministry of Higher Education) website. The GPI is then calculated by dividing the female GER by the male GER:

$$\text{GPI} = \frac{\text{female Gross Enrolment Ratio}}{\text{male Gross Enrolment Ratio}}$$

A GPI of 1 indicates parity between the genders; a GPI that varies between 0 and 1 typically means a disparity in males, whereas a GPI greater than 1 indicates a disparity favouring females [39].

t-test

A t-test is a statistical test used to compare the means of two groups. It is often used in hypothesis testing to determine whether a process or treatment affects the population of interest or whether two groups are different [28].

The independent t-test (two-sample t-test) was used to determine the significant difference between the mean of undergraduate enrolment in STEM and non-STEM fields of study, and then perform a one-tailed t-test to know whether one population mean was greater than or less than the other. A t-test allows us to compare the average values of the two data sets and determine if they came from the same population. The t-test can be written as below:

$$t = \frac{\bar{x}_1 - \bar{x}_2}{\sqrt{s^2\left(\frac{1}{n_1} + \frac{1}{n_2}\right)}}$$

where:

t = t-value

$\bar{x}_1, \bar{x}_2$ = means of the two groups being compared

s^2 = pooled standard error of the two groups

n_1, n_2 = numbers of observations in each of the groups

The outcome of the t-test produces the t-value. This calculated t-value is then compared against a value obtained from a critical value table (called the T-Distribution Table). This comparison helps determine the effect of chance alone on the difference and whether the difference is outside that chance range.

RESULTS AND DISCUSSIONS

Undergraduate Enrolment of RU, FU and CU

Shapiro-Wilk Test

The Shapiro-Wilk test is a statistical test used to check whether or not a continuous variable follows a normal distribution. The null hypothesis (H_0) states that the variable is normally distributed, and the alternative hypothesis (H_1) states that the variable is NOT normally distributed.

Use the R Programming to test the normality of the data of research universities (RU), focused universities (FU) and comprehensive universities (CU) starting from 2012 to 2020.

Table 3: Result of Shapiro-Wilk normality test RU, FU and CU

Universities	W value	p-value
RU	0.92558	0.4404
FU	0.93681	0.5487
CU	0.90169	0.2620

In Table 3, the p-value equals 0.4404 from the normality test of RU, 0.262 from the normality test of CU, and 0.5487 from the normality test of FU. Since the p-value from the normality tests of RU, CU and FU is greater than 0.05, the normality assumption is acceptable.

ANOVA Test

Using the ANOVA test to analyse the undergraduate enrolment for research RU, FU and CU starting from 2012 to 2020. Below is the table of the undergraduate enrolment numbers in the three types of public universities. The data is recorded from the MoHE (Ministry of Higher Education) website.

Figure 1 shows the undergraduate enrolment numbers from 2012 to 2020 are 198,542 in research universities, 367,416 in comprehensive universities, and 279,878 in focus universities. There is the highest undergraduate enrolment in comprehensive universities for all years.

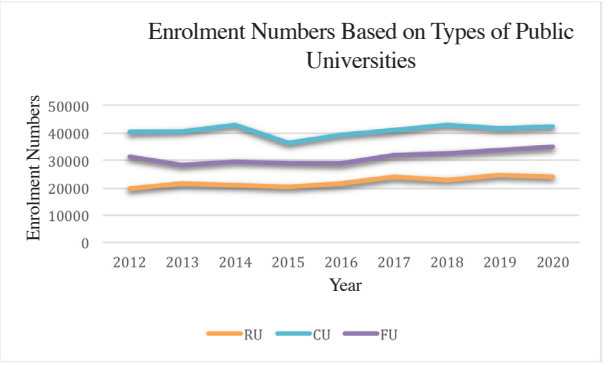

Figure 1: The undergraduate enrolment numbers in the three types of public universities

A hypothesis stated is to be tested which is to determine the mean difference among the undergraduate enrolment for three different categories of Malaysian public universities at $\alpha = 0.05$:

H_0: $\mu_1 = \mu_2 = \mu_3$. (There is no mean difference between the undergraduate enrolment for three different categories of Malaysian public universities).

H_1: μ_i not all are equal. (There is at least one mean difference between the undergraduate enrolment for three different categories of Malaysian public universities).

The ANOVA result table showed in Table 4. It shows that the F (F-ratio) value is 214.3981 and the total value of SS (Sum of Squares) is 1673787155.

Table 4: ANOVA result table

Sources of Variation	Sum of Squares (SS)	Degrees of Freedom (d.f)	Mean Sum of Square (MS)	F-ratio (F)
Treatment	1585069768	2	792534884	214.3981
Error	88717387.09	24	3696557.8	
Total	**1673787155**			

The critical region of size $\alpha = 0.05$ is given by $F_{tab} = F_{0.05}(2,24) = 3.40$. Reject the H_0 since the $F_{cal} > F_{tab}$, i.e. $214.3981 > 3.40$. There is enough evidence to conclude that at least one mean difference between the undergraduate enrolment for three different categories of Malaysian public universities.

t-test

The t-test was also used to investigate which means the group was different. There are three mean groups to investigate: RU to CU, RU to FU and FU to CU. The results are shown in Table 5.

Table 5: Two-sample t-test of three mean groups

Universities Categories	t-value	p-value
RU to CU	-20.444	6.82×10^{-13}
RU to FU	-9.244	8.106×10^{-8}
FU to CU	-9.3212	7.238×10^{-8}

RU to CU mean group shows the t-value is equal to -20.444 and the p-value equal to 6.82×10^{-13}. RU to FU mean group shows the t-value equals -9.244 and the p-value equals 8.106×10^{-8} . FU to CU mean group shows the t-value equals -9.3212 and the p-value equals 7.238×10^{-8}.

Since the p-value of all mean groups is lower than 0.05, there is a mean difference between the undergraduate enrolment for three different categories of Malaysian public universities to each other.

Pearson Correlation Coefficient

The Pearson Correlation test is then applied to investigate the relationship between undergraduate enrolment in FU, CU and RU. The result of Correlation Coefficients showed in Table 6.

Table 6: Correlation coefficients and p-value for enrolments relationships between FU, CU and RU

	Correlation Coefficients		
University Categories	**FU**	**CU**	**RU**
FU	-	0.5306624 (0.1416)	0.7540375 (0.01892)
CU	0.5306624 (0.1416)	-	0.5024328 (0.1681)
RU	0.7540375 (0.01892)	0.5024328 (0.1681)	-

( ): p-value

There is a strong positive correlation between enrolment in research universities and comprehensive universities from 2012 to 2020. It showed that RU and CU undergraduate enrolment move in the same direction. The R-value of 0.5024328 indicated a moderate positive correlation but there is no significant relationship at $\alpha = 0.05$ with a p-value of 0.1681 (p-value > 0.05).

The table shows a moderate positive correlation between comprehensive universities and focused universities from 2012 to 2020, where the enrolment in CU and FU moved in the same direction. The R-value is 0.5306624 but there is no significant relationship at $\alpha = 0.05$ with a p-value of 0.1416 (p-value > 0.05).

A strong positive correlation between focused universities and research universities from 2012 to 2020 is also shown in Table 5. The R-value is 0.7540375. There is a significant relationship at $\alpha = 0.05$ with a p-value of 0.01892 (p-value < 0.05).

Since the p-value of RU to CU and CU to FU groups are higher than 0.05, there is less confidence in showing a strong positive correlation between enrolment in RU and CU, and there is a moderate positive correlation between enrolment CU and FU, so the H_0 is accepted. While the p-value of the FU to CU group is lower than 0.05, H_0 is rejected. A strong positive correlation exists between focused universities and research universities from 2012 to 2020.

Difference between Gender of Undergraduate Enrolment

Gender Parity Index (GPI)

The Gender Parity Index (GPI) was used to measure the relative access to education of gender in Malaysian public universities.

Below is the table of the undergraduate enrolment numbers in the three types of public universities. The data is recorded from the Ministry of Higher Education (MoHE) website.

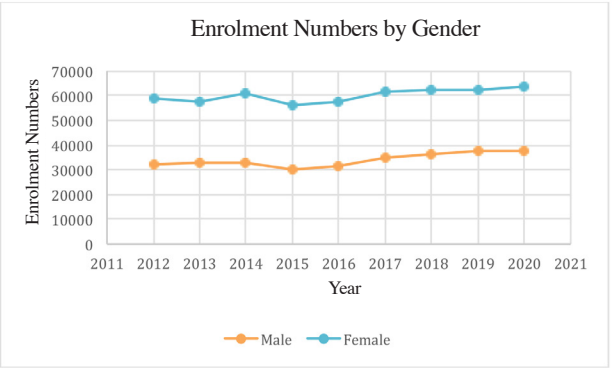

Figure 2: The undergraduate enrolment numbers in Malaysian public universities by gender

From Figure 2, the undergraduate enrolment of males and females in Malaysian public universities from 2012 to 2020 are 305021 and 540815, respectively. Below is the table of the total population of the official age for the undergraduate by gender. The estimated data is recorded from the Macrotrends.net website [19]. From Table 7, the total population with official age for the undergraduate males and females from 2012 to 2020 are 2473991 and 2333955, respectively.

Table 7: The total population of the official age (age 19) for the undergraduate by gender (estimate) from Macrotrends

Year	Male	Female
2012	269239	253999
2013	272622	257191
2014	274303	258777
2015	275952	260332
2016	277607	261894
2017	279172	263369
2018	280547	264668
2019	275285	259703
2020	269264	254022
Grand Total	**2473991**	**2333955**

To calculate the GER, one must first determine the population of the age for undergraduate enrolment by reference to the theoretical starting ages of the enrolment. Then, the students enrolled are divided by the official age population for that education level and the result is multiplied by 100.

Table 8: GER for males from 2012 to 2020

Year	Male (Undergraduate Enrolment)	Male (Total)	GER (%)
2012	31883	269239	11.8419
2013	33011	272622	12.10871
2014	32751	274303	11.93972
2015	29845	275952	10.81529
2016	31665	277607	11.40641
2017	34790	279172	12.46185
2018	35992	280547	12.82922
2019	37562	275285	13.64477
2020	37522	269264	13.93502
Grand Total	**305021**	**2473991**	**12.32911**

From Table 8, the total of males from 2012 to 2020 is 2473991 and the undergraduate enrolment is 305021. Around 12.33% of males (male GER) are undergraduates in Malaysian public universities.

From Table 9, the total of females from 2012 to 2020 is 2333955 and the undergraduate enrolment is 540815. Around 23.17% of females (female GER) are undergraduates in Malaysian public universities.

Table 9: GER for females from 2012 to 2020

Year	Female (Undergraduate Enrolment)	Female (Total)	GER (%)
2012	59059	253999	23.25167
2013	57289	257191	22.27489
2014	60771	258777	23.48393
2015	55858	260332	21.45645
2016	57684	261894	22.02571
2017	61693	263369	23.42455
2018	62613	264668	23.65719
2019	62269	259703	23.977
2020	63579	254022	25.02893
Grand Total	**540815**	**2333955**	**23.17161**

The GPI is then calculated by dividing the female GER by the male GER:

$$\text{GPI} = \frac{\text{female Gross Enrolment Ratio}}{\text{male Gross Enrolment Ratio}}$$

Figure 3 shows that the GPI in 2012 was 1.964 and decreased to 1.840 in 2013. However, there was a high increase in 2014, the GPI was 1.967 and it still slightly increased to 1.984 in 2015. The GPI decreased yearly from 2016 to 2019 and the GPI in 2019 was 1.757. In 2020, the GPI had increased slightly to 1.796. Since the GPI is higher than 1, thus, concluded that there is a disparity in favour of females to the undergraduate enrolment in Malaysian public universities.

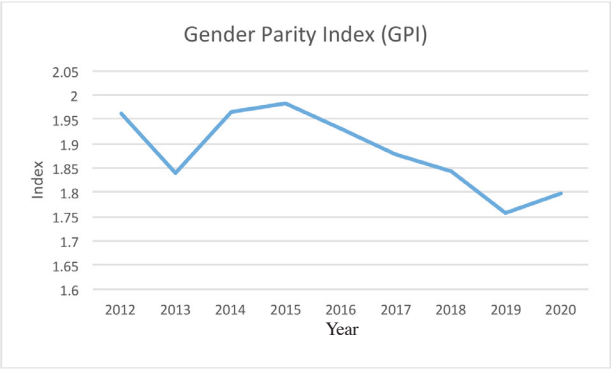

Figure 3: Graph of GPI to year

Mean Difference between STEM and Non-STEM

Shapiro-Wilk Test

The Shapiro-Wilk test is a statistical test used to check whether or not a continuous variable follows a normal distribution. The null hypothesis (H_0) states that the variable is normally distributed and the alternative hypothesis (H_1) states that the variable is NOT normally distributed.

Use the R Programming to test the normality of the undergraduate enrolment data in public universities based on the field of study.

Table 10: Result of Shapiro-Wilk normality test based on the field of study

Field of Study	W value	p-value
STEM	0.92842	0.4665
Non-STEM	0.9104	0.3187

Table 10 shows that the p-value of STEM and non-STEM are 0.4665 and 0.3187, respectively. Since the p-values from normality tests of STEM and non-STEM are greater than 0.05, and the normality assumption is acceptable.

t-test

The table below shows the undergraduate enrolment in public universities based on the field of study. The data is recorded from the MoHE website.

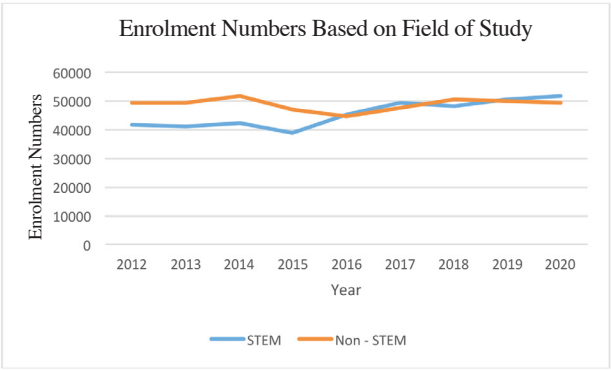

Figure 4: The undergraduate enrolment numbers in Malaysian public universities based on the field of study

In Figure 4, the total undergraduate enrolment numbers in Malaysian public universities for STEM and non-STEM from 2012 to 2020 are 407179 and 438657, respectively. The independent t-test (two-sample t-test) was used to determine the significant difference between the mean of undergraduate enrolment in STEM and non-STEM fields of study, and then perform a one-tailed t-test to know whether one population mean was greater than or less than the other. A t-test allows us to compare the average values of the two data sets and determine if they came from the same population.

Table 11: t-test

t-test				
Field of Study	**p-value**	**Mean**	**t-value**	**D.f**
STEM	0.05736	45242.11	-2.0478	16
Non-STEM		48739.67		

Table 11 shows that the t-value is equal to -2.0478 and the p-value is equal to 0.05736. There is a mean difference in undergraduate enrolment between STEM and non-STEM fields of study at the p-value equal to 0.05736 with $\alpha = 0.10$ (10% significance level). This finding was parallel to [34], where student enrolment in STEM decreased yearly and less than enrolment in non-STEM fields.

CONCLUSION

The government is committed to making Malaysia a regional hub for higher education by ensuring excellence in service and quality. Undergraduate enrolment in science fields in Malaysian public universities has recently been declining. Therefore, this study focused on analysing the trend of three different categories of undergraduate enrolment in Malaysian public universities, which are research universities (RU), focused universities (FU) and comprehensive universities (CU). As a result, it was found that at least one mean difference between the undergraduate enrolments for three different categories of Malaysian public universities. There was a significant strong positive correlation between RU and FU. Furthermore, there was a significant mean difference in enrolment between STEM and non-STEM fields of study in Malaysian public universities. It also can be concluded that there is a disparity in favour of females to the undergraduate enrolment in Malaysian public universities where females' enrolment is always more than males' throughout this study period. Through this statistical analysis, there is a need to improve the quantity and quality of inputs

and outputs data of public universities in Malaysia. The analysis of the factors affecting student enrolment can be done in future. Regarding the issue of fewer male students and those taking up the stem field, awareness campaigns need to be fostered from primary school. This campaign is not only through lectures to students but more about activities that can open students to make it important to enter the stem field, especially male students. One of the activities that may attract interest is short-term programs made outside of school.

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