



**UTM**  
UNIVERSITI TEKNOLOGI MALAYSIA

**SCHOOL OF COMPUTING**  
Faculty of Engineering

## Assignment 4

**SECP 1513**  
**TECHNOLOGY AND INFORMATION SYSTEMS**  
**SECTION 11**

Title : Number of Students In Higher Education Institutions Malaysia By  
Type of Institutions And Sex (2000 - 2020)

<b>NO.</b>	<b>NAME</b>	<b>NO. MATRIC</b>	<b>TASK</b>
1.	GAN HENG LAI (Leader)	A21EC0176	Distribution of work, Reorganize the data
2.	HENG XING YU (Member)	A21EC0183	Analysis of the results for data visualization
3.	CHONG JING WEN (Member)	A21EC0170	Describe trends of data analytics
4.	OOI JOO YEE (Member)	A21EC0218	Describe Industrial Talk 7 and Narrative of analytics

## **Trends of data analytics**

Nowadays, a high-value and quality business needs to have an abundance of high-quality data to run. The data needed is huge and complex. Information will generate the data discovered, prepare the data needed with some blending of different data. Automation trends are suitable for financial services, traveling and hospitality. Automation can shorten data scientist's 70 to 80% time that they use to prepare the information. There are three elements for data automation that are extract, transform and load. Extract is the process of extracting the data from the devices. Transform is the process of changing the data to the important part, the useful information will be selected while the unusual information will be ignored. Load is the process of loading the data from the first devices transferred into the final device or systems.

Artificial intelligence is also a trend for data analytics. Artificial intelligence is the invention of scientists aiming to act like a human. AI and machines will help humans solve some critical or inconvenient problems, it will interact with our data, systems and hence, human security also needs to be considered. For instance, a business needs to have a lot of information to run and check frequently to avoid the machine going wrong. AI can help to check at every second and give notification and warning when there are problems. Besides, AI will learn itself when the systems authority allows it to make future predictions on their own based on the previous learned data.

## **Reflection**

Data has exploded in this era of globalization, and it needs data analytics to deal with it. Data analytics must solve the information, dashboards, and reporting. Data analytics is a process of analyzing raw datasets to derive a conclusion regarding the information held. Through trends of data analytics, business companies can improve analysis by telling and presenting their data story and make high-quality products and datas for the society. Humans' lives will become more simple and convenient since automation and artificial intelligence (AI) will really appear in reality. Humans will look forward to the more analyzed data and move away from the traditional technology.

# Industrial Talk 7: Introduction to Data Visualization (iCEP)

## Introduction

Information can be visualized to provide a specific insight by using different ways. We need to analyze our data before we can visualize the data and pass it to our own messages by using pie charts, bar charts, etc.

We can separate the data into 4 types which is:

1. Quantitative- Data is numerical and it can be measured or counted.
2. Discrete- Data is numerical but it has a finite number of possible values.
3. Continuous-The data is measured and it has a value within a range.
4. Categorical- Data can be stored in category or in group

There are 7 types of data relationship:

1. Nominal comparison- Having a simple comparison of quantitative value of subcategories
2. Time series- The data changes in values of a consistent metric over time
3. Correlation- Two or more variables can be visualized with positive or negative correlation
4. Ranking- Two or more products compare with each other
5. Deviation- Examining how data points relate to each other
6. Distribution- Shows the data distribution, usually around a central value
7. Part-to-whole relationship- Displays a subset compared to the larger whole.

There are 6 chart types that can be used in visualizing data

1. Bar chart
  - Showing the change over time and doing comparison easily
  - Horizontal- usually used for data with long categories
  - Vertical- usually used for chronological data/ visualizing positive or negative data
2. Pie chart
  - Making portion to whole comparison with continuous data
  - Showing amount and percentage so it is suitable for small data types
  - Standard- show part-to-whole relationship
  - Donut- having total value or design element in the center of donut chart

3. Line chart
  - Showing the time series relationship with continuous data
  - Always use in showing acceleration, deceleration, trend, volatility
4. Scatter Plot chart
  - Showing relationship between two sets of variables
  - More suitable for large amount of data
5. Bubble chart
  - Good to display nominal comparison or ranking relationship
  - Bubble plot- display additional variable
  - Bubble map- visualize values for specific regions
6. Heat map variations
  - Used to display categorical data by using the intensity of color to represent values based on geographical areas

### **Microsoft Power BI**

- Focus on three points
  1. Report
  2. Data
  3. Modelling site
- Creating relationship between table and table which is modelling
- Do not do when visualizing data
  1. Use high contrast color
  2. Use more than six colors in a single layout because it will distract customer for reading data
  3. Use distracting fonts
- Focusing on the result and reading of data

## **Reflection**

After participating in the talk, I understand that the requirements of every customer are different and we need to provide different data visualization designs based on their demand to let them more understanding about their data. Microsoft Power BI is good to do data visualization but we need to use the correct format and chart types. Then, we can transform the data into the chart and modelling before presenting it to our customer and also management personnel. When the data is more categorical, it is easier to compare such as using pie charts. We can compare based on the years, product, and the data with competitors to improve the problem and become better.

# **Narrative of the Analytics**

## **Introduction**

Microsoft Power BI is a platform that provides a service for users to analyze, visualize and share their data. Microsoft Power BI is usually used to observe the organization's data as it can help us to separate the data types, connect, transform and clean the data. After that, the data can be modelled and created charts or graphs to visualize data. Microsoft Power BI can also provide an executive dashboard for managers or administrative staff to understand and observe the data. So, in this assignment, we are asked to analyze and visualize data. Therefore, we learned how to use Microsoft Power BI and visualize our selected data successfully.

Our chosen data is "Number of Students in Higher Education Institutions by Type of Institutions and Sex in Malaysia from 2000 to 2020". So, in this data, we have four data variables which is year, sex, type of institution. Meanwhile, we separate the type of institution into two parts which are private and public. Private included polytechnics and private higher education institutions while public included public university and teacher education institute.

## **Are people paying more and more attention to education?**

Education was often neglected in the previous society. Because people think that children can work and earn money is more important than reading, so fewer people receive higher education, but the society is constantly changing, and the need for more intellectuals. Through data, we can analyze whether more people have received higher education across 20 years.

## **Which university is more preferred? Private Higher Education or Public Higher Education?**

There are many differences between government universities and private universities, such as prices, teaching methods, etc., so we can look at the data to analyze the number of students in different types of higher education institutions in the past 20 years.

Through our data analysis, we have observed that the number of students receiving higher education has been on the rise since 2000. Although there may have been some decline in the past few years, we can see that the number of students has increased significantly over the past

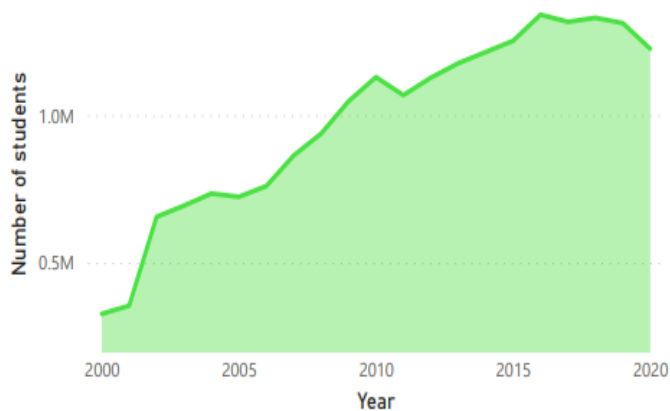
20 years. There are more and more people receiving higher education and more intellectuals appear in Malaysia. That means this is a good result for Malaysia.

We can see that the number of students who chose private institutions of higher learning was 0 in 2000, and then slowly increased. From 2011 to 2020, the number of students in private institutions of higher learning has also remained at 400,000 to 700,000, which has increased a lot compared to the previous period. For polytechnics, the number of students remains in the range of 30,000 and 60,000 as polytechnics do not have a big rise like private institutions, and increase at a slow rate.

On the contrary, the number of students choosing government institutions of higher learning has been on the rise since 2000. It has dropped a bit since 2013, but the number of students has increased again after 2016. Teacher education institute has a smooth data from 2000 until 2020 although it started to decrease from 2013 but the number of students is still in the range. So, if you want to compare, in 2000, there were more students in government institutions of higher learning. In 2020, the number of government institutions of higher learning will be slightly larger than that of private institutions of higher learning. However, we can see that the number of students who choose to accept private institutions of higher learning is constantly increasing.

## **Data Analysis**

Number of students by Year



-The type of data analytics for this data analytics is descriptive analytics.

-At year 2016, the number of students is the highest which is 1342278 and the number of students is the lowest which is 325741 at year 2000.

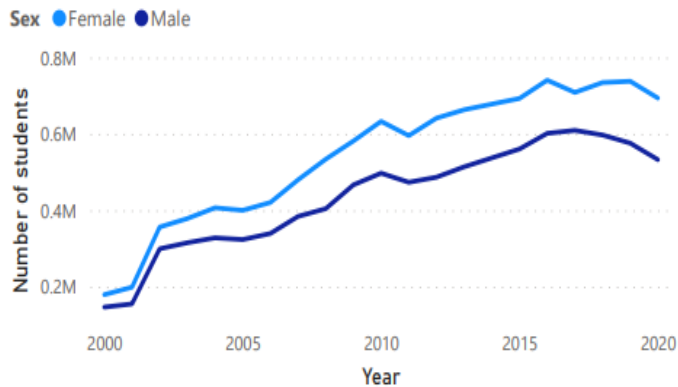
-Number of students at year 2016 is 312.07% higher than number of students at year 2000.

-Across all 20 years, the range of number of students is 325741 to 1342278.

-From year 2018 to year 2020, the number of student is decreasing. This happened because of declining population and pandemic pressures. Besides, Many of the teenagers are open minded and they are more willing to try to start a business.

-Overall, the number of students increased from year 2000 to year 2020. This is because there are more and more universities and the admission requirements become lower compared to before.

### Number of students by Year and Sex



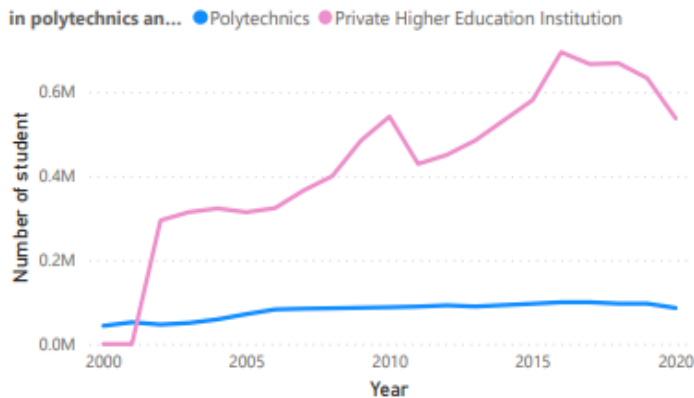
-The type of data analytics for this data analytics is descriptive analytics.

-Total number of students is higher for female (10777032) than male (8610406). This is because the university system is more suitable for female. For example, most of the female have more delicate thoughts than male. Besides, some of the course is more suitable to female like nurse, teacher and etc.

-Average number of students is higher for female (538852) than male (430520). This represents many of the male are more willing to have a job compared to go to university. Moreover, university can guarantee the future of female.

-Number of students for female and male diverged the most when the year is 2019, when female is 162038 higher than male.

### Number of student by Year and in polytechnics and private higher education institution



-From the data, we can see that the number of students in private higher education institutions increases from 2000 until 2010 with 541629 students.

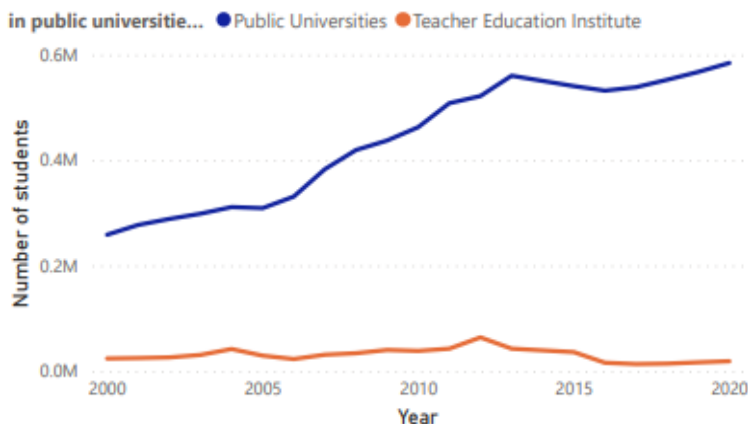
- It fallback to 428973 in 2011 and jumped to 695026 in 2016. The number of students starts to go down in the next four years until 537434 in 2020.

- We can see a slow rise in the number of students entering the polytechnics from 2000 to 2020.

- The significant increase in enrollment is because modern technology is becoming more advanced, and society needs many intellectuals. As a result, people are becoming more affluent, and more and more people are joining universities in private institutions.

- The number of students in polytechnics has not increased because

### Number of students by Year and in public universities and teacher education institute



- The number of students entering the public universities ascended until 2013 with 560359 students and decreased to 532049 students in 2016. It starts to rise until 584576 in 2020.

- For teacher education institutions, the number of students floated from 2000 until 2020 and maintained an average of 28740 students from 2000 to 2020.

- More and more students enter public universities as they realize the significance of higher education to them.

- While the number of students in teacher education institutions is not getting increased because teachers' work is too strenuous to take on a lot of responsibility, and there is no significant increase in salary.

## **Conclusion**

The conclusion is that according to our data analysis, the number of people receiving higher education has increased, whether it is male or female, or whether it is a government institution of higher learning or a private institution of higher learning. Learning new knowledge is very important, so if you have the opportunity, you must receive higher education.

In addition, Microsoft Power BI brings us a lot of convenience in analyzing, visualizing and modelling data, making our data analysis easier and less error-prone. Microsoft Power BI has many different types of charts so we can model our data by using a suitable chart. When looking at the chart, it is also easy to make comparisons and see the differences between the data because we can easily see the rise and fall in the chart, so that we can better understand the data we choose, and make analysis and conclusions to get better results.

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