Assessing the Awareness of Engineering Students at President University towards Massive Open Online Course (MOOC)

Anastasia Lidya Maukar[1], Jean Hillary P Korua[1], Herwan Yusmira[1]
[1]Faculty of Engineering, Industrial Engineering Department, President University
Jl. Ki Hajar Dewantara
Kota Jababeka,Cikarang, Bekasi - Indonesia 17550
Email: almaukar@president.ac.id, jean.korua@student.president.ac.id, herwan.yusmira@ president.ac.id

ABSTRACT

The COVID-19 pandemic impacted many aspects, including the global higher education sector. All the lectures had to be done online. MOOC platforms are mainly used to support the online learning system because it can be accessed online (open) and allow many participants (massive) to learn from top universities worldwide. The COVID-19 pandemic at President University is similar to the other universities. To boost the online learning activity, President University partnered with Coursera and provided free courses that have existed for over two years. It is needed to assess if students use the facility provided by the university or not by measuring the level of awareness towards MOOC. The main objective of this research is to assess the awareness of engineering students at President University towards MOOC. The data are collected using a questionnaire. The steps of doing this research are designing a questionnaire, doing cluster sampling, distributing questionnaires, descriptive statistics, validity and reliability tests, clustering analyses, cross-tabulation analyses, and making conclusions. Respondents are grouped into three clusters based on their answers to Likert-scale questions. Cluster 1 has the lowest awareness of MOOC (never took a course, used 1 platform), cluster 2 has medium level of awareness of MOOC (never took the course but knows at least 1 platform), and Cluster 3 has the highest awareness of MOOC (taken 1-3 courses, spent at least 1 hour on courses).

Keywords: COVID-19, Information and Communication Technology, Online Learning, Massive Open Online Course (MOOC), Cluster Sampling, Cluster Analysis, Crosstab Analysis

ABSTRAK

Pandemi COVID-19 berdampak pada banyak aspek termasuk sektor pendidikan tinggi global. Semua kuliah harus dilakukan secara online. Platform MOOC terutama digunakan untuk mendukung sistem pembelajaran online karena dapat diakses secara online (terbuka) dan memungkinkan banyak peserta (massive) untuk belajar dari universitas terkemuka di seluruh dunia. Situasi pandemi COVID-19 di President University mirip dengan universitas lain. Untuk mendongkrak aktivitas pembelajaran online, President University menjalin kerja sama dengan Coursera dan memberikan kursus gratis yang sudah ada selama lebih dari 2 tahun. Perlu menilai apakah mahasiswa menggunakan fasilitas yang disediakan oleh universitas atau tidak dengan mengukur tingkat kesadaran terhadap MOOC. Tujuan utama dari penelitian ini adalah untuk menilai kesadaran mahasiswa teknik di President University terhadap MOOC. Pengumpulan data dilakukan dengan menggunakan kuesioner. Langkah-langkah dalam melakukan penelitian ini adalah merancang kuesioner, melakukan cluster sampling, menyebarkan kuesioner, statistik deskriptif, uji validitas dan reliabilitas, analisis clustering, analisis tabulasi silang, dan membuat kesimpulan. Responden dikelompokkan menjadi tiga kelompok berbeda berdasarkan jawaban mereka dalam pertanyaan skala Likert. Cluster 1 memiliki kesadaran MOOC terendah (tidak pernah mengikuti kursus, menggunakan 1 platform), cluster 2 memiliki kesadaran MOOC sedang (tidak pernah mengikuti kursus tetapi mengetahui setidaknya 1 platform), dan cluster 3 memiliki kesadaran MOOC tertinggi (diambil 1- 3 kursus, menghabiskan setidaknya 1 jam untuk kursus).

Kata kunci: COVID-19, Teknologi Informasi dan Komunikasi, Pembelajaran Online, Massive Open Online Course (MOOC), Cluster Sampling, Analisis Cluster, Analisis Crosstab

1. Introduction

Coronavirus disease 2019 (COVID-19) is first identified as pneumonia in an unknown region. It was first identified in the city of Wuhan, Hubei Province, China, in December 2019 (Guan et al., 2020). The outbreak of COVID-19

is spreading rapidly all over the world, not only in China. Hence, the World Health Organization (WHO) announced it as pandemic on March 12 2020. COVID-19 pandemic had impacts on many aspects. This pandemic requires us to do social distancing and keep away from crowds to avoid the spread of the virus. Besides the social distancing rule, society must also get used to washing hands and always wear masks to protect and help prevent the deployment of viruses (J. Singh & Singh, 2020). In Indonesia, there are many policies that the government made to control the spread of COVID-19. One policy is staying at home, which makes online platforms very important. In the global higher education sector, COVID-19 has had a broad impact. The video conferencing tools such as Zoom and Google Meet became very popular because the scheduled on-class lecturers were mainly presented through live streaming using those platforms (Almendingen et al., 2021).

The technology of online learning, which is now a basic need of modern civilization, is also a provider of affordable and practical information and even a provider of courses at a professional level and degrees in education instead of attending offline classes traditionally (Bransford et al., 2008). In the past, the activity that was included in online learning was using LMS or uploading pdfs and text to the internet (Singh & Thurman, 2019). The types of online learning are e-learning, blended learning, constructivism, and learner-centred learning environment (Ratheeswari, 2018). With technological development in the current era, ICT can be used by teachers and lecturers to restructure the programs in education and facilities of the classroom to reduce the technological gap in teaching and learning between today and the future. Proper use of ICT in teaching activities changes the learning environment that was initially teacher-centred to become student-centred (Luhamya et al., 2017).

Popular MOOC platforms such as Coursera, edX, FutureLearn, etc., have established their trademark in the field of higher education and courses that improve competency with various subject disciplines (Purkayastha & Sinha, 2021). According to Ding & Liu (2019), MOOC's advantages are a perfect design for teaching online courses, improving the experience in real-time and interactive learning, and providing an effective mixed mechanism of job evaluation. According to Guo (2017), the disadvantages of MOOC are its return rate is higher than traditional way, excessive number of students, and authority of the credits and certificates of some MOOC cannot be used to reduce elective courses credits.

In Indonesia, some state universities such as Universitas Gajah Mada, Universitas Padjajaran, Universitas Indonesia, Universitas Airlangga, and Universitas Negeri Semarang has their own MOOC platform. These MOOC platforms provide courses freely and paid that everyone can access and open up opportunities for non-formal education. MOOC can enrich people's knowledge and learning sources. But, in Indonesia, the learning commitment that students have is still low, they do not complete the proposed program well (Kurniasari et al., 2018). The situation of COVID-19 pandemic in President University is similar to the other universities. To boost the online learning activity, President University partnered with one of MOOC platforms, Coursera, and provided students free courses and certificates of completion. The free courses can be accessed by making a Coursera account using the President University Student email. This partnership has existed for over 2 years, from March 2020. It is needed to assess if students use the facility provided by the university or not by measuring the level of awareness towards MOOC. In addition, the most popular MOOC providers in the world, such as Coursera, EdX from MIT and Harvard, Udacity, and Udemy, have had their business models examined (Puspitarini et al., 2021).

The main objective of this research is to identify the MOOC awareness variable applied to assess engineering students in President University and the awareness of engineering students in President University towards MOOC. The data collection is done using the questionnaire that is shared among the engineering students in President University. The total of respondents is 200 students. Each respondent is classified into a cluster using the K-Means cluster analysis. The clustering process is based on their answer to the Likert scale questions. In this report, the general characteristics of each cluster are explained.

2. Methods

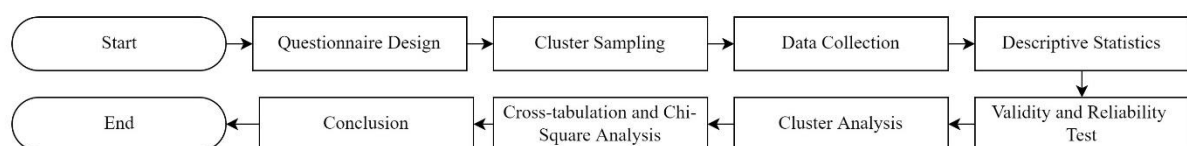Figure 1 displays the steps of performing this research.

Figure 1. Detailed Research Methodology

2.1 Questionnaire Design
A questionnaire is a collection of written questions with some choices to be used for the objective of survey or statistical study. In this research, the method used to collect the data from the respondents is by spreading the questionnaire to the engineering students at President University. Therefore, the questionnaire must be designed before distributing it to the targeted respondents. According to Malhotra & Dash (2016), there are a few questionnaire design steps. The steps are determining the required information, determining the interviewing method used, set the content of the individual question, form questions that respondents have the ability and willingness to answer, determining the structure of the questions, choosing the words used in the questions, organize the questions in the correct order, select the form and layout and pretest questionnaire to remove bugs.

2.2 Cluster Sampling
After designing the questionnaire, the next step is determining the sampling method. For this research, the sampling method used is cluster sampling. The respondents are clustered based on their majors. Because there are five majors in the faculty of Engineering at President University, the number of clusters in this research is 5. The number of populations in each cluster is based on the students' number data in each major. Before determining the number of samples needed for each cluster, a minimum number of samples is calculated using Equation 1.

$$n = \frac{N}{1+Ne^2} \tag{1}$$

The minimum number of each cluster is based on the proportion of a major with the total population. The selection of sample for each cluster is done using random sampling method. Every member of the population in each cluster can answer the questionnaire.

Data Collection
The data collection activity can be started after designing and determining the minimum number of samples and the proportion needed for each major. The questionnaire is distributed to all the engineering students in President University. The data are collected from June 15 until July 16.

2.3 Descriptive Statistics
Data analysis can be started after all the data, which are questionnaire answers from respondents already collected. The first analysis uses descriptive statistics. All the answers are summarized in form of table. Every table contains the frequency of each answer options.

2.4 Validity and Reliability Test
After the descriptive statistics, next is the test of validity and reliability for the Likert-scale questions in part 2 of the questionnaire. The validity test is done to check whether the questions are accurate or not to be used in this research. To decide the validity of a question, the base are as follows:
If r-calculation > r-table = valid
If r-calculation < r-table = invalid
The value of the r-table can be seen on Pearson Product Moment table. To see the value of r-table, the value of df needed to be known. The equation used to calculate df is as presented in Equation (2).

$$df = N - 2 \tag{2}$$

Reliability test is to check whether the answers are consistent or not. The Cronbach's Alpha value that is acceptable is 0.6 (Malholtra & Dash, 2016). The value of 0.93-0.94 described as excellent, 0.91-0.93 as strong, 0.84-0.90 as reliable, 0.81 as robust, 0.71-0.91 as good, 0.64-0.85 as adequate, 0.61-0.65 as moderate, 0.45-0.96 as sufficient, 0.4-0.55 not satisfactory, and 0.11 as low (Taber, 2018).

2.5 Cluster Analysis
After the validity and reliability test are conducted, the next analysis is cluster analysis. The K-Means cluster analysis is used in this research. The analysis classified respondents into three different clusters according to their answers in the Likert-scale question in part 2 of the questionnaire.

2.6 Cross-tabulation and Chi-Square Analysis
After the validity and reliability test are conducted, cluster analysis is next. This analysis classified respondents into 3 clusters according to their answers in the Likert-scale question in part 2 of the questionnaire. After that, a cross-tabulation analysis is conducted to know the characteristics of members in each cluster. Chi-square analysis is undertaken along with the cross-tabulation analysis to know whether the characteristic is associated with the cluster number of cases.

2.7 Characteristics Tendency (Conclusion)

After a cross-tabulation and chi-square analysis is done, the next step is identifying the characteristics of each cluster. The characteristics associated with the cluster number of cases are analyzed to see the awareness level of each cluster. Also, the characteristics tendency of each cluster is identified in this step.

3. Result and Discussion

3.1 Determination of Population and Sample
The population for this research are active batches of engineering students of President University, which are batch 2018, 2019, 2020, and 2021. The total amount of engineering students at President University is 1141 people. This data is taken from PDDikti (Pangkalan Data Pendidikan Tinggi). Table 1 displays the number of Engineering students.

Table 1. Number of Engineering Students

Major	Number of Students
Civil Engineering	119
Industrial Engineering	560
Mechanical Engineering	181
Electrical Engineering	172
Environmental Engineering	109
TOTAL	**1141**

The minimum number of samples is determined using Slovin's formula. For this research, the population (N) is 1141, and the error rate used is 10% or 0,1. The calculation of the number of samples refers to Equation (1).

$$n = \frac{N}{1 + Ne^2} = \frac{1141}{1 + (1141 \times 0,1^2)} = \frac{1141}{1 + 11,41} = \frac{1141}{12,41} = 91,94 \approx 92$$

So, the minimum number of samples needed for this research is 92 people. In doing the sampling, there is a method has to be used. For this research, the sampling method used is cluster sampling. Cluster sampling is a sampling technique with two processes to divide the population into subpopulations. Table 2 displays the minimum number of samples from each major.

Table 2. Minimum Number of Sample from Each Major

Major	Number of Students	Ratio	Minimum No. of Sample
Civil Engineering	119	0,1043	10
Industrial Engineering	560	0,4908	45
Mechanical Engineering	181	0,1586	15
Electrical Engineering	172	0,1507	14
Environmental Engineering	109	0,0955	9
TOTAL	**1141**	**1**	**92**

3.2 Questionnaire Design
The questionnaire has two main parts; Part 1 contains multiple-choice questions, and Part 2 contains questions that are answered using a Likert scale. Before filling in the questions in part 1, respondents will be asked if they are students of President University or not. If yes, they can continue to answer the questionnaire and be directed to the next section, Part 1. If not, they cannot continue to Part 1 to answer the questionnaire. This question ensures that all the respondents are students of President University. Tables 3, 4, 5, and 6 display the questions included in the questionnaire.

Table 3. Respondents' Profile

No	Questions	Answer Choices
1	Gender	Male
		Female
2	Major	Civil Engineering
		Industrial Engineering
		Mechanical Engineering
		Electrical Engineering
		Environmental Engineering
3	Batch	2018

		2019
		2020
		2021

Table 4. Technology and English Proficiency Questions

No	Questions	Answer Choices
1	Do you have smartphone?	Yes
		No
2	Do you have other gadget? What is it?	Laptop
		Computer
		I don't have
3	How do you access internet at home?	Wi-Fi
		Mobile data
		No internet
4	Where do you usually access internet?	Home
		Campus
		Other…
5	According to you, in what level is your English proficiency?	Elementary
		Intermediate
		Upper Intermediate
		Advanced

Table 5. Respondents' Usage of MOOC Usage

No.	Questions	Answer Choices
1	How many course(s) have you taken in MOOC?	None
		1 to 3
		4 to 6
		7 to 9
		10 or more
2	In a week, how long do you spend on MOOC course?	0 hours
		1 hour
		2 hours
		3 hours
		4 hours
		5 hours
		More than 5 hours
3	What MOOC platform have you ever used? (You may choose more than one)	Coursera
		edX
		FutureLearn
		Udacity
		Udemy
		MOOCs Universitas Terbuka
		IndonesiaX
		Oddo
		Canvas
		I never use MOOC platform
		Other…
4	How did you know MOOC?	Found on internet
		Recommendation from friend

| | | Recommendation from lecturer |
| | | Other… |

Table 6. Likert Scale Questions

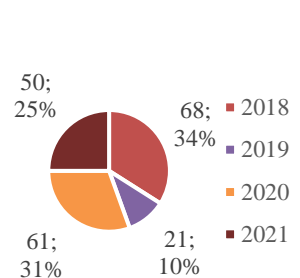| Variables	Questions
Technology Support	I have a computer that has an internet connection
	I have software to play video, MS. Office, and Adobe Acrobat on my computer.
	I have enough ability to operate a computer.
	I have an e-mail account.
	I can do virtual communication effectively.
	I am very comfortable using computer
	I can find information using the internet
Interest in Online Learning	I enjoy online learning.
	I browse materials online related to m subject.
	It is easier to understand course material if it is in the form of a video
	I enjoy watching educational videos.

Table 6. Likert Scale Questions (cont.)

Variables	Questions
Benefit of MOOC	In MOOC platform, I can choose what course I want to study
	MOOC is a booster of classroom learning
	MOOC helps me to compete in the modern job market
	MOOC helps to answer my curiosity
	MOOC helps me to understand confusing material
	MOOC gives me an opportunity to study from global mentors

For these variables, each statement have to be answered by choosing between 1 (strongly disagree), 2 (disagree), 3 (neutral), 4 (agree), and 5 (strongly agree).

3.3 Respondents' Profile

Descriptive statistics are numerical and graphical procedures that are used to arrange and explain the characteristics of samples, especially for profiles. Descriptive statistics are usually used to measure the central tendency and the scatter of scores, called dispersion or variance. Descriptive statistics is used to describe and summarized data to make it easier to read and use (Shi & McLarty, 2009).

Figure 2, Figure 3, and Figure 4 shows respondents' profiles containing information about their genders, majors, and batches.
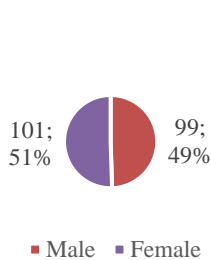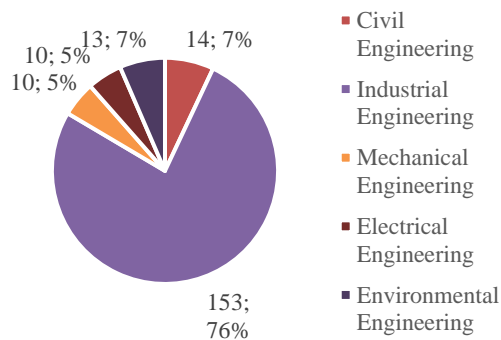
Figure 2. Gender   **Figure 3.** Major   **Figure 4.** Batch

All the respondents have gadgets and smartphones, as can be seen in Figure 5 and Figure 6.
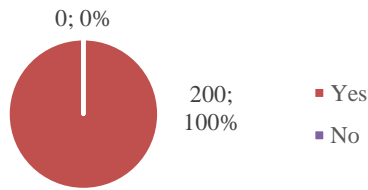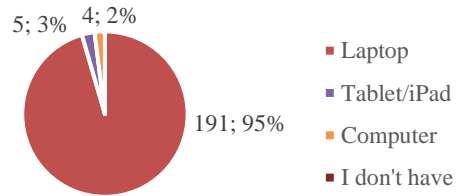
Figure 5. Smartphone Ownership

Figure 6. Gadget Ownership

As seen in Figures 7 and 8, most respondents access internet at home using Wi-Fi and all can access it.

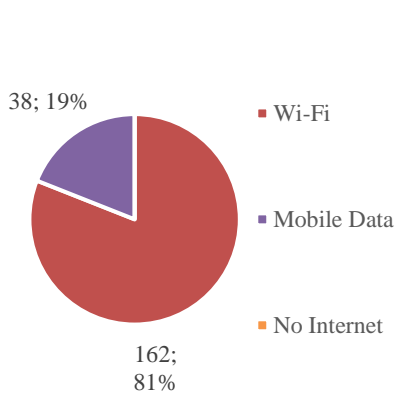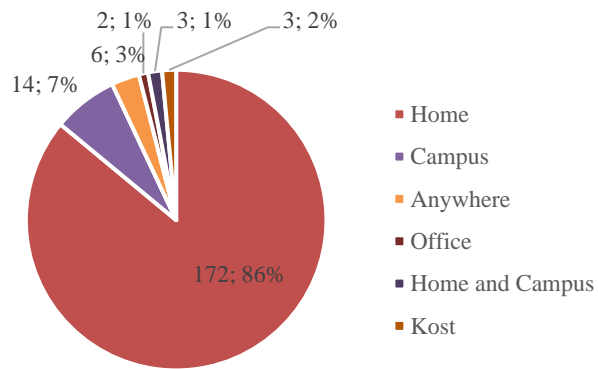**Figure 7.** Way Respondents Access Internet at Home

Figure 8. Place Respondents Access Internet

Based on Figure 9, most respondents have intermediate and higher level of English proficiency.
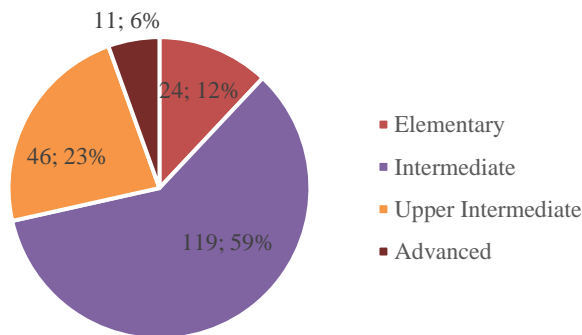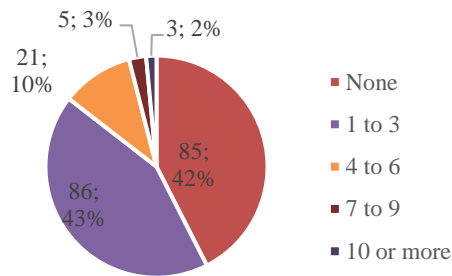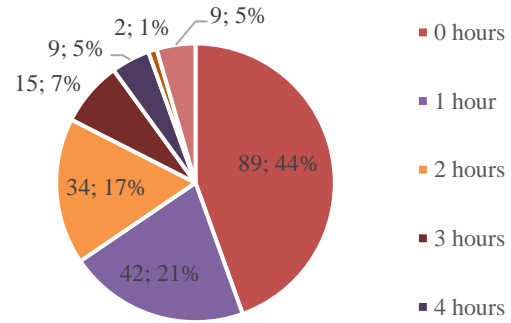

Figure 9. English Proficiency of Respondents

Based on Figure 10, most respondents have taken at least one course(s) in MOOC. Based on Figure 11, most respondents spent at least 1 hour on MOOC course(s) in a week.

Figure 10. Number of Course(s) in MOOC Respondents Have Taken

Figure 11. Time Respondents Spent on MOOC Course(s) in a Week

Figure 12 displays the MOOC platforms that respondents used. Coursera is the most popular MOOC platform because it is easy to use (Tsironis et al., 2016).
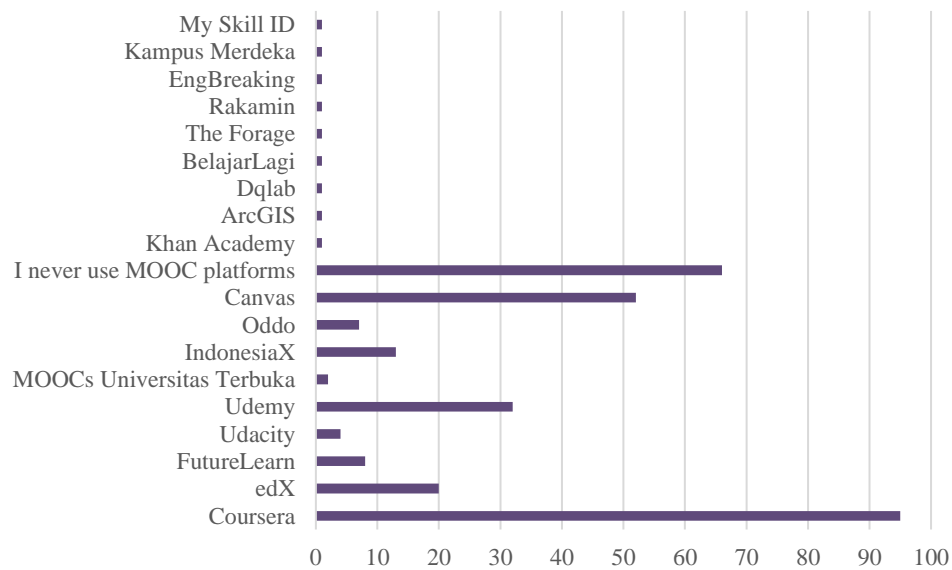
Figure 12. MOOC Platforms Respondents Used

Most respondents know MOOC from the internet, as can be seen in Figure 13.
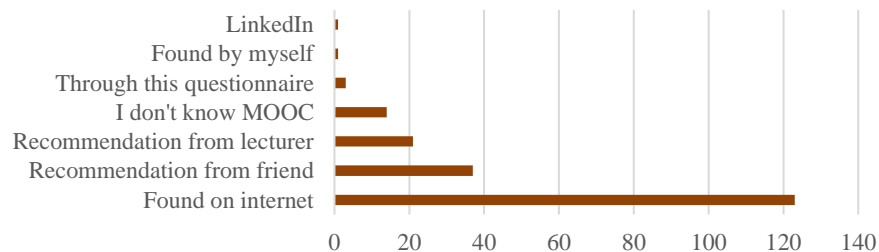
Figure 13. Source of Knowing MOOC

For Part 2 of the questionnaire (Likert-scale questions), the descriptive statistics and their evaluation level are presented in a table. The evaluation is based on the answers mean. The evaluation criteria is shown in Table 7.

Table 7. Evaluation Criteria

Mean	Likert Scale	Evaluation Criteria
1,00 - 1,79	Strongly Disagree	Very low level
1,80 - 2,59	Agree	Low level
2,60 - 3,39	Neutral	Medium level
3,40 - 4,19	Agree	High level

4,20 - 5,00	Strongly Agree	Very high level

As seen in Table 8, the overall mean of technology support is 4.31 and most respondents strongly agree with the statements given. So, it can be concluded that respondents have very high technology support.

Table 8. Technology Support

No.	Statements	SD	D	N	A	SA	Total	Mean	Std. Dev	Evaluation Level
1	I have computer that have internet connection	6	8	14	54	118	870	4,35	0,99	Very high
2	I have software to play video, Ms. Office, and Adobe Acrobat in my computer	8	3	25	53	111	856	4,28	1,01	Very high
3	I have enough ability to operate computer	9	7	22	73	89	826	4,13	1,04	High

Table 8. Technology Support (cont.)

No.	Statements	SD	D	N	A	SA	Total	Mean	Std. Dev	Evaluation Level
4	I have e-mail account	7	4	14	33	142	899	4,50	0,97	Very high
5	I can do virtual communication effectively	5	4	20	70	101	858	4,29	0,91	Very high
6	I am very comfortable in using computer	8	3	26	64	99	843	4,22	1	Very high
7	I can find information using internet	8	3	14	47	128	884	4,42	0,98	Very high
	TOTAL						6036	4,31		Very high

As seen on Table 9, the overall mean of interest in online learning part is 3.91 and most respondents are agree with statements given. So, can be concluded that respondents have high interest in online learning.

Table 9. Interest in Online Learning

No.	Statements	SD	D	N	A	SA	Total	Mean	Std. Dev	Evaluation Level
1	I enjoy online learning	7	11	68	65	49	738	3,69	1,01	High
2	I browse materials online related to my subject	7	8	20	81	84	827	4,14	0,99	High
3	It is easier to understand a material if it is in form of video	7	8	49	63	73	787	3,94	1,04	High
4	I enjoy watching educational videos	7	6	52	76	59	774	3,87	0,99	High
	TOTAL						3126	3,91		High

As seen in Table 10, the overall mean of interest in online learning is 3.86, and most respondents agree with the statements. So, it can be concluded that respondents think MOOCs give them high benefits.

Table 10. Benefit of MOOC

No.	Statements	SD	D	N	A	SA	Total	Mean	Std. Dev	Evaluation Level
1	In MOOC platform, I can choose what course I want to study	3	7	53	70	67	791	3,96	0,94	High
2	MOOC is a booster of classroom learning	2	9	68	73	48	756	3,78	0,9	High
3	MOOC helps me to compete in modern job market	3	9	68	72	48	753	3,77	0,92	High
4	MOOC helps to answer my curiosity	4	8	58	67	63	777	3,89	0,97	High
5	MOOC helps me to understand confusing material	3	12	58	72	55	764	3,82	0,96	High
6	MOOC gives me opportunity to study from global mentors	3	7	54	71	65	788	3,94	0,93	High
	TOTAL						4629	3,86		High

3.4 Validity and Reliability Test Results

Table 11 displays the comparison of r-table and r-calculation for statements in technology support. Table 12 displays the reliability analysis of technology support. The Cronbach's acceptable Alpha value is 0.6 (Malholtra & Dash, 2016). Table 11 and 12 shows that all technology support statements are valid and reliable.

Table 11. Validity Analysis Result of Technology Support

No.	r-calculation	r-table	r-calculation > r-table	Result
1	0,739	0,1166	Yes	Valid
2	0,772	0,1166	Yes	Valid
3	0,750	0,1166	Yes	Valid
4	0,804	0,1166	Yes	Valid
5	0,780	0,1166	Yes	Valid
6	0,772	0,1166	Yes	Valid
7	0,807	0,1166	Yes	Valid

Table 12. Reliability Analysis Result of Technology Support

Reliability Statistics	
Cronbach's Alpha	N of Items
0,963	7

Table 13 compares r-table and r-calculation for statements in interest in online learning. Table 14 displays the reliability analysis of interest in online learning. Tables 13 and 14 show that all interest in online learning support statements are valid and reliable.

Table 13. Validity Analysis Result of Interest in Online Learning

No.	r-calculation	r-table	r-calculation > r-table	Result
1	0,656	0,1166	Yes	Valid
2	0,765	0,1166	Yes	Valid
3	0,721	0,1166	Yes	Valid
4	0,714	0,1166	Yes	Valid

Table 14. Reliability Analysis Result of Interest in Online Learning

Reliability Statistics	
Cronbach's Alpha	N of Items
0,867	4

Table 15 compares r-table and r-calculation for statements in benefit of MOOC. Table 16 displays the reliability analysis of the benefit of MOOC. Tables 15 and 16 show that all benefits of MOOC statements are valid and reliable.

Table 15. Validity Analysis Result of Benefit of MOOC

No.	r-calculation	r-table	r-calculation > r-table	Result
1	0,736	0,1166	Yes	Valid
2	0,717	0,1166	Yes	Valid
3	0,704	0,1166	Yes	Valid
4	0,731	0,1166	Yes	Valid
5	0,689	0,1166	Yes	Valid
6	0,756	0,1166	Yes	Valid

Table 16. Reliability Analysis Result of Benefit of MOOC

Reliability Statistics	
Cronbach's Alpha	N of Items
0,942	6

3.5 Cluster Analysis

In this research, the 200 respondents will be classified into 3 clusters. The clustering analysis is based on their answer in the part 2 questionnaire, Likert-scale questions. Table 17 displays the summary of cluster analysis that includes the number of member, Likert mean, Likert scale, and evaluation level of each cluster.

Table 17. Summary of Cluster Analysis

Cluster	No. of Member	Likert Mean	Likert Scale	Evaluation Level
1	12	1,99	Disagree	Low
2	93	3,81	Agree	High
3	95	4,56	Strongly Agree	Very High

3.6 Crosstab and Chi-Square Analysis

Cross-tabulation is a statistical technique that describes two or more variables simultaneously and generates a table that describes the category of two or more variables with a limited number of categories or values. The Chi-Square test is also conducted to examine whether there is an association between the two variables. The hypothesis of Chi-Square statistics are: H_0 = Variable 1 and 2 have no association and H_1 = Variable 1 and 2 have an association. If the value of the test statistic is higher than the critical value of chi-square distribution, then H_0 is accepted and H_1 is rejected. If the value of the test statistic is equal to or smaller than the critical value of chi-square distribution, then H_1 is accepted and H_0 is rejected.

Table 18. Crosstab Analysis Summary

No	Characteristic	Asymptotic Significance (2-sided)	Association with Cluster Number of Case
1	Major	0,339	No
2	Batch	0,491	No
3	English Proficiency	0,036	Yes
4	Number of Couse(s) in MOOC Respondents Have Taken	0,003	Yes
5	Time Respondents Spent on MOOC Courses in a Week	0,001	Yes
6	Number of MOOC Platforms Respondents Have Used	0,005	Yes
7	Source of Knowing MOOC	0,061	No

3.7 Characteristics Tendency of Each Cluster

Characteristics tendency of each cluster can performed by doing cross tabulation analysis. Table 19 summarises the the characteristics tendency of clusters 1, 2, and 3.

Table 19. Characteristics Tendency of Each Cluster

Characteristic Tendency	Cluster		
	1	2	3
Male	X	X	
Female			X
Industrial Engineering	X	X	X
Batch 2018	X		X
Batch 2021		X	
Have laptop	X	X	X
Use Wi-Fi	X	X	X
Access internet at home	X	X	X
Never take course in MOOC	X	X	
Have taken 1-3 courses			X
Spent 0 hours on MOOC course(s)	X	X	
Spent at least 1 hour on MOOC course(s)			X
Used 1 MOOC platform	X		

Used at least 1 MOOC platform			X	X
Intermediate English proficiency		X	X	X
Knows MOOC from internet		X	X	X

As seen in Table 19, Clusters 1 and 2 are dominated by males and cluster 3 by females. Most members of Clusters 1 and 3 are majoring in Industrial Engineering from batch 2018, and most members of Cluster 2 are majoring in Industrial Engineering from batch 2021. Most members of clusters 1, 2, and 3 have a laptop, use Wi-Fi to access the internet at home, and usually access the internet at home. The main difference between clusters 1, 2, and 3 is the number of course(s) they have taken, the time they spent on MOOC course(s), and the number of the platform(s) they have ever used. Most members in cluster 1 never took a course in MOOC, spent 0 hours on MOOC course(s), and have ever used 1 MOOC platform. Most members in cluster 2 never took a course in MOOC, spent 0 hours on MOOC course(s), but have ever used at least 1 MOOC platform. Most members in cluster 3 have taken 1-3 course(s) in MOOC, spent at least 1 hour on MOOC course(s), and used at least 1 MOOC platform. This means cluster 1 has the lowest awareness level, cluster 2 has the medium awareness level, and Cluster 3 has the highest.

4. Conclusion

Respondents in this research are classified into 3 clusters based on their answer to Likert-scale questions in part 2 of the questionnaire. Out of 200 respondents, 12 students (6%) belong to cluster 1, 93 students (46.5%) belong to cluster 2, and 95 students (47.5%) belong to cluster 3. English proficiency, number of course(s) in MOOC respondents have taken, time respondents spent on MOOC courses in a week, and number of MOOC platforms respondents have used have association with cluster number of case. It an be concluded that these variables can be applied to assess the awareness towards MOOC.

Members of cluster 1 that mostly disagree with statements given in Likert-scale questions are aware of the existence of MOOC and have adequate ability to understand English but do not have an interest in using it. Members of cluster 2 that mostly agree with statements given in Likert-scale questions are aware of various types of MOOC platform and have adequate ability to understand English but are not interested in using it. Members of cluster 3 that most strongly agree with statements given in Likert-scale questions are highly aware of various types of MOOC, have adequate ability to understand English, and are interested in using MOOC platforms. So, it can be concluded that cluster 1 has the lowest awareness of MOOC, cluster 2 has medium awareness of MOOC, and cluster 3 has the highest awareness of MOOC.

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