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Analysis of Student Perception with Online Distance Learning during Covid-19 Pandemic

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Abstract: Many educational institutions have closed because of the COVID-19 pandemic, which has affected academic calendars. Online distance learning has become preferred method of learning in Malaysia to continue academic activities during the pandemic. Thus, the purpose of this study is to determine students' perceptions of online distance learning among Faculty of Applied Sciences and Technology (FAST) students using descriptive analysis, to analyse the association between students' perception and online distance learning perspective using Chi-Square test analysis, and to identify students' opinions on elements that influencing students' perception with online distance learning using text analysis. The analysis revealed that the most frequent utilized online platforms by lecturers and FAST students were Google Meet and Zoom for online interactive classes and WhatsApp for communication with students outside the class. The significant challenge for FAST students was related to their home learning environment. There is a significant and strong association between countless assignments and sufficient time to complete the task. The survey discovered that students are having problems concentrating in class due to lack of sleep and are continually logging out of Google Meet due to a poor internet connection. The findings of the study will assist educational institutions to take this online distance learning more successfully in the future.

Keywords: Online Distance Learning, Student's Perception, Chi-Square Test Analysis, Text Analysis

1. Introduction

Most of higher education universities worldwide have closed their campuses and shifted their educational programs to online distance learning while Covid-19 is occurring [1]. Online distance learning is education that takes place in computer-simulated surroundings. [2] has stated that educators

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and students can gain well from online distance learning because the educational system and technology have improved significantly during this pandemic.

[3] found that the closure of university during the Covid-19 pandemic has affected the student mental health. All students struggled to focus during online class learning caused by a lack of motivation and low perceptions. Online distance learning is difficult to adapt to because of many factors such as issues with internet access, poor internet connection quality, and a lack of understanding of learning [4].

The online distance learning environment is completely different from the usual classroom environment in terms of new learning approaches, group interaction, and student level of satisfaction [5]. In this existing state of virtual teaching and the establishment of a new standard of teaching-learning methodology, it is necessary to know about students' opinions and to evaluate students' perceptions of this new teaching approach. During the unlocking phases, online distance learning continues in line with regular offline lectures. The findings of this study could be useful in deciding on the learning environment in an online platform to encourage effective learning. Further, students' experiences and learnings can be used to make online distance learning accessible, efficient, and productive.

2. Data & Methods

2.1 Participants

A survey was conducted by the Science and Technology Club with FAST's deputy dean of student affairs and was distributed to 116 students from BWA, 119 students from BWC, 123 students from BWD, 168 students from BWQ and 97 students from BWW in the Faculty of Applied Sciences and Technology in 2020. The objective of the survey is to study students' perceptions about online distance learning classes during the Covid-19 pandemic. Throughout this study, the primary data obtained was translated from Malay to English.

2.2 Descriptive Analysis

A descriptive statistical method is used to summarise raw data from a population or sample [6]. Descriptive statistics include variables such as nominal, ordinal, frequency measures, and central tendency [7]. Data were collected on student demographics, student perceptions, constraints, and opinions about online distance learning. The descriptive statistics were used to determine students' perceptions of online distance learning among FAST students. The frequency and percentage of variables in the frequency distribution table were analysed. The variables chosen were used to measure FAST students' perceptions of online distance learning. Additionally, this descriptive analysis indicates a comprehensive data pattern. A bar chart and tree map chart was used to compare categorical data, and a doughnut chart was used to demonstrate the proportions of categorical data.

2.3 Association Analysis

Association analysis was used to determine whether there is a significant association between students' perceptions and online distance learning perspectives, as well as the strength of co-occurrence between the variables. Since the data obtained are categorical, the Chi-Square test of independence was utilized to analyse the association between students' perceptions and online distance learning using R studio software.

In this study, the null and alternative hypothesis tests were used for the two categorical variables. Against the null hypothesis implies that there is a significant relationship between the two variables. A *p*-value less than 0.05 was considered statistically significant, indicating robust evidence against the null hypothesis [8]. Therefore, the null hypothesis was rejected, and the alternative hypothesis was accepted. The Chi-Square test statistic [9] is defined as follows:

$$x^2 = \sum \frac{(O_{r,c} - E_{r,c})^2}{E_{r,c}} \qquad Eq.1$$

Where,

$O_{r,c}$ = Observed frequency at level *r* of variable *X* and level *c* of variable *Y*

$E_{r,c}$ = Expected frequency at level *r* of variable *X* and level *c*

2.3.1 Cramer's V correlation

Since the Chi-square test indicates a significant association between two variables, Cramer's V was then applied to determine the strength of the association. Cramer's V equal to 0 implies that there is no association between students' perceptions and online distance learning perspectives, while Cramer's V equal to 0.25 shows a strong association between the variables. The formula for Cramer's V correlation [10] is as follows:

$$\mathrm{V} = \sqrt{\frac{\mathrm{x}^2}{\mathrm{n(k-1)}}} \qquad Eq.2$$

where,

x^2 = Chi-Square statistic
n = Total number of observations
k = Minimum number of rows or columns

2.4 Text Analysis

Text analysis method classifies the unstructured text using predefined keywords [11]. Text analysis was used to expand students' perceptions of online distance learning and to identify the most influential students in online distance learning throughout the pandemic. There are four variables used for text analysis, two of which contain options answers and opinion answers from respondents for the effect of poor sleep and poor internet, while the remaining variables only contains opinion answers from respondents. For this analysis, Natural Language Processing (NLP) techniques were applied to analyse open-ended questions using Python software. Each student comment proceeds through a pre-processing step in which stop words are removed, all characters are lowercase, punctuation symbols are removed, and words are stemmed [12].

Based on the co-occurrence of words in a context, an NLP method was used to embed text in low-dimensional vector spaces [13]. First, lower case conversion was used to perform data pre-processing. The str.lower() function is used to lower the string and all its data. Following that, stopwords were removed using nltk.corpus and join(stopwords.words('english')) to remove stopwords such as "it", "did", and "do" that were found in the data. Then, the function of punct=string.punctuation is used to remove punctuation from data. Hence, all punctuation has been removed from sentences. Finally, the frequency of words has been calculated by using the function freq words=set(cnt.most common(10)) to count the frequency of each word that appears.

Also, the student comment responses were summarized using a word cloud based on word frequency. Word cloud is an appropriate tool for presenting text data summarization in a convenient chart or graph [14]. Word clouds represented the student opinions that were most strongly held. The higher the word frequency referred to, the larger and more colourful a concept is in the word cloud representation [15].

3. Results and Discussion

This section presents the findings of qualitative data analysis of questionnaires.

3.1 Demographics of Respondents

The demographic variables include the students' level of study and the programme they are enrolled in.

Table 1: Demographics of the respondents.

		N=623	
Demographic Variables		Frequency	Percentages (%)
Level of Study	Year 1	213	34.19
	Year 2	180	28.89
	Year 3	187	30.02
	Year 4	43	6.9
Programme of Study	BWA	116	18.62
	BWC	119	19.1
	BWD	123	19.74
	BWQ	168	29.67
	BWW	97	15.57

The demographic variables included the level of study and programme of study. Among the 623 students, most of the respondents were from year 1 studies 34.19%, followed by from year 2 28.89%, year 3 studies 30.02%, and only 6.9% from year 4 studies.

3.1.1 Respondent's perception towards online distance learning

Figure 1 shows students' perceptions toward online distance learning ranging from "Very Poor" to "Very Good". Around 53.61% of students are proficient at completing group assignments. This indicates that more than half of all respondents are comfortable with online distance learning at an online platform, even though students are away from physical interaction. It is also clear that approximately 50.40% of students have good internet access. However, 6.10% of students did not have adequate internet access to participate in online classes. Besides, 44.30% of students reported a good level of readiness and satisfaction with their online classes. During online learning in the pandemic, 40.13% of the students were in good mental health. Nonetheless, 9.8% of students believe they have poor mental health due to a variety of elements.

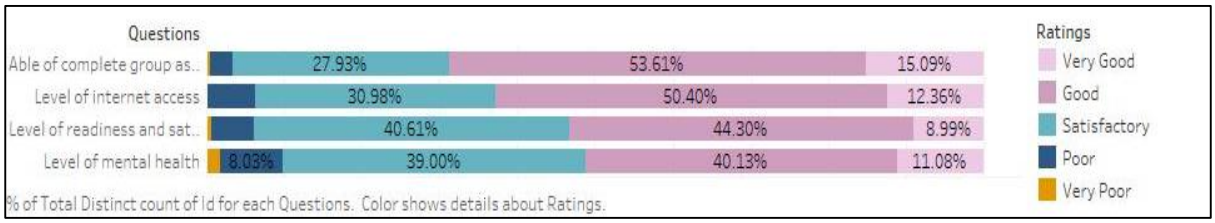

Figure 1: Students' Perceptions of Online Distance Learning.

3.1.2 Students' perceptions on the effectiveness of online distance learning

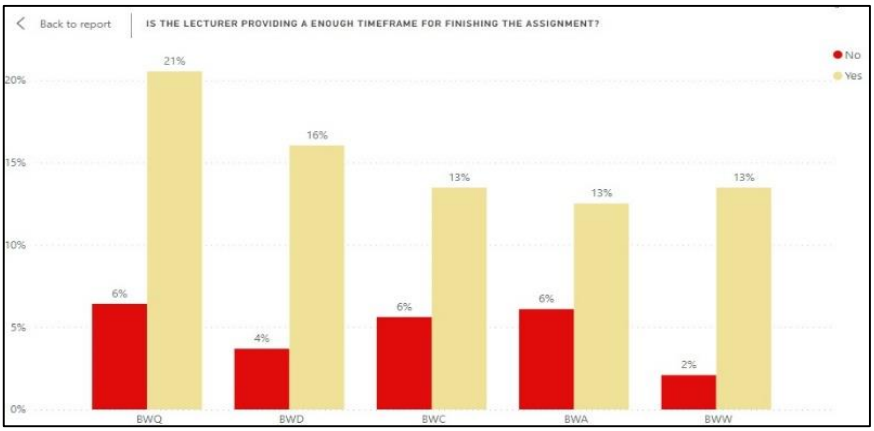

Figure 2: Students' timeframe for completing the assignment.

Based on Figure 2, the results revealed that the Industrial Statistics (BWQ) programme had 21% of students across all levels of years who were given enough time to complete their assignments. The result is also similar with Food Technology (BWD) programme, where 16% of them had enough time to complete the assignments.

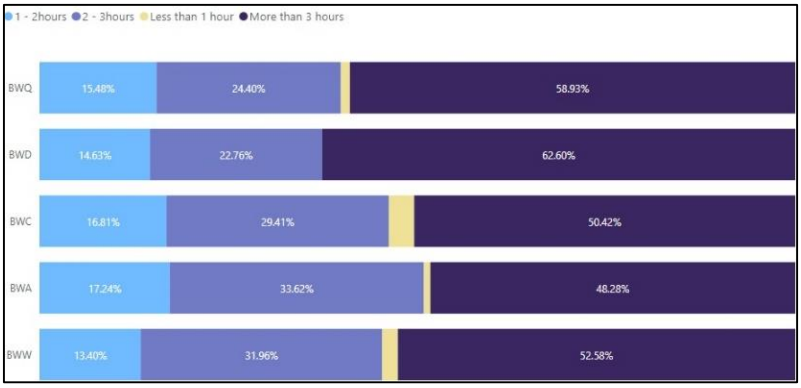

Figure 3: Students' time to review lessons and complete tasks.

Figure 3 shows that approximately half of the students enrolled in programmes such as Food Technology (BWD), Industrial Statistics (BWQ), Biodiversity & Conservation (BWW), and Applied Physics (BWC) spend more than three hours per day reviewing lessons and completing assigned tasks. However, 33.62% students who enrolled in Mathematics Technology (BWA) programme spend two to three hours per day reviewing lessons and completing the assigned tasks.

3.1.3 Students' challenges of online distance learning during COVID-19 Pandemic

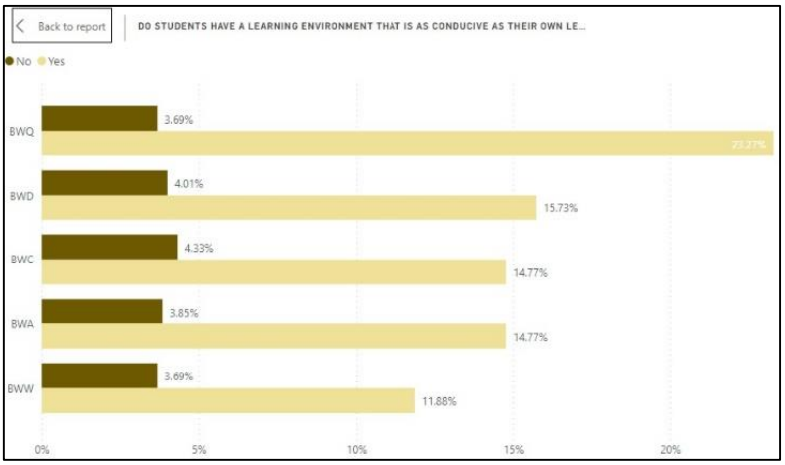

Figure 4: Students' learning environment.

Figure 4 shows that 3.69% of Industrial Statistics (BWQ) students lack a conducive learning environment, while 3.85% of Mathematics Technology (BWA) and 4.33% of Applied Physics (BWC) students do as well. However, 23.27% of students in Industrial Statistics (BWQ), 15.73% in Food Technology (BWD), and 14.77% in Applied Physics (BWC) had a conducive learning environment.

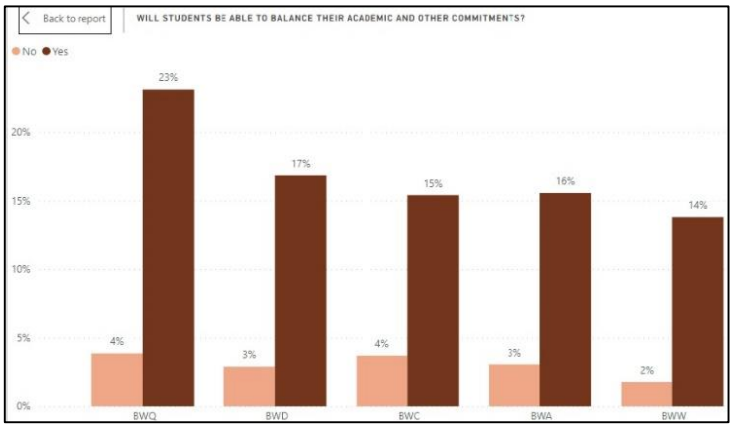

Figure 5: Students' ability to balance academic and other commitments.

Findings for students' ability to balance academic and other commitments shows that Industrial Statistics (BWQ) programme had 23% of students can plan academic and commitments wisely and also similar with 17% of Food Technology (BWD) students.

3.1.4 Student's preference during online distance learning

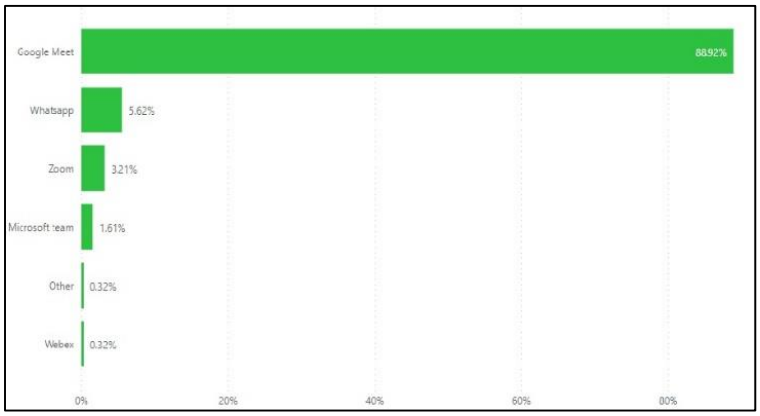

Figure 6: Students' user-friendly PDP platform.

Based on Figure 6, the study's respondents showed that most of the lecturers have used Google Meet (88.92%) rather than other platforms in conducting virtual classes while WhatsApp application (5.62%) as a medium of interaction between the lecturer and students outside the online class hours. The other platform is Zoom occupied the third rank with 3.21% while the Microsoft Teams platform was used only by 1.61% of the lecturers and students.

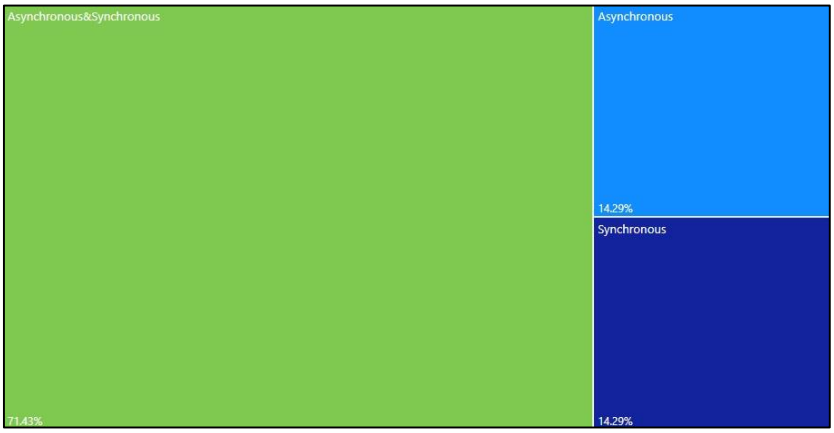

Figure 7: Students' learning style.

The analysis revealed that 71.43% of students prefer both asynchronous and synchronous learning styles. Surprisingly, only 16.28% of fourth-year students and 15.56% of second-year students prefer to study synchronously.

3.2 Association Analysis

The association analysis was used to determine the association between FAST students' perceptions and online distance learning perspectives.

Table 2: Test Statistics for Chi-Square test analysis.

	Pearson's Chi-Squared Test		
Variables	χ^2	*df*	*p*-value
Countless assignments and sufficient time to complete the task	94.276	1	<0.001
Countless assignments and duration completing assignments	15.239	3	0.001624
Sufficient time to complete the task and additional commitments of students	26.698	3	0.002169
Students' additional commitments and able of dividing time	7.1122	1	0.007656
Learning style and online record class	0.84932	2	0.654
Learning convenient platform and online record class	20.075	6	0.002685

Table 2 shows the Pearson's Chi-Squared test results for each of the six variables. There is a significant and very strong association between countless assignments and sufficient time to complete the tasks, as well as between countless assignments and duration completing assignments. Hence, the countless assignments have an impact on the time it takes students to complete assignments. Furthermore, there is a significant and strong association between sufficient time to complete the task and additional commitments of students, implying that students require sufficient time to complete the task, particularly those with additional commitments.

However, there is a significant association between students' additional commitments and their ability to divide time, but it is only a moderate relationship. Then, the findings indicate that additional commitments have a moderate effect on students' ability to manage their time effectively. In addition, there is no association between learning style and online class recording. Nonetheless, there is a significant and strong association between learning convenient platforms and online record classes, implying that learning convenient platforms have an impact on online record classes.

3.3 Text Analysis

Figure 8: Effects of poor sleep among students.

Many students experienced the following effects of lack of sleep such as difficulty concentrating in class, tiredness in class, and stress. Most of the respondents opined that difficulty concentrating in class was the most significant impact on them, and sleep deprivation increases the chances of being unable to concentrate during online classes. Students also mentioned that when they do not have enough sleep, they become easily tired in class. Besides that, students who get too little sleep are more stressed in their lives.

Figure 9: Impact of poor internet access among students.

Many students in this research study reported that their online learning experience was affected by being constantly logged out of Google Meet, being unable to focus in class, and being unable to hear audio. The most common issue students reported was being constantly logged out of Google Meet during online classes. Students who have a poor internet connection find it difficult to focus in class and to hear clearly. As a result, some students will be unable to participate in online classes due to a lack of internet access. Slow connections can make it difficult to access online course platforms.

Figure 10: Students' surroundings unpleasant.

Concerns about unpleasant learning at home make it difficult to create a comfortable environment for online learning. Noises from the environment can be distracting, especially during online classes. Next, students have limited study space and must share a room with their siblings, which makes the learning environment unpleasant for them.

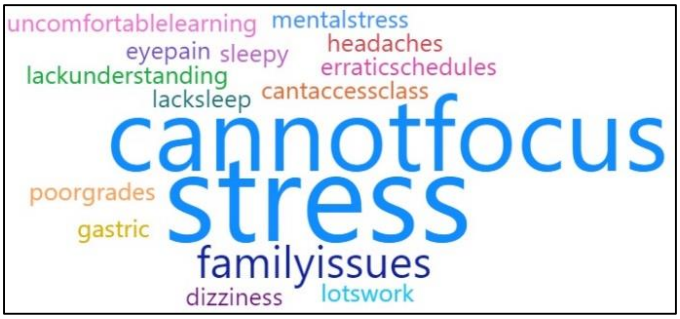

Figure 11: Effects of poor mental health among students.

Additionally, the findings indicate that stress is the primary effect of poor mental health among students. Besides, online distance learning is challenging to manage, particularly for students who are struggling to cope with family issues and lack understanding of their studies. Apart from that, students who have poor mental health cannot focus on online classes. All these students' opinions were founded based on poor mental health.

4. Conclusion

Throughout the study, all objectives have been achieved. The first objective of this research is to determine FAST students' perceptions of online distance learning. The findings of this study indicated many students can complete group assignments even when they are not physically interacting. Besides, students reported an elevated level of readiness and satisfaction with their online classes. Aside from that, students are more likely to suffer from sleep deprivation because of the numerous assignments assigned by lecturers. Furthermore, the analysis revealed that students spend more than three hours per day reviewing lessons and completing assigned tasks. On the other hand, a few students must share electronic devices with other family members. The results also reveal that half of the students have other commitments in addition to their online classes. Further to that, the majority of the study's respondents indicated that students used Google Meet more than other platforms in conducting virtual classes and WhatsApp as a medium of interaction between the lecturer and students outside of online class hours. The analysis then revealed that students prefer both asynchronous and synchronous learning styles in online learning.

The second objective of this study is to analyse the association between students' perceptions and online distance learning perspectives. the numerous assignments have an impact on the time it takes students to complete assignments. Also, students with additional commitments require adequate time to complete the task. The third objective of this study is to identify students' opinions on elements that influence students' perception of online learning. Most students reported difficulty concentrating in class, tiredness in class, and stress throughout the online learning process caused by a lack of sleep. Then, many students in this research study mentioned that being constantly logged out of Google Meet, unable to focus in class, and unable to hear audio had a negative impact on their online learning experience. Concerns about unpleasant learning environments at home, such as noises and a lack of study space, make it difficult to create a comfortable environment for online learning. Finally, the findings indicate that stress is the primary cause of students' poor mental health.

To overcome the challenges of online classes, governments should increase the accessibility of stable and reliable communication tools, have a significant impact on the development of academic experience, and enhance the technology that enables students to learn in addition to addressing the educational system's inequities. Nonetheless, the university administration should emphasize all the problems and difficulties that students face while pursuing online distance learning. Plus, in this ongoing pandemic, educators should provide substantial support to encourage students to successfully participate in online learning, even those students with limited abilities to cope with online learning due to technical issues. These findings also encourage universities to control online distance learning more effectively by implementing the most recent online class approaches, to make the learning process more fun and effective during the ongoing COVID-19 pandemic.

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References

[1] W. Bao, "COVID -19 and online teaching in higher education: A case study of Peking University," Human Behavior and Emerging Technologies, vol. 2(2), pp. 113–115, 2020.

[2] J. Potomkova, V. Mihal, & C. Cihalik, "Web-based instruction and its impact on the learning activity of medical students: a review in Biomedical papers of the Medical Faculty of the University Palacky, Olomouc, Czechoslovakia," vol. 150(2), pp. 357–361, 2006.

[3] C. Son, Savage, J. M. R. James, D. Magistro, J. Donaldson, L. C. Healy, M. Nevill, & P. J. Hennis, "Mental health and movement behavior during the COVID-19 pandemic in U.K. university students: Prospective cohort study," Mental Health and Physical Activity, vol. ED-19, 100357, 2020.

[4] Z. Almahasees, K. Mohsen, & M. O. Amin, "Faculty's and Students' Perceptions of Online Learning During COVID-19," Frontiers in Education, pp. 1–10, May. 2021.

[5] S. Bignoux, & K. J. Sund, "Tutoring executives online: what drives perceived quality?," Behaviour and Information Technology, vol. *37*(7), pp. 703–713, 2018.

[6] M. L. Cristino Pena, & A. S. Yeung, "Satisfaction with Online Learning," The International Journal of Technology, Knowledge, and Society: Annual Review, vol. 6(5), pp. 97–108, 2010.

[7] G. Marshall, & L. Jonker, "An introduction to descriptive statistics: A review and practical guide," Radiography, vol. 16(4), 2010.

[8] R. Schumacker, & S. Tomek. Understanding Statistics Using R. SI: Springer, 2013.

[9] S. T. Nihan, "Karl Pearsons chi-square tests," Educational Research and Reviews, vol. 15(9), pp. 575–580, 2020.

[10] H. Akoglu, "User's guide to correlation coefficients," In Turkish Journal of Emergency Medicine, vol. 18(3), pp. 91–93, 2018.

[11] W. Zhang, T. Yoshida, & X. Tang, "Text Classification using Multi-word Features," pp. 3519–3524, 2007.

[12] V. Vargas-Calderon, J. S. Florez, L. F. Ardila, N. Parra-A, J. E. Camargo, & N. Vargas, "Learning from Students' Perception on Professors Through Opinion Mining," Communications in Computer and Information Science, 1277 CCIS, pp. 330–344, 2020.

[13] A. Joulin, E. Grave, P. Bojanowski, & T. Mikolov, "Bag of tricks for efficient text classification," 15th Conference of the European Chapter of the Association for Computational Linguistics, EACL 2017 - Proceedings of Conference, 2, pp. 427–431, 2017.

[14] F. Miley, & A. Read, "Using Word Clouds to Develop Proactive Learners," Journal of the Scholarship of Teaching and Learning, vol. 11(2), pp. 91–110, 2011.

[15] F. Calle-Alonso, V. Boton-Fernandez, J. M. Sanchez-Gomez, M. A. Vega-Rodiguez, C. J. Perez, & D. De La Mata, "Word clouds as a learning analytic tool for the cooperative e-learning platform NeuroK," CSEDU 2018 - Proceedings of the 10th International Conference on Computer Supported Education, 2, pp. 508–513, 2018.