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## FACE-TO-FACE VS ONLINE LEARNING: A COMPARATIVE STUDY OF POLYTECHNIC DIPLOMA STUDENT'S ACHIEVEMENT

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### ABSTRACT

The Covid-19 pandemic has led to widespread education institute closures and a shift to online learning. This situation has created significant challenges for students in terms of learning approach. This study compares polytechnic student's achievement after transitioning from face-to-face to online learning because of the pandemic. The data analysis used both quantitative and qualitative measures. Data of student's results from 2018 to 2022 was descriptively analysed to obtain comparative results. Findings show that students' achievement during the face-to-face learning method (before and after the pandemic - Session June 2018, Dec 2018, June 2019, Dec 2019, and Session II: 2021/2022) was bell-shaped and skewed to the right where most students get a score below 3.49. However, this situation was different during the pandemic (Session June 2020, Dec 2020, and Session I: 2021/2022) where most students get a high score of 3.50 and above. This produces a graph that is bell-shaped and skewed to the left. This finding indicates that student's achievement was found to be better during the implementation of online learning during the pandemic. Structured interviews with the lecturers were also conducted to obtain the validity of the data analysis findings. The results of this study realising the potential of online learning to induce transformation in learning as well as assessment in response to the demands of a changing world.

**Keywords:** face-to-face, online learning, pandemic

### 1. Introduction

The world is afflicted by the Covid19 outbreak in 2020, which has an influence on daily life. Closures of educational institutions were also required to stop the spread of the virus. Institutional closure necessitates a shift in teaching, learning, and assessment approaches from face-to-face to online. This situation has created significant challenges for students in terms of learning approach. However, everyone must adapt online approaches as it is no longer an option but a necessity. Evaluation must also be performed differently in accordance with the deployment of the online approaches.

Polytechnics as TVET institutions in Malaysia need to adapt to the pandemic situation. The closure of the Polytechnic requires the implementation of learning in a synchronous or asynchronous manner. The synchronous method establishes a meeting schedule between students and lecturers as part of an interactive learning class, while the asynchronous method refers to the implementation of learning without interaction with students [1]. Online learning makes education more student-centred with students actively participating in the learning process and lecturers serving as supervisors and mentors [2]. At the same time, lecturers need to diversify online learning methods to ensure learning outcomes are achieved.

However, there are concerns about this online learning method because it discriminates against students who have limited internet and are technology blind [3]. Other concerns include slow Internet connections, server problems, and lack of access to learning resources

and tools [4]. These limitations are discovered to reduce students' enthusiasm in the learning process [5].

Furthermore, the online assessment method also received diverse reactions. Assessment methods such as open book examinations have several challenges that may affect the overall effectiveness and fairness during the assessment process [3]. A study by [6] shows the difference in exam results before and during the pandemic caused by changes in assessment methods. Meanwhile, a study by [7] discovered that student achievement was not significantly affected by learning methods either face-to-face or online.

Therefore, this study aims to compare student's achievement after transitioning from face-to-face to online learning because of the pandemic. The objectives of the study are to :

- i. identify student's achievement before, during and after the pandemic;
- ii. determine whether there are differences in the achievement of engineering and non-engineering students; and
- iii. explore lecturer's perceptions about the implementation of online learning and assessment.

## 2. Methodology

This study adopted both quantitative and qualitative measures. The data was selected through purposive sampling involving all Diploma Polytechnic students from all over Malaysia. Student's result from session June 2018 until session II:2021/2022 was descriptively analysed to obtain comparative results. The face-to-face learning was conducted from the June 2018 session until Dec 2019 session. Meanwhile, online learning was implemented throughout the June 2020 session until the I:2021/2022 session. However, the learning method was returned to face-to-face in session II:2021/2022. Therefore, the students were divided into eight groups based on their end session of study as shown in Table 1.

Table 1. Student's Group by End Session

Group	End Session	Learning Method
1	June 2018	Face-to-face
2	Dec 2018	Face-to-face
3	June 2019	Face-to-face
4	Dec 2019	Face-to-face
5	June 2020	Online
6	Dec 2020	Online
7	I: 2021/2022	Online
8	II: 2021/2022	Face-to-face

Interviews with seven lecturers were also conducted to obtain the validity of the data analysis findings. These samples represented three engineering lecturers and four non-engineering lecturers. They were purposely chosen because they were involved in face-to-face and online learning and teaching throughout all sessions. The respondents of this study were asked eight open-ended questions in the semi-structured interview. The questions were on:

- 1) Perception of face-to-face learning vs online learning
- 2) Perception of online assessment implementation



### 3. Result and Discussion

Analysis of students result and interview session with lecturers was conducted in order to identify student's achievement after transitioning from face-to-face to online learning.

#### 3.1 Data Analysis

Data of students' results from 2018 to 2022 was descriptively analysed to summarize and sum up the collected data. Next, a comparison of students' achievement between each group was presented by gender, engineering, and non-engineering courses.

##### i) Gender analysis

A total of 118,569 students' results were retrieved from 36 polytechnics all over Malaysia. It consists of 60,941 male students which represented 51% and 57,628 female students which represented 49% categorized by their End Session. The data for each group is shown in Table 2.

Table 2. Demography of student by gender

Group	End Session	Learning Method	Male		Female	
			n	%	n	%
1	June 2018	Face-to-face	4963	47.1	5567	52.9
2	Dec 2018	Face-to-face	9570	50.7	9297	49.3
3	June 2019	Face-to-face	4677	48.4	4979	51.6
4	Dec 2019	Face-to-face	9705	50.7	9439	49.3
5	June 2020	Online	4364	49.0	4539	51.0
6	Dec 2020	Online	10254	52.4	9328	47.6
7	I: 2021/2022	Online	6054	53.5	5269	46.5
8	II: 2021/2022	Face-to-face	11354	55.2	9210	44.8
			60941	51.4	57628	48.6

##### ii) Analysis of Overall GPA Result for Diploma Student Polytechnic Malaysia (2018-2022)

Table 3 and Figure 1 show the students' achievement for the End Session of June 2018 until Session of II:2021/2022. Group 1,2,3,4 and 8 has a right-skewed shape where most students got a GPA below 3.00. However, during the pandemic when online learning was implemented, students' achievement in Group 5, 6 and 7 showed a significant improvement. The distribution became skewed to the left with most students achieving high scores of 3.50 and above. These groups of students used smartphones or laptops with the internet to join classes and assessments from their homes. Therefore, students' efforts to attend online classes with their own equipment and facilities should be appreciated. Hence, this is a crucial factor to ensure online learning can be conducted well.

Table 3. Percentage of GPA result for Diploma Student in Polytechnic Malaysia (2018 – 2022)

Group	End Session	Learning Method	GPA < 2.00 (%)	2.00 < GPA	3.00 < GPA < 3.49 (%)	3.50 < GPA < 3.75 (%)	GPA > 3.75 (%)
				< 2.99 (%)			
1	June 2018	Face-to-face	5.8	33.3	33.9	16.2	10.8
2	Dec 2018	Face-to-face	2.5	27.2	38.6	19.9	11.7
3	June 2019	Face-to-face	5.4	32.9	33.7	14.8	13.1
4	Dec 2019	Face-to-face	2.1	27.8	38.7	18.9	12.5
5	June 2020	Online	0.8	9.6	28.3	28.9	32.4
6	Dec 2020	Online	0.4	7.7	28.2	30.9	32.8

7	I: 2021/2022	Online	0.8	10.7	28.6	26.2	33.7
8	II: 2021/2022	Face-to-face	1.3	16.9	37.6	24.9	19.4

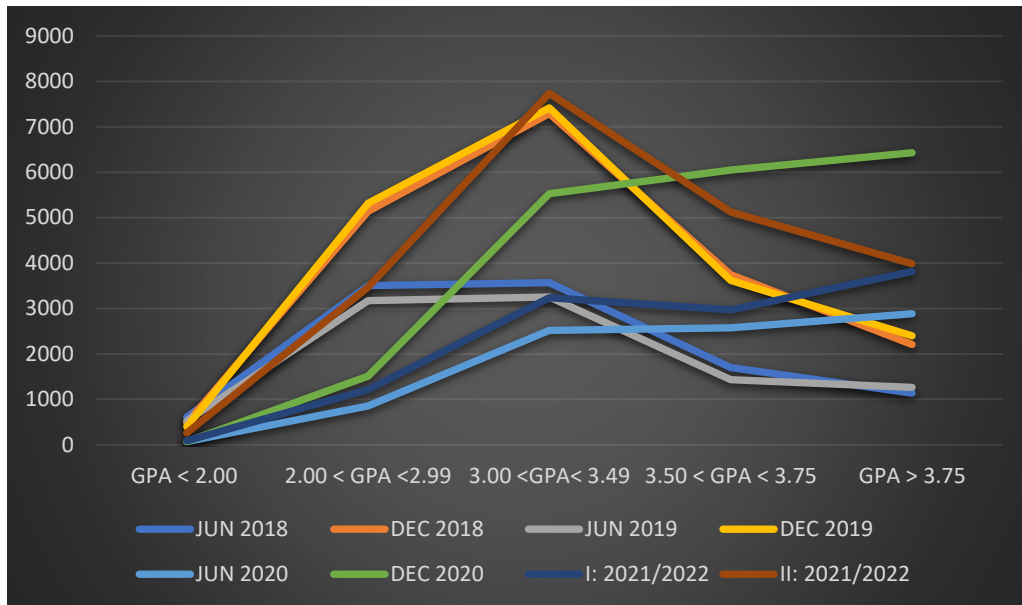


Fig.1. Chart of GPA results for Diploma Student in Polytechnic Malaysia (2018 - 2022)

Table 4 shows mean (M) and standard deviation (SD) values for face-to-face learning and online learning. The results showed that both learning methods have high levels of mean with low SD. However, online learning led to significantly higher levels of GPA (M=3.52, SD=0.42) than face-to-face learning (M=3.20, SD=0.56). These findings reinforce the general belief that online learning has a positive impact on students learning as well as assessment results.

Table 4. Descriptive Statistics for face-to-face learning

Variables	Face-to-face learning		Online learning	
	Mean	SD	Mean	SD
GPA	3.20	.56	3.52	.42

iii) Analysis of GPA result for Diploma Student Polytechnic Malaysia (Engineering Courses)

Table 5 and Figure 2 show the results of engineering students for the End Session June 2018 until II:2021/2022. Groups 1,2,3 and 4 have a right-skewed shape meanwhile group 8 has a bell-shape. These groups represented face-to-face learning. Groups 5,6 and 7 which represented online learning showed a skewed left shape of distribution.

Table 5. Percentage of GPA result for Diploma Student in Polytechnic Malaysia from 2018 – 2022 (Engineering)

Group	End Session	Learning Method	GPA < 2.00 (%)	2.00 < GPA < 2.99 (%)	3.00 < GPA < 3.49 (%)	3.50 < GPA < 3.75 (%)	GPA > 3.75 (%)
1	June 2018	Face-to-face	10.2	41.0	30.5	11.4	6.9
2	Dec 2018	Face-to-face	3.1	31.2	39.9	17.6	8.2
3	June 2019	Face-to-face	10.2	42.2	30.8	11.1	5.8
4	Dec 2019	Face-to-face	2.9	35.6	40.7	14.4	6.4
5	June 2020	Online	1.3	14.5	33.8	26.6	23.8
6	Dec 2020	Online	0.4	7.9	31.4	33.3	27.1
7	I: 2021/2022	Online	1.3	15.4	36.1	25.4	21.9
8	II: 2021/2022	Face-to-face	1.6	20.2	41.8	23.3	13.1

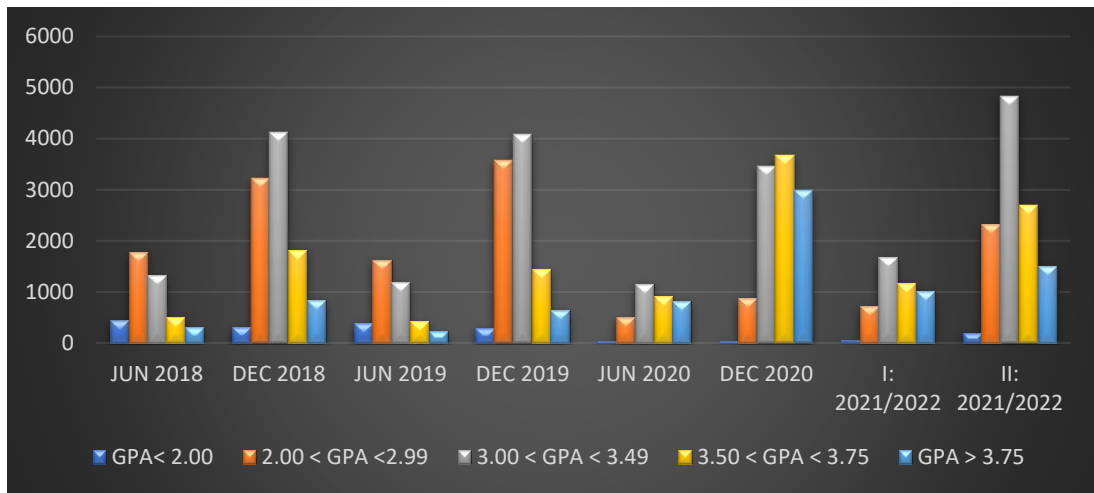


Fig.2. Histogram of GPA result for Diploma Student in Polytechnic Malaysia from 2018 – 2022 (Engineering)

iv) Analysis of GPA result for Diploma Student Polytechnic Malaysia (Non-Engineering Courses)

Table 6 and Fig.3. also present the same trend for non-engineering courses. Groups 1, 2, 3 and 4 have a right-skewed shape and group 8 has a bell-shape. While group 5,6 and 7 has a left-skewed shape. This result has the same trend as engineering students.

Table 6. Percentage of GPA result for Diploma Student in Polytechnic Malaysia from 2018 – 2022 (Non-Engineering)

Group	End Session	Learning Method	GPA < 2.00 (%)	2.00 < GPA < 2.99 (%)	3.00 < GPA < 3.49 (%)	3.50 < GPA < 3.75 (%)	GPA > 3.75 (%)
1	June 2018	Face-to-face	2.7	27.9	36.2	19.5	13.5
2	Dec 2018	Face-to-face	1.9	22.4	37.1	22.6	16.0
3	June 2019	Face-to-face	2.3	26.7	35.7	17.4	18.0
4	Dec 2019	Face-to-face	1.2	19.1	36.6	23.9	19.2
5	June 2020	Online	0.5	6.5	24.8	30.4	37.8
6	Dec 2020	Online	0.3	7.5	24.1	27.8	40.3
7	I: 2021/2022	Online	0.4	7.5	23.3	26.8	41.9
8	II: 2021/2022	Face-to-face	0.8	12.6	32.2	27.0	27.4

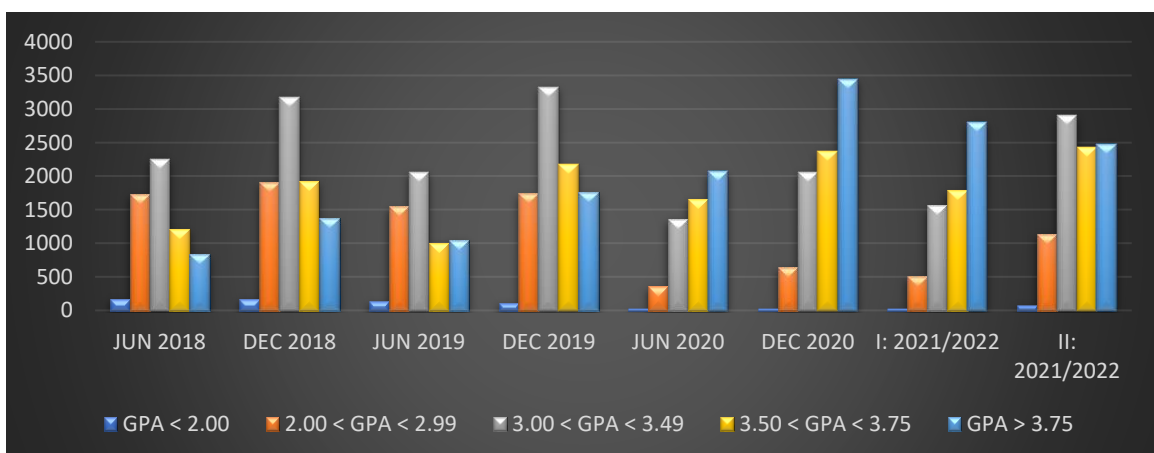


Fig.3. Histogram of GPA result for Diploma Student in Polytechnic Malaysia (Non-Engineering)

Based on the comparison made, both engineering and non-engineering courses gave the same observation that aligns with the overall CGPA result. The left-skewed shape was negatively skewed in nature can be caused by the changes in learning and assessment method that helps students score better. Due to the pandemic, the assessment method changed to alternative assessment that had a positive impact on students where students were found to be less stressed and more prepared which contributed to better results.

### 3.2 Interview Session Analysis

Analysis of the interview session identified three themes regarding the lecturer's perceptions about the implementation of online learning and assessment and interpreted as below :

- i. Lack of students engagement in online learning due to some issues such as lack of an adequate Internet connection and hardware constraints.
- ii. Alternative assessment methods gave students an advantage in achieving better results.
- iii. Students achievement was found to be higher when online learning was implemented.

Based on the data of students' result that has been collected, findings showed that students have better results when implementing online learning. Despite of good results, interview results found that students were less committed to online learning. The interview respondents believed that students were willing to learn but they were stuck by some constraints. This matter was raised by the respondents:

"Yes, they wants to study, try to attend online class but sometimes interrupted or disconnected, which is a problem. Those with limited or slow data will not turn on their camera until end of class because they want to save the data. But still they stay until the end of class."

[Respondent 1 | Theme: Online learning issue]

"I found the problem of internet coverage for example rural area students.. they did not get enough coverage.... so they have problems to join online class.."

[Respondent 2 | Theme: Online learning issue]

"The significant difference is from an instructional point of view and student focus. In the past, we could reprimand if the student was not focused. But during online learning, we can't control students like we do face-to-face."

[Respondent 6 | Theme: Online learning issue]

According to [8], most students felt that online classes could be more difficult than traditional classroom classes due to technology limits and delayed responses. Students have to face several challenges in adapting to online learning including the lack of interaction between students and lecturers [1]. However, the majority of students who engage in online learning illustrate that there is potential to continue learning online with improvements in all forms of convenience and readiness [9].

Online learning was determined to be useful since it offered learners flexibility and convenience [8]. Alternative assessment methods applied during online learning provide the opportunity for lecturers to explore and get evidence of their students' learning that is constructively aligned with the learning outcomes [10]. Respondents agreed that alternative assessment during the pandemic gave advantages to students to score better as they said :

"Online quiz..test.. using CIDOS. Assignments upload using MSTeams. Easier to manage. Students less nervous and mostly score better.."

[Respondent 3 | Theme: Alternative assessment]

“Students prefer open book tests.. or doing presentation or project instead of having to study and sit and answer an exam.”

[Respondent 4 | Theme: Alternative assessment]

“Usually students have to produce a video as their practical assessment using their own materials guided by the instructions given. The outcome will be used to measure the level of student’s understanding.”

[Respondent 7 | Theme: Alternative assessment]

The implementation of alternative assessment has a positive impact on the development of students' soft skills as well as their involvement actively in the learning experience [11]. Indirectly, this contributes to better results in students assessment. Several studies by [8], [12] and [13] show that students achieve better during online learning. These findings are in line with the findings of the data analysis and are supported by the respondents:

“According to the actual data, students achievement is better during online.. as their scores increase during pandemic..”

[Respondent 5 | Theme: Students achievement]

“During pandemic, scores were mostly higher. Because the assessment can be done online. The exam was an open book test. Students were more prepared so the result also better.”

[Respondent 6 | Theme: Students achievement]

“Students got better result during online learning. A factor that may influence students to score better was because of the ratio PB:PAIt = 80:20 which show the percentage of PB marks was higher than PAIt.”

[Respondent 7 | Theme: Students achievement]

In summary, these interview findings showed that lecturer’s perceptions about the implementation of online learning and assessment are in line with student’s achievement before, during and after the pandemic. Students’ result during the pandemic was found to be better with most students earning GPA of over 3.00 despite some technology constraints. The implementation of alternative assessment also seen as one of the crucial factors assisting students to accomplish the assessment better.

#### 4. Conclusion

The Covid-19 pandemic had an impact on all sectors including the higher education sector. Polytechnic Malaysia was no exception. In the effort to ensure that teaching and learning sessions can be carried out, the method of learning has been replaced with online learning sessions to ensure that students were not left behind. Despite of challenges when implementing online learning, students still can adapt to the changes and score better. This was evidenced by the achievement of students who earned a GPA of over 3.00 during online learning during the pandemic. These findings are also supported by the views of lecturers who believe that online learning helps students get better marks because of the more flexible alternative assessment methods.

In conclusion, this study suggests that the implementation of online learning during the Covid-19 pandemic resulted in improved student achievement compared to face-to-face learning. Alternative assessment methods played a significant role in facilitating better student performance. However, challenges related to limited internet access and technology issues were identified as barriers to student engagement. Overall, the study highlights the potential of online learning to positively impact student outcomes and adapt to changing educational needs.

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