

## **A COMPARATIVE STUDY ON THE HYBRID TEACHING APPROACH OF BASIC BUSINESS MATHEMATICS TO PRE-COMMERCE STUDENTS DURING MCO**

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### **ABSTRACT**

*Varieties of Teaching and Learning approaches have been applied among educators to the students during the Movement and Control Orders (MCO), COVID-19. Educators especially those who are teaching the mathematics subject need comprehensive and effective tools to make the students understand the concept and the students can do exercises with less face-to-face guidance or a normal conventional teaching approach. Teaching mathematics subjects especially to the Pre-Diploma students is very challenging because they are quite weak in mathematics fundamentals and coincidentally, they have to face the obstacle of teaching approach with Open Distance Learning (ODL) during MCO. Hence, creative and innovative methods are created and developed by educators to make teaching delivery effective and increase the learning curve or performance of mathematics among students. The ongoing and final assessment results are used to measure the performance of the students based on the teaching approach or model that has been practiced by the educators.*

**Keywords:** *performance, pre-diploma, mathematics, ODL, MCO*

### **Introduction**

The pandemic COVID-19 virus has changed the world activities to the new norms in all sectors. COVID-19 has seriously slammed Malaysian education sector as well. Schools and universities have been instructed to be closed in order to control the COVID-19 transmission.

The same situation is also affecting the pre-diploma students specifically the pre-commerce students at Universiti Teknologi MARA. Most of them are from the low-income families and they really need sponsorships or special funds from university (UiTM 2020). In addition, they are students with average results especially pass in mathematics and English in their SPM result who were given a chance to pursue their studies at university. Since the Open Distance Learning (ODL) approach needs to be implemented to continue the teaching and learning process during MCO, it become so cumbersome and stressful to the educators in ensuring that the teaching process is effective and satisfactorily delivered especially in teaching the mathematics subject to the weak students.

Therefore, the educators have come out with a comprehensive teaching and learning (T&L) methodology to pre-commerce programme students specifically for mathematics subject during the Semester Academic October 2020 – February 2021. This paper will share innovative ideas that influence the performance of mathematics subjects using the ODL approach during the MCO. The students result of ongoing and final assessments have been used to measure the performance and conclude the effectiveness of methods used for teaching the mathematics subject.

## Methodology

The following model has been applied to the students of pre-commerce program at UiTM Pulau Pinang branch specifically for the subject of mathematics. This model can be used to create interest among students and hence improve the student performance in mathematics.

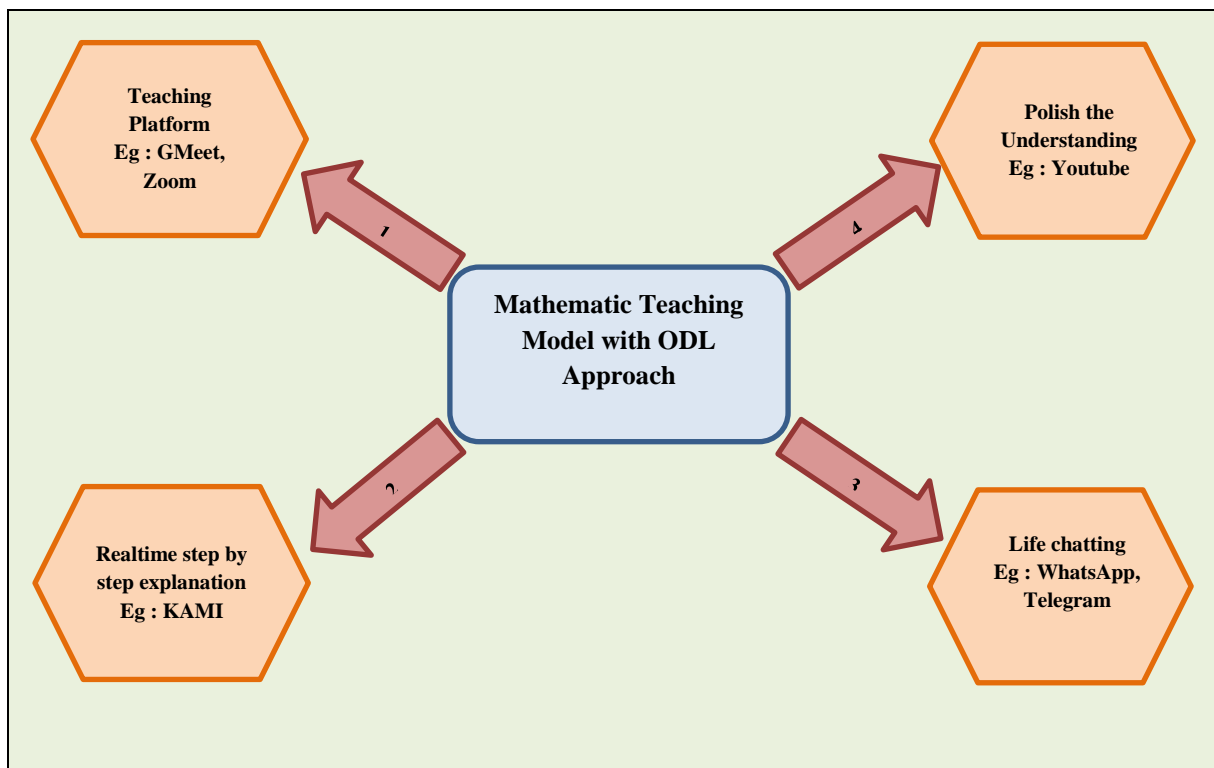


Figure 1: Mathematics Teaching Model with ODL Approach

The above figure 1 shows that there are four (4) main components that need to be considered for the effectiveness of ODL classes especially for teaching mathematics. Since conventional or face-to-face classes are not allowed, an online platform such as Google Meet or Zoom applications has been used. This application allows the instructor to give lectures up to 100 students in one session. The lecturers can share the instructor's screen with the students

and the live lectures can be recorded and viewed for revision purposes. The following figure shows a class which is conducted using the Google Meet platform and 25 students are joining the session.

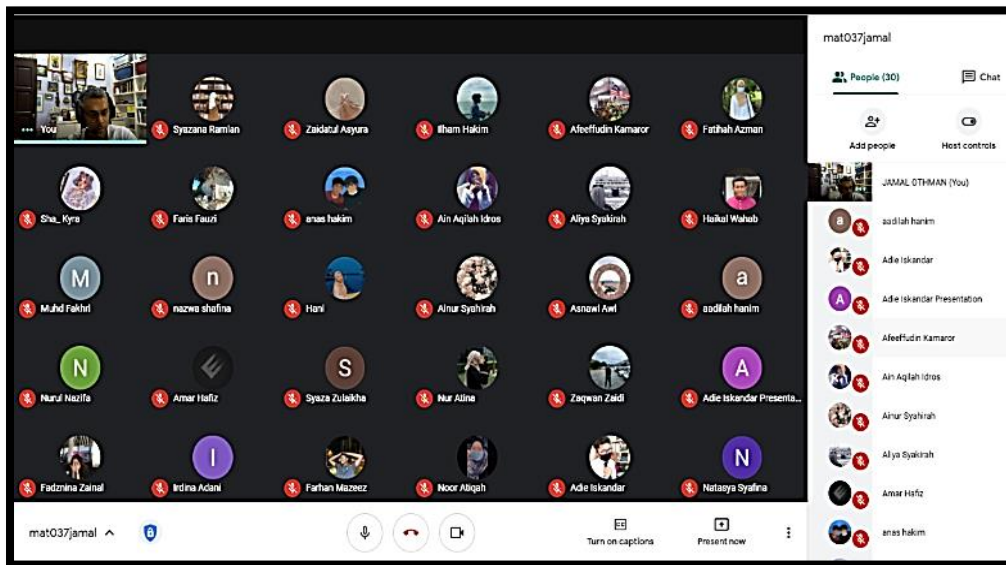


Figure 2: The Class is conducted with Google Meet Platform.

The second component that needs to be enforced by the lecturer is the explanation of students' need to real-time. The lecturer cannot use or just rely on the PowerPoint presentation for teaching mathematics to the weak students. Detail explanation helps students to understand the topic. KAMI is an online application that enables the lecturer to show the detailed steps of mathematic calculation through online which is similar to writing on the whiteboard in the classroom as shown in Figure 3. In addition, the students are able to record the lecturer's explanations on Google Meet and replay the video to understand the step as explained by using KAMI.

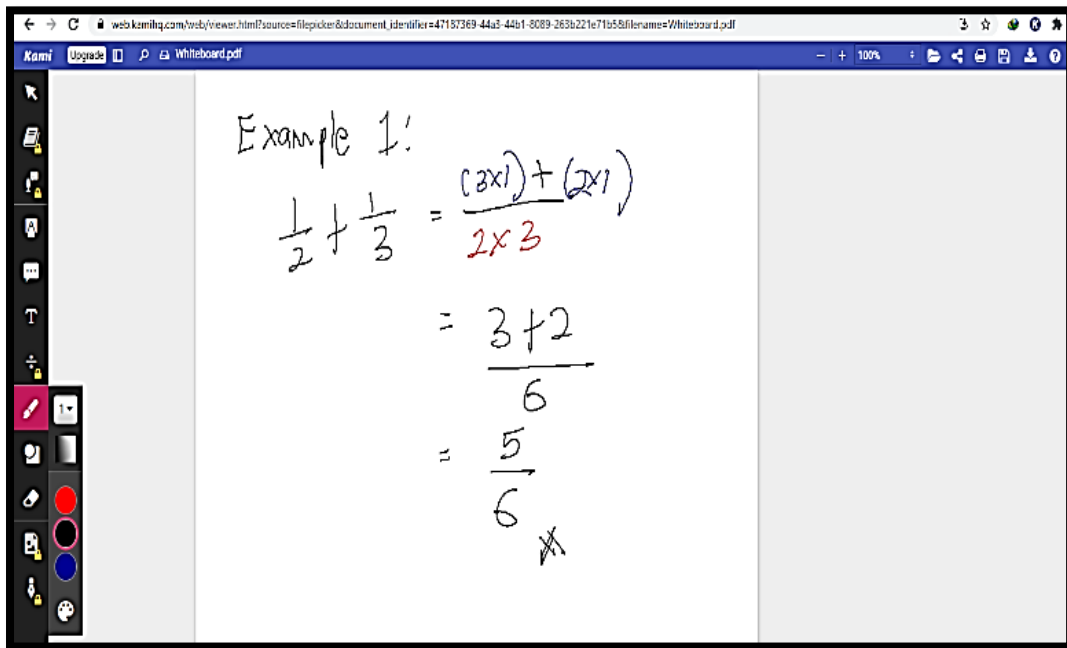


Figure 3: Explanation using KAMI

The third component is basically for personal coaching or consultation by using the WhatsApp application. Direct chatting through WhatsApp or Telegram is quite effective to tighten their understanding of the topic taught during an online class. Some students are quite shy to ask questions during the online class. They will use this platform to ask the questions and normally the consultation period will be longer until the students are satisfied with the explanation or they tend to ask the lecturer to check extra exercises of past years questions which have been answered based on their effort.

The fourth component is the extra self-study by watching the video through YouTube to polish their understanding and skills on the topic. The students are able to repeat the video and it helps them to remember and improve their understanding of the topic.

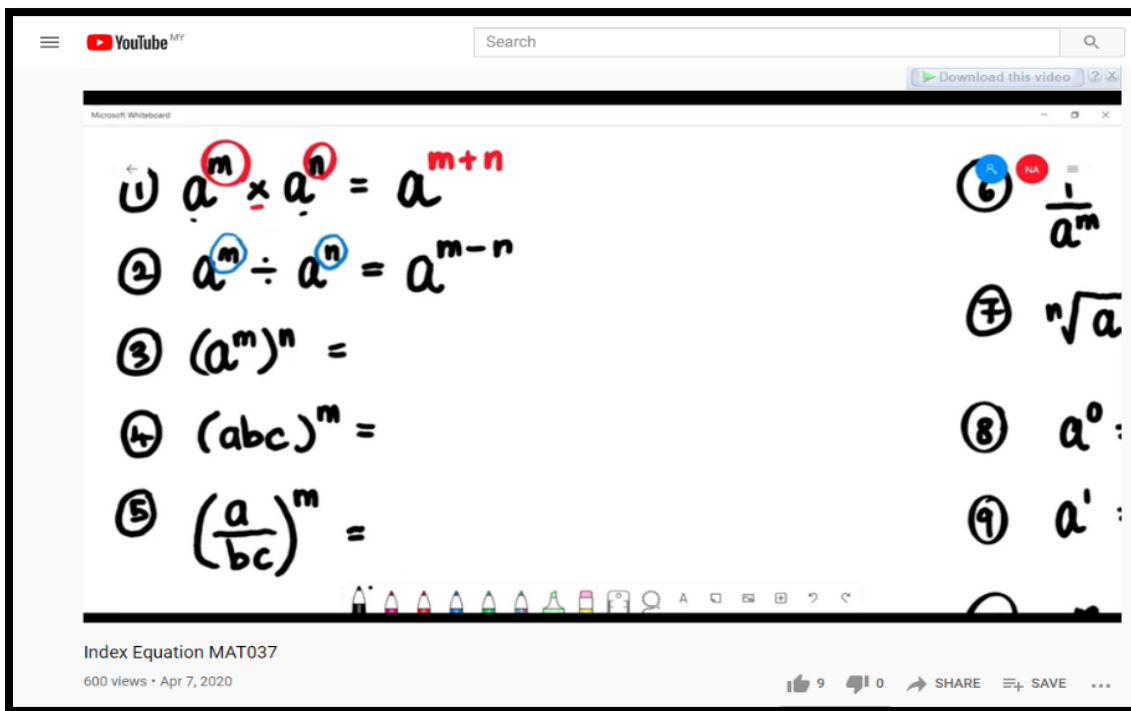


Figure 4: Improve Understanding through YouTube

These four components have been practiced by all students who enrolled in the mathematic subject. Although there are some challenges and obstacles it can be resolve once everybody in the online class actively participates, helps each other and give positive cooperation.

To determine the effectiveness of the model, the students' results of ongoing and final assessments have been taken from four (4) classes. The average number of students in each class is approximately 25 students. The following section will be discussing the analysis and results to conclude the effectiveness of the model for teaching mathematics.

### Data Analysis

This research used a data from two groups of students (the classes who experienced the Mathematics Teaching Model and without practiced the model). The data for ongoing assessment which are assessment 1, assessment 2, assessment 3 and final assessment score were recorded . Comparison was made between the mean assessment score for classes who experienced the Mathematics Teaching Model and without practiced the model

## Result and Discussion

A total of 146 responses were collected from Pre-Diploma students enrolled for MAT037 course. Table 1 shows that 59 (40.4%) responses were male respondents and 87 (59.6%) were female respondents. The respondents were equally divided into 2 categories: 1) not practice the Mathematic Teaching Model with ODL Approach 2) experiencing the Mathematic Teaching Model with ODL Approach. In group 1, 27 of the respondents are males while 46 are females followed by 32 males and 41 females for group 2.

Table 1: Cross Section between Method and Gender

Table 2: Mean vs Method

	Method	Mean	Std Deviation
Assessment 1	Not practice	21.99	5.38
	Experiencing	23.42	4.32
Assessment 2	Not practice	36.67	9.49
	Experiencing	40.66	6.99
Assessment 3	Not practice	25.27	8.08
	Experiencing	31.82	6.18
Final Assessment	Not practice	44.45	12.46
	Experiencing	49.63	6.82

Mean according to category of method were calculated for further analysis. From Table 2 the mean values of assessment 1, assessment 2, assessment 3 and final for not practice the model were found to be 21.99, 36.67, 25.27 and 44.45 respectively with 5.38, 9.49, 8.08 and 12.46 standard deviations. For the group that experiencing the model the mean values of assessment 1, assessment 2, assessment 3 and final were found to be 23.42, 40.66, 31.82 and 49.63 respectively with standard deviation 4.32, 6.99, 6.18 and 6.82. From this results we can conclude that implementing the model would give students a better result.

The mean difference for assessment 1, assessment 2, assessment 3, and assessment 4 is 1.43, 3.99, 6.55, and 5.18 respectively. Assessment 1 gives the smallest difference among the four assessments. This is an expected finding due to the adaptation of the first semester students to the new learning method. Switching from face-to-face with lecturer's guidance to computer-based education in a virtual classroom gives students a different learning experience. It takes some time for them to get accustomed to the new methods. There must be some obstacles when

students first use the online tools such as computer literacy, environment, and time management. Students who used computers for activities perceived that they could not adopt blended learning because of a lack of an enabling environment (Mswazi Tshabalala et al, 2014). For the pre-diploma student with an average result, this is a great challenge. After about a month following the online learning method, their result has improved constantly from assessment 1 to the final assessment. This shows that this new method did help them to understand their lesson well.

Comprehensive explanations help students because they gain a better understanding of the subject by seeing an example of the necessary steps and flow of the Mathematics calculation using KAMI. Additionally, students used YouTube to enhance their understanding. The students repeatedly watched the video, which helped them remember and develop their understanding of the subject. These findings seem to be directly supporting the hypothesis that the Mathematics Teaching Model would enhance the performance of the student.

Based on the observations, more questions were posted using WhatsApp as compared to the online class session. It is believed that the chat on WhatsApp allowed students to clarify their doubts immediately. Additionally, it is also delighted that students were also actively sharing their perspectives on the chat. They used this medium to ask questions, and the consultation period usually lasts longer until the students are pleased with the response.

The use of Google Meet or Zoom as a teaching platform in class provided students and instructors with instantaneous feedback and an opportunity to address misunderstandings promptly. This medium was also used to encourage discussion among students, which provided the opportunity for peer-to-peer learning, thus building on their understanding of the subject.

When comparing discussion to demonstration, lecture, and inquiry strategies, students in the discussion class performed better than those in the lecture group but less than students in demonstration and inquiry groups.

## Conclusion

ODL approach in teaching the mathematic subject is questionable when it's started to be implemented especially on the acceptance and effectiveness among students or lecturers. The lecturers need to create attractive module, platform, environment, courseware and teaching tools to make the ODL approach is more effective and furthermore to boost-up the confidence level among students and their parents. Transition of lecturer-centred to student-centred is the aim of national education policy for the students which are able to innovate creative ideas, to produce future leaders, high demanded assets, work with minimal supervision or work independently and assimilate of moral values to become excellent graduates.

The model of teaching mathematic to Pre-Commerce Programme students, as shown and discussed in this paper, can be further improvised by embedding additional components to enhance the ODL approach effectiveness. Sharing of ODL teaching approach experiences among lecturers and educators from different institutions will innovate news creative ideas. Hence, it will encourage active learning among students, motivated and nobody are left behind during the learning process.

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