

## PAPER NAME

**Turnitin-Template AJTLHE 2019-COMP  
RING THE EFFECTIVENESS OF ONLINE A  
ND FACE-TO-FACE TEACHING AND LE**

---

## WORD COUNT

**2565 Words**

## CHARACTER COUNT

**13979 Characters**

## PAGE COUNT

**9 Pages**

## FILE SIZE

**46.4KB**

## SUBMISSION DATE

**Jun 13, 2024 5:10 PM GMT+8**

## REPORT DATE

**Jun 13, 2024 5:10 PM GMT+8**

---

● **9% Overall Similarity**

The combined total of all matches, including overlapping sources, for each database.

- 7% Internet database
- 2% Publications database
- Crossref database
- Crossref Posted Content database
- 4% Submitted Works database

# COMPARING THE EFFECTIVENESS OF ONLINE AND FACE-TO-FACE TEACHING AND LEARNING METHODS IN AN ENGINEERING COURSE DURING AND AFTER THE COVID-19 PANDEMIC.

Diana Che Lat<sup>1\*</sup>, Roslizayati Razali<sup>2</sup> & Doris Asmani Mat Yusof<sup>3</sup>

<sup>123</sup>Civil Engineering Studies, College of Engineering, UiTM Johor Pasir Gudang Campus, 81750, Masai, Johor

(Corresponding author: [dianacl@uitm.edu.my](mailto:dianacl@uitm.edu.my), [roslizayati440@uitm.edu.my](mailto:roslizayati440@uitm.edu.my))

## Abstract

The horrific COVID-19 pandemic that took many lives stunned the entire world. To prevent the extremely hazardous COVID-19 infection, all work, including the teaching and learning process, had to be completed online. In order to make learning and teaching successful and accessible to school and university students, teaching and learning techniques have also undergone a drastic transformation. This is achieved through the use of online platforms. In this study, a case study was conducted based on Engineering Course at a Malaysian university for 3 course codes, for 3 semesters during COVID-19 and 2 semesters after COVID-19. The 3 course codes are Soil Engineering, Water and Wastewater Engineering, and Concrete and Steel Design. A comparison of teaching and learning assessment methods in normal and COVID-19 semesters is described in this study. Exam results of university students involved with a total of 111 to 283 students in each semester were analyzed to examine the effectiveness of online compared to face-to-face teaching and learning process. Overall, there was a drastic decrease in semesters that experienced a change in the teaching and learning process from online to face-to-face.

**Keywords:** [teaching and learning, online, face-to-face, COVID-19, engineering]

## Abstrak

Pandemik COVID-19 yang mengerikan yang meragut banyak nyawa mengejutkan seluruh dunia. Untuk mengelakkan jangkitan COVID-19 yang sangat berbahaya, semua kerja, termasuk proses pengajaran dan pembelajaran, perlu dilakukan secara dalam talian. Untuk menjadikan proses pengajaran dan pembelajaran berjaya dan boleh diakses oleh pelajar sekolah dan universiti, teknik pengajaran dan pembelajaran juga telah mengalami perubahan yang drastik. Ini dicapai melalui penggunaan platform dalam talian. Dalam kajian ini, kes kajian adalah diambil berdasarkan subjek kejuruteraan untuk 3 kod subjek bagi 3 semester semasa COVID-19 dan 2 semester selepas COVID-19. 3 kod subjek tersebut adalah Kejuruteraan

Tanah, Kejuruteraan Air dan Air Kumbahan, dan Rekabentuk Konkrit dan Keluli. Perbandingan kaedah penilaian bagi proses pengajaran dan pembelajaran pada semester normal dan COVID-19 diterangkan dalam kajian ini. Keputusan peperiksaan pelajar universiti terlibat dengan jumlah pelajar seramai 111 hingga 283 orang pada setiap semester dianalisis untuk meneliti keberkesanan pembelajaran secara atas talian berbanding secara bersemuka. Secara keseluruhannya terdapat penurunan yang drastik bagi semester yang mengalami pertukaran proses pembelajaran daripada secara atas talian kepada secara bersemuka.

**Kata kunci:** [pengajaran dan pembelajaran, atas talian, bersemuka, COVID-19, kejuruteraan]

## 1.0 INTRODUCTION

5 The World Health Organisation (WHO) declared the COVID-19 outbreak as a public health emergency of global concern on January 30, 2020. The biggest worry for World Health Organization (WHO) was that the virus would spread to nations with less developed health systems, making them unprepared to handle the outbreak (WHO, 2020). The COVID-19 epidemic caused widespread upheaval around the world, making 2020 a remarkable year. In many areas, including healthcare system, the economy, and education, governments and other institutions had to adjust to unanticipated problems. Consequently, a great deal of educational establishments moved swiftly to remote learning also referred to as e-learning, online learning, or virtual classrooms in order to guarantee their students' continuous access to classes (Bandar & Steve, 2024).

Over than hundreds of Public and Private Higher Education Institutions (IPTA and IPTS) in Malaysia decided to shift to online classroom in place of physical classroom instruction during the COVID-19 pandemic. The process of learning could not be operating as usual. The current physical class has to be done online using a variety of educational technologies (Sumitra & Roshan, 2021; Sukendro et al, 2020). The virus spread to Malaysia has affected the government's decision to implement a lockdown, which influenced the community's lack of physical activity and increased the use of smartphones and televisions for screen time (Bram 8 et al, 2020; Arkaitz et al, 2020; Derek et al, 2021). The learning process could never again take place face-to-face in the classroom; therefore, the educator would have to drastically change their previous approach to online learning (Huaijin et al. 2022). Since students and educators were unable to communicate face-to-face during the pandemic, the closure of educational institution broke the COVID-19 virus distribution. It is anticipated that the COVID-19 epidemic may end quickly when the online study guidelines are implemented (Edgar, 2020).

It was difficult for educators to teach using a manner that was unfamiliar and out of the ordinary. To address these problems and ensure that students are still learning in spite of the pandemic, effective teaching strategies has been implemented (Noboru et al, 2022). The teaching method was changing drastically; it was virtual and conducted from home (Minhyun et al, 2021), and teachers all around the world were using new technologies that have emerged (Panos & Dimos, 2023; Waleed et al, 2023; Le et al, 2023).

Following the COVID-19 pandemic for nearly three years, the WHO announced that the virus was no longer a global health emergency. After almost three years of the COVID-19 pandemic, Malaysia was able to successfully contain the outbreak with its vigorous reaction. The prime minister declared in March 2022 that the nation will enter the endemic phase in April 2022 (Joseph, 2022). In consideration of the widespread COVID-19 epidemic, most of Malaysian educational institutions are permitted to return to their campuses and start performing face-to-face classes, as per the directive of the Ministry of Higher Education. As a result, starting in October 2022, the School of Civil Engineering at UiTM was switching some of its education system from online to physical classroom and the students started physical classroom and examinations as before COVID-19. Student performance data based on assessments from September 2019 to February 2024 are the main focused in this primary study in order to compare the effectiveness between online and face-to-face teaching and learning during and after the pandemic. This is because these two specific time periods are important periods for students to normalize the transition of examination style from online to face-to-face assessment.

## **2.0 RESEARCH METHODOLOGY**

This research encompassed five semesters spanning periods during and after COVID-19 session. Data was collected from results of student during COVID-19 semester (online teaching and learning); <sup>2</sup> Sept 2019-Jan 2020 (Semester 20194), Sept 2020- Jan 2021 (Semester 20204), Oct 2021-Feb 2022 (Semester 20214), as well as during normal semester (face to face teaching and learning), <sup>3</sup> Oct 2022 - Feb 2023 (Semester 20224) and Oct 2023-Feb 2024 (Semester 20234) for three different course codes. These codes were selected as to represent the core subject such as Soil Engineering (ECG353), Water and Waste Water Engineering (ECW331), and Structural Concrete and Steel Design (ECS338). During pandemic, teaching and learning were carried out through online distance learning (ODL). Once the pandemic concluded, the teaching and learning process reverted entirely to face to face session.

## 2.1 Soil Engineering (ECG 353)

This course deals with the application of basic soil mechanic principles to civil engineering works. It covers topics on vertical stresses distribution in soils, lateral earth pressure, bearing capacity of soils, slope stability and subsurface soil exploration. According to the syllabus, the assessment is divided into a test (30%) and open assessment (10%) making up 40% of the total marks of the total continuous assessment marks. The final exam accounts for 60% of the total grade, covering all course topics. Table 1 list out the continuous assessment breakdown during normal semester.

Table 1: Assessment breakdown for ECG 353 during normal semester

Continuous assessment	Marks
Test	30%
Assignment	10%
Final examination	60%
Total	100%

During COVID-19 semester, the assessment was changed to different pattern in order to adapt with the online teaching and learning session. The final exam was replaced by two (2) assignments that contribute to 60% of total marks, and the other 40% of marks contribution was covered by 30% test and 10% quiz. The test was conducted in a synchronized manner, with students receiving test question using online platform. The question can only be assessed on the set date and time for limited time according to student learning time (SLT). Students were given two hours to complete the test, after which they had to upload their answer script through the online platform. If students were unable to upload their answer using the abovementioned medium, they could submit their answer script either using WhatsApp, Telegram or by email to their lecturer. The same procedure was followed for submitting assignment and quizzes. Table 2 illustrates the assessment breakdown for ECG 353 course during COVID-19 semester.

Table 2: Assessment breakdown for ECG 353 during COVID-19 semester

Continuous assessment	Marks
Assignments 1 and 2	60%
Test	30%
Quiz	10%

Total	100%
-------	------

## 2.2 Water and Wastewater Engineering (ECW331)

This course covers three area namely hydrology, water and wastewater engineering system. The study of water engineering focuses on the sources of water supply, water demand, water quality and water treatment system. The study of wastewater engineering covers the introduction of conventional wastewater treatment system, environmental impact of wastewater and its effect on public health. Like ECG 353, the assessment breakdown as stipulated in the syllabus included test, assignment and final exam. The final exam contributes to the highest mark for the continuous assessment which is 60% meanwhile test and assignment give 30% and 10% marks respectively as shown in Table 3.

Table 3: Assessment breakdown for ECW 331 during normal semester

Continuous assessment	Marks
Test	30%
Assignment	10%
Final exam	60%
Total	100%

During the COVID-19 semester, the course underwent changes in the assessment format. In stead of the traditional assessment that was stipulated in the syllabus, assessment was modified to include assignments, test and projects as shown in Table 4. These assignment and projects were to be completed as group projects, requiring students to works in group. Submission of their work was flexible whereby students could upload their assignments and projects via email or google drive. For those who has limited internet access, they could alternatively submit their work through WhatsApp. The test was conducted online through platform such as Microsoft teams or google classroom and students are compulsory to on their camera throughout the test session. This method can probably avoid students copying during test or discuss with their classmates.

Table 4: Assessment breakdown for ECW 331 during COVID-19 semester

Continuous assessment	Marks
Assignment	10%
Test	30%

Project 1	30%
Project 2	30%
Total	100%

### 2.3 <sup>4</sup> Structural concrete and steel design (ECS338)

This course deals with the methods of analysis and design reinforced concrete and steel structures in accordance with the relevant standards. The normal semester assessment is similar to ECG 353 and ECW 331 which comprises of test (30%), assignment (10%) and final exam (60%) as stated in Table 5.

Table 5: Assessment breakdown for ECS 338 during normal semester

Continuous assessment	Marks
Test	<sup>6</sup> 30%
Assignment	10%
Final exam	60%
Total	100%

Following the implementation of emergency measures and the transition from traditional face to face method of teaching to ODL, the assessment structure for ECS 338 was outlined in Table 6. The continuous assessment primarily consisted of assignments and quizzes with all assignments being conducted individually. Assignments were distributed to students through Whatsapp group/Telegram/ Email or any other suitable platforms. Students were required to submit the assignment in PDF form through the online platforms. Meanwhile for quiz, the question will be set up using Google Quiz Form or any other suitable platform. Students will answer all questions within the time given. At the end of each quiz session, student will get their marks directly and will see the right answer for each question. The details information about the assignment breakdown for this course during COVID-19 semester are explained in Table 6.

Table 6: Assessment breakdown for ECS 338 during COVID-19 semester

Continuous assessment	Marks
Assignment 1	20.0%
Assignment 2	27.8%
Assignment 3	15.0%
Quiz 1	15.0%
Quiz 2	22.2%
Total	100%

### 3.0 RESULTS AND DISCUSSION

Tables 7, 8 and 9 show the total students and failure rate for course code ECG353, ECW331 and ECS338 respectively for 5 different semesters. The graph as shown in Figure 1 compared 5 semesters of different batch of student with failure rate in 3 course codes; ECG353, ECW331 and ECS338. For the first 3 semester, the teaching and learning was online. The 4th semester showed the highest failure rate when full face to face was implemented after COVID-19 19 ceased. The 4th semester consisted of batch of student intake during pandemic COVID-1919 whereby they faced online teaching and learning from the 1st semester. During online teaching and learning, student assessment was also online. This batch of student undergone online class until Semester 3. During semester 4, they undergone face to face teaching and learning including assessments. From the graph of failure rate for different course code, it showed that this batch of student faced the highest failure rate during semester 4 whereby this period is the transition between online and face to face teaching and learning. The 3 course code is a hard core subject which the highest percentage cover up the cognitive domain. During the first three semester, they faced with fully online assessment method. They are not familiar with face to face assessment at the university, thus many of them were not able to score the subjects.

Table 7: Failure rate for Code ECG353

Semester	Total Students	Failure Rate (%)
2 Sept 2019 - Jan 2020	242	6%
Sept 2020 - Jan 2021	274	1%
Oct 2021 - Feb 2022	146	1%
3 Oct 2022 - Feb 2023	120	45%
Oct 2023 - Feb 2024	207	17%

Table 8: Failure rate for Code ECW331

Semester	Total Students	Failure Rate (%)
2 Sept 2019 - Jan 2020	222	23%
Sept 2020 - Jan 2021	283	2%

Oct 2021 - Feb 2022	153	6%
Oct 2022 - Feb 2023	117	34%
Oct 2023 - Feb 2024	211	17%

Table 9: Failure rate for Code ECS338

Semester	Total Students	Failure Rate (%)
Sept 2019 - Jan 2020	234	16%
Sept 2020 - Jan 2021	264	2%
Oct 2021 - Feb 2022	144	8%
Oct 2022 - Feb 2023	111	47%
Oct 2023 - Feb 2024	225	14%

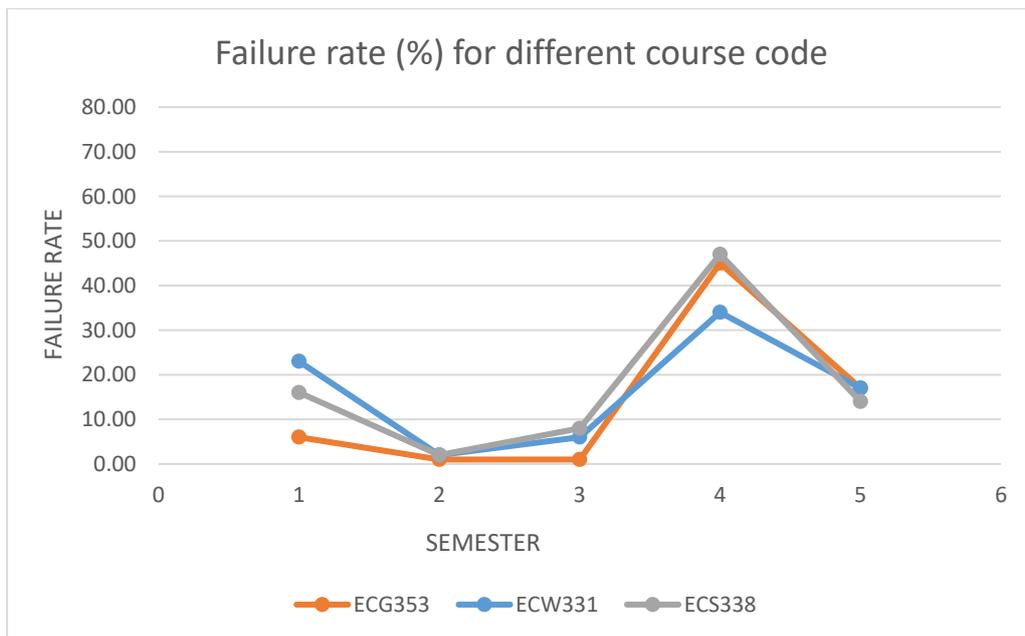


Figure 1: Failure rate (%) for different course code

#### 4.0 CONCLUSION

Online teaching and learning are not as effective as face to face method as the students are not able to pay full attention during teaching and learning process and the assessment is online at their own home so that it is more to open book test. Comparing to face to face assessm

ent, they carried out assessment in the lecture hall or classroom without bringing any reference books. Since the assessment is online, the student not really able to focus on the learning process since they have in their mind that the assessment will be conducted similar to open book test. Therefore, since their mind was trained to the relax learning process for the first three semester, they were not familiar with the serious or difficult learning process, therefore they were not able to carried out the assessment well when it comes to face to face assessment. The results during online assessment showed better compared to face to face assessment due to the assessment can only be monitored on the screen, thus the students still able to refer to the books.

## 5.0 ACKNOWLEDGEMENTS

The authors would like to express the warmest gratitude to Universiti Teknologi Mara Pasir Gudang for all the support given in this study.

## ● 9% Overall Similarity

Top sources found in the following databases:

- 7% Internet database
- 2% Publications database
- Crossref database
- Crossref Posted Content database
- 4% Submitted Works database

### TOP SOURCES

The sources with the highest number of matches within the submission. Overlapping sources will not be displayed.

1	<b>studylib.net</b> Internet	2%
2	<b>gemeinde-burgberg.de</b> Internet	1%
3	<b>www1.nyc.gov</b> Internet	1%
4	<b>Institute of Graduate Studies, UiTM on 2017-10-09</b> Submitted works	<1%
5	<b>newsclick.in</b> Internet	<1%
6	<b>coursehero.com</b> Internet	<1%
7	<b>Australian Catholic University on 2015-08-23</b> Submitted works	<1%
8	<b>bis.org</b> Internet	<1%

- 
- 9 Oh Chai Lian, Mohd Raizamzamani Md Zain, Norrul Azmi Yahya, Lee Si... <1%  
Crossref
- 
- 10 Universiti Putra Malaysia on 2021-11-16 <1%  
Submitted works
- 
- 11 S. A. Idris, A. R. Rashidi, A. Muhammad, M. Abdullah, O. S. J. Elham, M.... <1%  
Crossref
- 
- 12 ohbulan.com <1%  
Internet
- 
- 13 Swansea Metropolitan University on 2011-05-06 <1%  
Submitted works
- 
- 14 Universiti Utara Malaysia on 2020-01-08 <1%  
Submitted works