

## ORIGINAL ARTICLE

# Adapting to the New Normal: The Teaching and Learning of Parasitology Course During Covid-19 Pandemic

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## ABSTRACT

**Introduction:** The emergence of Coronavirus disease (COVID-19) has had the Malaysian Authorities enforce strict actions and tactical strategies to control the widespread disease. Education was one of the sectors greatly affected during that period. Hence, this survey was carried out to investigate the challenges in adapting to the new norms of which academicians and students face in teaching and learning Parasitology subjects in Malaysia. **Methods:** The qualitative explorative questionnaires (online survey) were administered to academicians and students who volunteered to participate in this study from February 2021 till April 2021 via Google form. **Results:** Based on the results gathered from pools of academicians and students (n=142), many academicians prefer the online teaching method (60%) over the physical, face-to-face teaching method. Surprisingly, 60% of the lecturers and 75.5% students were neutral on the question whether virtual online practical lesson is efficient as a live session for teaching. The current study has found that the COVID-19 pandemic lockdown had varying degrees of impact on most participants' academic achievement. **Conclusion:** Online teaching offers more freedom to lecturers and students to learn at their own paces and spaces. The recommendations from academicians and students indicated that they welcomed and were comfortable with online learning methods for Parasitology subjects in the future. However, as the laboratory practical, they prefer it to be held via physical (face-to-face) sessions.

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## INTRODUCTION

COVID-19 is a disease that was first found in Wuhan, China, in December 2019, caused by a new coronavirus called SARS-CoV-2 [1]. It was declared as a global pandemic by the World Health Organization on 12th March 2020. On 18th March 2020, Malaysia first accepted the unforgiving reality of the new norms as the government announced the movement of control order (MCO) [2]. Apart from essential services, all economic activities and other sectors were not allowed to operate, and education was a greatly affected sector. To ensure continuity, the education sector has transformed from face-to-face classes to online learning. Institutions that engage in this online mode of delivery or also known as online and distance learning (ODL), are doing so to help curb the spread of the COVID-19 virus.

The academicians and students needed to adapt to this new way of learning and had to master various educational online tools such as Microsoft Teams, Google Classroom, and Zoom Remote Conferencing quickly. ODL offers advantages such as the students can learn anywhere, anytime. However, there are also some challenges, such as limited internet access, not having any computer or laptop, and those from the science stream being unable to do laboratory practical's. The limitation of online learning is its extreme reliance on a network connection. Students may have a problem accessing online classes because of internet connection issues. Although the internet infrastructure in Malaysia has grown by leaps and bounds in the past few years, in smaller cities and towns, however, the problems with a consistent internet connection persist. There may be a loss of consistency and concentration in students' learning if they do not have a good connection, which would probably negatively impact the educational process [3].

Students in the science stream experience a great loss as they cannot do 'hands-on' experiments and research

in the laboratory. Parasitology subject, for instance, focuses on the study of parasitism, the relationship between parasites, hosts, and the environment. Parasitology is one of the subjects which mainly require laboratory practice, and all the necessary equipment or tools can only be found in the laboratories [4]. During the pandemic, lecturers and students' "absolute online" teaching approaches were used in Parasitology courses to replace physical teaching/experiments in universities. Some online experiments are conducted by breaking students into smaller groups online in the virtual demo classes. However, students are unable to practically experience the real procedures and receive an instant reaction to the experiments.

A previous cross-sectional observational study among medical science students has highlighted that the participants preferred live online lectures. Most students favor hybrid or blended learning in the post-COVID-19 period [10]. However, recently learning practical lessons through videos, YouTube, etc., have been a new norm in teaching Parasitology subjects. Hence, this survey was carried out to investigate the challenges of adapting to the new normal faced by academicians and students in terms of teaching and learning Parasitology subjects in Malaysia by enlightening the academicians on the perceptions of the current challenges.

## **MATERIALS AND METHODS**

### **Study designed and data collection**

A stratified sampling method was carried out on academicians teaching Parasitology subjects and students undertaking Parasitology subjects involving all universities across Malaysia. The online survey was carried out from February 2021 till April 2021 using a self-administered online form, namely Google form. Due to the escalating rate of pandemic cases in Malaysia during the study, all physical methods to collect data for sampling were cancelled. Several requests and reminders for data distribution were made via WhatsApp and Facebook, and phone calls were made as data collecting methods. Consent from the participants were obtained at the start of the online survey after they were informed about the purpose of the study and research objectives. Privacy and confidentiality were assured.

Next, participants were cross-checked with their familiarity to complete the survey using an online platform. The inclusion criteria are those who are teaching Parasitology subjects or students undertaking the subject. Exclusion criteria, on the other hand, are those who are unfamiliar with answering online surveys and were not involved in the online teaching/learning process.

### **Pilot study**

The questionnaire was tested on 10 staff and 30 students. The necessary modifications, changes, and corrections were done to ensure ease of understanding and clarification of all questions.

### **Research Questionnaires**

The qualitative explorative questionnaires were administered to academicians and students who had volunteered to participate in this study.

### **Research Questions to academician: -**

- I. RQ1: Socio-demographic factor of the academician, which includes gender, age, years of teaching experience,
- II. RQ 2: Methods of online teaching, challenges of online education, and satisfaction level
- III. RQ 3: Effectiveness of lecturers' teaching online Parasitology lessons and virtual lab demonstration.

### **Research Questions to the students: -**

- I. RQ1: Socio-demographic factor of the students which includes gender, age
- II. RQ 2: Methods of online learning, challenges of online learning, and satisfaction level
- III. RQ 3: Effectiveness of students learning and understanding of online Parasitology lessons and virtual lab demonstration.

### **Ethical Approval**

The study protocol is a part of study from approved ethics by Human Ethical Committee of UniKL [UNIKL REC /2020/003].

## **RESULTS**

### **Socio-demographic of the studies group**

Results encompassed 40 academicians teaching Parasitology subject and 102 students undertaking Parasitology subject from various universities including public and private universities, participated in this interesting survey. For the academician part, majority participants were female lecturers aged 30 years and above with most of them were in senior lecturer positions with an age range between 36 to 50 years old and mainly teaching Parasitology subjects.

For the students, the majority of participants were female students (72.5%), followed by male students (27.5%) with majority age range between 24 to 29 years (57%), and most were degree students (92.2%). (Table I).

### **Lecturer's Online Parasite Teaching Methods**

During the survey, most academicians agreed that they had some issues adapting to online teaching when it was newly implemented in March 2020.

**Table I : Socio-demographic of the studied group**

Academicians		Students		
Percentage (%)	Frequency	Demographic/ Description	Frequency	Percentage (%)
		Gender		
40%	16	Male	28	27.5%
60%	24	Female	74	72.5%
		Age		
		18-23	43	42.2%
		24-29	58	57%
35%	14	30-35	1	1%
45%	18	36-50		
17	7	51-60		
2	1	>60		
		Teaching Experience		
75%	30	≤ 10years		
25%	10	≥ 10 years		
		Programme Level		
25% (Teaching)	10	Diploma	8	7.8% (Learning)
75% (Teaching)	30	Degree	94	92.2% (Learning)
	<b>40*</b>	<b>Total</b>	<b>102*</b>	

\*Academician and students from eleven universities throughout Malaysia have participated in this study.

Among all the teaching platforms, Google Meet (55%) was the most frequently used to deliver a lesson, followed by Microsoft teams (25%). Other platforms such as Zoom meet (10%) and WebEx (10%) were also utilized to provide Parasitology lessons. Most academicians used laptops to conduct their classes, and the majority agreed on the ability to cover all topics as per pre- pandemic situation with the aid of a virtual lab demonstration. The results displayed that many had their engagements 1-2 times per week, with about 60% reported that they had no distraction while conducting classes. Surprisingly, many academicians voted for the online teaching method (60%) over the physical, face-to-face teaching method (Table II).

#### Students' Online Parasitology Learning Method

Feedback from the students indicated that most students were taking online classes from their own homes (75.5%), and only 24.5% had online classes from the hostel. Most students preferred the online platform for Parasitology lessons (87.2%), and most were using their laptops for learning (84.3%). The common engagement time for a Parasitology lesson was 3 hours per week (41.2%). As for the internet

connection, most of them have a moderate internet connection while no major issue was, such as shifting their locations to a higher ground or other locations to attend the online classes.

#### Comparison between Lecturers' and Students' Perspectives on Online Parasitology Learning

In this section, similar questions were posed to academicians and students on their experience and perspective of online Parasitology lessons. The first question was on the availability of adequate online resources to teach and learn Parasitology lessons. As for lecturers, 50% disagreed, and the student majority was neutral (77.5%) on the adequate online learning resources like an e-book on Parasitology, website, etc. However, both lecturers and students were neutral on the efficiency and satisfaction of learning Parasitology via the online platform. The most glaring result, was observed in the question about assessment submission section. Most of the academicians (55%) were just neutral, but the majority of the students, 55%, voted for online submission of the Parasitology course (Table IV).

**Table II : Lecturer's Online Parasite Teaching Methods**

Description		Percentage (%)
Do you have any issue with adapting to online teaching when first it was implemented	Yes	70%
	No	30%
Which platform did you use to teach parasitology subject to students?	Microsoft Teams	25%
	Google Meet	55%
	Zoom	10%
	WebEx/Others	10%
Which device do you use for online teaching?	Laptop	60%
	Desktop	40%
The students learn all the parasitology topics as how physical classes conducted before pandemic?	Yes	65%
	No	35%
Do you use virtual parasitology lab while teaching?	Yes	65%
	No	35%

**Table III : Students' Online Parasitology Learning Methods**

Descriptions		Percentage (%)
Where do you take online class	Own Home	75.5%
	Hostel	24.5%
Which platform do you prefer to learn parasitology subject	Online class	87.2%
	Physical class	5.9%
	Both	6.9%
Which device do you use to take online parasitology class?	Laptop	84.3%
	Phone	8.8 %
	Tablet	6.9%
How many hours you spent for parasitology class per week	Less than 2 hours	27.5%
	3 hours	41.2%
	4 hours	29.4%
	5 hours and more	1%
Viability of Proper Internet Connection	Slow	31.4 %
	Moderate	56.9 %
	Fast	11.8%

**Table IV : Comparison between Online Parasitology Teaching and Learning for Lecturers and Students**

Description		Rating				
		Strongly Agree	Agree	Neutral	Disagree	Strongly disagree
Questions asked on L (for lecturers); S (for students) There are adequate online resources and references to deliver (L) and to learn (S) parasitology course online	Lectures	0	0	37.5%	50%	12.5%
	Students	0%	5.9%	77.5%	13.7%	2.9%
The virtual online practical lesson as is efficient as live session for teaching (L) or learning (S)	Lectures	2.5%	30%	60%	7.5%	0
	Students	1%	15.7%	75.5%	5.9%	2%
Your students are satisfied the way you deliver parasitology lesson via online? (L) You are satisfied with the way your lecturer deliver parasitology lesson via online? (S)	Lectures	0	35%	45%	15%	5%
	Students	0%	12.7%	66.7%	16.7%	3.9%
Your students proactive in asking question during lesson? (L) You are able to clarify all your doubts and questions during online lesson? (S)	Lectures	2.5%	42.5%	42.5%	12.5%	0
	Students	15%	22.5%	44.1%	18.4%	0
Online parasitology assessment is as effective as physical assessment (L) Online assessment are easier to be done and submitted (S)	Lectures	0	2.5%	55%	27.5%	15%
	Students	55%	20%	20%	5%	0

**Table V : Recommendations from Lecturers and Students on Parasitology Teaching**

Lecturers	Students
To continue with online teaching platform after pandemic for lecturers, but laboratory session should be in physical classes.	Lectures to be conducted both via online and physical method post pandemic.  Allow students to learn parasitology online from hostel or hometown.
To train academicians on online teaching tools and methods from time to time.	Practical sessions to be held in universities with smaller groups of students.
Universities to purchase online software to teach parasitology course.	To conduct live demonstrations in lab while teaching practical session.

**DISCUSSION**

World Health Organization declared COVID-19 a pandemic on January 2020, affecting many sectors in terms of health practices and lifestyles. As we are aware, the education sector worldwide was very much influenced by the sudden changes in teaching and learning methods from physical to online sessions

resulting in a high- dependence on online distance learning methods, especially for university students [5]. This was due to the first COVID-19 case detected on 25th January and then spreading precipitously throughout Malaysia [6]. The Ministry of Higher Education Malaysia (MoHE) announced that all teaching and learning activities should be conducted online in early 2020. It became more unpredictable

regarding the decision to resume normal physical classes and return to normal ways of life. It was gazetted that other physical, face-to-face activities were not allowed to prevent the spread of the COVID-19 [7].

The standard operating procedures (SOP) implemented for university teaching and learning practices have also directly impacted the Parasitology subject all over Malaysia. Several blended teaching methods and absolute online assessments have been implemented and have become a norm for all Parasitology lectures and students. This survey was conducted to unravel the viewpoints on how “absolute online” teaching and learning technologies for Parasitology course has affected both lecturers and students involved in the Parasitology course in Malaysia.

Based on the viewpoints gathered from academicians and students, it is evident that the current curricula used to teach Parasitology subjects in Malaysia are fairly good, flexible, and adaptable for both physical and online teaching. Feedback from various questions exhibited that the majority was quite neutral and agreed on the conversion efficiency from physical to online methods. No reports of major cancellations on specific topics or disruption of assessments due to the E-learning implementation. During the sudden implementation of E-learning in early 2020, educators were not fully trained to implement online teaching methods. Nevertheless, after a year of E-learning implementation, all modules for Parasitology were successfully taught and covered by the majority of lecturers [7].

During a pandemic, Malaysia’s common online teaching methods are livestreaming classes, online problem-based learning (PBL), quizzes, pre-recorded virtual lab, assessment, etc. For all questions posed to eleven institutions, it was discovered that the Parasitology course had been successfully implemented online despite some minor hitches involving laboratory lessons. In a write-up from an author from Melbourne Veterinary School (University of Melbourne), several online adaptive tutorials were implemented in 2018 using Smart Sparrow. They showcased a desirable result in enabling students to understand and solve clinical problems related to animal matters. The author also supported for future Parasitology lessons to be inclusive of online adaptive learning activities, which can aid learning and understanding of the subject matter [8]. In contrast, Jabbar et al., 2021 mentioned that face-to-face learning is more effective than asynchronous learning in veterinary students undertaking Parasitology subjects [9].

However, compared to these two authors’ viewpoints which focused on veterinary students undertaking

Parasitology lessons, our survey worked on a wide range of academicians/ students from eleven institutions. This survey recorded feedback from multiple sights and perspectives of the participant and was generalized to the Parasitology course in each institution. We managed to acquire participation in the study from various departments such as Medical school, Veterinary school, Biomedical Science School, Basic Health Science School, Microbiology Faculty, Dentistry school, Forensic Science programme, etc. Communication is crucial for students and lecturers to ensure smooth and effective teaching and learning. Communication is not mainly to deliver information, but it can also promote initiatives, modify attitudes, and stimulate critical thinking. In the survey, students were discovered to be proactive in asking questions or discussing during the lesson and no “strongly disagree” rating was recorded. Other findings suggested that online communication and preparation for online learning were positively connected through survey items relating to comfort in using asynchronous technologies such as email and submitting queries via comment threads [11]. The discussion also taught the students to practice quick critical thinking and enhance their communication skills. Both students and lecturers play an important role in discussion activities as it can increase the students’ understanding of the lesson, helps to generate more ideas about the topic, and help build confidence in themselves. It is also worth mentioning that online learning has boosted confidence in students to ask questions openly, as observed in this study.

Typical Parasitology practical session involves identifying a group of parasites via microscope and various hands-on techniques. However, due to COVID -19, the practical and lab sessions can only be held virtually or demonstrated through videos. Nevertheless, most academicians and students voted for “neutral”, meaning virtual demonstration still manages to play a role in teaching the organism morphology, diagnostics technique, and analyzing methods.

The current study also discovered that the COVID-19 pandemic lockdown had varying degrees of impact on most participants’ academic achievements. Online teaching seems to offer more freedom to both lecturers and students to learn at their own pace and place. The recommendations from participants showed they welcome the online learning method in Parasitology in the future, but as for laboratory practical’s, they prefer it to be held in physical classes. As Science, Technology, Engineering, and Mathematics (STEM) in Malaysia has a rampant development using digital technologies, artificial intelligence, automation, etc., all of these should be considered as a form of blended learning for future delivery practices of Parasitology lessons.

## CONCLUSION

The current study aimed to investigate the challenges of adapting to the new normal faced by academicians and students in terms of teaching and learning Parasitology subjects in Malaysia. This study has shown that both lecturers and students showed neutral feedback on the efficiency and satisfaction of learning Parasitology via the online platform. These results suggest that it is evident that the current curricula used to teach Parasitology subjects in Malaysia are fairly good, flexible, and adaptable for both physical and online teaching. As to highlight that communication and student participations are crucial to ensure smooth and effective teaching and learning. Limitations throughout the study were on the small sample size of academicians, students and due to the survey, which was exclusively focused on only Parasitology lecturers and students undertaking Parasitology courses that were offered at few universities throughout Malaysia. For future studies, we suggest conducting more detailed surveys on a broad scale of participants regarding the effectiveness of online lessons based on science-related subjects. This is to ensure improved and effective teaching and learning techniques can be successfully applied in any given conditions.

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