Physiotherapy Students' Perceptions of e-Practical Learning on Achieving Learning Outcomes – A Pandemic Perspective

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Abstract. The Movement Control Order (MCO) currently in effect in Malaysia was imposed in order to control the spread of the COVID-19 virus. This unfortunate circumstance has resulted in dramatic teaching and learning pedagogy shifts from traditional physical classes to online learning, including practical sessions. Therefore, this study aims to identify the Malaysian physiotherapy students' perceptions of e-practical education in achieving learning outcomes. In this cross-sectional study, 409 physiotherapy students from Malaysian universities participated voluntarily in the online Google Form survey, which was circulated through social media platforms from August 2021 to October 2021. Data were analyzed using IBM SPSS version 26.0 software. The results of the study demonstrate that students preferred traditional classes in comparison to online practical sessions in achieving the learning outcome of practical skills ($p<.0.000$) and social competencies ($p<.0.000$). Moreover, their activity level was also higher in physical classes ($p<0.000$). In a comparison of online and traditional practical (face-to-face) classes, the majority of students voted gaining theoretical knowledge as neutral or slightly effective but slightly ineffective in improving practical skills. Students felt that more hands-on practice through face-to-face classes would enhance the attainment of the learning outcome. In future, therefore, educational institutions can consider introducing other forms of interactive online mediums to simulate physical classes.

Keywords: COVID-19; pandemic; e-learning; online learning; practical classes; practical skills; physiotherapy students

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1. Introduction

Electronic (e) learning is the use of electronic technology and media to deliver, support, and enhance learning and teaching through online content communication (Howlett et al., 2009). It refers to a method of teaching and learning in which teachers and students communicate and accomplish tasks via the Internet, as opposed to the traditional classroom (Li et al., 2014). In a survey reported in 2011, more than 6.1 million students were enrolled in at least one or more online courses in 2010, with 31 per cent of all students enrolled in higher education enrolled in at least one online course in the previous academic year in the United States (Allen et al., 2011). According to a more recent report, the number has climbed by approximately 570,000, bringing the total number of students enrolled in at least one online course to one million. The report also indicates that the number of students enrolled in at least one online course has reached a record high, with a current growth rate of 9.3 per cent; moreover, it anticipates that there is no indication that the trend will halt in the foreseeable future (Allen & Seaman, 2013). According to a recent study by Ng et al. (2021), 100 per cent virtual learning is a pedagogical approach with no face-to-face component and relies entirely on online-based learning tools. Online learning or e-learning is not a new concept and has been incorporated into modern 21st-century education.

Since the outbreak of the coronavirus illness (COVID-19) in late December 2019, the disease has spread around the world. Consequently, the World Health Organization (WHO) has declared COVID-19 to be a global pandemic, resulting in movement restrictions (Almomani et al., 2021). Education has been identified as one of the sectors most adversely affected by these constraints. In the new age of technology educational institutions have switched to e-learning owing to the unforeseen global pandemic that forcibly changed the ways we currently conduct our lives. However, many universities have not fully grasped the concept of total online learning; therefore, the sudden change can lead to many disturbances in the efficient delivery of teaching.

As the MCO has been in place in Malaysia since March 2020, effective execution of online pedagogical design should be implemented so students' learning experience is engaging and not lacking. In light of this, most Malaysian universities have turned to online classes or e-learning as a substitute for maintaining continuing education for students. The physiotherapy field is no exception, with half of all physical activity reduced for both practitioners and students (Quek & Alexanders, 2020). e-Learning can be understood as an educational strategy that involves the application of blended computer science and communication to provide the students with access to all the required education programs (Regmi et al., 2020). In a study, educational institutions have responded by implementing online learning (e-learning) using a virtual learning environment (VLE) and utilizing applications such as Blackboard, WebCT, or Moodle as a medium to re-enact a classroom setting (Peacock & Hooper, 2007). It has been reported that learning outcomes were attained more effectively in e-learning than in physical classes (Kemp, 2020), while another

study (Kemp & Grieve, 2014) reported remarkable insight reflecting students' academic performances indicating average to similar levels in both modes. Their study results revealed that students prefer conducting written activities online while being able to discuss issues physically amongst peers and instructors. Therefore, it is essential to understand the students' perspective as it provides the necessary insight, especially when it comes to learning approaches for optimized learning. This includes several aspects such as learning achievement, emotional and intellectual stimulation, and satisfaction (Van Wart et al., 2020).

As the initiation of an online learning system requires change, usability in e-learning is considered a vital issue. Additionally, a coherent and efficient learning intervention includes the alignment of the technology, the learner and educational software where the needs of the user have to be the focus for usability to mitigate the high dropout rate as well as academic aspects (Rodrigues et al., 2019). According to a study conducted by Muthuprasad et al. (2021), 60 per cent of the students who participated in the survey deemed online classes to be less effective than face-to-face classes in terms of communication between students and lecturers. Another study (Kemp, 2020) analysing e-learning and physical classes focused on two main aspects: perceived learning and perceived effort. It was found that though there was only a modest difference between the two, face-to-face learning was recorded as being favoured. The main reasons for this are physical classes fulfilling expectations and students participating in classes that are engaging (Kemp, 2020).

Despite this, students' perceptions of the quality and effectiveness of online classes for their education are highly subjective owing to the following factors: their learning objectives, course content, educational support satisfaction, technical accessibility, assessment criteria, and peer-learning groups (Bączek et al., 2021; Van Wart et al., 2020). As a result, students and teachers both find it difficult to communicate and apply concepts in real-world contexts while teaching behind a computer screen. An article published by Yu and Jee (2021) indicated that online physical education sessions do not assist students in terms of health, physical skills, collaboration among students or encouraging social interactions.

Furthermore, while e-learning improves students' theoretical knowledge, it may not be beneficial in terms of clinical skills and achieving learning outcomes (Olivier et al., 2020). Activities such as online discussions provide support, improve communication and deepen engagement with the learning materials. However, undergraduates in a study by Peacock and Hooper (2007) mentioned that the traditional face-to-face classes are necessary to understand the importance of certain information and particular knowledge in practice. Therefore, it is suggested that research be conducted to determine the effectiveness of e-practical learning in terms of achieving learning outcomes in physiotherapy students.

With the developing dependency on online education, a pedagogically effective learning design model should be implemented to supplement the lack of face-to-face demonstration and correction to ensure an engaging learning environment despite being online. A poorly designed class would lead to learners losing interest owing to the confusion (Almomani et al., 2021; Yu & Jee, 2021). In addition, e-learning is efficient in terms of academic knowledge; however, the same cannot be said of the practical aspects (Olivier et al., 2020). Activities such as online discussions and quizzes provide support and improve communication; however, face-to-face demonstration and practice better enable the grasping of ideas (Peacock & Hooper, 2007).

A recent systematic review of 24 studies conducted by Regmi et al. (2020) has identified e-learning as an educational strategy that facilitates learning through the utilization of information technology and communication, providing an opportunity for access to all the required education programs. There has to be a two-way reciprocation between the students and educator for learning to take place. The students' self-discipline and prioritization can also affect the effectiveness of e-learning as the pedagogical system on which virtual classes are based provides everything. Therefore, the students are expected to be sufficiently responsible and mature to meet the deadlines provided and keep up with the scheduled subjects (Gorbunovs et al., 2016). Unlike traditional classes where a student is present when the lecture is given, online classes may not require the students to do so since the classes are recorded so that the students can refer back at a later date.

As online classes are becoming the new norm, the feedback from students in e-practical education is essential. This study garnered statistics on whether online students are achieving their learning objectives for their course compared to their classroom-based course counterparts and vice-versa (Almomani et al., 2021; Garratt-Reed et al., 2016; Yu & Jee, 2021). There is not much research on web-based physiotherapy education; more research is needed in this discipline (Mącznik et al., 2015). It was stated that there is a lack of systematic reviews available on e-learning, especially in specific practice areas of medical education. Though e-learning has been shown to have its drawbacks and there is justification for dissatisfaction, there are also students who are content with e-learning, which results in better performance. Gopal et al. (2021) identified the four distinct determinants for the students' satisfaction as course design, quality of the instructor, prompt feedback, and students' expectations. Primarily, consistency in course design and the interaction between the instructor and students promote and enhance critical thinking and even information processing.

Moreover, several studies have indicated that one of the highest-rated key components in students' satisfaction with e-learning is the quality of the instructor (Gopal et al., 2021; Muthuprasad et al., 2021; Rodrigues et al., 2019). This component includes everything an instructor does for the class such as explaining assignments, answering questions and structuring assignments (Van Wart et al., 2020). Additionally, Khlaif et al. (2021) suggest that instructors

engage with the students personally with mindful interventions and positive psychological approaches to improve the students' satisfaction and performance. Furthermore, prompt feedback speaks of clear communication between the instructor and student. It is noted that prompt feedback aids in creating a strong bridge between students and instructors which can ultimately result in an improved learning performance (Gopal et al., 2021).

Therefore, this study focuses on the future generation of the physiotherapy discipline in Malaysia. To further build an online environment, it is necessary to better understand how students regard working and studying online (Hammarlund et al., 2015). It examines the self-discipline factor in Malaysian students during online classes during the MCO period. Upon investigation, it was mentioned that students who are academically focused tend to perform better than those who prioritise their enjoyment and entertainment (Muksin & Makhsin, 2021). The maturity of the students also comes into effect when students understand the consequences of procrastination and practise self-discipline to avoid falling behind.

There is much research from other countries about the effect of online education on their students (Armstrong-Mensah et al., 2020; Gopal et al., 2021; Subarkah et al., 2020). However, there is no current research on Malaysian physiotherapy students. Therefore, this study aimed to compare e-practical learning and traditional practical (face-to-face) classes in attaining the learning outcome in theoretical knowledge, clinical skills, social competencies and participation level. In addition, the advantages, disadvantages and satisfaction with e-practical learning for physiotherapy students in Malaysia during the COVID-19 pandemic were also considered. This research aims to answer the following question: "What is the perception of e-practical learning and traditional practical (face-to-face) classes of physiotherapy students in achieving their learning outcomes from a pandemic perspective?"

2. Methodology
2.1 Study Design and Setting
This is a non-experimental and cross-sectional approach study. A face-validated adapted questionnaire developed by Bączek et al. (2021) was provided to the physiotherapy students pursuing diplomas and degree levels in Malaysia.

2.2 Study Participants, Sampling and Criteria
The current study purposively recruited 409 students pursuing their physiotherapy studies in Malaysian universities. Students who do not understand English were excluded from the study owing to the nature of the questionnaire. As the research is based on online practical classes, only diploma and undergraduate students were included in the study.

2.3 Study Procedure
Upon informed consent, the participants were requested to complete an adapted questionnaire developed by Bączek et al. (2021). The questionnaire was created using an online Google Form and the link was distributed via social media

(Facebook, WhatsApp and emails). The purpose, risks, benefits, confidentiality, and contact details of the researcher were included in the questionnaire, followed by the demographic profiles of the participants.

The main section of the questionnaire comprised the following areas, namely theoretical knowledge, clinical skills, social competencies and participation level. It compared e-practical learning and traditional practical (face-to-face) classes and their advantages, disadvantages and satisfaction with e-practical learning for physiotherapy students. Respondents were asked to rate face-to-face and online learning in terms of their ability to achieve learning objectives (knowledge, clinical skills, social competencies, and participation level) on a Likert scale (1 = ineffective to 5 = effective) (See Appendix 1).

2.4 Ethical Considerations

Before collecting data, institutional ethical approval was obtained from the research ethics committee. Participation in the study was voluntary, and individuals could withdraw at any time during the study without providing a reason. In addition, informed permission was acquired from each participant during the administration of the questionnaire.

2.5 Data Analysis

IBM SPSS version 26.0 software was used for statistical analysis in the current study. Demographic data and e-practical learning versus traditional practical (face-to-face) data were represented using the frequencies and percentages. In contrast, the comparison between e-practical learning and traditional practical (face-to-face) classes was analysed using the Wilcoxon signed-rank test. The level was set at 0.05.

3. Results

3.1 Demographic Details of the Participants

A total of 409 students (Age: 21.99 ± 1.74) were recruited in the current study. Table 1 represents the detailed demographic characteristics of the participants.

Table 1: Demographic characteristics of the participants

Variables	Frequencies (n)	Percentage (%)
Gender		
Male	172	42.1%
Female	237	57.9%
Age		
19 and below	37	9%
20-24	354	86.6%
25-27	18	4.4%
Level of study		
Diploma	33	8.1%
Degree	376	91.9%
Year of study		
Year 1	59	14.4%
Year 2	85	20.8%
Year 3	112	27.4%
Year 4	153	37.4%

IT skills		
High	90	22.0%
Moderate	64	15.7%
Low	255	62.3%

Tables 2 and 3 compare e-practical learning and traditional practical (face-to-face) learning during the Covid-19 pandemic among physiotherapy students. The majority of students answered neutral (n=177, 43.4%) on the stance on the effectiveness of e-practical learning in improving theoretical knowledge. Besides, most students prefer traditional learning voted as slightly effective (n=177, 43.4%) and effective (n= 55, 13.4%) compared to e-practical. There were significant differences between e-practical and traditional practical learning (p=0.000).

Students found e-practical learning slightly ineffective (n=186, 45.4%). Most students viewed traditional practical learning as more effective (n=229, 56%). In addition, the results also showed significant differences (p= 0.000) as students identified more improvement in traditional physical, practical classes than in online-based learning (e-practical). Most students found e-practical learning slightly ineffective (n=163, 39.9%) in the social competencies component in comparison to traditional practical (face-to-face), where the majority students responded as either slightly effective (n=164, 40.1%) or effective (n=166, 40.6%). The Wilcoxon signed-rank test showed a significant difference (p= 0.000) as students felt they were more sociable in traditional classes over virtual lectures.

Most students had a neutral (n=170, 41.6%) stance in terms of activity during online practical classes. In comparison to traditional practical (face-to-face) learning, students mainly responded as slightly active (n=182, 44.5%). The results also showed significant differences (p= 0.000). Thus, students were more active in traditional practical (face-to-face) as compared with e-practical learning.

Table 2: **Comparison between e-practical learning and traditional practical (face-to-face) classes on theoretical knowledge and clinical skills**

Level of effectiveness	Theoretical knowledge		p value	Clinical skills		p value
	e-Practical learning	Traditional learning		e-Practical learning	Traditional learning	
Ineffective	16 (3.9%)	2 (0.5%)		167 (40.8%)	4 (1%)	
Slightly ineffective	53 (13%)	20 (4.9%)		186 (45.5%)	12 (2.9%)	
Neutral	177 (43.3%)	155 (37.9%)		39 (9.5%)	13 (3.2%)	
Slightly effective	130 (31.8%)	177 (43.3%)	0.000	15 (3.7%)	151 (36.9%)	0.00
Effective	33 (8%)	55 (13.4%)		2 (0.5%)	229 (56%)	

Table 3: **Comparison between e-practical learning and traditional practical (face-to-face) classes on social competencies and participation level**

Level of effectiveness	Social competencies		p value	Participation level		p value
	e-Practical learning	Traditional learning		e-Practical learning	Traditional learning	
Ineffective	85 (20.8%)	3 (0.7%)	0.000	38 (9.3%)	4 (1%)	0.000
Slightly ineffective	163 (39.9%)	14 (3.4%)		153 (37.4%)	12 (2.9%)	
Neutral	136 (33.2%)	62 (15.2%)		170 (41.6%)	144 (35.2%)	
Slightly effective	24 (5.9%)	164 (40.1%)		42 (10.2%)	182 (44.5%)	
Effective	1 (0.2%)	166 (40.6%)		6 (1.5%)	67 (16.4%)	

The participants' responses showed high percentages for both advantages and disadvantages of e-practical learning (Table 4). The highest numbers of recorded benefits of e-practical learning were watching the recorded lecture session and accessing online materials. The disadvantages faced by the students were the reduced interaction with the teacher, technical problems encountered during the online sessions and lack of interactions with patients. However, in terms of satisfaction, most of the students responded as being neutral or dissatisfied.

Table 4: Advantages, disadvantages and satisfaction towards e-practical learning for physiotherapy students

Variables	Frequencies (n)	Percentage (%)
Advantages		
Access to online materials	334	81.7%
Learning at your own pace	316	77.3%
Ability to stay home	286	69.9%
Class interactivity	68	16.6%
Ability to record a meeting	351	85.8%
Comfortable surroundings	272	66.5%
Disadvantages		
Reduced interaction with teacher	351	85.8%
Technical problems	357	87.3%
Lack of interactions with patients	384	93.9%
Poor learning conditions at home	284	69.4%
Lack of self-discipline	335	81.9%
Social isolation	310	75.8%
Overall satisfaction		
Ineffective	59	14.4%
Slightly ineffective	149	36.4%
Neutral	141	34.4%
Slightly effective	50	12.2%
Effective	10	2.4%

4. Discussion

The current study evaluated the perceptions of 409 physiotherapy students on the effectiveness of e-practical in accomplishing learning objectives during the

pandemic. It is thought to be the first of its kind in Malaysia. The current study revealed that the students preferred traditional practical classes to e-practical in improve their theoretical knowledge. Even though 69.9 per cent of students think staying home to study is a benefit, an equal percentage, namely 69.4 per cent, consider the learning environment at home to be inferior to that at a university. Drašler et al. (2021) found that a poor home environment interferes with learning activities owing to distractions from other family members and the fact that they do not have a dedicated study space at home. Most students (81.7%) thought having access to online information would be useful because they could learn at their own pace (77.3%). The majority, however, suffer from a lack of discipline (81.9%), which contributes to the slow rate of learning, disengagement and lack of motivation. As noted in a previous study, the continual availability of the computer for leisure-type activities may result in increased distraction and decreased efficiency among the students (Regalado & Smale, 2015).

In terms of clinical skills, students have a significant preference (p=0.000) for physical practice rather than virtually guided practice sessions. As discussed by Bączek et al. (2021), not having hands-on experience in the clinical setting will compromise students' ability to grasp concepts that cannot be seen or pictured with purely wordy explanations. Even thorough demonstrations are not the same learning experience as applying hands-on skills with modifications or corrections given by instructors (Van Wart et al., 2020). Moreover, when it comes to diagnosing a patient's condition, a lack of competencies, experience and practical skills might have long-term consequences at a higher level of education or when entering the job market (Gamage et al., 2020). Furthermore, the majority of instructors who have never had any online teaching experience or obtained suitable training are unlikely to be able to offer an effective online learning experience. This could contribute to the lack of competencies among the physiotherapy students (Chiu, 2022).

Moreover, the current study confirmed that face-to-face practical learning is more effective than virtual online learning in improving social competencies (p=0.000). The 75.8 per cent of respondents selected social isolation as a disadvantage, and only a small percentage of 16.6 per cent felt that a virtual class was interactive. According to previous research, students who feel much more socially isolated and receive less social support may be at greater risk of experiencing negative social consequences such as anxiety, stress, and depression, leading to mental health problems (Elmer et al., 2020). Anxiety and stress exacerbated by the unusual public health crisis, social isolation, and economic slump could further aggravate students' pre-existing mental health problems (Singh et al., 2020). Therefore, student self-regulation, motivation, and a positive learning disposition are emphasized and must be supported even more in the future.

Research shows that studying at home resulted in a loss of teamwork consistent with concerns about distance learning in pre-COVID time (Choate et al., 2021). Similarly, students in face-to-face practical lessons are more engaged than those

in online courses regarding activity levels. This is also related to why students felt the lack of interaction with teachers (n=351, 85.8%) and patients (n=384, 93.9%) was an issue. The lack of social support from the instructors and peers causes great student dissatisfaction with learning (Khlaif et al., 2021). Educators may boost student motivation in online or distance learning by supporting student autonomy, assuring education, and engaging interpersonally with the student (Chiu, 2022). In the long run, instructors who support autonomy will consider student perspectives, allow for alternatives in learning, provide reasoning when the choice is limited, minimize the use of controlling language, and reduce excessive pressure and expectations on students, enabling them to use their voices to seek help and, as a result, feel empowered in learning (Alamri et al., 2020).

According to the perception of the benefits of e-learning, the most favoured benefits of e-learning were the ability to record the session (85.8%), accessibility to online materials (81.7%) and the capability to learn at their own pace (77.3%). The readily available information makes it convenient for students to access any lecture notes or meetings as it is all placed in one space (Choate et al., 2021). The amount of information on the Internet is vast and readily available for use; thus, students can give a quicker response when asked questions (Hammarlund et al., 2015). In the other hand, 83.4 per cent of students identified class involvement as their least favourite benefit. Reduced interactivity has been identified in previous studies as a common cause of discontent with e-learning because of the scarcity of electronic devices, technical issues, a lack of technical support, as well as the lack of access to a high-speed Internet connection (Khlaif et al., 2021; Lapitan et al., 2021; Muthuprasad et al., 2021). Some students will be unable to participate in online courses because they do not have access to the Internet, and sluggish connections might make accessing course platforms and resources challenging (Muthuprasad et al., 2021). Thus, to ensure the success of online learning, Internet access should be made equitable and accessible to all.

Although a recent study has forecast the benefits of using e-practical learning as a pandemic alternative, e-practical learning is not without its drawbacks. More than 90 per cent of physiotherapy students highlighted insufficient engagement with patients as a major drawback. Students would have no hands-on skills, even if clinical placements were conducted virtually. It is vitally essential and invaluable for students to apply their theoretical knowledge by having hands-on experience with actual patients (Bączek et al., 2021; Khan et al., 2021).

Education is a two-way process involving both the institution and the students. In the current study, 81.9 per cent of students reported lacking self-discipline. Students are assumed to be alert and ready to process information taught in physical classes. In contrast, everything is already provided online in e-learning. Nevertheless, it is up to the students' self-discipline, time management, and motivation to complete their coursework on time and keep up with the lectures (Gorbunovs et al., 2016).

When physical classes abruptly change into fully online courses, students have to rely on good Internet connectivity, Internet availability and accessibility to computers or electronic devices (Almomani et al., 2021; Choate et al., 2021; Hammarlund et al., 2015). Lack of decent Internet accessibility can lead to discrepancies in video exchange by both educators and students, which is also an issue reported by Choate et al. (2021). Thus, user perception and their knowledge of and skills in computer use are all critical variables in the effective implementation of e-learning tools.

The study's limitations include the possibility of decline bias and selection bias, as e-learning is a relatively new concept introduced abruptly, and the study group may be reacting badly to something that is out of the ordinary. Owing to time and resource constraints, the focus of this study was only on students' perspectives; the instructors' views were excluded.

The survey found that Malaysian physiotherapy students are generally dissatisfied with their e-practical learning experiences. As for physiotherapy education where the emphasis is on hands-on learning, it may not be viable to convert to an online learning model. A hybrid method is advocated for universities by means of which online lectures are supplemented by small-group practicals in which social distancing is maintained.

5. Conclusion

When comparing online and traditional practical (face-to-face) classes, the majority of students are neutral and regard attaining the theoretical knowledge only as slightly effective. However, in terms of improving practical skills, students felt more hands-on practice through face-to-face contact sessions would enhance the learning outcomes. The results thus showed that the students were enthusiastic about the novel teaching technique, yet believed traditional classes were required for practical sessions. Therefore, educational institutions can consider introducing other forms of interactive online mediums to simulate physical courses. The participants' responses showed high percentages for both advantages and disadvantages of e-practical learning. In contrast, in terms of the level of satisfaction, however, most of the students responded as neutral or dissatisfied.

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Appendix 1

How old are you (in years)?
What is your gender?
What is your current level of studies?
What year of physiotherapy studies are you in?
How would you describe your IT skills?
Have you ever participated in any type of e-practical learning before the pandemic?
What are the advantages of e-practical learning?
What are the disadvantages of e-practical learning?
Rate the effectiveness of e-practical learning in terms of increasing theoretical knowledge.
Rate the effectiveness of e-practical learning in terms of increasing clinical skills.
Rate the effectiveness of e-practical learning in terms of increasing social competencies.
Rate the effectiveness of traditional face-to-face learning in terms of increasing theoretical knowledge.
Rate the effectiveness of traditional face-to-face learning in terms of increasing clinical skills.
Rate the effectiveness of traditional face-to-face learning in terms of increasing social competencies.
Rate your activity during e-practical learning.
Rate your activity during traditional face-to-face learning.
Rate how much you enjoyed e-practical learning classes during the pandemic.

Ratings: 1-Ineffective, 2-Slightly ineffective, 3-Neutral, 4-Slightly effective, 5-Effective