

Vocational College Mathematics Teachers' Perception on Home-Based Teaching and Learning During the COVID-19 Pandemic in Johor

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ABSTRACT

This study examines the perception of mathematics teachers at a Johor vocational college on Home-Based Teaching and Learning (HBTL) during the COVID-19 pandemic. Past research has found out that most teachers are effectively able to conduct online classes. However, the teachers also face difficulties during online classes. This study was conducted to evaluate teacher efficacy in terms of knowledge and skills, instructional strategies, access to technology and motivation. This study also aims to evaluate the challenges in terms of technical barriers, student participation, student situation and online teaching experiences. This study is only limited to vocational college teachers who teach mathematics in Johor. This study used a quantitative survey-based research methodology. The survey's respondents were 46 mathematics teachers at 12 vocational colleges in Johor. The respondents were purposively selected. The 5-point Likert scale was used for the data collection. The data was analysed by using the median value. The findings indicate that the overall median value for teacher efficacy in online teaching is 4.00. Generally, this value indicates the effectiveness in terms of knowledge and abilities, instructional approach, access to technology, and motivation among the respondents. The total median score for challenges faced by the teachers is 4.00, which indicates that most respondents have difficulties with technological barriers, student participation, student circumstances, and online teaching experiences. In conclusion, the teachers need to be ready for online teaching in order to ensure that the

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HBTL can successfully be implemented and managed during the COVID-19 pandemic period.

Contribution/Originality: The results of this study are likely to be extremely valuable to vocational college teachers who are interested in learning more about the efficacy of online teaching and the difficulties that teachers experienced during the COVID-19 pandemic.

1. Introduction

Education was one of the industries severely impacted by the COVID-19 pandemic since it affected the entire world (Hebebcı et al., 2020). Hence, the Malaysian government decided to implement Home-Based Teaching and Learning (HBTL), also known as *Pembelajaran dan Pengajaran Dari Rumah* (PdPR), to ensure that the educational system would continue to operate throughout the lockdown period (Kementerian Pendidikan Malaysia, 2020). As a result, the teachers were advised to conduct their classes using an online platform while working from home (WFH), also known as *Bekerja Dari Rumah* (BDR). Additionally, the teachers were expected to be at the assigned workstations and be prepared if the Head of the Department, such as the Headmaster or the School Principal, instructed them to report for duty. Since online education has been established at the university level, it is not a novel way to teach and learn in Malaysia. According to Adams et al. (2018), one of the main objectives of the Malaysian Ministry of Education under the Malaysian Education Blueprint 2015–2025 (Higher Education) is for blended learning (BL) to be used as a medium for transforming the current pedagogy. The Malaysian Education Blueprint 2015–2025 (Higher Education): E-16 lists several vital aims, including "making online learning an intrinsic component of higher education and lifelong learning, requiring up to 70% of courses to utilise blended learning models." Few higher education institutions have adopted blended learning models as a standard pedagogical strategy. However, the Frog VLE, a virtual learning environment, must be used by primary and secondary schools starting in the middle of 2013, according to the Malaysia Education Blueprint 2013–2025 (KPM, 2013). According to Cheok et al. (2017), early statistics show that e-learning is only used to a limited extent. As a result, online instruction is rarely employed since face-to-face instruction accounts for most of the teachers' teaching time. Since then, most scholars have investigated the difficulties encountered by teachers during HBTL (Nasir & Mansor, 2021), the challenges faced by students during HBTL (Kaur & Singh, 2021), and the impact of HBTL on Malay languages teachers (Hamzah et al., 2021). Nevertheless, there are divergent opinions and limited studies on teachers' perception on HBTL, particularly at a vocational institution. As a result, it is necessary to look at the viewpoints of mathematics teachers at vocational colleges with regard to HBTL during the COVID-19 pandemic in Johor.

2. Literature Review

According to recent UN News articles (Zhao et al., 2020), the COVID-19 pandemic has caused school closures in 194 countries, affecting at least 1.59 billion children and 63 million primary and secondary teachers. More current UNESCO statistics show that, as of May 30, 2020, school closures in 150 countries prevented more than 1.19 billion students from attending class, or 68% of all registered students worldwide. Kementerian Pendidikan Malaysia (2021) defines HBTL as Teaching and Learning (PdP) that can be carried out at home, at community centres, or in any other appropriate settings. HBTL may

be conducted in a controlled and planned manner online and offline. HBTL is used when a student cannot attend school for an extended period of time due to a catastrophe or a pandemic or for other reasons with the agreement of the state registrar. [Kementerian Pendidikan Malaysia \(2021\)](#) suggests several approaches on how HBTL can be carried out by the teachers. First, "online" HBTL (through the Internet) occurs when students have Internet connectivity and use technologies that allow them to learn in real-time. Second, "offline" HBTL appears without Internet connectivity. Alternatively, students learn to utilise gadgets like computers, laptops, tablets, and smartphones. Learning can also take place when students use textbooks or other learning materials. Lastly, "off-site" HBTL takes place at a site such as a community centre or any other properties designated as a temporary evacuation centre due to a disaster or a pandemic.

Cambridge Dictionary ([Press, 2022b](#)) defines "efficacy" as "the ability" to generate or achieve the desired intended result. In a sense, teacher efficacy is similar to teachers' capabilities to perform online learning during the COVID-19 pandemic. [Abdul Rashid et al. \(2021\)](#) states that teachers' performance significantly influences their students during an online learning process. The idea of teacher efficacy is crucial in understanding disparities in overall teacher efficacy, with high levels of efficacy having beneficial consequences on various student and teacher outcomes. According to [Corry and Stell \(2018\)](#), three areas of research on teacher efficacy in online education have been examined in the last 15 years. These areas are: (1) the ease of adopting online teaching; (2) the comparison between teacher efficacy and experience variables; and (3) changes in teacher efficacy in professional development scenarios, in which self-efficacy is measured before and after a treatment. [Bandura \(1977\)](#) claims that people develop self-efficacy from four primary sources: mastery of teaching experience, vicarious experience, social persuasion, and physiological and emotional behaviours. According to [Zhen et al. \(2021\)](#), there are three aspects that are necessary to measure teacher efficacy in remote teaching: teachers' knowledge, skills and affective domain.

Technology adoption and personal innovativeness are other aspects related to teacher efficacy. [Khalid et al. \(2021\)](#) investigates the factors that increase online learning adoption during the COVID-19 pandemic. Likewise, [Ab Aziz and Maat \(2021\)](#) examine the effectiveness of mathematics teachers in using technology during the COVID-19 pandemic. Cambridge Dictionary ([Press, 2022a](#)) defines "challenge" as anything that requires mental or physical efforts and puts a person's skills to test. As a result, the problem during HBTL refers to the hurdles experienced by teachers in providing a successful online teaching and learning experience for their students. According to [Abdul Rashid et al. \(2021\)](#), it is challenging for teachers to retain their self-efficacy in the face of the COVID-19 pandemic. The online teaching and learning process has left both teachers and students unhappy. Thus, these challenges are categorised based on the sources of self-efficacy: mastery of teaching experience, vicarious experience, social persuasion and physiological and emotional behaviours. [Rashed et al. \(2021\)](#) highlight five challenges faced by teachers: the Internet, student engagement, knowledge and skills, infrastructure, emotional issues, and time constraints. Additionally, [Rashed et al. \(2021\)](#) also discover that teachers who are quickly introduced to online learning have a significant protection against emotional disruption. There will be tension and emotional exhaustion if there are a lot of tasks to do. [Rasmitadila et al. \(2020\)](#) claim that the teachers in Indonesia face difficulties in terms of developing online learning systems, particularly in the utilisation of facilities and the accessibility of infrastructure. Notably, all previous studies have identified the challenges that require further investigations, such as technical hurdles of online teaching, student

engagement in instruction, student conditioning, and teachers' expertise with online instruction.

3. Methodology

In the present study, a quantitative design was chosen. An online quantitative survey is essential to ensure the safety of participants and researchers (Wong et al., 2021). The participants in this study consisted of mathematics teachers at a vocational college in Johor. Twelve vocational colleges were selected, based on the list given by the Johor Bahru District Education Office (Portal Rasmi PPD Johor, 2022). There are at least 50 teachers teaching mathematics at vocational colleges in Johor. Based on Krejcie and Morgan (1970), 44 teachers were recruited. A purposive sampling method was used to select 44 respondents. They were all teachers with some experience in online teaching during the COVID-19 pandemic. Finally, 46 participants were gathered to complete an online survey form. The survey was carried out between 26 June 2022 to 3 September 2022.

The current study used a questionnaire as the main instrument. The questionnaire was divided into three main parts: 1) respondent demography (age, gender, teaching experiences, prior experiences in online teaching before the COVID-19 pandemic), 2) teacher efficacy in online teaching, and 3) challenges faced by teachers during online learning. The validation was carried out before turning the questionnaire into an online survey. A Google Form-based online survey was used as the instrument. The first section covered the respondents' demographic information, while the second section covered the respondents' opinions on teacher efficacy, and the third section covered the respondents' challenges with online instruction during the COVID-19 pandemic. A five-point Likert scale (Strongly Disagree = 1 to Strongly Agree = 5) was used. Following the recommendation by past studies (Presser et al., 2004; Zukerberg, Von Thurn & Moore, 2013), a pilot study was conducted with 14 mathematics teachers at vocational colleges outside Johor. In terms of reliability, the Cronbach's Alpha value of the questionnaire is $\alpha = 0.729$ (out of 25 questions in the survey), which is highly reliable. The WhatsApp and Telegram applications were used to collect the data online. The respondents could opt out at any time, and all data was gathered in complete privacy. Additionally, demographic data on the respondents' ages, genders, and teaching experiences were gathered for this study. Other than that, no personally identifiable data, pictures, or videos were disclosed.

The questionnaire included items corresponding to two research questions. For the first research question, the following items were included: teacher efficacy on online learning in terms of knowledge and skills, teacher instructional strategy, teacher access to technology, and teacher motivation. For the second research question, the following items were used: challenges faced by the teacher during online teaching (four items related to the question: technical barrier, student participation, student situation (internal and external conflict) and overall experience on online learning). The Social Science Statistics Package (SPSS) version 26.0 was used to analyse the data using descriptive statistics.

4. Results

A total of 46 teachers participated in the study, with 84.8% women and 15.2% men. The demographic data of the respondents are summarised in Table 1.

Table 1: Distribution of Demographic Background of the Respondents

Demographic Data		Frequency	Percentage (%)
Gender	Male	7	15.2
	Female	39	84.8
Age	23-29	8	17.4
	30-39	20	43.5
	40-49	12	26.1
	50-59	6	13
	Teaching Experiences	1-5 years	18
	6-10 years	8	17.4
	11-15 years	5	10.9
	16-20 years	4	8.7
	21-25 years	8	17.4
	26-30 years	3	6.5
Do you have experience in online teaching before the COVID-19 pandemic?	Yes	23	50
	No	23	50

The following are the criteria for teachers efficacy in online learning: (a) Teachers' Knowledge and Skills (b) Teacher's Instructional Strategy (c) Teacher's Access to Technology (d) Teacher's Motivation. Three items are present in criterion (a), four items are present in criterion (b), three items are present in criterion (c), and three items are present in criterion (d). Another item addresses the challenges faced by teachers during online teaching and learning. The instrument is classified into four criteria: (a) Technical Barriers to Online Teaching, (b) Student's Participation in Online Learning, (c) Student's Situation (External And Internal Conflicts), and (d) Online Teaching Experiences. There are three items for each criterion.

Table 2 shows the median value of teachers' knowledge and skills in Teacher Efficacy on Online Learning. The median score for the entire section is 4.00, indicating a high degree of acceptability. Most respondents concur that they are knowledgeable and proficient in teachers' effectiveness in online learning. 73.9% of the respondents said that they are adept in using technology for their online programmes. Besides that, 69.6% of the respondents state that they have sufficient skills to handle online courses using an appropriate device and system. Furthermore, 65.2% of them claim that they could arrange and plan their online classes effectively. With regard to teachers' instructional strategies, most respondents agree to a limited extent that they have an instructional approach for teacher efficacy in online learning. 63% of them admit that they always encourage their students to engage in online classes. Additionally, 52.2% of the students are at ease and excited to enroll in online programmes. 47.8% of the respondents said that they were unsure whether the students felt comfortable talking to teachers or other students during the online session. In addition, 47.8% of the respondents said that they were uncertain whether the students in an online class could grasp the lessons. They concur that the students are able to organically organise and prepare online classes.

For teachers' access to technology, the median score for the entire section is 4.00, which denotes a high degree of approval. Most respondents agree that access to technology enhances teachers' ability to facilitate online learning. According to the data, 56.5% of the respondents believe that they have adequate access to the Internet for online instruction. In addition, 52.2% of those surveyed claim that they have no trouble finding resources for

an online course. Additionally, 60.9% of the respondents assert that they have the right system and equipment to conduct online classes. Next, for teachers' motivation, 67.4% of the respondents agree that they consistently give their all to run online classes more effectively. However, 39.1% of the respondents express no opinion about whether they have any problems switching from in-person to online instruction. Additionally, 32.6 % are unsure whether the institution has given them enough support to adopt online learning.

Table 2: Teacher Efficacy and Challenges Faced by Teachers and the Median Value

Variables	Median
2. Teacher Efficacy in Online Learning	
2.1 Teacher's Knowledge and Skills	
a) I am proficient in using technology for my online class.	4.00
b) I have sufficient skills to handle online classes using the appropriate device and system.	4.00
c) I can arrange and plan my online class session effectively.	4.00
2.2 Teacher's Instructional Strategy	
a) I always encourage my students to participate in my online class.	4.00
b) My students are comfortable and happy to join my online class.	4.00
c) My students feel at ease conversing with others and me during the online class.	3.00
d) My students are able to understand my teaching and instruction during online classes.	3.00
2.3 Teacher's access to technology	
a) I have good access to the Internet to conduct online classes.	4.00
b) I can easily find reference material for the online class.	4.00
c) I have the appropriate device and system to handle the online class.	4.00
2.4 Teacher's motivation	
a) I always give my total commitment to successfully conduct my online class.	4.00
b) I have no issue with transitioning between face-to-face to online learning.	3.00
c) The college has provided me with sufficient assistance to properly adapt online learning.	3.00
3. Challenges Faced by Teachers During Online Teaching and Learning	
3.1 Technical barriers to online teaching	
a) I am having trouble putting up online systems that are too sophisticated or have terrible networks.	3.00
b) Some of my students do not own mobile phones or computers.	4.00
c) I am having difficulties giving teaching materials since my students do not have enough Internet data, despite having a decent Internet connection.	4.00
3.2 Student participation in online learning	
a) My students' living conditions are not suitable for online learning. For example, interference may come from a family member.	4.00
b) My students thought that the online class is not important. Hence, they do not actively participate in the online class activity.	4.00
c) My students communicate with other students on unrelated issues. Hence, online lesson is less beneficial to learning.	4.00
3.3 Student's situation (external and internal conflicts)	
a) My students share their smartphone or computer with siblings during online learning.	4.00

b)	My students have less interest in online learning since they find it challenging to grasp the lesson.	4.00
c)	My students complain that they receive a lot of tasks during online learning that cause late submission.	4.00
3.4 Online teaching experiences		
a)	I receive adequate training via a seminar/workshop/course on online teaching.	4.00
b)	Online teaching is challenging for me.	3.00
c)	My experiences on online teaching are both stressful and exhausting.	4.00

With regard to the challenges faced by teachers during online teaching and learning, [Table 2](#) displays the median value of technical barriers to online teaching. The respondents acknowledge a technical barrier encountered during teaching and studying online. According to the data, 34.8% of the respondents are undecided about whether they have problems setting up online systems that are overly complex or have poor networks. In addition, 47.8% of the respondents concur that some students do not own cell phones or computers. Despite having a reliable Internet connection, 60.9% of the respondents face difficulties in providing their students with necessary instructional resources. As for student engagement in online learning, the median value is 4.00, indicating a strong approval. The respondents acknowledge an issue with student engagement during online teaching and learning. As seen in [Table 2](#), 54.3% of the respondents think that their students' living situations are unsuitable for online learning. For instance, younger siblings may interfere and bring on their anguish. Most respondents (52.2%) agree that their students believe that online classes are insignificant. Hence, they do not actively participate in online class activities. 50% of the respondents agree that the students talk to one another about topics irrelevant to the subject matter they are studying. Online learning is, therefore, not as effective for learning.

Another challenge is about students' circumstances' (external and internal conflicts). With a 4.00 median score, there is a high degree of acceptability. The students' situation is an issue that the respondents agree with when it comes to online teaching and learning. According to 65.2% of the respondents, siblings may share their smartphones or computers during online classes. 63.0% of the respondents claim that their students are less interested in online learning since it is more difficult for them to understand the materials as compared to a face-to-face instruction. According to 43.5% of the respondents, the students are concerned that they are given many assignments during online learning, leading to late task submission. Lastly, for online teaching experiences criteria, the respondents agree that online teaching experiences are a challenge they face during online teaching and learning. 47.8% of the respondents agree that their experience in online teaching is both stressful and exhausting. 41.3% of the respondents agree that they receive adequate training or attend related online teaching seminars/workshops/courses. Finally, 32.6% of the respondents agree that using technology and online teaching tools is challenging.

5. Discussion and Recommendation

The findings of the current study reveal that more than half of the teachers believe that they possess the knowledge and skills required for online teaching and learning. Most respondents concur that they are adept at utilising technology for their online courses. The findings are consistent with [Kanojiya \(2020\)](#) who claims that online teaching may improve teachers' technical proficiency, help them discover new teaching strategies, and

increase their confidence. In addition, the respondents agree that they possess the necessary skills to manage an online course by utilising the proper hardware and software. [Rashed et al. \(2021\)](#) found that WhatsApp and Telegram are frequently used for communication in distant learning. Most students can use these platforms which are reportedly more straightforward. These days, teachers frequently utilise systems like Microsoft Teams, Zoom, Google Meet, Google Classroom, Skype, and Edmodo to organise their online learning. Other options include the HBTL that still uses textbooks and is more casual. Furthermore, the respondents agree that they can effectively arrange and plan the online class session.

Most respondents neither agree nor oppose to having an instructional approach for teachers' effectiveness in online learning. They agree that they always urge students to take part in online courses. According to [Rasmitadila et al. \(2020\)](#), the adoption of different instructional approaches will stimulate more passionate engagement in online learning. The respondents also concur that the students are at ease and delighted to enroll in online classes. The respondents are, however, split on whether or not it is appropriate for students to talk to teachers and other students during online classes. According to [Kanojiya \(2020\)](#), participation is difficult since there is no communication between the students and the teachers. As a result, many perceive that online classes are less engaging and lack a welcoming environment or a social contact. Furthermore, the respondents neither agree nor oppose that their students are able to comprehend the lessons delivered through online classes. [Kanojiya \(2020\)](#) asserts that, since online classes employ innovative techniques and are less disruptive, they appear to be more methodical in their approach and promote the use of more graphs, charts, and films the respondents also believe that online classes can save time as it can be conducted from the comfort of their homes.

The respondents agree that having access to technology improves their ability to facilitate online learning. They concur that their internet access is sufficient for online teaching. According to [Rashed et al. \(2021\)](#), one of the research subjects states that the school lacks a Wi-Fi facility. Since many teachers conduct their lectures remotely from the school, the management decides to build a Wi-Fi facility there. [Rashed et al. \(2021\)](#) show that the teachers use both online and offline strategies. The use of interactive applications such as Wordwall, Quizlet, Google Meet, PowerPoint presentations, video, and other modalities is widespread. They also concur that they have proper systems and gadgets to manage online classes. The teachers offer their lessons using a range of software programmes, which is supported by [Tay et al. \(2021\)](#).

According to [Abdul Rashid et al. \(2021\)](#), despite the difficulties in juggling house activities and classroom responsibilities, the teachers agree that they consistently give their commitment in running online classes effectively. To produce high levels of self-efficacy in running online classes, the teachers can effectively manage their time and complete both tasks every day. However, half of the respondents express no opinion about whether they have any problems switching from a face-to-face method to online teaching. According to [Abdul Rashid et al. \(2021\)](#), unlike face-to-face sessions in which the teachers only concentrate on preparing the teaching methods in the classroom, online sessions require additional preparation with technological tools and teaching materials before conducting the online lesson. Additionally, half of the respondents are unsure whether the institution has given them enough support to adopt online learning properly. Supported by [Abdul Rashid et al. \(2021\)](#), it is the administration's responsibility in helping the teachers to

embrace new pedagogical and instructional practices in order to be successful in running online classes.

Many respondents concur that there is a technical barrier between teachers and online instruction. Despite having a good Internet connection, the respondents state that it is challenging to provide educational materials when the students do not have enough Internet data. Similar to students' responses in [Kanojiya's \(2020\)](#) study, frequent data recharge prices increase the expense and the stress of taking online classes, especially for those with less stable financial situations. [Abdul Rashid et al. \(2021\)](#) state that, in order to access the Internet for the lesson, the students must utilise technical gadgets and pay for Internet access. The teachers must come out with solutions to help students who come from families with little resources to buy equipment or Internet data. In addition, the respondents concur that some students do not own mobile phones or computers. [Tay et al. \(2021\)](#) state that several students are unable to use online materials in the HBTL because they have to share technology with their siblings or they have no access to technology. Additionally, [Kanojiya \(2020\)](#) state that the students from low-income families do not have access to Internet resources and tools, which increases their financial burden. There is an equal percentage among the respondents who agree (34.8%) and neither agree nor disagree (34.8%) in response to their difficulties with online systems. As reported by [Rashed et al. \(2021\)](#), senior teachers lack the knowledge of online devices, applications, and platforms. Another participant raises a comparable issue, revealing that the teachers are not digitally literate.

Upon further analysis, many respondents concur that another difficulty in online teaching and learning is students' willingness to participate. Most respondents concur that their students believe that online classes are unimportant. As a result, they don't actively engage in online class activities. According to [Kanojiya \(2020\)](#), the student have too many classes on the same day, which makes it difficult for them to pay attention and participate. They feel worn out and overwhelmed with knowledge. Hence, the student claim that they lack the motivation and enthusiasm to enroll in online courses. Since they attend online classes for the sake of attendance only, online learning makes them less serious. Another finding reveals that more than half of the respondents concur that their students' living circumstances do not permit online learning. According to [Rasmitadila et al. \(2020\)](#) and [Efriana \(2021\)](#), online lessons are less effective because the students communicate with one another about topics unrelated to the subject matter. Additionally, the teachers discover that their students are chatting during online classes, which interrupts the whole class.

The respondents concur that dealing with the circumstances of the students (both external and internal conflicts) is a challenge to online teaching and learning. Most of the respondents concur that their students are less interested in online education since it is harder for them to understand the materials as compared to a traditional classroom setting. According to [Kanojiya \(2020\)](#), the students think that during online classes, the teachers do not effectively instruct. Instead, they merely go over the content, making the students overloaded with knowledge. According to most respondents, siblings frequently share mobile phones or computers with the students who are enrolled in online learning. Similarly, [Efriana \(2021\)](#) asserts that some children do not possess any devices or computers that may be utilised as online learning tools, or if they do, they belong to their parents. The use of the Internet for educational purposes occurs regularly. Sometimes, when his father arrives home from work, another child will use the device. However, some parents come home at night, although the students' online schedules are extended until

nighttime. In addition, half of the respondents concur that the students complain about getting a lot of assignments during online learning, which results in late submission. Some students are less inclined to participate in online learning. According to [Efriana \(2021\)](#), even though the student have access to the required tools, including computers and an Internet connection, they are less concerned about the importance of work submission. As a result, it is common to observe late submission for assignments among the students. According to [Kanojiya \(2020\)](#), the students express considerable stress because of the continuing pressure to finish their assignments. They hold the opinion that no information is being transferred or learned.

Furthermore, the respondents also concur that one critical obstacle they encounter while teaching and learning online is the online teaching environment. Half of the respondents concur that their time spent teaching online is difficult and draining. Teachers usually feel physically and mentally exhausted when guiding online learning, as also reported by [Rashed et al. \(2021\)](#). According to [Ozamiz-Etxebarria et al. \(2021\)](#), teachers are able to adapt to new settings and unknown conditions by conquering growing problems. However, a lack of relationships makes teaching difficult and causes numerous problems. Even though online classes can be conducted from the convenience of one's home, teachers consider online classes as less successful as compared to traditional classes. [Kanojiya \(2020\)](#) points out a lack of work satisfaction when one enrolls in online classes. Some of the teachers complain that online materials take more time to prepare because they are impersonal, inactive, and lack a distinctive touch.

The students' inability to assess the clarity of concepts taught during online classes poses another challenge. Other issues include the inability to manage the students' behaviour, a lack of work satisfaction, background distractions, time restrictions when using online applications, a delay in the start of the class, and the inability to tell whether the students are mentally present or not in online classes. 41.3% of the respondents concur that they attend a conference, a workshop, or a course on online teaching that provide some training in this area. [Rashed et al. \(2021\)](#) claim that organising webinars for teachers and giving students ongoing support are the administration's tasks. Teachers, therefore, need to possess the skills and knowledge required to produce online resources for the coaching process. Additionally, a discussion is another way on how teachers can develop their proficiency. The development of teacher competencies, including providing media and connections, managing online learning, and engaging in peer discussions, becomes significantly impacted by principal supervision. [Efriana \(2021\)](#) further remarks that many teachers have gained a broad grasp of ICT, can produce captivating audio-visual learning materials, and have even become YouTube stars because of the necessity to supply online lesson materials. 32.6% of the respondents concur that they find it difficult to use technology and online teaching tools. According to [Rashed et al. \(2021\)](#), as teachers are not trained as content creators, they find it difficult to handle online classes. The problem arises when teachers have little experience with online learning and struggle to understand classroom dynamics, student moods, and the dynamics of content delivery. Due to their lack of prior experience in integrating technology in the face of this crisis, teachers also face difficulties when trying to organise classes. Similar to this, [Kanojiya \(2020\)](#) claims that some of the teachers even believe that their lack of ICT proficiency prevents them from properly utilising many online teaching platforms. According to [Efriana \(2021\)](#), not all teachers possess the technical know-how required to use computers or other devices for online learning activities. Other teachers can use computers, but some teachers' abilities are still limited when it comes to using computers

to support teaching. Some of them are still unable to access the Internet, use other learning programmes, or make their own media or lesson videos.

The recommendation for the administration in this context refers to the Ministry of Education and the school administration. This study provides a conceptual framework for the Malaysian Ministry of Education and the Technical and Vocational Education Division in order to enhance and facilitate the development of future mathematics modules for online learning, especially for a mathematics teacher at a vocational college. As a result, it helps both teachers and students to be ready for more effective online learning. To overcome the limited Internet access, the Technical and Vocational Education Division must actively participate in educational television broadcasts organised by the Ministry of Education in collaboration with the television station in order to help the education sector during the COVID-19 pandemic. As suggested by [Kanojiya \(2020\)](#), the administration should prioritise building an organised, user-friendly environment that is accessible to everyone without imposing a financial burden on students and academics while promoting online education. It has been found that sufficient technological training for teachers on how to conduct online classes is necessary for successful deployment of online classrooms. Hence, this should also be given a top priority. The government should offer online teaching resources that help teachers and students in this area. The students who do not have the device or do not have access to the Internet can still complete the activities.

To guarantee that education is still ongoing despite the COVID-19 pandemic, teachers may provide various solutions to every problem. The student needs to keep learning even while they are at home. When incorporating online learning, teachers use various technical tools. According to [Efriana \(2021\)](#), teachers must be able to choose applications that match the needs and features of specific courses, students, and environmental situations. During online learning activities, the task usually takes precedence over explaining the subject. Students must remain engaged in order for learning to be effective. [Tay et al. \(2021\)](#) report that teachers voice out some concerns about students' involvement in the HBTL. The teachers believe that they should observe students' cognitive, behavioural, emotional, and social engagement in a face-to-face setting. While teachers are concerned with their students' understanding of the subject, students' involvement in behaviour and emotions is essential in promoting cognitive engagement during online classes.

Teachers must actively create communication opportunities if they want to develop and maintain a two-way communication with their students during online interactions. According to [Tay et al. \(2021\)](#), teachers employ a range of software programmes to provide courses. The usage of a range of technologies by teachers to implement online HBTL has some practical ramifications. To create virtual classrooms, teachers use video conferencing software like Zoom or Webex, a communication platform for information dissemination and exchange like email systems, assessment tools to monitor students' learning, and discussion for group projects (e.g., Padlet or Google Classroom). Teachers struggle in utilising the technology's potential for efficient teaching and learning. The results are consistent with past studies that place a greater emphasis on the need for teachers to focus on interactions between the students and the content, besides the technical opportunities that support these interactions. Teachers are supposed to be more selective with their subjects and delivery methods rather than using the most up-to-date resources to encourage students' participation in their learning.

It is essential that students keep learning even while they are staying at home. While incorporating online learning, teachers use a variety of technology tools in the classroom.

Students are able to actively participate in a learning session by using the same tools provided by the teachers. In this online learning exercise, it is accepted that the task is more significant than explaining the topic. Student engagement must be maintained for learning to occur more effectively. By keeping an eye on their children, parents can support the teachers. Additionally, parents may always stay in touch with the teachers to learn more about upcoming information regarding the educational progress of their children. Student should always be informed about their classes by actively participating with the real-time session arranged by their teachers. Teachers are not supposed to look for the newest software solutions. It is because not every student is capable in having a gadget, especially those from the low-income family. Teachers will always rely on existing teaching materials. They also provide handouts by sending the materials to students' home or by asking parents to collect the materials at school. The results are consistent with past studies that emphasise the importance of learner-content interactions and the technologies that support these interactions. Teachers pick their subject and focus on how it will be taught rather than using the newest technology to encourage student engagement in their education. To effectively employ technology for learning, especially with younger students, it is vital that schools provide their students with the information and skills they need. Students must first learn how to use technology before they can use it for learning. While it is advantageous for schools to explore a standardised set of resources to enable online HBTL, the choice of tools must take into account the training of teachers, student profiles, and learning objectives.

The present study has several limitations. The findings are limited to 46 mathematics teachers at a Johor vocational college. Future researchers can continue to contribute to this field by including teachers from other academic disciplines, grade levels, institutions, and geographical locations. Instead of a survey-based research design, future researchers should consider a qualitative research design in order to address the current research gap in this area and to benefit academics who are primarily concerned with the learning environment at vocational colleges. Another possible limitation is that the findings are limited to teacher perspectives. It would be important to take into account the views of students and parents in order to acquire a thorough understanding of student engagement and challenges during the online HBTL experience.

6. Conclusion

Mathematics teachers in vocational institutions have experienced the success of HBTL and its challenges during the COVID-19 pandemic. Most teachers with at least five years of teaching experiences have implemented HBTL. Half of them have the knowledge of online instruction prior to the COVID-19 pandemic. The current study lends some evidence on how effective the teachers' efforts are in implementing the HBTL. Most respondents agree that they have the knowledge and skills necessary to teach online. The respondents also agree that their methods of online instruction are successful. Many respondents also claim that they have enough access to technology for online instruction. The government supports this initiative by providing Internet connectivity so that teachers and students may attend online courses without any issues. However, many respondents are unsure how much help the school management has offered during the pandemic, especially with regard to online teaching.

The challenges faced by teachers when conducting online teaching can be divided into four categories. The first one is a technological barrier. Many of the respondents agree that using a particular system, software, or programme to handle online learning is difficult.

The second category is student involvement with online learning. Most respondents agree that family responsibilities, student motivation, and students' readiness to switch from in-person to online learning are the main causes of students' incapability to actively participate in online learning. The third category is based on both internal and external elements and pertains to student conditions. Since some of them have problems getting resources due to financial issues, most respondents agree that overall student conditions are unfavorable for online learning. The unavailability of tools and applications also has an influence on the students who regularly engage in online learning. The last category is the cumulative experience of the teachers with online learning. Most teachers claim that they feel exhausted when teaching online since there are so many aspects of the pandemic that they have to handle. Due to their inability to handle technology, several teachers grow frustrated while teaching online. However, they also agree that teachers have enough assistance for offering online instruction since the education administration holds webinars, seminars, or workshops to help them get over their lack of technological know-how when it comes to online learning. In conclusion, this research shows that there is no significant relationship between teachers' efficacy of online learning and the success of HBTL implementation during the COVID-19 pandemic among vocational college mathematics teachers. There is also no significant relationship between the challenges faced by teachers on online learning and the success of the HBTL implementation during the COVID-19 pandemic among vocational college mathematics teachers. The hypotheses are therefore accepted.

Ethics Approval and Consent to Participate

The application to conduct this study has been approved by the Education Planning and Research Division (EPRD), Malaysian Ministry of Education.

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Conflict of Interest

The authors reported no conflicts of interest for this work and declare that there is no potential conflict of interest with respect to the research, authorship, or publication of this article.

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