Exploring Challenges and Impacts: Insights from School Teachers in Virtual Learning Environments

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Abstract

As Virtual Learning Environments become increasingly integral to educational practices, this study delves into the often-neglected realm of challenges faced by teachers in the implementation of virtual teaching and learning. This study aims to explore the challenges and impacts faced by teachers in implementing virtual learning environments. Next is to identify the best features in addressing the challenges and impact of virtual learning implementation among teachers. Employing a qualitative case study design, the research conducted semi-structured interviews and observations involving primary school teachers from level 1 (years 1 to 3) and level 2 (years 3–6). The findings illuminate multifaceted challenges and constraints encountered by teachers, resonating across the realms of teacher dynamics, school infrastructure, and student engagement. Efforts to surmount these challenges revolve around recognizing teachers as crucial exemplars and elucidating the responsibilities they shoulder. Moreover, the study underscores the pivotal role of the learning environment and atmosphere during virtual teaching and learning implementations. In essence, teachers emerge as driving agents shaping the practical construction of the curriculum, necessitating a supportive environment and comprehensive infrastructure. The implications of this research extend towards fostering effective teaching and learning practices, ensuring a more conducive educational landscape for both educators and students in the era of virtual pedagogy.

Keywords: virtual learning environment, online education, challenges and impact, school teacher

Introduction

The global crisis due to the COVID-19 pandemic that hit the world has globally changed the significant landscape of human life today. The lockdown has led to isolation and transformed the business, services, financial, medical, household, or education settings without being exceptional into new norms. Although, people feel the adverse effects and struggle regarding movement, socializing, and working, the positive side of lockdown has directed us to accept the challenges and modify into a scenario where online activities and interactions arise in all sectors.

In education, the role of teachers in teaching is increasingly challenging when they need to adapt to new life norms, where the teaching and learning process should conducted online (Hapini et al., 2018). Due to the global pandemic, alternative strategies from conventional (face-to-face) learning practices are digital online platforms across all education system levels are considered the best option in dealing with situations that threaten the learning environment.

Empirical researches in education indicate most teachers use Virtual Learning Environments as a simple repository for students to obtain materials such as PowerPoint slides and reading lists (Rienties et al., 2016). Another study found that most teachers fail to apply electronic media technology in teaching because they feel comfortable with the traditional methods they have been practicing for so long (Asim et al., 2020). These researchers mentioned that using the internet takes a long time, even if they are interested. However, teaching and learning techniques should align with current changes requiring teachers to perform educational activities virtually for education sustainability. Thus, the global pandemic became a push factor in shifting teaching and learning conducted online with no exception. The internet has become the easiest and preferred method for students and teachers to use for imparting knowledge, finding information to acquire skills, and sharing views (Sofi-Karim et al., 2023).

Decades ago, Simpson et al. (1999) found weaknesses and shortcomings in teaching using technology due to the teacher’s lack of skills in using technology in teaching. The reason encountered is that the use of technology in education has not yet reached the expected level of implementation. In light of that, Hapini et al. (2018) discovered that the factor of low intention using VLE technology is moderate, and accessibility is the central experience that reduces VLE integration into teaching. Therefore, there is a need to explore the problems teachers face in conducting virtual education in schools. In-depth findings on the challenges and impact of VLE among Malaysian teachers, including abilities, skills, and commitment, are critical to explore. The teachers’ willingness to adapt is also an essential factor to consider.

Therefore, this study explores the challenges and impacts faced in implementing virtual teaching and learning among school teachers. Subsequently, it is crucial to discern key features that will enhance the exploration of challenges and implications related to future implementations of virtual learning among teachers. This strategic approach is geared towards fostering efficiency and effectiveness in subsequent actions. By highlighting these challenges and impacts, schools can enhance teachers’ and students’ experiences and better prepare for future adversity. Furthermore, it is crucial to understand how to effectively transition between offline and online education during the pandemic. The research questions are as follows:

1. What are the challenges of teachers in realizing the implementation of virtual teaching and learning?
2. What is the impact of the implementation of virtual teaching and learning on teachers?
3. What are the best features in addressing the challenges and impact of implementing virtual teaching and learning among teacher?
Literature Review

Information and Communication Technology (ICT) is a new platform in society today. Roger (1995) pinned in the Innovation Diffusion Theory is a process in which an innovation is connected through specific channels over time among members of a social system. In short, this theory delves into how something new has evolved for different audiences, whether in ideas, technologies, goods, or techniques. Thus, this study focuses on the innovative use of virtual learning in teaching among teachers in five fragmentation stages: i) knowledge (characteristics of the decision-making, namely, socio-economic, personal variables, and communication behavior); ii) persuasion (relative advantage, compatibility complexity, trialability, and observability); iii) decision (adaptation and rejection); iv) implementation; and iv) confirmation. Hence, the pandemic seems to be a push factor today have to know and know how to apply and take advantage of it. Moreover, Vygotsky (1978) posited sociocultural factors of extrinsic to teachers in integrating ICT in their teaching activities which embedded with individual and social environments to facilitate the action.

In this era of globalization, adequately equipping oneself with various ICT knowledge and skills is necessary for a person who holds the title of teacher. Wang (2023) asserted that the virtual learning environment is internet-based, built to connect community members. He also highlighted virtual learning as a platform for discussing and collaborating on tasks or projects due to being easily accessible via the Internet. In light of that, Abd Samad et al. (2021) stated peon line learning that involves the use of ICT, including mobile devices, such as laptops and mobile phones, as well as Internet accessibility, can be said to be in line with the agenda of creating a technology-based learning space for the current generation of students.

Virtual Learning Environment and the Challenges

Virtual learning environments offer crucial tools for teachers, especially during the COVID-19 pandemic. These platforms create both opportunities and challenges to enhance teaching techniques and learning processes compared to traditional methods (Vargas-Murillo & De La Asuncion, 2023). The popularity of virtual learning uses technology to improve the learning process, rather than relying solely on a face-to-face, teacher-pupil approach for remote or distance education (Gunawardena & McIsaac, 2013). Previous research has found that utilizing virtual learning can add various opportunities, such as interactive exercises, exchanging views, discussions, communication tools, and enjoyment. In other words, virtual learning strengthens students' feelings of connectedness to the educator and the content (Southard et al., 2015). Thus, traditional learning methods are no longer relatively effective as they restrict the release of more effective learning methods.

Facilitating teaching and learning in an online environment poses several challenges to educators, who often struggle to adapt the practices they have found effective in conventional classes to an online setting. Chiu et al. (2021) argue that teachers, as educators, are particularly challenged because asynchronous online environments may impede the fostering of positive relationships between educators and students. Most teachers consider these relationships central to meaningful teaching and learning. Professional teaching programs should not only be based on asynchronous instruction but should also be blended with synchronous online class sessions and conventional interaction (Moorhouse & Wong, 2022).

Based on a systematic review of digital transformation among teachers, an educator's quality level is highly dependent on their motivation level (Razak et al., 2023). Many educators are
starting to take proactive steps by building online education-related application accounts such as Google Classroom (GC), Zoom, Kahoot, YouTube, Google Meet, and other related Web 2.0 tools, and by guiding students to participate in these applications (Subban et al., 2022).

The main direction is to ensure that implementing various ICT initiatives in education in Malaysia provides equal access to quality education, regardless of location, whether in the city or inland (Raman & Yamat, 2014; Razak et al., 2018). Additionally, ICT should also facilitate the routine tasks of teachers, as has been proven by most previous studies (Razak et al., 2019). However, the latest findings contradict this goal, as current statistics show that ICT use is minimal, especially among teachers (Chen et al., 2023). These results indicate that the initiative to digitize education is not on the right track to achieve success, and the potential for failure is high.

Hence, virtual learning environments (VLEs) present a myriad of challenges for teachers, significantly impacting the efficacy of digital education. One of the primary issues is the lack of technical proficiency among educators, which hinders their ability to effectively utilize various digital tools and platforms. This technical gap often results in inefficient lesson delivery and reduced student engagement. Additionally, the absence of face-to-face interaction makes it difficult for teachers to gauge student comprehension and provide timely feedback. Teachers also face challenges in creating an interactive and collaborative learning atmosphere, as the virtual setting can often lead to feelings of isolation among students. Moreover, the increased workload associated with designing, implementing, and maintaining online courses adds to the stress and burnout experienced by educators. Finally, disparities in access to reliable internet and technological resources among students further complicate the teaching process, requiring teachers to adapt their methods to accommodate diverse needs. These challenges underscore the need for comprehensive professional development and support systems to enhance the effectiveness of virtual learning environments.

**The Importance of Teaching and Learning Virtually**

The direction of virtual teaching and learning as an e-learning alternative is mediated via technology, the internet, and electronic devices such as CD-ROMs, projectors, and DVDs (Ahmed et al., 2020). Nevertheless, online learning will not replace activities taking place in face-to-face environments (Saghafi et al., 2014). Instead, it demonstrates that both face-to-face and web-based learning environments have their respective uses and limitations. Thus, previous researchers have concluded that both settings work together in complementary ways for students if a holistic model for blended learning is adopted. As a result, virtual learning facilitates the transfer and acquisition of knowledge by teachers and students at any distance, time, and location (Razak et al., 2021).

Empirical studies promote that a strong educator presence and quality content are essential in courses that successfully facilitate online student engagement and learning. The importance of teaching and learning virtually includes creating engaging learning opportunities (William, 2023), applying collaborative, problem-based learning, fostering critical thinking, and implementing more authentic performance-based assessments (Sutadji et al., 2021; Almulla & Al-Rahmi, 2023). To achieve this, a supportive learning environment is necessary, where educators strategically combine audio, video, synchronous and asynchronous discussions, practical activities, and other online tools to engage students (Chatterjee, 2022).

Establishing an educator's presence in online courses can be achieved in several ways, such as through regular communication with students, consistent feedback, and critical discourse modeled by the educator (Farley & Burbules, 2022). Thus, providing regular online interaction...
between teachers and students helps develop an online community, which is especially important when face-to-face interaction is limited due to the pandemic.

The success of virtual teaching and learning for teachers requires pedagogical and material support to be incorporated into e-learning (Ahmed & Opoku, 2022). However, issues regarding the human connection between teachers and students might arise, as distance learning can become frustrating due to technological failures (Kauppi et al., 2020).

To ensure long-term success in virtual teaching and learning, various other determinants contribute, especially involving the policies of each country and institution (Bennett et al., 2011; Caprara & Caprara, 2020), facilities, infrastructure, beliefs, intentions (Kundu & Bej, 2021), and accessibility (Naimi-Akbar et al., 2023). Therefore, it is clear that technology integration in education is needed, and technology itself is an enabler. Malaysia is considered one of the fastest-growing countries, given its high priority in ICT initiatives for the educational sector.

Methods

This study utilized a qualitative research design. The research focuses on the inductive study conducted by the researchers to understand a context in a deeper meaning, understanding, and experience that an individual goes through (Merriam & Tisdell, 2016). Utilized interviews and observation procedures to explore and gain in-depth knowledge based on the research objectives. In this study, the researchers examined the challenges and impacts of conducting virtual teaching to primary school teachers. Research questions are observed and linked to the efforts, processes, and practices of forming excellence and student outcomes in schools.

Participants

Purposive sampling was employed in this study for the researchers to understand a phenomenon (Merriam & Tisdell, 2016). For selecting the participants, the researchers set the criteria that the participants must be Malaysian primary school teachers who have experienced more than five years as in-service teachers starting academic year 2016. The age participants must be above 30 years old to acquire the maturity data and the willingness of participants to participate in the study also be taken into consideration. However, all participants may withdraw at any time.

The participants participated in this study as indicated in Table One. This research focuses on the criterion based on the respondents which include the teaching experience which is more than 5 years and two decades to represent their experiences and phenomena understanding on virtual learning environment from the perspective of different generations for quality assurance in the research context (Patton, 2015a). Moreover, knowledge from the perspective of technology is pedagogically aligned with field specialization (Pool et al., 2013).

Table 1. Demographic characteristics of respondents (Teachers)

<table>
<thead>
<tr>
<th>Bil</th>
<th>Age</th>
<th>Gender</th>
<th>Teaching Experience</th>
</tr>
</thead>
<tbody>
<tr>
<td>P1</td>
<td>45 years</td>
<td>Women</td>
<td>18 years</td>
</tr>
<tr>
<td>P2</td>
<td>37 years</td>
<td>Men</td>
<td>10 years</td>
</tr>
<tr>
<td>P3</td>
<td>36 years</td>
<td>Women</td>
<td>11 years</td>
</tr>
<tr>
<td>P4</td>
<td>30 years</td>
<td>Men</td>
<td>5 years</td>
</tr>
</tbody>
</table>

Before the actual study was conducted, a pilot study was undertaken to identify and improve any shortcomings in the questionnaire provided to the participants. No significant problems occurred during the interview, and all the question items could be asked clearly and understood by the
informants. Thereafter, the researcher obtained a letter of permission from the office to conduct the actual study by setting the date and platform for the interview session. A consent letter was given to the participants for confirmation, serving as an agreement to take part and providing a brief overview of the research objectives. The interview sessions lasted about 30 to 45 minutes for the verbatim process. The researchers stopped collecting data after the fourth informant because the findings were repeated, indicating that the saturation point had been reached (Merriam & Tisdell, 2016).

Data Analysis
This study employed a thematic analysis by Braun and Clarke (2006, 2019). The data analysis was conducted simultaneously after data collection to gain meaningful themes and established trustworthiness during each phase of thematic analysis comprising of (i) familiarizing, (ii) generating initial codes, (iii) searching for themes, (iv) reviewing themes, (v) defining and naming themes and finally (vi) producing the report. By applying this process, the researcher can establish findings that support the main points, building toward a convincing explanation (Starks & Trinidad, 2007).

In this study, the NVIVO version 12 software was used to organize, analyze, and code the data for gaining the themes to answer research questions. The data from the transcript were read and analyzed line by line to identify the patterns in each participant. The researchers put together the codes thought were similar and repeated the analysis process for all the data in the participant. Each researcher reviews the codes to ensure the validity of the theme that emerged (Creswell, 2007). The researcher realized that similar words and phrases were used in different participants' data that dealt with similar ideas. This recurring pattern of ideas became a theme. The researcher could navigate through the phrases, quotes, codes, and memos in the NVIVO version 12 software's node unit. During this procedure, the researchers analyze the data to uncover the entire data. This procedure ensures the analysis could explain not just the drawbacks and challenges of the phenomena but for the strategies implemented by the teachers to resolve the issue of integrating Virtual Learning technologies.

Starting with data collection, including interview transcripts, the data were transferred to NVIVO for coding and analysis based on the research questions exploring the challenges and impacts of virtual learning environments on teachers, as well as the best features to overcome these challenges and impacts. Thematic categories were highlighted for more specific coding and analysis, enabling a detailed thematic analysis to identify and interpret key themes and patterns in the findings. The descriptive narrative presented in the findings explains the challenges and impacts of virtual learning environments on teachers and provides directions for future research.

Findings
In this study, the findings are formulated and broken down into some main sections based on the research questions that have been formed. First, “What challenges are faced in implementing virtual teaching and learning for teachers?” Second, “What is the impact of the implementation of virtual teaching and learning on teachers?” and third, “What are the best features in addressing the challenges and impact of the implementation of virtual teaching and learning on teachers?” The findings presented described data obtained in the form of interviews and observation elaborated based on the sequence of research questions.
What challenges are faced in implementing virtual teaching and learning for teachers?

The first research question identified the challenges and three themes appeared: roles and responsibilities of teachers, ICT accessibility and work environment from home.

Roles and responsibilities of Teacher

The findings revealed that the teachers’ attitude toward ICT signifies implementing virtual learning. Two different views, positive and negative comments received. For example, P3 showed more positive comments as below:

In a situation where there is no choice, I think this method is best for ensuring that learning sessions are continued using various online platforms, especially when MCO. E-learning is the safest step so students do not drop out and do unprofitable activities. (p.3)

However, as highlighted by respondents, for example, both of them feel a bit stressed in terms of chasing time in preparing the learning and facilitation process virtually as below:

Changes in the conventional approach to a more technologically centered virtual resource.

So, teachers are the main movement in this implementation. I feel like chasing time preparing teaching materials. Feeling depressed.

The changes in the implementation of teaching put pressure on them, especially in preparing teaching materials for new norms. According to P1 participants, teachers also need time to handle IT as it is a unique knowledge in teaching which has never been implemented. However, P2 participants believe this implementation needs to be welcomed as it is the best medium to replace the conventional method since PKP is implemented throughout the country and even the world.

In a situation where there is no choice, I think this method is best for ensuring that learning sessions are continued using various online platforms, especially when MCO. E-learning is the safest step so that students do not drop out and do unprofitable activities. (p.2)

Teachers' role should also comprise readiness for ICT knowledge and skills in education. In addition to face-to-face methods being the choice of teachers, the lack of use of ICT among teachers may be due to a lack of skills. For example, P2 explained

Yes… teachers already necessarily need to equip themselves with ICT knowledge and skills. I think this our responsibility as a teacher in the changing world of education. (p. 2)

Important … Us as teachers have to seek knowledge regardless of any source. Should be a little diligent. (p.4)

Teachers have different ways and views in their readiness to conduct virtual classrooms. The majority of participants admit to being relatively weak in IT but are willing to learn if given the opportunity. Participants' readiness is needed to deepen their knowledge and skills in IT. Teachers need to seek wisdom from various sources as well as increase self-confidence in dealing with students while teaching.

Additionally, teachers need to ensure that they can apply ICT as best as possible in the teaching and learning process to guide students to use the internet and handle online learning effectively. This study indicated that self-efficacy in using ICT in the learning process is crucial for teachers when utilizing virtual knowledge, especially during COVID-19 or future crises.

…I kind of like IT. So, every time before class, I will do the initial preparation. I will feel satisfied when any class is running smoothly. There are students good welcome... (p. 2)
... But for our efforts as teachers which animates comfortable classroom atmosphere for students. I also try to get gadgets from shopee for perfect online classes. I… have fun too… (smile). (p. 3)

Based on the comments and opinions given by participants shows, all participants have a similar statement concerning the satisfaction of effective teaching teachers depending on the efforts of the teacher to create a comfortable environment for students to learn otherwise will lead to a lower percentage of online learning. However, the decreased percentage of student involvement before the school holidays illustrates a disturbance in students' momentum in the "mood" of school holidays. In addition, if seen from the responsibility of the student himself should also play a role. On top of it, self-assessment needs to be done from time to time by students as this will help students and teachers ensure that learning outcomes can be achieved at the end of the learning session. The teacher can prepare the assessment feedback questions or the student independently. The results will be used by teachers in improving and strengthening this virtual teaching.

**ICT Accessibility**

The spread of Covid-19 that has hit the world has shown a sharp increase in using online learning to replace learning in the classroom. Based on this scenario, findings revealed that most teachers and students are already exposed to online learning, but to ensure widespread use, several key issues are often raised, including infrastructure facilities, adequate equipment, and access to internet access should be given attention. Majorities of the respondents responded regarding ICT facilities and accessibility to showcase the concern of the uncertainty of the accessibility as follows:

The problem with internet access is…very testing patience. Bad line anywhere… Build if class 40 minutes we had time to teach less than that …. That is not to mention the disruption of students in online classes. (p.1)

There is no denying the line is sometimes bad… Many may use school holidays to make classes. But I sometimes record a video to avoid line interference… so students can open the video I shared. Hope the authorities can think of a way to solve this problem…. (p. 4)

Overall, it can be concluded the main issue that plagues the implementation of online learning is the excellent internet access infrastructure facilities. According to the P3 participant, he strives to try the various telcos available to ensure that online classes run smoothly. Among other alternatives, Participant P4 records teaching videos offline to make it easier for students to learn when online disruptions occur.

**Work Environment from Home**

The findings revealed shared knowledge that PKP has changed the work environment from office to home. Therefore, managing time and having a conducive home teaching environment is essential for teachers to conduct teaching and ensure the learning takes place. As explained by the respondents as follows:

I am honest prefer to teach as usual ... can go to class. Follow the schedule set from teaching from home… want to say the many challenges of working from home…in the middle we teach suddenly, the neighbors do noisy… carpentry job. That is not to mention the children who have to be treated… have to take care of their aurat, which in the house is worried about seeing nonsensical actions (laughs). (p.1)
... I have three children’s need to use a 'mobile phone' for their class. In the house, only one of my laptops... so indeed, I fought with his and the children's classes. Stress... I became dizzy mixed work of teachers and housewives ... (p.3) In this study, most participants prefer to teach at school rather than from home. According to Participant P1, he was disturbed by the noise from the neighbor’s house, creating an inappropriate atmosphere during the online teaching session. He also stated that virtual teaching and learning activities have also been limited, especially physical ones. In addition, P3 also said that he lacked communication device facilities (mobile phones or laptops) which was not enough. For example, three children attend school in a family, and the teacher holds a virtual lecture class simultaneously. So, a mother or father has to choose the priority of the child who has to put first and sacrifice others. This condition can cause children to drop out of class. Despite studying from home, this is not an excuse for students not to dress appropriately during online or virtual classes. Even people who are in the house need to dress appropriately so as not to create an uncomfortable situation at all during the class

**What is the impact of virtual teaching and learning implementation on teachers?**

Two themes appeared in the second research question: curriculum structure, virtual lectures and teaching and learning materials.

**Curriculum Structure**

The findings indicated changes in the method for learning assessment. Changes in the structure and delivery of the academic program curriculum in schools will occur more vigorously during and after the COVID-19 pandemic. Although most currently used methods are temporary, the effects of these changes are expected to continue. Teachers who are used to face-to-face methods at school are beginning to feel comfortable with online forms because they are among the best alternatives for today. However, the new phenomena during COVID-19 have forced classes to be online and apply a variety of methods for learning assessment as mentioned below considered as the impact:-

... I like the flexible platform that I use. According to my experiment, Google Zoom can be used by early school students (Level 1) and Google Meet for middle or upper school students (Level 2). When using Google Zoom, I can block students from talking in class by setting my online restrictions (laughs)... I also close the chat space. This is all to avoid interrupting my teaching. Safe little class. But our little students don't have to do that... they are good at thinking. (p. 2)

I use various methods according to the class I teach ... Means every use class has different approaches. Now there are all kinds of interactions that we can use like online quizzes, Google Meet, Google Classroom and more ... (P4)

From these views, the respondent was more comfortable using applications such as Zoom, Skype, MS Team, Google Hangout, Google Meet, WhatsApp, and so on after a few months through the new normal. This virtual learning further opens up opportunities for teachers to explore the various existing methods for teaching and learning. Participant P1 used the approach to select the platform's suitability according to the level of students during the online teaching session. Such an exciting partnership can also benefit other teachers who have doubts about choosing the appropriate medium to use, especially the classroom directly.
Additionally, the findings discovered that the assessment of self-learning by students is one of the good impacts of this virtual learning. Students can be independent without waiting for the teacher to teach. Therefore, we can conclude that the student assessment system is no longer sitting for the examination in the examination hall by answering the test paper questions provided by the teacher. Pupils can self-assess their understanding at the end of learning by answering questions provided by their teachers using various platforms such as Google Forms. Moreover, students can obtain marks directly without waiting long. Participants explained the following interview results below:

For me, it is very subjective … I just refer to the results of the marks during the online test held. (P2)

When they can answer a quiz that I give is about achieving a little bit of objective… for now it's a little hard to target a lot. Student can make their assessment directly through the quiz… (P3)

I have assessed Google Forms for students to answer. (P4)

Referring to the results of interviews with participants, the average respondent is still less confident with the transparency found in the assessment that students do themselves at home online. According to P1 participants, he went through his own experience where the lowest students in the class could answer questions well while online. Even so, the comments from these respondents for primary school students who are considered immature in operating their own electronic devices and need parental guidance at home. In addition, according to other participants, this virtual learning assessment is a test of the student's honesty in learning. In conclusion, virtual learning can shape students' personalities by demanding high discipline and honesty.

Virtual Lectures

Recalling the conventional learning situation where a teacher will come to class to give a face-to-face lecture that takes 40 minutes to 60 minutes in class. This situation differs from virtual or online teaching, where teachers must focus on the crucial things to convey. Time is minimal and needs good focus from students. The majority of the respondents shared the same opinions, for example:

Here is their time… they love it very much. Often the exercises that use the medium in the form of online quizzes are what they like to do. The response was good because it can be answered spontaneously.(P1)

They like it … Usually the slaves of today good at playing gadgets… (P3)

The students I teach are younger in years 1 to 3… so every class is their parents for preparation… there are also more advanced slaves in IT; they know how to use the chat room… until there is a commotion there… some scratch the screen that I present (laughs)… (P4: Line 24)

The research found similar results. All participants gave the same opinion, and the student welcomed the virtual lecture conducted by the respondent. Participants state students find it easier to use this medium because it suits their age.
Teaching and Learning Materials

Technology development over time seems too fast for us to catch up. Therefore interactive teaching and learning materials are essential tools as part of the process. Teachers must accept that they are educating a generation born in the age of technology. The COVID-19 pandemic that plagued the world seems to give us the awareness to change. For example, in today's world of education, text-packed notes are no longer relevant. Teachers can further develop creativity for teaching materials such as inserting voice, video, or simulation explaining statements on slide pages. Pupils are now more easily drawn to realistic elements to engage them in learning. To answer this question, the researcher has prepared a question: Do interactive teaching and learning materials can encourage students to study? Do you agree? Why? Researchers received comments and opinions from the respondents' interview results as follows:

Yes… I agree… as I mentioned earlier, this is their time. Kids are easily now interested in learning using electronic devices. They were born in the age of technology. (P1)

… My students agree I like it when I do quizzes online, available playfully. They compete for high marks. The classroom was lively, and the students were sporting (chuckle). Sometimes I invite teachers to answer my questions… (P2)

Agree… Today's boys prefer visuals. After all, now such material many in electronic media which we use. (P3)

Agree… even though studying from home does not necessarily mean students cannot study. They like to study online. So, we as teachers have to be creative because slaves now have more advanced IT knowledge… Hehehe…. (P4)

Based on the comments and opinions of all participants show that more interactive teaching and learning materials have had a positive impact on student learning. According to Participant, P2 states that students like online quizzes as online games. In addition, the knowledge that existing students have allowed them to attend this virtual classroom. Here indirectly, education in the book country keeps pace over time in educational technology.

Overall, the implementation process began during the lockdown crisis, allowing teachers to focus appropriately on aspects of their role as the backbone of the implementing agent of the national education mission. Therefore, changes from conventional to virtual teaching and learning are more meaningful and fun for teachers and students. The same is true in the matter of determining practices or behaviors that have a positive impact on teachers and students. In this aspect, teachers have shown a high level of professionalism when successfully using teaching methods that are appropriate to the level of development and needs of students.

What are the best features in addressing the challenges and impact of implementing virtual teaching and learning among teachers?

The final research question identified the best features in addressing the challenges and impact of the implementation of virtual teaching and learning in the new era of education as follows:

Moving along with time

The disaster that befell the country to some extent impacts the use of online learning systems in schools. The sharp increase in the use of online learning to replace learning in the
classroom has begun to implement following the spread of Covid-19 that has hit the world. Even so, researchers want to unravel the extent to which this change is in line with the current circulation. Here the researcher has posed research questions: Do you aware that education in Malaysia can move along with time? What is your opinion? To get reviews from respondents. Here are the comments and views from the respondents regarding this question:

Here, I see KPM's efforts towards digital education, especially when our country accepts the covid pandemic. Before the pandemic, we did have Online Frog as a platform. But now a more effective digital platform such as Google Classroom and Microsoft Team is an easy-to-use app. Therefore, our education is still on the right track and not left behind. (P1)

Yes… this is the wisdom of the covid-19 pandemic. Changes towards digital education. But not entirely on those in rural areas. The authorities need to think about accessing infrastructure internet so that no one is marginalized. (P2)

Efforts to improve the quality of continuous teaching
The findings noted that the actions and preparation of teachers in dealing with online teaching and learning, which is counter to face-to-face meetings, are crucial. In the school context with diverse learners' backgrounds, such as different socio-economic levels, thus teachers must put extra effort into gaining new knowledge to ensure the quality of teaching style at the highest level.

I used to go to school; a teacher friend made a video tutorial to teach using Google Classroom. If I don't know, I like to ask… hehehe…” (P2)

"So far there are also for e-learning courses. But for me, teachers need to be diligent as well as knowledge outside… many other fellow teachers share an interesting platform. (P42)

After referring to the comments and opinions of participants, it can be concluded that all participants desire to add knowledge to their teaching techniques. According to participants, they get guidance from other skilled friends to increase their understanding of the use of IT applications. In addition, the willingness of experienced friends to share knowledge is also welcomed by participants, for example, by holding a video tutorial on how to use Google Classroom.

Fostering the student
The findings showed the teacher is the agent of knowledge for the students. The knowledge that teachers transfer is the best knowledge for the students, especially in this era of advanced technology. Teachers' exposure to specific techniques in virtual teaching needs to be learned so that students can effortlessly convey and understand expertise. For example:

This teacher is true and will be an example of students at school… so among the efforts I made was with multiple teaching mediums using IT and exposure to IT. In addition, I, as a teacher, also need to 'top up' knowledge in IT… to give better to my students. (P1)

"I love to tell stories and share information while making classes live online… so that's where I give it to encourage students to recognize educational applications. (P4)

Participants P1 and P4 stress teachers' pivotal role in IT education. P1 asserts that teachers, as role models, inspire students through integrated technology, acting as a catalyst for proficient tool
usage. P4 actively shares practical IT information, aiming for engaging learning. Both advocate broader ICT use in education, enabling optimized virtual learning, transcending geographical and skill-level barriers, and fostering inclusivity.

Discussion

The primary objective of this research is to identify the challenges faced by school teachers in implementing virtual teaching and learning. By examining the inherent challenges in virtual learning environments, our study aims to highlight key themes that significantly impact the efficacy and experience of both educators and learners. The identified themes include the roles and responsibilities of teachers, ICT accessibility, and the work environment from home. These themes emerged from our study and provided insights into teachers' readiness, ICT knowledge, and skills required for effective online teaching (Rashid et al., 2021).

Facilitating education and learning in an online environment presents several challenges for educators, who often struggle to adapt practices that have proven effective in traditional classrooms to an online setting (Tynan et al., 2015). Moreover, our study found that teachers face significant pressure in adapting to new norms in teaching and preparing materials. Fletcher and Bullock (2015) argue that teachers' roles and responsibilities are particularly challenged in this regard, as asynchronous online environments may hinder the development of positive relationships between educators and their students—a relationship central to meaningful teaching and learning.

The study's results also reveal constraints in utilizing IT systems and accessibility for teaching and facilitating. This lack of IT knowledge can undermine teachers' self-confidence, particularly in virtual interactions with students (Ledger et al., 2019). However, the findings demonstrate teachers' willingness to acquire IT knowledge. A previous study found that online teaching positively impacts teaching methodologies and learning styles (Encarnacion et al., 2021), fostering increased commitment from teachers. This aligns with the goals of the Education Technology Division, given current statistics indicating shallow ICT usage among teachers (King & South, 2017)

All teachers agree that the primary challenge affecting the implementation of online learning is inadequate internet infrastructure. Teachers make every effort to secure reliable connectivity to ensure smooth online classes. As a contingency measure, some teachers also record offline teaching videos to facilitate learning during online disruptions. This finding resonates with Wang (2023), who argues that virtual learning should engage the community to access relevant materials and information, which should be easily accessible online. Therefore, expanding the use of IT in teaching and learning can encourage student engagement with technology. Through ICT, teachers can enhance virtual learning experiences, whether through distance learning or self-paced study, regardless of students' location or skill level. Gray & DiLoreto (2016) support this by suggesting that educators establish their presence in online courses through regular communication, consistent feedback, and modeling critical discourse.

The theme of the work environment from home presents unique challenges. Educators emphasize the significant role of the environment, with many reporting difficulties in managing time and feeling disconnected from the school community while working remotely (Millan et al., 2022). They highlight that creating a suitable home office setup conducive to teaching poses challenges such as limited space, distractions, and inadequate technology. Consequently, teachers may find it difficult to assess student understanding and provide the necessary support (Kasprzak & Mudlo-Glagolska, 2022).
Next, we would like to discuss the secondary objectives of the research, specifically exploring the impact of implementing virtual teaching and learning on teachers. The themes identified in the study include curriculum structure, virtual lectures, and teaching materials. According to previous research, a well-established curriculum structure is crucial for enhancing learning outcomes (Aini, 2023). This study reveals that delivering subjects, conducting assessments, and utilizing online teaching materials offer more flexibility and alternative methods. Ghavifekr and Rosdy (2015) emphasize that advancements in technology contribute significantly to diverse learning approaches, highlighting the importance of understanding who, for whom, where, and how learning processes occur in educational contexts.

By regularly teaching virtually, findings indicate that all teachers are eager to enhance their teaching techniques while embracing new knowledge in IT applications. Moreover, teachers are open to learning from colleagues skilled in technology, such as participating in video tutorials on platforms like Google Classroom. This finding resonates with Tai et al. (2022), who assert that the rapid advancement of computing technology in education significantly contributes to progress and performance among teachers and students. They categorize the use of computer technology into administrative tools, research tools, and teaching media. Therefore, effective virtual lectures necessitate meticulous instructional design to engage students and facilitate learning.

The impact of the virtual learning environment includes the use of teaching materials to support teaching and learning (Naimi-Akbar et al., 2023). Teachers need to be creative and adept at utilizing existing resources while developing new materials tailored for digital platforms, which can be time-consuming and require specific skills (Xing & Qi, 2023). A study conducted by Luna and Marulanda (2023) found that using lightboards positively influences students' learning satisfaction, highlighting the importance of methodology and supporting materials in virtual lectures. Digital platforms promote engagement, enjoyable learning experiences, and critical thinking among students, thereby enhancing teaching practices for educators. Thus, the impact of the virtual learning environment optimizes the evolution of the educational landscape, enhancing experiences for both teachers and students in the future.

The third objective of this research is to explore the best features for addressing the challenges and impacts of implementing virtual teaching environments for teachers. This study focuses on three main themes: adapting to technological advancements, enhancing continuous teaching quality, and fostering student engagement. Previous studies have highlighted that teachers often lack the technical knowledge and skills required for effective online instruction (Jidi & Jamian, 2022). Therefore, this research emphasizes the importance of raising awareness and enhancing teachers' proficiency in adopting new technological tools. This approach enables teachers to adopt more student-centered approaches, making online lessons more engaging and impactful. To support this, educational institutions must offer comprehensive training to upgrade teachers' ICT skills and familiarize them with teaching tools and methods (Jidi & Jamian, 2022).

Furthermore, virtual teaching environments introduce innovative digital teaching approaches that engage students' senses and improve the quality of continuous instruction, providing timely feedback (Xia et al., 2022). With enhanced skills and knowledge, teachers can effectively convey subject matter and strengthen student relationships. Thus, comprehensive training and the application of creative, innovative teaching methods and materials in online settings can optimize the quality and effectiveness of virtual teaching and learning.
Implications

This study focuses on a content analysis guided by semi-structured interview techniques. Aspects of exploration entail discussing the study's main findings and their implications from the theoretical and practical aspects. Virtual teaching and facilitation is an innovation in the renewed education system aimed at replacing the existing education system, which is conventionally a series of COVID-19 pandemic effects that hit the world. Thus, encourage students to be more innovative and creative in learning to be able to seek knowledge, engage in virtual academic discussions and contribute knowledge in the world of technology aligned to build a lifelong learning journey. As posited by Rogers (1995), the acceptance of this innovation depends on the individual to evaluate innovation is connected through specific channels according to time among the members of a social system.

The challenges include the role of a teacher in implementation, ease of internet access, and the challenges of working from home. In addition, the findings of the interview analysis also unravel the impact of virtual learning implementation on structural changes and curriculum delivery, as well as interesting interactive teaching materials. Practically, this study provides many benefits in an academic environment. Firstly, we can understand teachers' constraints in implementing teaching and learning virtually. Thus, the monitoring process is to work from home by arranging systematic teaching and facilitating schedules to lessen pressure on teachers and parents to help children at home. In fact, during COVID-19 pandemic indicates the avenue to accept that learning concepts have changed differently from before, which is just waiting for the teacher to enter the classroom to teach. The students must be mentally equipped and self-sufficient to study online without teacher supervision sometimes. This new method requires students to manage proper good time and high discipline towards commitment as a student.

Virtual learning also assists the educator in planning more effective and attractive teaching and learning strategies. The interactive teaching materials can attract students to virtual learning continuously compared to conventional teaching strategies that occasionally reduce interest in education. However, while learning online, teachers must also be sensitive to the socio-economic background so that no students feel marginalized or drop out. The study also set an opportunity to review when conducting a student performance evaluation virtually by the schools and the examinations board to a higher stage of the policy maker. Evaluation of access to internet facilities and sufficient electronic devices for use in education as strategies to improving the quality of education in the country, also, by looking at the aspects of job satisfaction, psychological well-being, and learning styles virtually compared to conventional settings.

Conclusion

This study explored the challenges and outcomes in implementing Virtual Teaching and Learning in primary education. Teachers play a pivotal role, in providing motivation, encouragement, and anxiety alleviation in the virtual landscape. Dynamic online classroom activities include interactive quizzes, storytelling, visual presentations with images, competitions, and music integration via various applications, fostering a vibrant learning environment. This highlights Virtual Teaching and Learning transformative potential beyond information repositories, acting as catalysts for meaningful learning experiences.
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