Research Article:

E-Leadership: Reconceptualising Teacher Leadership in the Singapore Digitised Educational Landscape

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ABSTRACT

There is an increase in demand for teacher leaders to take on and lead the digitised change in the classrooms. However, there is still limited research on how ready teachers are to lead and manage online teaching during and post-COVID times, and hence this exploratory study investigates the challenges that teachers face in enacting e-leadership. To answer the question on "how do the process and development of the introduction of Home-Based Learning (HBL) influence teacher leadership in Singapore?", through convenience sampling, this study used questionnaires to understand in-service teachers' readiness to be e-leaders and the drawbacks in the development and introduction of the hybrid or e-curriculum. The study concluded that when building teacher leadership capacity, it is important for school leaders to set the direction, establish a culture of online learning, and develop e-champions to support e-pedagogies. E-teacher leadership can be described as hybrid leadership that consists of a blend of face-to-face and virtual leadership skills.

Keywords: Teacher leadership, hybridity, online learning, COVID-19, home-based learning

INTRODUCTION

Teacher leaders are important; they are educators who take on leadership roles and extra responsibilities that extend beyond the traditional classroom. Teacher leaders support student learning because they seek to improve schools' performance, solve problems and are often the catalysts for change and innovation in schools. This group of teachers are considered leaders even though they may not hold formal positions because they inspire change and improve the quality of teaching. As the world enters a new era of innovation whereby the pace of change has been intensified, the concept of leadership has moved beyond "on-site" influence. Especially when the coronavirus (COVID-19) pandemic hit in 2020, leaders faced tremendous stress as they led their team to navigate this extreme and uncertain reality virtually. Similarly, in the educational setting, schools moved to online teaching and learning, and school leaders had to pivot leading online and remotely. Leaders were leading from their laptops, in their school building, leading in the community online (Harris, 2020). When students were allowed to return to schools, school leaders were tasked with additional responsibilities, such as social distancing, quarantining, and contact tracing. Consequently, many teachers play a central role in assisting school leaders in establishing effective and efficient school systems that support the additional tasks and the shift from online to face-to-face, and in some cases back to online teaching and learning.

This study aimed to answer these research questions (RQs):

> RQ1a: How has the introduction of Home-Based Learning (HBL) influenced teacher leadership (TL) in Singapore?
> RQ1b: What are the challenges that teachers face in enacting e-leadership?
> RQ2: How did the teachers demonstrate the 5Es during HBL?

E-learning was introduced to include technological usage in teaching and learning, while HBL was launched as a temporary response to ensure continuation of learning when schools were shut to contain the spread of the virus. RQ1a looked at Singapore teachers' readiness in taking on the role of an e-teacher leader (e-TL) when they had to mediate the relationship between principal and student learning in a centralised education system. Basically, e-TLs are teachers who are able to demonstrate leadership practices virtually in the use of technology and support other teachers in using these technological tools to enhance student learning and improve both digital teaching pedagogies. Thus, RQ1b aimed to discover the challenges teachers face in leading online classes since the implementation of HBL required schools to transition to online teaching quickly and for teachers to adapt their teaching method speedily, which had posed significant challenges for many educators to teach and lead online (Wai-Cook, 2020). RQ2 attempted to conceptualise teacher leaders as the agent of change in the school system even though it has been extensively discussed (Harris et al., 2017; Lieberman et al., 2016). Nevertheless, research on how teachers take up responsibilities and respond due to the temporal shift to online learning that was introduced during the pandemic is still relatively new. In short, this study proposed that a hybridised leadership is required for formal and informal teacher leaders to collaborate, review their own work, engage and lead others, and experiment with new e-pedagogies.

Overview of the Types of Leadership Approaches

For a long time, many leaders have drawn on the idea of "great man theory" whereby the focus was on individuals with exceptional talents or traits (Borgatta et al., 1954). Unlike the great man theory, behavioural theorists argued that leaders can be made, and their actions can be developed by learning from others. By the 1960s, there had been a shift in focus from individual attributes to collective action (Hallinger, 2003). This shift was to better reflect the complexity of leadership and looked at the "particular variables related to the environment that might determine which style of leadership is best suited for a particular work situation" (Amanchukwu et al., 2015, p. 8).

Before the pandemic, leadership theorists have already existed and widely discussed, and they are still relevant today. For example, Yukl (2002) characterised leadership as "traits, behavior, influence, interaction patterns, role relationships, and occupation of an administrative position" (p. 2). Katz and Kahn (1978) described leadership as "the influence increment over and above mechanical compliance with the routine directives of the organization" (p. 528). Schermerhorn et al. (2000) explained that "leadership is a special case of interpersonal influence that gets an individual or group to do what the leader or manager wants to be done" (p. 287). Whereas Kouzes and Posner (2007) defined leadership as a dynamic process where "leaders mobilise others to want to make extraordinary things happen in organisations" (p. 2). In the educational context, developing leadership at the school and system level is an important factor for reforms to be translated in schools (Organisation for Economic Co-operation and Development [OECD], 2010).

Since then, there has been a plethora of research on the different leadership styles (Vanvelzer, 2021). For a start, there is distributed leadership. In this leadership approach, leaders empower others in the decision-making practices whereby organisational members or different stakeholders are involved (Harris, 2008; Spillane, 2006). For instructional leaders, their main tasks are creating clear goals that are focused on student learning. They need to take the lead in coordinating the curriculum and monitoring student learning outcomes by fostering continuous improvement and developing a climate of high expectations for teachers in the areas of teaching and learning (Fullan, 2014; Hallinger, 2005). In the case of transformational leaders, they prefer to pursue their shared goals and values through interacting and raising others' motivation. They are concerned about their staff's morality and how their actions can impact others (Bass & Avolio, 1993; Black, 2015). For servant leaders, they focus on serving others and establishing relationships (Brewer, 2010; Greenleaf, 2002). However, despite the different definitions of leadership, there are two things that determine leadership effectiveness, and they are, "the decisions you make and the influence you have" (Harkavy, 2020, p. 14).

In the educational setting, these above-mentioned leadership approaches are practices that are generally adopted by positional leaders. These leaders would be principals, vice principals, or heads of departments. However, as compared to these leaders who operate from a position of power, teachers often take the passive role of receiving orders from them. Nevertheless, teachers take on a different kind of leadership practices whereby they

lead in supporting school and student success at the ground level and demonstrating these approaches in their area of influence. In addition, they play a critical role in mediating the relationship between principal leadership and student learning (Sebastian et al., 2016). According to Cosenza (2015), there is no common definition for TL. For example, TL is strongly connected to the success of schools whereby teachers are given opportunity to collaborate with others to avoid working in isolation with the aim to increase teacher professionalisation and build leadership capacity (Cosenza, 2015; Dozier, 2007; Greenlee, 2007). TL is also conceptualised as a collective effort that empowers teachers to make positive contributions to their schools and communities. Hence, TL is not reserved for the highest levels of an organisation. Instead, it can be found at the ground level when adequate opportunities, training and support are given to teachers to lead (Kotter, 1996), and showcase the various leadership approaches in a localised micro level. As schools undergo tremendous changes over the last few years, how teachers lead has also evolved as the use of technology has profoundly changed education.

The recent COVID-19 pandemic served as an example of how it had disrupted schooling, and Singapore teachers (and teachers worldwide) are fully aware of the disruptions. They had to create teaching and learning resources, collaborate and support other teachers online, ensure students' emotional health were taken care of, support them to adapt to new ways of learning and assume the role of information and communication technology (ICT) champions and managers virtually (Tan, 2020). All these expectations not only had increased teachers' workload, but it had also escalated their stress leading to teacher burnout. For instance, a national survey conducted by the Singapore Counselling Centre (SCC) found that more than 80% of teachers reported that the additional responsibilities during COVID had hurt their mental health (Qing, 2022).

An Overview of Singapore and its Education System

Singapore is a tiny Southeast Asia country located at the southern tip of the Malay Peninsula, surrounded by predominantly Malay speaking neighbours. Devoid of any natural resources, Singapore has a population of about 5.6 million with a land area of only about 733 sq. km (Department of Statistic Singapore, 2023), which forms the most valued capital for its economic development. For example, in 2014 a nationwide initiative known as Smart Nation movement was launched to accelerate Singapore digitisation efforts to boost its human capital and reap the benefits of a digital economy. To execute this plan, a major digital revolution would be seen in the public, private, and people sectors (Smart Nation and Digital Government Office, 2018). The Singapore education system led by the Ministry of Education (MOE), a centralised system that oversees the designing, developing, and implementing educational policies and curriculum for all government-owned schools plays a critical role in building the desired human capital for Singapore. One such policy directive was the ICT Masterplans (MPs), which have undergone four iterations since its implementation.

E-Learning and E-Teaching: ICT Masterplan in Singapore

For the last 40 years, technology advancement has been the driving force in all its industries. As early as 1991, the Singapore government through the National Science and Technology Board introduced "Technet", a nationwide computer network to connect academic institutions to the internet and to one another. By 1997, it was also the first few countries in the world to launch a nationwide broadband network, known as Singapore One, to link homes, businesses, and schools through high-speed internet access (Smart Nation Singapore, 2022). In the same year, the MOE introduced the first ICT MP in schools.

The four ICT masterplans

The Singapore educational technology journey began in 1997 with the aim to transform Singapore schools into an ICT-enriched environment to bolster teaching and learning, as well as students' educational experiences. In total, there are four phases for this MOE's ICT MPs with each building on the previous phase to respond to the rapid changing needs and driving forces in the society (Table 1).

Table 1. ICT masterplans phases and description

MP phase	Year	Description
Phase 1	1997–2002	Island wide approach to provide basic technological infrastructure for all government run schools and to support educators to build up their digital skills.
Phase 2	2003–2008	Focused on achieving a higher usage of ICT use in education by incorporating ICT curriculum and assessment in schools.
Phase 3	2009–2014	Targeted the development of the learning environments in schools.
Phase 4	2015–2019	Targeted at developing quality learning with a strong emphasis on acquiring the desired 21st century competencies and becoming responsible Singapore digital students.

With the completion of the first three MPs, in November 2014 the Singapore government launched the Smart Nation movement to propel Singapore to the next phase of nation building. Its main objective was to forge ahead the country's transformation process by empowering its people to take on Industry 4.0 whereby big data, AI, Internet of Things (IOT) and robotics will further challenge the global economy, people's lives, work and social life (Smart Nation and Digital Government Office, 2018). With that objective, phase four (MP4) was introduced from 2015 to 2019. To complement MP4, SLS (Studend Learning Space) was introduced; it serves as a platform for Singapore teachers to access various tools to teach online and for them to share new teaching pedagogies across schools, and all school leaders, teachers, and students in the national school system have access to it. (MOE, 2023). In 2020, an updated road map for teachers, called Skillsfuture for Educators was launched to help teachers to choose their areas of professional learning so that they can better implement curricula changes (Teng, 2020), and create talents needed in support of a Smart Nation. These calculated strategies to embrace ICT revolution have provided the foundation for the current Educational Technology (EdTech) Plan that seeks to develop a technology-enriched school environment for quality teaching and teaching (MOE, 2022).

How Would the Current Situation Affect Leadership in School?

The reality is that "A digital economy is emerging, and data is its lifeblood… [and] The COVID-19 pandemic has given a significant boost to digitalisation" (Menon, 2022, pp. 14-15), Consequently, leaders in these digital workplaces not only need to be agile, forward looking, digital savvy, innovative and nimble, but they must lead differently (World Economic Forum, 2018). In fact, effective digital leaders are key to digital transformation and the success of the organisations. Meanwhile, in the educational setting, educators become digital leaders and are expected to acquire appropriate skills and knowledge to lead and manage this digital transformation. As seen in the case of Singapore, technological advancements have equipped teachers with various tools to differentiate their teaching, enhance teacher professional development and tailor their teaching to their students' learning needs. More notably, technology has allowed Singapore teachers to create virtual classes and lead them differently. For example, the use of technological pedagogical content knowledge (TPACK) in the classroom whereby teachers work on integrating technology into their teaching has been widely studied, such as works by Chai et al. (2017), Pringle et al. (2015), Tee and Lee (2011), and Voogt et al. (2013). In Singapore, it was found that pre-service teachers were willing to accept their role as designers for the learning environment, which could be attributed to the MP4 (Chai & Koh, 2017). However, as noted by Koh et al. (2015), notable gaps in TPACK research include contextualising it to specific context and applications, as well as difficulties teachers faced when designing ICT lessons that support twenty-first century learning.

Unfortunately, one of the greatest impacts of the COVID-19 pandemic happened in the classrooms whereby online teaching and learning became a replacement for in-person classes. As a result, many teachers had to become informal digital leaders and had an immense responsibility to ride this wave of using digital technologies in their classroom teaching. They had to kick start virtual and remote-teaching, and deal with all the complications that come with delivering a fully online or hybrid teaching of the curriculum during HBL. Although Singapore schools have been equipped with the necessary infrastructure and Singapore teachers with the technological skills through the various ICT MPs, many teachers were still faced with tremendous challenges as schools transitioned to HBL. As pointed out by Hargreaves (2021), "Digital learning and digital proficiency entail much more than mastering apps and tabs. They go far beyond knowing how to use digital tools…" (p. 840). While knowing these tools is important, there are other factors to consider, such as online teaching pedagogy, effective communication, time management and providing online support to students.

Despite the challenges, there are teachers who were able to respond swiftly by taking the lead to become the pillar of support for school leaders and by going beyond conducting online classes. For instance, some teachers stepped up to support the government's plan to digitise education. They helped other teachers in creating digital resources and took the proactive role to influence others in and outside their schools (Shen et al., 2020). These teachers were resourceful and became "informal" teacher leaders or "the go-to" teacher.

(Re)Conceptualisation of Teacher Leadership

The research on the role of teachers as school leaders has gained much momentum in recent years although work has been done on this topic since the 1980s (York-Barr & Duke, 2004). In conventional schools in Singapore, formal teacher leaders are those who are given designated roles, such as subject head, level head, head teacher, or vice principal. However, there are others who are agents of influence and change but without official titles. As pointed out by Sebastian et al. (2016), there are teachers who participate in a professional community, assume collective responsibility for students, collaborate with peers, take part in reflective dialogue about instruction, and engage in networks without any official leadership position (see, e.g., Supovitz et al., 2010). Essentially, formal and informal teacher leaders possess the capacity to select instructional materials, shape school curriculum, set standards for student behaviour, design staff development, and in service programmes, put in place related school policies, involve in school budgeting and selection of new teachers and administrators, as well as evaluate teacher performance (Barth, 2001).

York-Barr and Duke (2004) described TL as "teacher agency through establishing relationships, breaking down barriers, and marshalling resources throughout the organisation in an effort to improve students' educational experience and outcomes" (p. 263). To them, TL includes coordination and managing of curriculum work, participating in professional development that contribute to the teaching profession, working with parents, the community, and preservice teachers, as well as involving in school improvement plans. Fairman and Mackenzie's (2012) idea of TL is teacher leaders engaging in critical reflections and sharing their learnings with others with the aim to improve their own teaching practices; they coach and mentor fellow teachers, establish relationships and collaborate with others to support and advocate school capacity, as well as engage in distributed leadership approaches and school-wide improvement. They can enhance creativity among teachers by developing new ideas and innovative ways to solve problems (Zoellick et al., 2018). Shen et al. (2020) conducted a meta-analysis of teacher leadership and student achievement. They identified seven dimensions of teacher leadership:

1. Promoting a shared school vision, mission and goals of student learning.
2. Coordinating and managing beyond the classroom.
3. Facilitating improvements in curriculum, instructions and assessment.
4. Promoting teachers' professional development.
5. Engaging in policy and decision making.
6. Improving outreach and collaboration with families and communities.
7. Fostering a collaborative culture in school.

(Shen et al., 2020, p. 5).

Harris and Jones (2019) summarised TL as influencer, action, and developer of pedagogical excellence. At the same time, teachers expand their leadership when they influence external stakeholders, such as parents. Nonetheless, as pointed by Wenner and Campbell (2017), there is still a need for clear conceptualisations of TL for future research. This is further supported by Schott et al. (2020), whereby their studies found that "the number of authors

who provide a clear definition of teacher leadership is limited" (p. 6), and "the concept is still often undefined, or defined in divergent ways" (p. 12).

Based on the literature on TL and online teaching pedagogies, this study proposes that e-TL is made up of five key actionable 'E's: Exchange, Examine, Engage, Enforce and Experiment, that teachers are able to demonstrate virtually, discussed by Cheung et. al. (2018), Pan and Chen (2020), and Smylie and Eckert (2017). To begin with, "Exchange" refers to possessing the ability to work with colleagues to develop various online teaching materials, i.e., to be collaborative and share expertise. Next, "Examine" means taking the initiative to review and provide feedback on online teaching materials, that is, to promote improvements in teaching pedagogies and resources. Then, to "Engage" highlights teacher leaders' skills in using different online platforms to communicate with the various stakeholders, i.e., extend outreach. Following that, to "Enforce" means setting goals, strategies, indicators to support others to align their teaching and learning approaches virtually; they can promote a shared vision physically and virtually. Finally, to "Experiment" refers to creating opportunities to improve online teaching pedagogies with colleagues creatively and innovatively. We wanted to explore teachers' perceptions of their capacities, understanding, support and challenges in the implementation of HBL through the '5Es'. The intention was to find out teachers' mindsets and perceptions of their abilities and limitations and how they can affect the way they lead formally and informally online. Utilising the 5Es framework, this study posits a renewed perspective on the approaches of teachers, in general, to TL in the technological era, i.e., e-TL since they are expected to use ICT to teach and engage with their students, as well as to work with other teachers online and offline. The objective is to explore how online teaching and learning has redefined how teachers lead, influence, and develop pedagogical excellence during HBL.

METHODOLOGY

To examine how the processes of the introduction of HBL influenced teacher leadership in Singapore and to what extent are the Singapore teachers ready to take on the role of an e-TL in this current education system, a questionnaire was designed and administered to a small group of teachers with the aim to establish the preliminary understanding of e-leadership. The questionnaire comprised two main sections:

> (1a) To examine how the introduction of HBL has influenced TL in Singapore.
> (1b) To explore the challenges that teachers face in enacting e-leadership.
> (2) How teachers demonstrated the 5Es during HBL.

These questions are asked to find out if a teacher possesses the traits/characteristics of the e-TL. Ethics approval was obtained from the Nanyang Technological University's Institutional Review Board (IRB-2022-882). The questionnaire was emailed to different types of schools (Primary, Secondary and Higher Education)[1] to recruit about five subjects from each school. A sample of 37 teachers, average age of 36 years old, completed the questionnaire.

The first part of the questionnaire consisted of general demographic questions. Following that, the first section of the survey started with a series of Likert-scale questions to measure of (1a) teachers' perception of their abilities in conducting HBL:

1. Capacity of the teachers to carry out HBL.
2. Empowerment to teach HBL by the school or ministry.
3. Clarity of communication of policies on HBL.
4. Support and time allocated to prepare HBL.
5. Personal well-being when conducting HBL.

In this section, nine open-ended items were included throughout the survey to examine the (1b) five key challenges teachers faced in conducting HBL:

1. General challenges when conducting HBL.
2. Support on hardware and software teachers used in school.
3. Health and wellness when conducting HBL.
4. Providing feedback and assessment when doing HBL.
5. Improving HBL pedagogies.

The second section of the survey was to determine (2) the conceptualising e-TL by measuring the context and the teachers' own perceptions of their capacity and the support structures that were available for them to lead through the 5Es:

1. Exchange: How teachers work with colleagues.
2. Examine: Reviewing on own work.
3. Engage: Communicating with others.
4. Enforce: Leading in e-teaching, setting goals for self and others.
5. Experiment: Trying new e-pedagogies.

The instrument was sent to five experts and teachers to ensure face and content validity to ensure that the questionnaire is appropriate and effective.

Convenience sampling was used, and participants were educators in Singapore schools. Participants are approached by personal contact and emailing to school leaders for distribution. Questionnaire was sent to all the participants, and they completed both the Likert-scale questions as well as the open-ended questions. Data were analysed using SPSS (version 28.0), and open-ended responses were collated and reported where necessary. Descriptive statistics were applied to obtain a general overview of the perceptions of the participants and basic characteristics of the 5Es. Respondents' demographic profile presented in the table below. Respondents are trained teacher who are currently teaching in a school in Singapore. There is a good representation of teachers by gender as well as the types of schools in Singapore[2] (Table 2). There are teachers of Languages, Mathematics, Sciences, Food and Consumer Education, Design and Technology, and Humanities subjects. Most teachers taught at least two subjects.

Table 2. Demographic of samples (*n* = 37)

Level	Female (*n*)	Male (*n*)	Age (years)	Years of teaching
Primary	12	1	36.2	10.7
Secondary	16	4	35.3	10.8
Post-secondary	3	1	42.3	15.8
Total	31	6	36.4	11.3

RESULTS AND DISCUSSION

The following section illustrates the key findings of: (1a) the five aspects that influence HBL on Singapore teachers, and (1b) the challenges faced by teachers when conducting HBL, as well as the results on (2) conceptualising teacher leadership through the 5Es. Responses to questionnaire items not mentioned in the text were presented in Tables A1 and A2 found in the appendices.

(1a)   Five Aspects that Influenced HBL on Singapore Teachers

In the aspect of "Capacity", on a scale of 5 (1 = strongly disagree to 5 = strongly agree), the teachers responded that they have the capacity to teach HBL independently, source for a variety of materials to use in their lesson and manipulate the various functions of the live steam software (*M* > 4). However, they recognised that they were less able to engage with their students, maintain social connections with their students (*M* = 3.46), and had limited capacity in setting tests and assessments. This was largely due to lessons moving online when students were grouped using the Zoom breakout room and hence the teachers were less able to set group tasks and promote group activities for the students (*M* = 3.73), as well as teachers facing more difficulty in conducting class tests and assignments (*M* = 3.81). On the positive side, teachers felt that they were empowered to certain extent as they were given space to be creative to implement MOE's policies on HBL (list MOE policy on HBL) (*M* = 4.04). They were also encouraged to be innovative (*M* = 4.42) and adapt policies where necessary (*M* = 4.23). Unfortunately, the events happened so fast as they were given less than a week's notice of school closure (announcement of circuit breaker on 3 April 2020 and implemented on 7 April 2020), some teachers felt that they were not given sufficient time to implement HBL policies effectively (*M* = 3.77).

In the aspect of clarity or communication of policies, the ratings for the survey items in this segment were rather neutral (neither agree nor disagree, *M* = 3.42 to 3.88). This could be due to the COVID-19 pandemic that happened so suddenly, policies and guidelines for HBL were quickly disseminated. Although before the pandemic, the students were already engaged in HBL only once or twice a year, the final guidelines and logistical operations were not well established when HBL became full time. Consequently, there was confusion and inconsistencies as schools had to make quick adaptations when the crisis hit. In general, most teachers agreed that they were not very clear of ethics considerations (*M* = 3.88) and

logistical guidelines (*M* = 3.85) when conducting HBL set by the MOE and their schools. For example, in the early use of Zoom for HBL, participants, in this case students, were not informed that the session would be recorded including their photographs and log in details. In addition, these Zoom sessions did not require a password to join in and there was no 'Waiting Room' for authentication. This had led to the suspension of the use of Zoom by the Ministry of Education following breaches involving obscene images on the second day of HBL on 9 April 2020 (Baker, 2020).

During changing or introducing new policies, support is always most important to reduce anxiety. However, teachers felt neutral towards timely support given by their schools when they met with technical issues during HBL (*M* = 3.63). They also did not agree that sufficient time (*M* = 3.35) to create online learning resources, and adequate financial support, for example, mobile phone, and broadband services (*M* = 3.35) were accorded. They were also neutral towards sufficient training (*M* = 3.62) to implement HBL. This is because even though schools have been providing technological training programmes for teachers throughout the various ICT MPs, online lessons are a new concept. In addition, the lack of practice of using technology for teaching online resulted in less familiarity.

Finally, HBL took a toll on teachers' wellbeing and mental health. Teachers felt stress teaching HBL (*M* = 2.88) and were rather neutral about having positive emotions during HBL (*M* = 3.42). Most participants were also neutral regarding building positive teacher-student relationships during HBL due to stress (*M* = 3.72). Not everyone agreed that they had a conducive environment at home to teach HBL. One of the positive outcomes of COVID-19 pandemic was the growth in knowledge (*M* = 4.27), probably due to the demands to use technology to teach and learn the use of new software.

(1b)   Challenges Faced by Teachers When Conducting HBL

The nine open-ended questions that were embedded throughout the survey targeted at the five key challenges that teachers faced in enacting e-TL: (i) classroom managements; (ii) resources support; (iii) mental health and wellness; (iv) providing feedback to students; and (v) improving HBL pedagogies.

Classroom management

For conducting online lessons, teachers were asked to list examples of challenges in conducting these online lessons and how difficult it was as compared to face-to-face teaching. One common challenge that all participants highlighted was classroom management issues. For example, teachers were unable to control what students are working on during online classes due to their student's short attention span. As one teacher put it:

> Classroom management is an issue. It is hard to catch student attention without interrupting the flow of the lesson to call names, unlike in a face-to-face lesson.
>
>   (Humanities teacher, Secondary School, 24 yo, 1 ty)[3]

Resources support

The other common issue was participants felt that teaching resources were not readily available since teachers were working from home, particularly for certain subjects, like Chinese language. Hence, they had to craft out new lesson packages which were time consuming. A teacher commented the following:

> Resources may not be readily available as well, so have to research and perhaps curate... It is time consuming to draft a lesson package. Although we can work with colleagues to come up with a lesson, but ultimately refining the lesson template to cater to the target audiences can take up a lot of time, sometimes more than doing it from scratch.
>
> (Chinese Language teacher, Primary School, 40 yo, 15 ty)

On top of that, "There are other unforeseeable problems like Internet and network issues, sudden audio issues" which one teacher indicated that they had time to troubleshoot, and hence would appreciate if there were more support from school.

The second challenge looked at the hardware and software support that teacher received while working remotely. Teachers indicated they would like to have better financial support from MOE to purchase or be supplied with good laptops that come with "better" webcam, bigger desktop and dual monitor screen, better internet connection from home, official mobile number to contact students, parents and colleagues due to privacy issue, and subscriptions fees or paid corporate account for software programmes that could be used for online teaching. The teachers listed Zoom, Miro, Padlet, Mentim and Peardeck as some of the software that they commonly used. They also responded that online grading and assessment were more challenging compared to doing it traditionally using pen and study.

Mental and health wellness

Here, the responses were categorised into two groups. The first group indicated that they felt good and enjoyed online teaching during HBL as compared to face-to-face teaching since the amount of instruction time was reduced. As a result, there was "work-life balance". One teacher stated that:

> I am trained in HBL initially with a private firm specialising in online education, hence I am able to use tools (computer and tablet and collaboration app on tablet) to teach my student real time and have them to break up to group for collaborative problem-solving session if required.
>
> (Math and Statistics teacher, 43 yo, >10 ty)

Conversely, the other group felt that there was "greying of work and personal space". They experienced new health problems, such as eye strain, anxiety and exhaustion.

Providing feedback to students

Teachers specified that online platforms, such as Zoom, Design2Learn, Google Classroom, Miro, SLS, Padlet, WhatsApp, Telegram, Email, Teams and Blackboard were utilised to support student learning and provide individual feedback. Through these various platforms, teachers set online etiquette, gave positive emoji and encouraging words to create a positive online learning environment. They also used Google Slides for weekly chat and online group work, as well as shared non-school related fun videos, played online games and asked questions to check students' understanding.

Improving pedagogies

Teachers were asked how often they reflected on their online pedagogies and how they had incorporated 21st century competencies into their online teaching. They indicated that they often referred to the MOE guidelines when planning online lessons. Teachers also included thinking questions that opened discussion to wider social contexts, incorporated collaborative learning and gave students opportunities to research, and relate their learning to real life examples and share their findings to class.

(2)   Conceptualising E-Teacher Leadership Through the 5Es

Amongst the 5Es, the results suggested that teachers were "stronger" in "Exchange" and "Engage", but were "weaker" in "Examine", "Enforce" and "Experiment". That means that most teachers were not fully ready to conduct online teaching effectively as they might not be familiar with the prescribed platform. Hence, the results suggested that these teachers faced difficulty in leading online; they indicated that they were more adapted to co-teach online and use online platforms to communicate with the various stakeholders only.

Exchange

In general, teachers agreed that they were able to work and co-teach with their colleagues to teach online only if the colleagues were assigned to them by the school leaders ($M = 4.18$). They indicated that they felt less confident in supporting colleagues or providing directions on what could be done for e-pedagogy ($M = 3.7$) although they were comfortable using technology to work collaboratively with their colleagues ($M = 4.03$) but were less confident in helping their colleague to practise e-pedagogy ($M = 3.85$). Teachers neither agreed or disagreed that they were willing to invite colleagues to co-teach with them ($M = 3.21$), and to support them in monitoring students' progress ($M = 3.7$).

Engage

For this section, it was found that most teachers agreed that they were able to communicate effectively with colleagues, parents and students using online platforms (rating slightly above 4). They were able to support their colleagues and students by sharing documents using the online platform ($M = 4.30$) and facilitate learning ($M = 4.11$). As discussed previously, teachers used a variety of platforms and digital icons to engage with their students.

Examine

Teachers' ratings for the questions under the "Examine" aspect hoovered around 3.7–3.8 (i.e., slightly below "agree"). The findings showed that teachers found the official prescribed online platform by the school was not so easy to use (M = 3.78), and they were not so familiar with all the functions on the platform (M = 3.76) and hence unable to utilise all the functions (M = 3.70). They also did not quite agree that they could provide feedback to students through the prescribed platform (M = 3.70). Despite the challenges mentioned above, they did not agree that they faced challenges conducting online lessons (M = 3.60).

Explore

Teachers agreed that they used different strategies for online teaching (M = 4.00) and incorporated 21st century competencies (M = 4.14) into their online lesson but were rather neutral about exploring working with their colleagues, such as setting goals for online teaching with their colleagues (M = 3.71), or inviting them to provide feedback on their teaching (M = 3.56). They were also able to align their teaching and learning approaches to the Singapore Teaching Practice framework (M = 3.81).

Experiment

Teachers were neutral in experimenting on e-teaching. They agreed that they had tried to create opportunities for themselves to improve online teaching (M = 4.06), but less so with their colleagues (M = 3.58). The teachers were less proactive in introducing new online programmes or designing new materials as they mainly used ready-made or modified ready-made materials.

DISCUSSION AND IMPLICATIONS

This preliminary study is conclusive that e-TL requires more support from MOE and school leaders for e-learning to transit to the next stage post COVID-19. To conceptualise e-TL, this study highlighted the importance of effectively integrating technology in teachers' instructional practices, and moving beyond simply exchanging information and knowledge, as well as engaging the different stakeholders through the various online platforms before they embark on formal or informal leadership practices. Based on the findings, three themes emerged when considering building e-TL: Setting the direction; establishing a culture of online learning; and developing e-champions to support e-pedagogies.

Setting the Direction

The findings showed that teaching is challenging and isolating for teachers in an online environment, especially during unforeseen circumstances when face-to-face interactions are not feasible. Consequently, clear guidelines from their leaders and MOE become more critical so that they will not struggle with ambiguity and are able to understand their roles and expectations to deliver high quality and effective online learning experiences quickly. Although there was no lack of instructions from MOE, the directives had to be clear so that school leaders were able to provide teachers with localised frameworks and

guidelines to ensure the sustainability and effectiveness of HBL. Most of all, this study found that teachers preferred to have colleagues assigned to them by the school leaders and were less willing to be proactive in inviting colleagues to co-teach with them. This seems to suggest that a top-down arrangement was still favoured by the teachers and not self-directed teamwork during the pandemic even though the Singapore education system takes a centralised approach and even when they were empowered to make their own decision independently. Thus, perhaps during a nationwide crisis, a top-down support system, in this case MOE, was preferred at the initial stage whereby there is additional ministerial support to schools. It is unrealistic to expect MOE to operate a strict top-down approach when school resumes normalcy, however, it is still crucial for the ministry to be able to understand how these guidelines and changes could affect educators at the school level and continues to work with schools to improve online teaching and learning at the school level.

Establishing a Culture of Online Learning

At present, digitalisation continues to move into schools, establishing a culture of online learning among teachers becomes imperative even when classes have resumed face-to-face teaching. E-TL requires teachers to possess strong skill sets, hence, a separate online culture of learning needs to be established. The intention is to enable teachers to establish a sense of community and promote digital citizenship both online. Although the four MPs and subsequent ICT plans have put in place a strong technological infrastructure in Singapore, "Digital proficiency and ability to teach online as well as in-person should now be a mandatory part of teacher preparation" (Hargreaves, 2021, p. 1840). In this world of ongoing digital transformations, there should be parallel on-going "just-in-time, just enough" virtual professional development (PD) opportunities for in-service teachers whereby they are encouraged to work, collaborate, experiment and mentor each other online. A positive online learning culture or Professional Learning Communities (PLCs) would help teachers develop trust, i.e., virtual relationships, to familiarise with the various online platforms and to teach online more effectively and stay informed about the latest trends in educational technology. Besides, research has confirmed that participation in PLCs is a strong predictor of increased teacher efficacy (Voelkel & Chrispeels, 2017). Furthermore, collective efficacy has been shown to improve student outcomes (Donohoo, 2018). On top of that, an e-learning environment is becoming important for schools in Singapore and around the world since the influx of technology in schools is unavoidable. The key is for teachers to embrace change, to future-proof themselves by becoming digitally literate so that they will remain relevant and up to date.

This study found that teachers were already accustomed to several online platforms, school leaders could use these platforms to create virtual communities of practice where teachers could collaborate and share information during official school meetings. Although the concept of "communities of practice" (CoPs) whether in person or virtual has been studied widely, virtual CoPs have been spotlighted recently due to the pandemic when members of a group meet virtually through an online platform (Ghamrawi, 2022). Such virtual connections and familiarity are powerful tools that could forge strong and trusting online relationships, which could also improve collaboration among teachers, teachers'

mental wellness and promote teacher leadership (Ghamrawi, 2022). An important note, not everyone is at the same competence level when using IT, hence there is a need to have just in time PD available for training to conduct HBL. For that to happen, resources should be available on demand to ensure that lessons can be carried out efficiently. In Huber and Helm's (2020) study, schools with a supportive culture of collaboration, in this case a parallel e-culture, are more likely to take on challenges, such as digital forms of teaching and learning during a crisis, and such cooperation should be extended online as well. With such a positive online environment, teachers would likely feel more empowered and adapted to take on leadership roles formally and informally amidst crises.

Developing Hybrid Champions to Support e-Pedagogies in Schools

Based on the results from the 5Es, the next consideration for establishing effective e-TL is selecting a leading group of experienced online teachers, who may not hold any formal or informal leadership positions, to be e-TLs to support others in online teaching, such as those who have received training for online teaching pedagogy. In the current state, although the Singapore government and MOE have been fast in adapting technologies into learning, this study has shown that numerous teachers were still not fully ready to change how and what they teach online. The purpose for these hybrid champions becoming e-TL is to advocate for more effective use of technology in education as they would have a wealth of knowledge and expertise, and to provide guidance and support to inexperienced teachers to help them teach in cyberspace. These hybrid champions act as both instructional and transformational leaders because they are innovators, energetic, risk takers, persistent, unique individuals that possess high levels of self-confidence who seek to improve student learning (Howell & Higgins, 1990). As shown in this study, empowering teachers, and providing them a space to experiment are not enough. Schools will need to take steps to nurture and support e-champions to become formal or informal e-TL so that they are able to lead their colleagues who feel less confident in helping others to practise e-pedagogy. Appointing mentors is a powerful way to create positive change for teachers, which will in return grow future successful e-TLs.

CONCLUSION

In this small-scale study, the research has its limitations, in particular, the small number of respondents that could devalue the statistical tests, and the results may not be generalised. Nevertheless, through examining how HBL has impacted teachers and the challenges they faced in Singapore, this study revealed the need for the traditional view of TL needs to shift. Clearly, contemporary teachers are not purely physical classroom face-to-face teachers anymore, even as normalcy resumes and even when HBL remains a part of the national efforts to implement blended learning. As reflected in this study, teachers must adopt and adapt a blended or hybrid educational model of in-person and online instructions more effectively, and to find a balance between these two working environments. This study shows teachers who are competent in creating and delivering online lessons, conducting virtual coaching, and promoting online PD; they are also the ones who have inherited a wide

range of skills to lead and manage others in both in-person and virtual environments. One key takeaway is that despite Singapore's centralised system and coupled with considerable support given to teachers from MOE during the pandemic, in truth, teachers need greater support from MOE to further help them to be more productive and ultimately succeed in a hybrid teaching environment, such as financial, resources and technical support from school and MOE. When this happens, they are more likely to lead others.

This study affirms that a range of support is still needed to develop e-TLs despite the different cycles of ICT MPs that had been put in place. Although the teachers in this study were able to use a variety of online platforms, as shown, e-TL requires teachers to possess a unique set of skills and competencies, such as the 5Es, as well as the right mindset and the abilities to ensure mental wellness and capitalise digital technologies and platforms to support school leaders and other teachers. In that sense, e-TL is conceptualised as hybrid leadership, i.e., a blend of face-to-face and virtual leadership skills in a hybrid teaching environment. The findings in this study will be helpful for MOE in making informed decisions when offering in-service PD and the type of support and resources needed for teachers to perform better in online teaching, which in return would support teachers to take more leadership roles in schools be it formally and informally. Likewise for pre-service teacher training, trainee teachers will need to embrace technology and to be more prepared to teach in cyberspace and in class. One thing for sure, the future of schools will be a mix of online and in-person experiences, and teachers will have to negotiate the relationship between these two spaces. There is simply no other alternative.

NOTES

1. Primary education also known as elementary school; Secondary education also known as middle school.
2. Number of schools by type: 179 primary, 136 secondary, 16 mixed level, 11 junior colleges/centralised institute and 4 universities. Gender of educators: 72% Female, 28% Male (MOE, 2020).
3. "yo" stands for "years old"; "ty" stands for "teaching years".

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APPENDICES

Appendix A

Table A1: Five aspects that influence HBL in Singapore. Responses from the selected questionnaire items (N = 37).

Aspects	Positive	Mean	Negative	Mean
Capacity	I am able to teach HBL independently.	4.19	I am able to design online tests and assessments.	3.81
	I am able to source for the teaching materials needed for HBL.	4.38	I am able to provide online feedback on my students' performance.	3.88
	I am able to manipulate the various functions of the live stream software.	4.27	I am able to minimise lesson descriptions by teaching via HBL.	3.54
Empowerment	I am empowered to implement HBL policies in my classes.	3.96	I am able to design activities that allow students to choose their learning tasks.	3.58
	I can choose which policy to implement in my class.	3.96		
Clarity	Nil		I receive the guidelines of HBL directly from MOE/School administrators.	3.77
			I receive feedback regarding HBL from school administration.	3.42
			I understand the MOE's HBL implementation guidelines.	3.88
Support	I am given sufficient software from MOE/School for HBL.	3.92	I am given sufficient hardware from MOE/School for HBL.	3.88
			I am able to provide feedback regarding technical issues for HBL.	3.73
Wellbeing			I have a conducive environment to teach HBL.	3.81
			I have a positive social support group to teach HBL.	3.73
			I am able to manage my HBL workload.	3.77

Appendix B

Table A2. The "5E" of E-teacher leadership (*N* = 37)

Characteristics	Behaviours/Actions	Mean ratings
Exchange	I am able to co-teach online lessons with colleagues who are assigned to me.	4.18
	I often invite my colleagues to co-teach with me online.	3.21
	I often work with external vendors to run my online programmes.	3.05
	I am able to collaborate with my colleagues to create best practices for online teaching.	3.85
	I am comfortable in using technology to inspire school improvement.	3.83
Examine	I am able to review my colleagues' online teaching materials.	3.83
	I am able to create a positive student learning environment through online teaching.	4.08
Engage	Most agreed that they were able to communicate effectively with colleagues, parents and students using online platforms.	4
	Agreed that they could support their colleagues and students by sharing documents using online platforms (4.30) and facilitating learning.	4.3
	Agreed that they could facilitate learning with colleagues.	4.11
Explore	I am able to use online platforms effectively with … • my colleagues on teaching matters. • my students on teaching matters. • my parents on school matters.	4.38 4.15 4.03
Enforce	I set indicators for myself to monitor my online teaching.	3.94
	I often share teaching resources with my colleagues for online teaching.	3.97
	I often reflect on online pedagogies.	4.08
Experiment	I often modify materials for my online teaching.	4.06
	I often introduce new online programmes for my students to improve their learning.	3.59
	I often design new materials for my colleagues to help them with their online teaching.	3.55
	I often try out new online teaching pedagogies to improve my teaching.	3.97