Hub-and-spokes practices of blended learning: trajectories of emergency remote teaching in Brunei Darussalam

Fahmi Ibrahim[1] · Nena Padilla-Valdez[1] · Umi Kalthum Rosli[1]

Abstract

The recent global pandemic has conveyed emergency remote teaching (ERT) specifically the blended approach, an indispensable alternative teaching and learning delivery in formal schools. In Brunei secondary schools, the blended learning approach formed the core 'Continuity Learning Plan' for instruction along with the mandated educational changes accruing to the social and economic challenges of the twenty-first century learning system. Its widespread adaptation underlies teachers' transitional initiatives and practices which must have reshaped the structural climate and relational dynamics of conventional instruction. Espousing the continuous learning model, this paper envisages to investigate the adaptive-related practices of Bruneian secondary school teachers and learners employing blended learning. Qualitative research approach with semi-structured interview was adopted in the study with respondents comprising of 18 teachers and 13 students. Thematic coding and recursive analysis of data revealed seven (7) dimensions or centre points of blended learning and teaching practices, namely: technological, interactive and effectiveness, added value, feasibility, pedagogical, institutional support and evaluation of success. In general, results suggest the *Hub-and- Spokes* model that organic support, integrated implementation and professional readiness are germane to the adaption of a functional and manageable blended delivery approach.

✉ Fahmi Ibrahim
fahmi.ibrahim@utb.edu.bn

Nena Padilla-Valdez
nena.valdez@utb.edu.bn

Umi Kalthum Rosli
umi.hrosli@gmail.com

[1] Universiti Teknologi Brunei (UTB), Tungku Link, Bandar Seri Begawan BE1410, Brunei Darussalam

1 Introduction

The twenty-first century development paradigm maintains the cultivation of innovative practices to ensure that overall education quality and excellence are pursued. It is a transformative thrust that shows how the secondary school system, in particular, has been evolving from a privilege provider for a few to an endless or a borderless provider for a broad-based clientele. The unfolding of circumstances just to meet this ideation reveals that expansion of services, programmes, and functions continues to escalate making the system economically robust and socially relevant (Richmond, 2012). In proportion to projected expansions has emerged the multiple and complicated tasks heaped upon teachers and learners, indicating that the trend of practices revolves around instruction. Apparent to the current system, varied modalities of instruction such as formal, informal, non-formal and alternative delivery platforms are linked to and open for technological integration. In the very process of improving instruction (teaching and learning), technology-laden pedagogies stand unabated. Similarly, the quality and standards of learning in any innovation must never be compromised (Lick et al., 2013).

The need for a meticulous and scholarly approach goes hand in hand with the search of break-throughs in instruction especially thoughtful initiatives introduced during unprecedented times. The COVID-19 pandemic has flattened the geographical differentiation curve, whereby education has to be delivered with the basic support of media and technology in their varied forms. The global acceptance of social distancing policy, as announced by WHO as a measure to curb the spread of COVID-19, has forced schools to close their doors, and this has caused unexpected disruption of traditional teaching and learning method (Adedoyin & Soykan, 2020). Although Brunei is one of the few countries that has been able to control the outbreak and "flatten the curve" (Hamid & Karri, 2021), resilient actions were taken to mitigate further infection and contain outbreak nationally particularly in education schools and higher education institutions during the pandemic. Schools switched instructional activities to remote learning platforms and this migration came with several logistical challenges, and one major issue is that the migration has caused compulsory modification in the attitudes of education administrators, instructors and learners on the significance of online learning (Ribeiro, 2020). Online-blended learning which carries the features of face-to-face classroom in a virtual environment has taken toll to date as the most-sought stop gap for instruction. Previously, blended learning reaped scrutiny with regard to how it must be designed and transmitted not to be unfairly dismissive of the conventional routine and how it must be efficient and effective in relation to performance (Kim et al., 2008). However, the implementation of new technologies in an effort to become more efficient, more competitive and most importantly more profitable in this modern world is still on the rise (Skoumpopoulou, et al., 2018). Besides this, the readiness and attitude of the end users (educators and students) and technical staff who are expected to use the new technologies often hinder technology adoption in the workplace (Gedik, 2013).

Creating a digitalized environment depends much on media and technological literacy among users both in the individual and organizational levels. The

study of Mahesh et al. (2007) stated that in-class learning typically consists of traditional delivery methods (e.g. simulations, labs, lectures, demonstration, self-study, seminars, conferences, job aids, and presentations) whilst blended learning involves interactive learning activities (e.g. discussion, simulation, role-playing, experimental, mentoring, interactivity, case studies, games, and support groups), both approaches showed connectivity and co-existence. In brief, blended learning pathways help evolve the organizations to the highest stage of executing their stated learning management strategies. This blended use of various delivery methods assumes that teachers are adaptive to external and internal changes; that they are able to cope with different challenges associated with these changes; and that they are able to initiate responsive practices to meet diverse expectations and eventually develop themselves. As teachers are exposed to an endless stream of initiatives, guidelines, and policies, it becomes imperative for teachers to adhere to the continuous learning model (Fullan, 1993) in order for them to perform a wide range of functions and to support the new and rapidly changing developments in the system. More importantly, whatever initiatives they pursue, school improvement and promotion of student learning and learning outcomes remain their priority goals (Creemers et al., 2013).

In Brunei secondary schools, the conventional method which has been widely used in delivering instruction with the integral infusion of technology into the curriculum, does not only cater to the different student learning styles but also it aligns with Brunei Vision 2035 and Ministry of Education Vision, where SPN 21 aims to 'Meet the social and economic challenges of the twenty-first century and equip students with twenty-first century skills (Ministry of Education, 2013). Brunei reflects an educational landscape underway strengthening its technological pedagogies. It is not surprising then that some high schools are provided with new technologies, and only a handful of them claim adequate exposure to e-driven technologies such as blended learning. Inescapably however, the crisis brought by this pandemic has instantly revolutionized the normal scenario into the widespread adaptation policy of alternative teaching using the none-face-to-face teaching modality. The extraordinary consequences and transitions currently observed in the school and workspace grip the critical importance of technology and the relational changes taking place among students, teachers and parents- these altogether can leverage responses, demands and requirements of alternative teaching (MOE Brunei Darussalam, 2020). Although the evidence of alternative learning has proven itself existent, the area of local and global interest and major query centred around what technological pedagogy practices have driven teachers' and learners' alternative interface functional and integrated in remote teaching.

Although transitory initiatives are labelled responsive actions, they carry vital or even extra ingredients which can leverage future teaching practices. It goes with the saying that if and when claims of practice and fragmented opinions were unscathed, residuals of pedagogical mediocrity and uninformed tactics may prevail. From this vein, this study intends to investigate the blended learning adaptive-related mechanisms and practices of Brunei secondary school teachers and learners. Results of which shall form part in advancing the *hub and spokes blended learning framework* and future-related technological pedagogies fit for secondary educational settings.

2 Review of literature

Before the emergence of technology being introduced in the school lesson, majority of the educators and teachers are comfortable in teaching and learning the traditional ways, such as doing face-to-face with students, individual and group-oriented activities, and interacting as well as building rapport with students in between. Nevertheless, the brick and mortar technique has been widely considered as the best practice in the school environment since then as it brings learning closer to the end users: educators, teachers and students. Back then the population size of students was not that big, so it was easy for teachers to control and manage the classroom effectively and efficiently. Thus, all the knowledge and extra information from the *chalk and talk* method brought satisfaction and was believed to increase the quality of the academic performance.

The COVID-19 pandemic landed the education system in jeopardy. Online teaching is very different from traditional learning, the shift from conventional pedagogy in higher education to the online mechanism required by teachers to veer their pedagogy (Joshi and Vinay, 2020). Online learning is the use of internet and some other important technologies to develop materials for educational purposes, instructional delivery and management of program (Fry, 2001). Hrastinski (2008) stated that the two types of online learning, namely asynchronous and synchronous online learning, are majorly compared but for online learning to be effective and efficient, instructors, organizations and institutions must have comprehensive understanding of the benefits and limitations. The challenge thus imposed had to be accepted by the educational institutes to take advantage of asynchronous learning, which works best in digital formats.

Blended learning is both a face-to-face and a technology-based learning opportunity which are combined for effective use. In other words, blended learning is a formal education approach in which a student learns through delivery of content and instruction via a mix of media and tools, ranging from digital and online media (Vanhoucke & Wauters, 2015). Garrison and Kanuka (2004) refer that the collaboration of traditional and online learning is termed as blended learning, which enhances the teaching and learning processes in terms of more responsiveness and adaptability. It is also defined as a distance learning community in recognizing the value of synchronous learning activities, like face-to-face interactions with instructor, and collaborative work with peers, as complements to activities performed asynchronously by individual learners (Howard, et al., 2006).

Studies from various countries forwarded the notion that blended learning can bring changes in the workplace environment in terms of management and overall performance. A case study made by Stockwell et al. (2015) reported improved science education; it was blended learning that contributed a great impact to the students' attendance, satisfaction and their improved academic performance. This has showed that interactive learning helped students come to class regularly. However, Ali (2015) believed that the transition from traditional teaching to an online environment is considered a challenge for many teachers in high school education, since traditional teaching was still described as being passive teaching,

the resultant of which discouraged students from critically filtering the delivered information (higher order thinking skills). This argument pointed to the lack of *socialization*; the process of converting tacit knowledge from shared experience and analytical thinking proved inactive, rendering students' limited internalization of explicit knowledge and tacit knowledge gained through experimentation and simulations (Ibrahim & Salleh, 2019). This internalization process is related to 'learning by doing' in promoting creativity and innovation. Drawing from Knowledge Management research perspective, relevant frameworks so called (1) KMPro was developed as guidelines which is applicable in blended learning to have a balance view for both tacit-explicit knowledge interactive process. (Ibrahim & Ali, 2021) (2) Two-C KM-Blended Learning Pedagogy Model was developed to demonstrate tacit-explicit knowledge which complements and is compatible with blended learning perhaps it can emerge as a 'new norm or approach' in learning and teaching (Ibrahim & Padilla-Valdez, 2021).

Although a blended learning is types of courses, there is no formula for aligning time and technology in a precise way (Gülbahar & Madran, 2009). By inserting the blended learning in teaching, students and teachers spent extra interaction in terms of answering the questions and be proactive through the lesson. This claim is supported by Thi and Huong (2018) study where a blended learning can be categorized into activity level, course level, program level and institutional level depending to what levels are being implemented. On top of that, Gülbahar and Madran (2009) believed that through communication and collaboration, satisfaction, equity, and autonomy are among those concepts that need to be taken into consideration. In addition, Al-drees, et al. (2015) mentioned that, blended learning contributes to the development of interpersonal and communication skills, presentation skills, promotes self-directed learning. Overall, it enhances students' enthusiasm and motivation.

Porter, et al. (2016) believed that before adopting blended learning, educators reported concerns with regard to decreasing the quality of student interaction, the lack of time to prepare online content and activities, and the difficulty of dealing with online interactions. Moreover, Al-zahrani (2014) studied that some of the school teaching staff lacked adequate training and experience in computer use and technology, thus they had low level of readiness related to technology and its uses. In fact, by not having an internet connection in their offices had showed how generally weak they were in preparing the teaching resources in terms of effective use of digital technologies. Another study by Kim et al. (2009) showed that although many places did recognize the potential of blended learning to bring learning closer between the students and teachers, there were still numerous issues to be addressed in delivering blended learning in workplace learning settings. Inversely, Singla et al. (2018) mentioned that technology is a stimulant for change. This however can be observed as a positive or negative change- resulting from different individuals or groups depending upon their approach with reference to change or acceptance. Though some changes in delivering the lesson, students' acceptance of blended learning took time, denoting whether these changes advanced or stunted the lesson itself.

In line with this, Beaman et al. (2018) also argued that with a better understanding of the diffusion process, how people choose to adopt new technologies could potentially impact social learning especially those strategies that would maximize diffusion. It simply means that drastic changes cultivate innovative capability. For example, providing creative learning spaces help develop students' techniques and skills efficiently thereby increasing learning productivity and reducing waste time in return. In other words, integration of technology approach in delivering the lesson balances students' knowledge, better understanding, and greater efficiency in adapting blended learning in their daily school and personal lives. Moreover, the study by Miftachul et al. (2018) explained that by attempting to collect big data for innovative learning meant engaging learners to manage and store intangible assets such as report and documents. The study further stressed that with the integration of technology, students can prepare paperwork and notes more efficiently as it could reduce workload in no time. As a result, utilization of ICT in all dimensions of student life can be generated into data volume within the purview of the human daily needs.

From the organizational perspective, Aubert et al. (2008) claimed that the benefits from a new technology are not achieved if organizations experience low utilization by the intended users, emphasizing that teachers' and students' exposure to technology while supporting human daily needs increases ICT literacy. Unfortunately, due to the still lacking access to technology such as computers and reliable internet has become a common problem and this in return, has restricted the use of modern technology such as a laptop in the computer lab where the teachers preferred to use the old method or the chalk and talk approach (USAID, 2014). Also, Robert (2005) cited that some of the workforce had never known life without a computer. It is thus right to assume that technology adaptation can bring difficulties to teachers as they are not adept users of newer technology and eventually dent students' satisfaction and lead them to the brink of boredom. With less application of technology and real exposure to digital life, workforce productivity and achievement is doomed to happen.

Vongkulluksn at el. (2018) noted that there were responsive teachers and administrators to the challenges brought about by available technological and organizational resources with full administrative leadership and school culture in support of technology integration. Technology use in blended learning resources such as desktop and/or laptop computers, tablets and connection network for the teachers and students narrows down inequity and digital divide. Once technology integration is achieved, learning technology and digital curriculum can operationalize maximally. Apart from that, due to the rapid changing requirements of job related tasks, traditional learning and trainings are no longer considered sufficient for acquiring the necessary skills and knowledge (Schumacher, 2018). Here, e-learning provides the flexible learning options for educators, employees and students which then allow them to up -skill more rapidly. Even more, it can also decrease the costs of up-skilling a workforce through reducing travel and time away from work as this is more beneficial for a geographically dispersed work places because it can deliver a consistent training experience (Wang, 2018).

As the foundation of Interactive Learning, blended learning emerged poorly understood but as time went by, teachers introduced several approaches which led

to the polarization of technological resources in pursuit of pedagogical innovations such as distance and functional interventions to the space and time limitations of face-to-face lessons. On a similar vein, blended learning reaped advantages; it enhances the learning opportunities and propels learning experiences by means of facilitating learners' access to the resources, motivating learners through communication, collaboration and interaction, and supplementing the course management activities through giving feedback and grading (Yildirim & Kurt, 2018). From the students' perspective, they gained satisfaction from the interaction, technology, classroom management and teaching as they were able to follow, contribute as well as give feedback during the lesson time. More essentially, they felt a boost in their self-confident while they voluntarily engaged in discussion and class activities.

The growth and access of blended learning as a form of the distance learning has brought attention to the felt need for the students to meet face-to-face and later for them to conduct peer-to-peer evaluation for students' interaction (Picciano, 2015). It is a recognition that this type of assessment increases students' and teachers' rapport at the same time provide opportunities for socialization and connectivity. Moreover, blended learning which can include interactive online activities through a combination of conferencing tools, electronic whiteboards, cloud storage, among others cultivate motivation and social learning engagement with the present as well as in the future time (Ashton et al., 2014). Interestingly, flipping the classroom in blended learning increases students' motivation, enhances independent learning, and bolsters students-centred classroom strategies as students lead the discussions, and participate in activities such as technology exploration where they display gained skills (Villanueva, 2015). Afterall, there is no difference either face-to-face learning or e-learning in generating better students' performance in a holistic way.

The introduction of the web-based learning system such as the Moodle has helped in the integration of instructional materials via different types of media. Since it acts as a primary means of communication, known as an interaction with learners, students must not fail to use such system as this acts as a supplementary learning tool for traditional classes and therefore, it is important to consider school initiatives, students' perceptions and attitudes, and parents' involvement and assistance towards Moodle in a blended learning in a fully online distance learning context (Yeou, 2016). On a similar vein, the open source Learning Management System (LMS) Moodle, a widely used free, flexibility and customized system contains many standard features and is available in various languages. In other words, it is an easy or user-friendly learning system with tools and provisions for communication, discussion area, group space, and workspace (Umek et al., 2016). All these are observed to make learning more interesting, sustain participation of stakeholders, and increase school and student overall performance.

The view from the National Curriculum perspective, Brunei's educational system envisions students to know, to be able to do, to be lifelong learners who are confident and creative, connected, and actively involved. On top of that, it sets out values that are to be encouraged, modelled, and explored. Thus, offering students the most effective and engaging blended learning experiences possible and supporting them to achieve to their highest potential and to be successful citizens of Brunei Darussalam.

3 Methodology

This qualitative research study which conceived as theory-building approach was performed through in-depth interviews understanding of blended learning and the corresponding practices and initiatives of secondary school teachers and students in a remote setting. It should be noted that the ontological stance of the study is taken from an *idealism* perspective (Ritchie et al., 2013). This ontological stance is actually appropriate with the qualitative interview which suggests that participants' views, understandings and interpretations of blended learning are the nature of reality. Therefore, to generate data on this ontological stance is to interact with people, to talk to them and to listen to them. Interview is believed to be a powerful tool as the process of investigating in-depth what participants feel, experience, believe and think about certain issues (Al-zahrani, 2014).

Purposive sampling as suggested by Patton (2015) was achieved by having samples of teachers (18) and students (13) drawn from two (2) different secondary schools of Brunei. This small sample allowed in understanding the participant's perception and describing it at greater length rather than generalizing it on the basis of pre-existing theories and concepts. Student year level and teacher subject assignment were considered in setting the selection criteria. To ensure rigor and trustworthiness, Lichtman's (2013) model was followed. In this case, their views and attitudes toward what blended learning were treated with importance; all feedback were lifted verbatim. The interview was conducted in a formal way, where they were contacted earlier and given a consent paper to prove their willingness to participate in the audio-recorded interviews.

In the course of the in-depth interviews, the general interview guide approach was used to make sure all relevant topics of blended learning were covered, combined with standardised open-ended questions in pre-determined fashion in order to guide the flow of the interview. The opportunity for narratives or 'story telling' and expressions of opinion of blended learning usage and experiences were considered more important than strictly addressing each question in order to gain insight into context and meaning and secure richness of data. In addition, participants can express their understandings as precisely as possible in their own terms and words and be given the opportunity to reveal their own perspective. It can be claimed that the interviews were conducted in a 'non judgemental form of listening' (Zuboff, 1988, p. 428), with questions asked to probe emergent issues and seek explanations.

Interpretative analysis of qualitative research methodology has been used in this research which aims to explore and understand in detail about the person's experience of a particular phenomenon of blended learning. The analysis of the interviews followed the thematic analysis technique, as suggested by Ritchie and Spencer (2002). The main themes of the research were identified through the process of spelling out the meanings and concepts of each statement in the transcripts. It should be noted that the list of themes underwent iterative revisions and refinements until *saturation point* was achieved (Glasser and Strauss, 1967; Lincoln & Guba, 1985). The themes were then clustered into main components and

the framed the conceptual development as presented in a 'logical chain of evidence' (Miles & Huberman, 2014). This serve as a basis and rationale for the proposed framework development (see section 5) which is 'grounded' from themes uncovered from the qualitative interview data.

4 Findings and discussions

Seven (7) themes were uncovered from the research analyses as follows:

4.1 Blended learning readiness

Not all students or even teachers are predisposed to online or blended learning. Whether seen as natural or abrupt, a shift from the classroom (face-to-face) to blended online (none-face-to-face) setting necessitates stakeholders' (parents, teachers and students) understanding of the entire change and practice of doing; otherwise, confusion and pressure which are inherent precursors can halt the undertaking or even deter performance expectations (Gillet et al., 2013). This observation holds true with the participants' responses as follows:

> *"Yes, I know what blended learning is. In my understanding, it is combination of new technology into traditional learning inside the classroom, even further it can be used beyond classroom".* (Respondent 1)
> *As for me, it is really quite new in Brunei. As for now, if talk about WhatsApps where it is more to home link learning where the parents received the messages from the teachers and convey the message to their children, and get the answers share with their children".* (Respondent 1)
> *"Yes, I do. Well that is mixing together and to me including a culture. I think the key points for me, it is just not the language I should teach the students but the culture and custom so much, which I think one of my mind, the key things in Brunei to inform the students to adapt new way of learning"* (Respondent 4)
> *"Maybe, it is like 50– 50, a combination of traditional and IT. In the case of IT, we can use online learning everywhere and anywhere we want such as school to school, home to home, school to home and as for offline learning, this is like a normal teaching that we do in the classroom".* (Respondent 16)

Based on the interview session, there were mix responses as not all the participants knew what blended learning is by definition although it has been practised by the respondents. On this account, concept knowledge is built-up in the 'process of doing' or 'learning while doing' (Churchill et al., 2011). It is a piece of evidence that opportunities to enhance respondents' knowledge base about blended pedagogy remains wanting.

> *"….. is blended a mixing of Malay and English as it is holistic, as this is my first time heard about it. "I never heard about it as there is a lot of terms being used nowadays to describe learning"* (Respondent 3)

"*I do exposed to the technology yet I never heard about blended learning before*" (Respondent 5)

"*In general is more like mixing the ice and water but in learning, I have never heard about it before*" (Respondent 6)

"*…….it is sound like a mixture, I am thinking of maybe like using a various technique or learning method, a teaching method to help to facilitate each different individual learning style*" (Respondent 27)

"*No I do not know, but in general, I think something we mix together that blending something. Maybe something we learn and make it easier to understand*" (Respondent 22)

All in all, results of the analysis show the growth of web-based technology and the high usage of internet have made teaching and learning via the online mode more viable. The lack of training and strategic planning must have contributed to the mixed understanding of blended learning concepts by definition although it has been part and parcel of teaching approach by the respective respondents.

4.2 Technology

This theme addresses the significance of technology which is in tandem with blended learning practices. It is worth noting that schools and teachers are exposed to a constant stream of new initiatives, policies, and guidelines- all are enablers toward a transformative mindset. Although technology can be seen as a teaching platform for innovative directions, student learning outcomes and programme standards regardless of setting and delivery retain top priority importance (Bretz & Johnson, 2000).

'Online learning can be done anytime, anywhere, you just type in any subject/ topics, so easy access. More wide range of knowledge, teacher is able to learn from other teachers, observation via online, sharing pedagogical and many more. While students able to learn from home, so that they won't miss any lessons and also students may learn from other schools too' (Respondent 3)

"For this blended learning, we need to know whether students have the computers and laptop, unlike in normal school, students are borrowed the textbook for their references" (Respondent 29).

Any discussion about technology relates to a range of educational and social technologies. The instructional delivery methods and practices reflect a wide range of platforms with the end purpose of fulfilling the mantra for inclusive education (UNESCO, 2001). This is related to Beaman et al. (2018) who emphasized that by the integration of technology approach in delivering the lesson will balance the students' knowledge, better understanding and efficiency in adapting the blended learning in their daily school life. Thus, the acceptance of blended learning approach helps teachers to provide varieties of teaching and learning materials to students. This in return, will give more exposure to the students in using the modern technology and be able to apply it in their learning skills and growth mindset.

"Since teacher upload materials, we still come to the school to meet friends The test, the revision is everything there, less paper, less book being used, easy, yet still prefer to write something more to traditional. Website is better with all the materials because easy to refer" (Respondent 15).

Nevertheless, on the effects on COVID-19, online learning on instructors and teaching stated that students with outdated technological devices might find it hard to meet up with some technical requirements of online learning (Adedoyin & Soykan, 2020). For example, this particular student could not download the browser after several attempts and it was later discovered that she was using an outdated device that is not compatible with the browser. Although with the technological limitation, drawn from the above verbatim, mobility in delivering the lesson was expressed easier as everything concerning technology came in a fingertip mode. From here, it can be surmised that the use of ICT activates the emergence a supportive platform where by having blended learning actually facilitates the learning processes in accordance to what have been planned including the materials and other related notes that could be stored in drives or laptops and later retrieved and reused for the upcoming classes. However, a foreseen limitation in technology use goes to the teacher's willingness to assist students and facilitate students' learning.

"So up to the teachers to deal with the students…..shy students need help, they know what it is, but did not how to start, so we have to guide them thoroughly…. self -esteem needs to be boosted. Soft skills such public speaking, discipline of books reading , confident explore new things not easy….while new technologies such as mobile phone, the students can pick up easily how to use it"

This suggests educational institution to adopt in providing the suitable technology for blended learning instruction through identifying its teachers and students' overall level of technological proficiency and competency (Rasheed et al., 2020). It is learnt that students are willing to use technology for instruction but have no sufficient support from their educational institutions and teachers in making the effective use of the technologies.

4.3 Interactive and effectiveness

Proactive preparation and management of the class to create an effective learning environment lays the foundation of interactive, effective and even sustainable teaching and learning experience (Churchill et al., 2011). In terms of the interactive and effectiveness in bringing the changes in delivering the lesson, most participants perceived that the idea of the combination of offline and online learning will give a great impact to students' and teachers' performance in the future. Below are some of the responses from the participants;

"It is good, because it might not get boring like usual, where students even more energetic to do research, some interaction between teachers and students as well as have a study group," (Respondent 21)

"Yes, it will be. It saves time in class, where students are more motivated because they always on the phone. Yes it is effective since it nowadays phones are not that expensive, so they can access the internet as it becomes necessity". (Respondent 4)

"It is a good thing, because problem can be solved through online, as we need to learn new thing. While offline, sometimes we cannot access the internet, so the interactions with teachers face-to-face is still needed".(Respondent 13)

"It is interactive because we not only can learn from the school but we can do this at home, so I agreed with this system" (Respondent 12)

From the above texts, blended learning thrives along with other technological gadgets (e.g. mobile phone) and media resources, it will help the lesson learning to be engaging and interactive at the same time, as it can be applied offline and online learning. This again made them more independent and more focused to students' centred rather teacher centred. In addition, it is argued that enhancing electronic learning with media-rich content and interaction can increase its efficiency and effectiveness (Caladine, 2008). Rich media presents multimedia-based content that is easily distributed to provide a unique and more precious student experience.

4.4 Added value—benefits

There are several potential advantages to blended learning that are emerging. Some of these revolve around accessibility, pedagogical effectiveness, and course interaction (Dziuban et al., 2005). It shows that blended learning offers greater benefits to the instructor and learners in terms of the teaching and learning activities. The following are some of the responses with regard to the positive experiences;

"Yes, it will be great to have this kind of system in the school because if it is offline we can ask directly to the teachers but what if we have problem regarding the subject matter at home and we do not understand it? So by texting our teacher through whats app and do not have to wait for tomorrow during school time," (Respondent 6)

"In terms of offline learning, this can only be done at allocated place and time, but this is more guided by the teachers, more like hands-on activities and tasks, build up more confidence through socialisation yet limited resources" (Respondent 3)

Given that blended learning is a combination method, both offline and online are embraced by the respondents for the flexibility and efficiency.

"It helps the students in learning their own paces, assess online, provided the website links, if the students answer correctly, the students get the marks instantly, since it automatically calculated and can see the progress… so less burden for the teachers to marks" (Respondent 11)

Busy students like the ability to access course materials anytime, anyplace, and they are positive about the convenience and flexibility these blended courses provide them (Prasetya et al., 2020). It is argued that enhancing students' motivation to

learn on their own "at their own pace and in their own time" is a critical aspect of a blended learning environment (Poon, 2013).

Further it optimizes the workloads of teachers for effective deliverables.

"In term of workloads still there, willing to learn okay but reluctant a bit harder. At first, of course is not easy, but after sometimes it will be okay. This can keep on track the lessons, check back the lessons…." (Respondent 14)
"Workloads will be less everything is in the website, students can access to it, by using pen drive and so" (Respondent 17)
"Workloads will still be the same and even more, in terms of more- we have to prepare early, we need a lot of computer to upload things…." (Respondent 20)

These findings are aligned with Miftachul et al. (2018) which stated that, with the integration of technology, preparing paperwork and notes preparation can made more efficient as technological mediation could reduce the time and workload. Consequently, teachers can easily document student records such as trial tests, attendance checklists, homework, classwork, among others; the main purpose for this undertaking is to keep track on the students' continuous progress.

4.5 Feasibility

In terms of feasibility, the findings hinted difficulties of blended learning implementation such not having gadgets and not having been exposed to the online learning. Majority of the participants expressed their thoughts pertaining to the pros and cons in assessing blended learning in high school, as claimed by some participants.

"Nowadays, courses even offered by some universities can be taken online as well, however, all of the above required stable internet connection as well as availability of computers" (Respondent 3).

"We need to check the availability of gadgets that students have such as mobile phone. If they do not own one, then it will be difficult for them to access through the internet and look for resources. Unless, if the school has provided a place yet it will be still hard for some of the students to go to that place due to transportation problem." (Respondent 15)
"First thing first, do every student have computers/laptop/WIFI at home? If they do, then they are a lot of platform such as free platform, platform that needs to be purchased. If it is for teacher's side, it should not be a problem but due to the students' financial background, this will restrict the blended learning further even though they do have phone" (Respondent 20)

In terms of resources, majority of the participants agreed that in their respective schools, there are still lacking in provisions for enough facilities such as laptop, internet coverage, WIFI and anything related to it. Thus, without all those resources, the stance of the blended learning system can reap mediocre results.

"Depends on the courses, like in high schools, we just rely on that where we still need to do mix teaching. For those students with IT minded and have

*access to the internet yet if there is still have limitation, that's why I still prefer
to do mixed learning"* (Respondent 23)
*"What happened if there is a blackout, then of course there will be no services
to connect to the internet so this can create a problem."* (Respondent 25)
"……internet access coverage, if there is no, then what should we do? Let say
using broadband—very costly" (Respondent 20)

Although it is potential for blended learning to bring learning closer students and
teachers, feasibility is yet to be sufficiently addressed in delivering blended learn-
ing in workplace and other related learning settings (Kim et al.2008). It is observed
that internet connection fault has posed the greatest challenge for blended learning
implementors (Ramos et al., 2011) with issues like limited bandwitdh access (Ale-
baikan & Troudi, 2010).

4.6 Pedagogical

Shifting pedagogical paradigms which is strongly propelled by technological
advancement stems from critical pedagogy, a perspective of mutuality in creating
"incubatorial" learning environment (Cingel Bodinet, 2016). From the responses
derived, the pedagogical dimension of blended learning needs calibration spe-
cifically methods to deliver quality learning content and to ensure that needs meet
learning objectives and produce the desired expectation. Given that it is challenging
to get students to adapt to the use of new learning strategies as they are so used to
the traditional didactic, lecture-based classroom (Alebaikan & Troudi, 2010), it is
difficult to change the mindsets and practices of the teaching staff that are so used to
the traditional method (Ramos et al., 2011).

*'….this is between a traditional method and modern method, so it is really a
good thing, it encourages the teachers to deliver the lesson not only in one way
but both ways ……… so the resources not only limited to the textbooks, it is
quite wide. This can also build students mentality in learning thing and it is
a fun learning if only the students give full cooperation. A traditional method
is also important but this is after the students do research using the gadget for
better explanation for them to understand certain topics'* (Respondent 2)
'Indeed great, a combination of a media and chalk and talk' (Respondent 4)

This online discussion for example is perceived as a two-way forum between
teacher and students and it is a useful channel for multi-discussions relating to con-
cepts, theories and applications.

*"For me blended learning is a good way or tool to be used with the main role
is the teacher, since it could help to improve the method teaching to upgrade
their performance and this will automatically make the students to follow the
steps"* (Respondent 28)
*'……so that students will not only practice conventional method of teach-
ing and learning process, but more towards on the proactive for the benefits*

of their future, meaning to say no culture shock on new learning approach situation' (Respondent 1)

Since student-directed learning is an integral function in alternative teaching methods, students have the right to be oriented with different pedagogies applied for and with them (Panda et al., 2011). Familiarizing them with the learning and teaching approach in blended learning in this case cultivates self-instructional and self-exploratory attributes, at the same time, building among students the sensitivity to a learner-friendly and a systematic learning process.

"With this blended learning, of course the interaction would be great, conducive, the study is not too boring, open up students mind......sometimes we didn't expect their critical thinking and this help them developing their mind where it leads to the SPN21, Brunei Vision 2035 and Mission Vision of Ministry and the school itself..."(Respondent 28)

The findings corroborate Al-drees, et al. (2015) study which indicated that blended learning contributes to the development of interpersonal and communication skills, presentation skills, promotes self-directed learning; it also enhances students' enthusiasm and motivation.

"It is all depend on the student itself, if they are interested they will do it and if they do not then not bother to know about it. It also give bad impressions, since it is more to technology, we are not fully using our critical thinking to solve the problem as everything can be found in the website provided, tend we will become lazy due too much relying on technology. (Respondent 24, 25, 26).

While blended learning can provide a platform for students to enrich their learning experiences, it can be still be considered a passive teaching mode when it results to discouraging students from critically filtering the delivered information. This is indicative of lacked of socialization whereby students can process and convert tacit knowledge from shared experiences and analytical thinking inputs (Ibrahim & Salleh, 2019).

4.7 Institutional support

One major issue with most schools is inadequate resources (i.e. hardware, financial, internet infrastructure) in the conduct of bringing new changes in learning environment. It is a reality that requires the support of top management from the institutional to the ministerial level.

"It is been a long time we have been used Moodle, but the we got problem accessing the website. Of course students satisfied, since at school the internet is provided, but when at home it becomes restricted due to no internet connections (Respondent 16)

"No doubt it makes easy to check the progress and the performance of the students, and if we're investing more money yet our internet access is limited, things won't work. (Respondent 19)

In order for blended learning practices to be efficiently implemented, internet infrastructure and budget management must be taken seriously. Unfortunately, with the tight budget in providing the right places, a good WIFI spot, desktop computer and laptop hamper the transition of blended learning to the end users. Also, the teaching environment which includes remote settings are least scrutinized pragmatically, is a growing source of frustration to educators, teachers and students.

"Students are willing to learn but when it involves money, it becomes a barrier" (Respondent 22)

"If the school were given enough budget, it can be reconsidered, apply the proposal to the Ministry since it to align with ICT and Brunei vision 2035, future generation future technology, brings benefit to the schools, students"(Respondent 3)

"Let's say, the school provided the resources – God Will can be success – success in term of utilization the resources…for lesson learning it is hard to tell, maybe more or less the same, if students know how to use it then good advantage" (Respondent 20)

The wider scope using the technology dons on teaching daily lessons. A major problem that is most evident in the implementation of blended learning is the issue of fragmented skills in technology use. There were traces of demotivation especially with the millennial group as most of the senior teachers find it hard to follow and remember all the technical steps and process in order to fulfil lesson requirements. In adopting of technology might take time for users such as millennial, and senior groups due to variation in age and education level, need to undergo technology reskilling (Robert, 2005). Therefore, institutional support such providing training and development is essential for success implementation of blended learning.

"It is very difficult to say since I have been working with junior and senior teachers, I would say, junior teacher will be more willing to accept this idea, but to do work with senior are not easy, because they are not open yet reluctant, as for them what works in the past should work now too. So I suggest that they must be willing to accept the changes" (Respondent 27)

The low level of awareness related to technology and its uses because some of the school teaching staff are lacked from adequate training and experience in computer use and technology as mentioned by Al-zahrani (2014). Therefore, to deal with technological glitches, the establishment of technical support team is highly recommended for effective and smooth delivery of blended learning (Levin et al., 2013; Ramos et al., 2011). While support is important for instructors to deal with challenges in blended learning, this factor is also important for students as the support could be provided in terms of technical aspects such as a helpdesk (Alebaikan & Troudi, 2010; Kenney & Newcombe, 2010), mental and health aspects such as

counseling services (Levin et al., 2013) and also personal development like management skills (Lotrecchiano et al., 2013).

4.8 Evaluation of success

Majority of the participants expressed optimism that blended learning is underway being implemented although it would take time to develop a concrete yardstick to measure success from it. Below are some of the responses from the participants to support such claim:

> "Back in January this year, I had paid a visit to Singapore, there it really amazed me, where they have provided this type of training especially for autism people, there they work is to make the books into digitalised, even though it seems tedious, like every pages need to be scanned but still it attract my attention since it is teachable to this people. So I believe, if they can do there, so do our students provided we need to train them very well." (Respondent 31).
>
> *"I believe everyone like blended learning to be done in the high school, ever though it takes time at first, but in the future it will be success,"* (Respondent 5)

Another interesting input at the peak of technological advancement and new generation of users is the evolution of new language systems for communication (Churchill et al., 2011). For example, media and other printed materials including audio–video records are instructional technology materials, but these can be transformed into technological platforms. Comparing the digital natives and the older generation, technological connectedness is wired from a spectrum of a cognitive differences. This suggests that evaluation of success indeed provides a spectrum of indices.

> "It will be a success, because a lot of teenagers in this school nowadays rely too much on technology, which led to really to buy books. So I believed when we have technology everywhere and people can easily access will give us knowledge too, then do not have to go to the book store" (Respondent 7).
>
> "God Will, it will success. Even though it takes time, everyone can gain skills from learning to use technology. We also gain new knowledge and really expose to new things. I believe, Brunei will be like the rest, such as in Singapore where all labs are equipped by the computers and if possible Brunei High School could do the same things too where everyone be able to use the technology and know basic thing on how to work with technology." (Respondent 12).
>
> "Yes, it will success because it involves with the technology and internet, where nowadays students are more attracted to technology, internet, mobile phone; easy access" (Respondent 22).

Understanding the combined approach to teaching and learning requires "new learners" who can be apt in a blended setting. Hence, the focus of change comes in

a mutual package where teachers and students move toward a convergent platform. Unless the appropriate structure and the knowledge support are aligned, only then evaluation merits a space in technological and pedagogical integration. For instance, in order to achieve the success of using web-based learning systems, the students and teachers must not fail to use such system as this act as a supplementary learning tool for traditional classes (Yeou, 2016).

> "I'm not saying it would not success but students nowadays still need teachers' assistance because the students are not confident enough to try their own unless they have right mind-set, that should be fine. As a form teacher myself, I'm afraid that with this system, students might not come to school because they can access the lessons through the internet, so if possible it should be balanced" (Respondent 29).

Altogether, blended learning will obviously be an interactive and open process of exploratory learning, the setback nevertheless, lies on the breadth and depth of learnings gained. With the volume of accessible platform for information search, student real learning engagement to fully utilize learning opportunities may decline (Ashton et al., 2014) and may impact students' attendance and social connectedness (Stockwell et al., 2015). As for the students, the issue of participation becomes the most outstanding barrier for the implementation of blended learning. While blended learning is supposed to improve student participation in learning, several studies reported that this aspect had been an issue in blended learning implementation where students are reported unable to meet the demands of blended learning which require high level of student discipline and responsiveness (Alebaikan & Troudi, 2010). Besides, poor time management (Kenney & Newcombe, 2010) and students' heterogenous backgrounds (Lotrecchiano et al., 2013) also affect student participation in blended learning.

In summary, the logical derivation between the seven (7) dimensions of analysis and the Hub and Spoke framework and the corresponding positive contributions are justified in following Table 1.
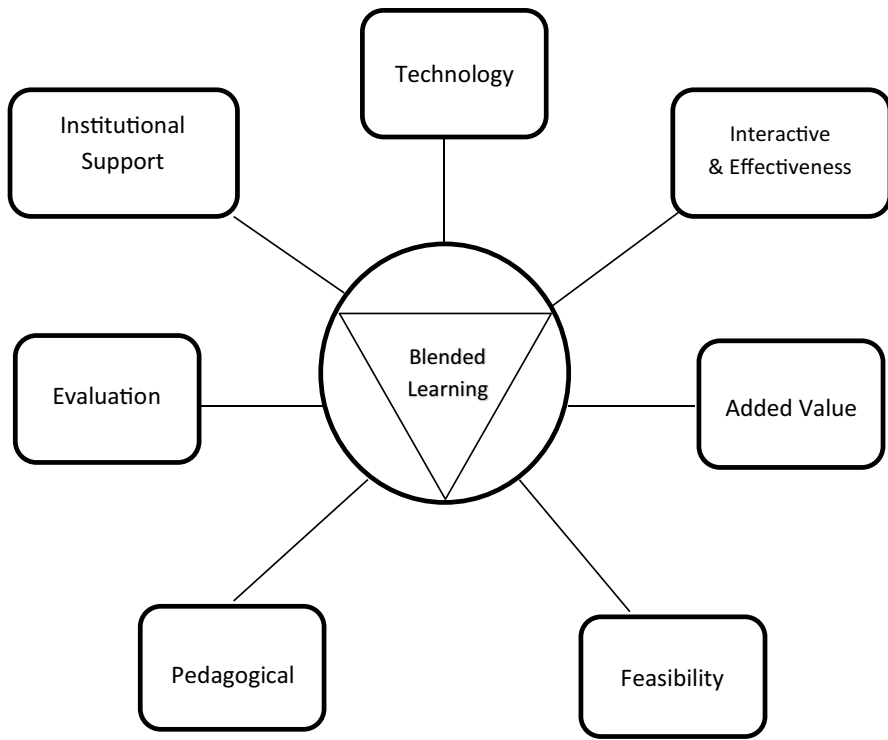
5 Proposed hub-and-spokes framework

This section draws from the main findings and literature tenets to develop a conceptual framework that provides an understanding of the integrated dimensions for effective blended learning. Simply, the framework highlights the conceptual bases, illustrates dimensions of the framework and discusses how it can be applied in academic settings. The illustration is only conceptual based on interpretations from the synthesis of concepts and theories both from blended learning literature and research findings.

As shown in Fig. 1, the framework maps the major dimensions in 'hub-and-spoke' approach under the concept domain of blended learning. From an integrated perspective, this framework schematically encapsulates and assembles all the various dimensions in simplified fashion and laid as input elements to central point (hub). The framework has seven dimensions: technology, interactive

Table 1 Derivation of findings and analysis

Dimensions in the Analysis	Hub and Spokes Dimension	Specific Contribution
4.1 Blended learning readiness of teachers and students	Pedagogy	Awareness of blended learning approach and method
4.2 Technology	Technology	Technological proficiency and competency, control and management of technological resources
4.3 Interactive and effectiveness	Interactive and effectiveness	Media rich content, proactive preparation to propel engagement and desired outcomes
4.4 Added value—benefits	Added value	Accessibility, inclusivity, collaboration, flexibility, adaptability/ self-directed learning, effective workload reduction
4.5 Feasibility	Feasibility	Availability of hardware/software, technological gadgets, internet/wifi connectivity
4.6 Pedagogical	Pedagogical	Evolving paradigm shifts –combination traditional and technology, self-instructional and self-exploratory attributes, learner-friendly and a systematic learning process
4.7 Institutional support	Institutional support	Top management support, technical support, training and development
4.8. Evaluation of success	Evaluation	Highd degree of technological utilization in learning and teaching, Performance and success measures on students' participation in blended learning

Fig. 1 Hub-and-Spokes Framework

and effectiveness, added value, feasibility, pedagogical, institutional support, and evaluation. Each dimension in the framework represents underlying issues or concerns that need to be addressed. These issues help to organize thinking, and ensure that the resulting learning program creates a meaningful learning experience.

- Technology

    This dimension addresses the need for a technology platform most suitable for a learning management system (LMS) that can manage multiple delivery types for the learning program.

- Interactive and effectiveness

    The interactive and effectiveness dimension addresses factors related to how participation and engagement in the learning process could be achieved.

- Added value

    This dimension relates to the benefits gained by both teachers and learners from the teaching and learning activities.

- Feasibility

  Technical requirements, such as wifi/internet connections, the server that supports the learning program, bandwidth and accessibility, security, and other hardware i.e laptop, software, and infrastructure issues are addressed.

- Pedagogical

  This dimension is concerned with the combination and selection of the learning contents and teaching strategies to be delivered online and to be delivered offline (face-to-face). It also analyses learners' learning style, objective of the contents, and evaluates students' learning outcomes.

- Institutional support

  The Institutional dimension addresses issues concerning organizational, administrative, budget, infrastructure and training for multiple deliveries and improvement facilities.

- Evaluation

  The Evaluation dimension is concerned with the usability of a blended learning

  program. The program must have the capability to evaluate how effective a learning
  program has been running as well as evaluating the performance of each stakeholder (learner, teacher, parents, technical staff, administration)

In summary, the framework confirms the significant configuration of blended learning practices. Emerging from ever evolving digital landscape, blended learning bears profound challenges that would require a broader institutional perspective and a more inclusive instructional platform. Given the widespread notion that an integrated and systemic change stems from stakeholders' readiness (Lick, 2013), it is unrealistic to expect a more efficient, more competitive value for deeper learning and responsive teaching in the absence of institutional support, feasibility of technical requirement and technology adoption alongside the evaluation of resources, operations, and outcomes. A further result of pursuing the blended learning framework dimensions, thus, holds the criticality to inform theory into practice or vice versa.

Figure 1 constitutes factors that may change how end-users and providers can sustain a meaningful interface in a blended teaching and learning environment. These factors which are interrelated and interdependent ground blended learning *(hub)*, one that is unable to function without these connecting and complementary factors (*spokes*): technology, interactive and effectiveness, added value, feasibility, pedagogical, institutional support and evaluation. Hence, the perpetuation of the *hubs-and-spokes* model demands a systemic interaction from the institutional to instructional levels in order to create a powerful and deep learning-driven environment. Accordingly, the proposed framework is intended to be neither normative—as

it describes how educational institution ought to function and not necessarily how they actually do function—nor prescriptive—as it defies a rigid set of rules that guarantees blended learning success. An illustration framework of its concept and contributing factors with results and future research discussion, is the main contribution of this paper.

6 Conclusion and future works

Drawing from findings, teaching and learning is an evolutionary process, it has evolved from a total traditional teacher/classroom to an online environment. The emerging of computer and education technologies along with ERT resulted from COVID-19 pandemic has shaped teaching and learning activity a very dynamic process. A globalized system, the secondary schools particularly in Brunei will inevitably adopt blended learning approaches in a significant way. As recommended by hub-and-spoke framework in previous section, once there is clear policy, adequate resources, adaptability to new learning and teaching norms, the evolution will be quick. In a matter of few years, Brunei secondary education systems can be transformed in a manner consistent with their values and mitigating the institutional supports, feasibility and pedagogical challenges and deficiencies currently challenging the quality of the blended learning experience. Blended learning can begin the necessary process of redefining secondary schools as being learning-centred and facilitating a school learning experience. This study investigated the practice of blended learning in Brunei Secondary Schools, and the perceived experiences of teachers and students. In view of the Brunei Vision 2035 and Ministry of Education (MOE) vision, school practices and teaching approaches have morphed to provide students with better skills, knowledge, and understanding in ICT with the aspiration the new generation, thus bringing back these differences in the economy of Brunei. Thus, in this case, based on the findings the acceptance of technology among the teachers and students is significantly crucial for the successful transition toward blended learning practise.

In conclusion, this study explored the use of blended learning given the view that evaluation and assessment of its effectiveness is integral in the process. Tracking the practices resulting from the use of blended learning approaches with ERT, with respect to technological, interactive and effectiveness, added value, feasibility, pedagogical, institutional support and evaluation of success, are important to use as benchmarks for successful implementation. Therefore, this paper serves the academic community its contribution of a proposed Hub-and-Spoke Framework developed and described in the previous section. It is essential that researchers begin to explore the impact of blended learning in achieving more meaningful learning and teaching experiences. This will provide opportunity for further research by testing the proposed framework in larger research sample. The framework also is simply a recommendation to be applied in organisations, as such, not a final outcome. It was produced as a result of this research and, therefore, open to examination and modification. This study is not free from limitation. Due to the small sample size based on single setting in the context of the school in Brunei Darussalam used in our

study, the findings may not be generalizable. Nevertheless, as the concept of `theoretical generalisation' was applied, there was no intention to give a false impression of the results. As with other qualitative research approaches, the emphasis of this paper is on the perceptions of the participants which is always open to multiple interpretations.

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