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# *Blended Synchronous Learning Environment- Perceptions and Experiences of Educational Therapists at Dyslexia Association of Singapore*

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*Abstract*

*The emergence of Blended Synchronous Learning Environment (BSLE) as an innovative teaching method has gained traction during the COVID-19 pandemic. While it is mostly used in higher education, its potential to help students with dyslexia has not been explored much. This study delves into the views of educational therapists from the Dyslexia Association of Singapore (DAS) who integrated BSLE during the pandemic. Using interviews and thematic analysis, the research uncovers key themes like BSLE's benefits, challenges, and its impact on therapists. It sheds light on issues like effective teaching, student engagement, and inclusivity. Despite not being ideal for dyslexic students, BSLE offers advantages like ongoing support and flexibility. The study suggests strategies for improvement, such as tailored implementation for older students and better technology support. Future research could explore students' experiences, evaluate training programs, and assess parental support's impact during BSLE for remote learners.*

Keywords: blended synchronous learning environment , dual mode teaching, COVID-19, dyslexia, remote learning, face-to-face students, hybrid, educational therapy

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## INTRODUCTION

The onset of the COVID-19 pandemic in 2020 triggered a global crisis marked by widespread border closures and substantial disruptions to daily life, profoundly impacting various facets of society, including a tragic loss of lives (WHO COVID-19 Dashboard, 2024). In response to this unprecedented situation, the Singaporean government swiftly implemented a series of measures to contain the viral outbreak (Tan et al., 2020). Consequently, COVID-19 brought unprecedented changes in educational systems, teaching methodologies, and student learning experiences worldwide (Sahu, 2020; Bhamani et al., 2020).

Amid the pandemic, online learning, known as Home-Based Learning (HBL) in Singapore (Tay et al., 2021), emerged as the primary mode of instruction as countries worldwide enforced lockdown measures. This transition necessitated educators to adapt their resources to facilitate online lessons. While mainstream teachers turned to platforms like the Student Learning Space for teaching during lockdowns, they encountered challenges such as limited device availability, technical expertise, and unsuitable learning environments (Reimers, 2022; Lee, 2020).

These obstacles were not limited to educators of mainstream students but also affected Special Educational Needs (SEN) educators and tutors at enrichment centres, who were mandated by the government to conduct online lessons to prevent student intermingling (Ministry of Education, 2020).

With the gradual relaxation of COVID-19 safety restrictions, some educators began implementing a Blended Synchronous Learning Environment (BSLE), also known as 'dual-mode teaching' in Singapore, to support students unable to attend physical classes while adhering to safety protocols. Although not mandated by the government, BSLE became essential for providing continuous education.

Educational therapists from the Dyslexia Association of Singapore (DAS) embraced BSLE upon the return to physical classrooms. BSLE integrates face-to-face and remote learning in real-time, requiring a focus on pedagogy, lesson materials (Zydney et al., 2019), student communication, inclusivity (Szeto and Cheng, 2016), logistical considerations, and class sizes (Lakhal et al., 2021). Understanding the complexities of BSLE is crucial for assessing its effectiveness as a mode of instruction and identifying areas for improvement.

As someone with first-hand experience implementing BSLE as an educational therapist, the researcher encountered challenges in lesson delivery. Apart from preparing comprehensive lesson materials for both groups of students, the researcher managed classes comprising one remote learner and three to four in-person students. Despite technological and workload challenges, the researcher acknowledged BSLE's pivotal

role in sustaining learning during challenging times. This prompted her to explore the experiences of fellow educational therapists in utilising BSLE and its impact on students with dyslexia.

**Existing Research Gaps**

The current research landscape regarding BSLE still lacks thorough exploration, especially with a limited focus on tertiary institutions in the available literature. Despite the increased adoption of BSLE due to the pandemic (Olsen-Reeder, 2022; MacKevett and Feubli, 2022), its application in SEN classrooms, specifically for students with dyslexia, remains largely unexplored. Hence, this study aims to enhance understanding regarding SEN educators' perspectives on implementing BSLE and their related experiences.

**Research Aim**

This research aims to:

- Identify the challenges and opportunities that DAS educational therapists experienced in a BSLE
- Identify strategies that can improve the delivery of BSLE in classrooms

**Research Questions**

1. What are the challenges and opportunities in implementing BSLE for students with dyslexia?
2. What strategies can improve the delivery of BSLE in classrooms?

**Study's Objective**

This study aims to offer insights into the experiences, challenges, and recommendations related to BSLE instructional mode. Given the innovative nature of this teaching approach for educational therapists, gaining a better understanding of lesson delivery and resource utilisation could shed light on areas requiring enhancement. Additionally, it presents an opportunity to reflect on teaching practices and refine existing methods. The outcomes of this research may pave the way for further investigations aimed at developing evidence-based practices or suitable pedagogical frameworks to enhance the quality of BSLE lessons provided to students with dyslexia.

## Literature Review: Blended Synchronous Learning Environment

BSLE, or Blended Synchronous Learning Environment, integrates technology to deliver simultaneous instruction to both in-person and remote students (Bower et al., 2014). This approach, also known as 'Dual-Mode Teaching' (Soesmanto and Bonner, 2019), 'HyFlex' (Abdelmalak and Parra, 2016), or 'Blended Synchronous Learning' (Lakhal et al., 2021), has gained prominence, particularly in tertiary education.

Primarily utilised in higher education institutions, BSLE serves as a vital tool not only during crises like pandemics (Lakhal et al., 2021) or disasters (Wang et.al., 2018) but also to accommodate students unable to attend physical classes. It empowers learners to select their preferred mode of learning (Lakhal et al., 2021; Norberg, 2012), considering their commitments, health concerns (Pope, 2010), or geographical constraints (Bower et al., 2014). To engage remote students effectively, instructors employ video conferencing or equip classrooms with cameras and microphones (Olt, 2018; Bower et al., 2014).

Advancements in technology have further enhanced BSLE, with platforms like Moodle offering interactive whiteboard features, and Adobe Connect facilitating seamless communication between students (Lakhal et al., 2021). Additionally, the role of teaching assistants is indispensable, providing crucial support to instructors who juggle multiple responsibilities (Bell et al., 2013; Bower et al., 2014).

Bower et al.'s (2014) case studies in Australian tertiary institutions, based on extensive data collection and observations, delve into various aspects of BSLE, such as technology integration, classroom setup, lesson delivery, and its impact on learning outcomes. The research underscores BSLE's ability to offer flexibility and convenience to remote learners, fostering a sense of connectedness. Drawing from their findings, the researchers propose a BSLE Design framework, focusing on pedagogical, technological, and logistical considerations. However, the practical application of these recommendations may vary across different educational contexts.

## Challenges of BSLE

Studies on BSLE often explore various dimensions including pedagogical, social, logistical, and technological aspects (Lakhal et al., 2021; Wang and Huang, 2018; Zydney et al., 2020). Previous research in these areas has highlighted challenges such as the difficulty of preparing lessons that cater to both face-to-face and remote learners (Lakhal et al., 2021). Moreover, instructors face the additional task of ensuring inclusivity and effective communication among both groups of students (Bower et al., 2014), as remote learners may feel isolated due to their physical absence from the classroom (Szeto and Cheng, 2016).

Technology poses a significant challenge in BSLE, as unreliable technology can disrupt lessons (Zydney et al., 2019). Instructors must also make a conscious effort to distribute their attention evenly, as remote students may feel neglected if more focus is placed on face-to-face learners (Wang et al., 2017), especially when the remote group is smaller in size compared to the in-person cohort (Lakhal et al., 2021).

In response to these challenges, much research has centreed on enhancing the design of BSLE to improve the learning environment, instructional resources, and teaching strategies (Zydney et al., 2020; Wang and Huang, 2018; Bower et al., 2014). However, it is important to note that existing studies predominantly focus on higher education contexts. As a result, there is a lack of literature supporting the implementation of BSLE in special educational needs (SEN) classrooms or for students with specific learning difficulties like dyslexia.

**Dyslexia**

Dyslexia, classified as a "neurodevelopmental disorder," profoundly affects an individual's reading, spelling (Snowling, 2012, p.7), writing abilities, and phonological awareness (Snowling et al., 2020). Often, individuals with dyslexia also contend with additional coexisting conditions such as Dyscalculia, Developmental Language Disorder (Snowling et al., 2020), and Attention Deficit Hyperactivity Disorder (ADHD) (Boada et al., 2012). Beyond these comorbidities, individuals with dyslexia may grapple with challenges related to motor skills, executive functions, and concentration (Rose, 2009), all of which could potentially hinder their online learning experiences, as evidenced by Woodfine et al.'s (2008) qualitative study involving students with and without dyslexia.

Given the challenges and impediments in reading and learning faced by students with dyslexia, it is imperative to comprehend their educational needs and tailor lessons and materials accordingly. Renowned researchers such as Rose (2009), Snowling (2012), and Torgesen (2006) underscore the significance of ongoing, structured, and systematic interventions targeting phonological skills and phonemic awareness. Consequently, the Orton Gillingham (OG) method stands out as a widely recognised evidence-based teaching approach for students with dyslexia, emphasising a sequential, explicit, and multisensory educational approach (Sayeski et al., 2018).

Nevertheless, the feasibility of implementing this approach within a Blended Synchronous Learning Environment (BSLE) remains uncertain. Therefore, it is essential to identify the critical factors to consider when conducting BSLE for students with dyslexia. Given the unexplored nature of this realm, a comprehensive examination of the diverse challenges and considerations for dyslexic learners in an online setting is warranted.

**Challenges of online learning and dyslexia**

Over time, researchers have highlighted the challenges that dyslexic learners face in the realm of online education. For instance, Gabay et al. (2012) found that individuals with dyslexia encounter difficulty transitioning between tasks and effectively engaging in sequential activities within online environments. Similarly, Habib et al. (2012) conducted a study involving twelve dyslexic students, either graduated or pursuing tertiary education, using a learning management system. Their findings underscored additional hurdles such as disorganised interfaces inundated with irrelevant information, leading to cognitive overload, non-intuitive functions, and struggles with understanding abbreviations for effective peer communication.

Woodfine et al. (2008) further contributed insights into the challenges faced by dyslexic students in text-based synchronous learning environments. They revealed that these students often experience embarrassment due to difficulties in articulating themselves effectively, stemming from reading, spelling, and typing challenges. Additionally, they grapple with following and executing multiple instructions swiftly compared to their non-dyslexic peers, owing to heightened cognitive demands. Consequently, educators must take these factors into consideration when designing and delivering online lessons tailored to dyslexic students' needs.

This perspective is reinforced by Tay and Asmuri's (2021) investigation, which conducted four case studies on dyslexic students undergoing Home-Based Learning (HBL) in Singapore. Beyond the challenges in reading, writing, typing, and limited support in navigating online resources, the findings unveiled a lack of differentiated instructions or resources for these students, despite educators being aware of their learning difficulties. Moreover, students were expected to juggle multiple tasks, including listening to the teacher, navigating various websites, and responding to chat messages. However, the study's focus primarily on students from mid-income families leaves a notable gap in understanding the experiences of low socio-economic status (SES) students, which could illuminate additional obstacles such as accessibility to learning devices or home support.

Nevertheless, the researchers advocate for heightened awareness among educators regarding the cognitive load faced by dyslexic students and suggest leveraging dyslexia-friendly technology to enhance their learning experience. They propose designing lessons with familiar and uncluttered screen layouts, maintaining appropriate text spacing, and incorporating titles and headings for reading texts. These recommendations hold relevance for dyslexic students in a BSLE, urging educators to develop learning resources that align closely with their needs, thus fostering a dyslexia-friendly remote learning experience.

As such, teaching individuals with dyslexia, whether in a traditional classroom or through online platforms, demands careful deliberation. The introduction of BSLE prompts

questions about its effectiveness in meeting the educational needs of dyslexic students and the potential adaptability of traditional teaching methods and materials. While BSLE may be a familiar learning environment for many university students proficient in multitasking and technology use, its suitability for dyslexic learners is uncertain due to the specialised instructional approaches designed for them. Consequently, understanding the feasibility of integrating BSLE is crucial, given the unique learning requirements of students with dyslexia.

## METHODOLOGY

This research employs a qualitative methodology to collect data from individuals within a natural setting (Creswell, 2013). Specifically, the study centres on the experiences and perspectives of educational therapists, making a qualitative approach well-suited for gaining in-depth insights into the phenomenon of Blended Synchronous Learning Environments (BSLE) through the lens of the participants involved (Yin, 2011), thus providing rich and detailed insights.

Considering Creswell's (2013) qualitative research strategies, a case study approach is selected due to the limited sample size. A case study delves deeply into a real-life situation involving one or more participants, employing a variety of data collection techniques (Creswell, 2013). However, this method presents limitations in generalising findings due to small sample sizes (Farquhar, 2012) and the potential for biases or personal influence if adequate precautions are not taken (Yin, 2008).

Nevertheless, the case study design is chosen to explore the unique phenomenon of BSLE comprehensively, allowing for a detailed examination of participants' perspectives in addressing the research questions. Following Stake's (1995) categorisation, this research design aligns with an instrumental case study, which prioritises understanding the phenomenon itself over the individuals involved. The study is specifically bounded to the implementation of BSLE at DAS for dyslexic students and aims to understand the experiences and perceptions of educational therapists.

### Sampling, participants & selection criteria

A purposive sampling technique was employed to select participants capable of offering comprehensive and detailed insights into the research topic (Suri, 2011) and effectively addressing the research questions (Forman et al., 2008). This sampling strategy was considered appropriate as participants needed to possess experience teaching in a Blended Synchronous Learning Environment to share their perceptions and experiences.

The focus of this case study centres on the implementation of BSLE at DAS, involving educational therapists responsible for teaching the Main Literacy Program (MLP) to students aged 7 to 16. While a case study can encompass one or multiple cases

(Creswell, 2013), a sample size of three was deemed optimal to explore distinct cases and gather diverse perspectives on the phenomenon under investigation for this research. To be eligible for participation in the study, educational therapists were required to have implemented BSLE in at least two MLP classes during the COVID-19 pandemic.

Table 1: Demographics of Participants

| Participant's Pseudonym | Gender | Years in DAS | Prior teaching Background | IT Background |
|---|---|---|---|---|
| Hayley | Female | 3 | 9 years (tutoring and relief teaching) | No |
| Tracy | Female | 3 | A short period of teaching at a private school | No |
| Jane | Female | 12 | No | No |

**Ethical considerations**

The research study adhered to ethical guidelines outlined by Creswell (2009). Firstly, approval was obtained from the DAS Research Committee to conduct interviews at a DAS centre involving educational therapists. Secondly, participants provided informed consent to ensure their understanding and agreement with their involvement, as recommended by Gregory (2003). Thirdly, measures were implemented to maintain confidentiality and anonymity, following the guidelines of the British Educational Research Association (2018). Participants were assigned pseudonyms in quotations, and all collected materials were encrypted and securely stored. Data will be retained until the completion and submission of the project, after which it will be responsibly disposed of.

**Data collection method**

The researcher obtained authorisation for the study on the 4th of May, 2023. An open invitation comprising of the study's agreement form and information leaflet was forwarded via the DAS company email to request participants on the 10th of May, 2023. Following a thorough evaluation, three interested individuals who met the selection requirements were asked to take part.

To gather information, the researcher conducted face-to-face, semi-structured interviews. Interview appointments were arranged using the Google calendar to accommodate the participants' schedules. Subsequently, the interviews were held face-to-face at the DAS Rex House learning centre. The audio was recorded with the laptop's sound recording tool. Each interview lasted between 45 minutes to an hour. After the interview, transcripts were shared with participants for member checking.

A semi-structured interview involves posing open-ended questions to participants with the flexibility to probe further based on responses to address the research inquiries (McIntosh and Morse, 2015), enabling a deeper exploration of the subject and discovery of new insights. This approach encourages participants to openly discuss their viewpoints and encounters with BSLE, fostering a conversational setting (Adams, 2015).

**Pilot interview**

Researchers have emphasised the significance of pilot studies in acquainting researchers with the interview process, refining interview questions, and making necessary adjustments to mitigate complexities in the main study (Shakir and ur Rahman, 2022; Young et al., 2018; Majid et al., 2017). Consequently, a pilot study of the semi-structured interview was conducted prior to the main study. An educational therapist with a similar profile, representing the main study's participants, was selected for the pilot study. The preparation of the interview guide and questions was guided by Bolderston's (2012) article.

The pilot interview was conducted face-to-face at the DAS Rex House centre, lasting 46 minutes. Subsequent to the interview, the researcher identified areas for improving interview questions by refining them to be concise and explicit. To prevent confusion, questions pertaining to online learning were omitted, and the term "BSLE" was substituted with "dual-mode teaching," a terminology familiar to educational therapists. This alteration enhanced participants' comprehension and elicited responses, aligning with Bolderston's (2012) recommendation to employ familiar terms for ease of conversation and understanding. Additionally, the interview questions were adjusted to effectively address the research inquiries.

Table 2: Demographics of Pilot Interview Participant

| Participant's pseudonym | Gender | Years in DAS | Prior Teaching background | IT background |
|---|---|---|---|---|
| Susan | Female | 6 | 2 years, Behaviour Therapist | None |

**Main interview and member checking**

The main study was held in-person at the DAS centre. Subsequently, the audio recordings of the interviews were transferred to a Microsoft document and a preliminary transcription was generated using the 'dictate' feature. Following this, the researcher meticulously reviewed the audio content and revised the transcription to ensure precision. The final transcriptions were presented to the participants for member checking, a method aimed at enhancing the trustworthiness of qualitative research and diminishing researcher bias by guaranteeing an accurate representation of the participants' perspectives (Lincoln and Guba,1985). Consequently, member checking enabled the researcher to seek clarifications from participants regarding specific elements of the interview necessitating further clarification and to objectively interpret the interview.

**Data analysis**

Braun and Clarke's (2006) six-stage thematic analysis model served as the framework for identifying primary themes within the interview data through an inductive approach. Thematic analysis aims to identify raw data, identify, examine, and pinpoint crucial themes or patterns within the data, facilitating exploration of the research inquiry. This method holds significant importance in qualitative research, as it yields profound, intricate, and detailed data, aligning well with the objectives of the current study (Braun and Clarke, 2006). However, thematic analysis lacks extensive literature guidance for novice researchers compared to other methodologies, potentially hindering their ability to conduct it with confidence and rigor, thus jeopardising the validity, reliability, and credibility of the research data (Nowell et al., 2017). Moreover, due to its adaptable nature, the quality of the analysis largely depends on factors such as the research question, the researcher's discretion, and proficiency in managing large volumes of data (Braun and Clarke, 2006).

**Procedure**

The analysis process comprised several stages. Initially, the researcher thoroughly acquainted herself with the data by actively and repeatedly reading it to identify patterns and gain understanding. Transcribing the data and listening to audio files assisted in achieving a deep understanding and honing analytical skills (Lapadat and Lindsay, 1999).

Secondly, codes were generated by identifying initial thoughts and intriguing aspects emerging from the data. This manual coding process involved writing notes, highlighting potential patterns, and utilising the ‘comment’ function in Microsoft Word for codes.

In the third phase, themes were sought from the generated codes and organised into prospective themes. The researcher transferred highlighted texts and corresponding

codes into an Excel sheet. Subsequently, a thematic map was constructed to categorise the codes and establish connections between themes and codes, following Braun and Wilkinson's (2003) recommendations. This step facilitated the identification of main themes and sub-themes.

The fourth phase entailed reviewing the themes through meticulous evaluation to determine their relevance and consider merging or excluding weak themes. This resulted in a set of refined and reviewed themes accurately representing the overall data. To ensure accuracy, the researcher shared the interpretations of findings with participants to confirm their alignment with the sample's perceptions, as suggested by Birt et al. (2016).

The fifth phase involved defining and naming themes. This included analysing the data for each theme, grasping the core idea of themes, and identifying the data features they represent. A thorough analysis was conducted for each theme, and the narrative for the research questions was identified, leading to the establishment of distinct and clearly defined themes.

In the final phase of thematic analysis, writing commenced, and the analysed themes and data were presented in a concise, logical, and sequential manner. Throughout this analysis process, the researcher remained mindful of 'researcher bias,' which can impact qualitative studies due to personal opinions and background (Johnson, 1997). Hence, reflexivity was practiced to ensure the validity and credibility of the study, involving the maintenance of a personal memo to record personal thoughts and ethical considerations, as recommended by Hammarberg et al. (2016) and Johnson (1997).

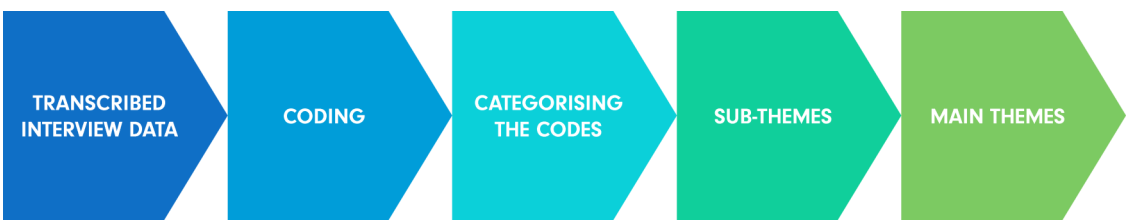


Figure 1: Data Analysis Process

## RESULTS & DISCUSSION

The study's purpose was to understand DAS educational therapists' experiences and perceptions of implementing BSLE. It sought to address the following research questions:

1. What are the challenges and opportunities in implementing BSLE for students with dyslexia?
2. What strategies can improve the delivery of BSLE in classrooms?

Four major themes and additional sub-themes emerged from the findings.

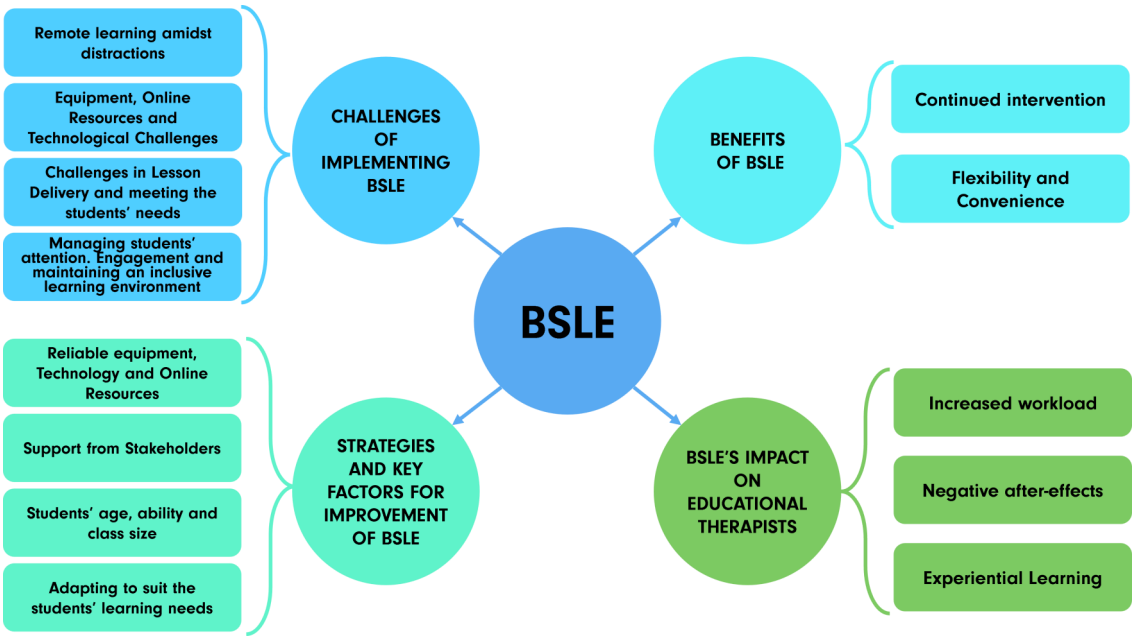


Figure 2 BSLE Findings

**Theme 1: Benefits of BSLE**

The abrupt shift from remote instruction to Blended Synchronous Learning Environments (BSLE) allowed minimal time for educational therapists to adapt to the novel instructional approach. Nevertheless, educational therapists recognised the advantages of BSLE, such as ensuring ongoing academic support and offering students enhanced flexibility and convenience.

**Continued intervention**

During the pandemic, students impacted by factors such as quarantine, being immunocompromised, or choosing to avoid in-person interactions, chose to participate in remote learning. Educational therapists recognised the prompt implementation of Blended Synchronous Learning Environments (BSLE) to cater to these students' instructional preferences and facilitate uninterrupted learning experiences.

> *"If the student is unwell, but still able to be attentive for lesson. I think this dual mode promises that they do not miss their lessons." — Jane*

One educational therapist highlighted the potential advantages of utilising BSLE for their professional practice, notably in decreasing the necessity for review sessions.

### Flexibility and convenience

BSLE presented a beneficial chance for students to acquire knowledge from the comfort of their homes, bolstering adaptability and ease. By removing the necessity for travel, learners were able to engage in studies without encountering exhaustion. An educational therapist further acknowledged the potential business prospects associated with BSLE and proposed the prospect of expanding its services outside the borders of Singapore.

## Theme 2: Challenges of implementing BSLE

Educational therapists faced numerous difficulties while putting BSLE into practice, despite its advantages.

### Equipment, online resources, and technological challenges

Google Meet functioned as the chosen video conferencing tool, with remote learners engaging through either laptops or iPads. Various challenges such as poor audio and camera performance, improper device positioning, insufficient screen dimensions, slow device response, and the requirement to switch between different websites hindered the successful integration of BSLE for students attending remotely. Additionally, the absence of suitable devices further impeded effective communication.

> *"The laptop screen is not ideal as it comes with restrictions because I need to use it for sharing screen. Once you share your screen, you cannot see who's online. And the iPad comes with even more restrictions. The screen is really small and we can easily forget the students who are online. There was a student who was trying to put up their hand online. But because the iPad was away from me, I couldn't see that he was putting up his hand and his laptop has audio issues." – Jane*

The positioning of devices played a critical role in establishing an ideal learning atmosphere. Laptops were frequently adjusted to face either the educational therapists or fellow classmates, thereby obstructing a comprehensive view of the class. This suboptimal placement of devices not only impeded remote students' auditory experience but also constrained the movement of educational therapists around the devices.

The occurrence of technical difficulties was so prevalent that educational therapists resorted to utilising WhatsApp as an alternative method to ensure continuous communication and aid students in resolving issues. Notably, in instances of microphone malfunctions, educational therapists initiated WhatsApp calls to enable students to hear their instructions while participating in Google Meet sessions.

In addition to these obstacles, educational therapists attended to remote students' queries and technical challenges. This support involved assisting students in logging into their accounts, clarifying basic online terms, instructing on screen-sharing functions, and navigating digital resources. However, students often encountered compatibility issues and navigation difficulties with their devices. Common devices like laptops, iPads, and smartphones frequently posed compatibility issues with the online learning materials, with smartphones being particularly unsuitable due to their limited screen size.

> *"When we set assignments on these fancy tools, the first thing the student will ask is, 'Teacher what to do, how to do it'. You find that you need to spend at least a good 10-15 minutes to get them some hands-on." — Jane*

Furthermore, students resorted to online resources for quick access to information, where the auto-correction feature negatively impacted spelling exercises beyond the control of educational therapists. While some remote learners struggled with the demands of online learning due to these technological hurdles, educational therapists had to allocate additional time to support students in familiarising themselves with the digital tools before engaging in the learning process.

Educational therapists faced an additional technological hurdle when it came to online resources, affecting their capacity to provide timely feedback to remote students. For instance, a therapist relied on Liveworksheets.com, where access to student work was only available upon completion.

> *"There were so many different materials to be used and so many platform to juggle." — Hayley*

Additionally, maneuvering between different online platforms posed a challenge. Moreover, younger students were particularly affected due to their limited proficiency in using digital tools efficiently, requiring additional time to complete tasks such as uploading materials or typing.

**Challenges in lesson delivery and meeting the students' learning needs**

The integration of BSLE had a significant impact on lesson delivery, posing considerable challenges in effectively meeting the diverse learning needs of both in-person and remote student groups. Educational therapists faced notable difficulties in providing corrective measures for remote learners, primarily due to time constraints and the prioritisation of attending to the needs of physically present students.

> *"I didn't get the students to trace. I just gave him the answer a few times because I was pressed for time and I was tired. My mind was constantly on finishing the component*

> *because there's so much else to do that I cut short. In fact, I didn't even do the correction procedure with him." — Jane*

Moreover, the virtual environment presented inherent obstacles for delivering corrective interventions, particularly in activities like reading and spelling, resulting in remote students requiring repeated guidance due to technical issues affecting audio clarity.

Monitoring the progress and assessing the academic and emotional development of remote learners proved challenging for educational therapists, as their focus was mainly on students in face-to-face interactions.

> *"If it's online, I totally cannot gauge. I don't know what's happening to them. You know Google doc- yeah, they might get it correct, but I would still not be confident enough to know whether they really understood what's happened in the classroom, or what I taught, so my objective is at least one word that they need to remember." — Tracy*

Consequently, remote students often struggled to grasp concepts, lagging behind their peers receiving in-person instruction and experiencing communication breakdowns and frustrations.

> *"I find that the remote students had a higher number of 'I don't knows' compared to the face-to-face." — Jane*

Educational therapists unanimously recognised the daunting task of developing a multi-sensory learning framework tailored for remote students. While successful in implementing such an approach for in-person learners, adapting it for remote participants proved challenging, as online resources designed for multi-sensory engagement were often perceived as exhaustive and redundant.

> *"The multi-sensory part, it's just basic and after a while it gets boring when you do it over and over again. Whereas for face-to-face, I can always change where you write it and all the materials I bring in class for them. Online, they can only watch from afar." — Hayley*

**Managing students' attention, engagement, and maintaining an inclusive learning environment**

Educational therapists found it challenging to juggle the needs of both in-person and remote student groups, as they tended to prioritise those physically present in class over those participating remotely. This preference stemmed from the remote students' less tangible presence in the BSLE, leading to lower levels of interaction and motivation compared to their in-person counterparts. Consequently, maintaining engagement and

fostering inclusivity became difficult for therapists, resulting in occasional unintentional neglect of remote learners and delayed support for them.

> *"There's so much going on that I completely didn't look at that screen for a long period of time. Then that student called another student who is face-to-face on the phone to tell the student, "Tell teacher to look at me," I feel so terrible even now you know." — Jane*

The unequal distribution of attention was partly due to in-person students dominating discussions and enjoying the spotlight, which overshadowed the contributions of remote participants.

> "They are always just by the side, listening to our conversation because the *students in class overpower everything. Which I feel to be honest, the students in class would still be more outspoken. No matter how quiet they are, they will still be the loudest than those online" — Hayley*

Efforts to establish an inclusive learning atmosphere were largely unsuccessful due to limitations such as time constraints and the educational setting. Additionally, endeavors to standardise lesson materials through exclusive use of digital resources, aiming for equal learning opportunities, were met with resistance from face-to-face students who preferred hands-on activities.

> *"The students online were engaged, but the ones who are face-to-face, they were not into it. They like that multi-sensorial, tactile feel so they felt like- well, I'm already here in class, so why are you asking me to do it on a tablet? They feel that they are being restricted just because somebody else is online and they all have to do it online" — Jane*

As a result, navigating student engagement across various instructional tasks proved to be daunting. Therapists felt pressured to keep students consistently involved, especially since remote learners tended to disengage more easily in the absence of a physical authority figure. A lack of intrinsic motivation among remote students, stemming from limited participation in activities, sometimes made online learning burdensome, leading to requests for early lesson endings due to fatigue.

> *"The online student was getting frustrated because she cannot follow through his story. So she said she's going to the toilet and then went missing for a long period of time." — Jane*

**Remote learning amidst distractions**

Remote students encountered increased distractions compared to their in-person counterparts, as they utilised personal devices, exposing them to digital distractions. Additionally, they had to consistently monitor the microphone's mute feature to avoid picking up background sounds, further disrupting their learning experience.

> *"Once I could hear my student's grandma, she's cooking. He's sitting in dining table at the kitchen. He's sitting there and the grandma is cooking. And she's asking him like, what he wants, whether he wants it more spicy, less spicy. And I'm like. 'Hello', then he has a baby sister who's, like, crying and at one point the grandma picked up the baby sister and put her on his lap. So, he was holding onto the baby sister and he's attending the lesson. I felt very bad about that." –Jane*

**Theme 3: Strategies and key factors for improvement of BSLE**

Despite encountering a multitude of obstacles, educational therapists posit that enhancements to BSLE are attainable through the deliberate consideration of specific factors and strategies.

**Students' age, ability, and class size**

Educational therapists have pinpointed students' age and skill level as pivotal elements for enhancing performance in BSLE. Proficiency in manoeuvring through online tools and autonomously resolving technical issues has been identified as crucial for facilitating a seamless BSLE experience. Remarkably, this was particularly noticeable among older learners starting from Primary 5, who exhibited reduced dependency on educational therapists for technical assistance and displayed enhanced participation throughout instructional sessions.

Moreover, the significance of class size was underscored by an educational therapist, emphasising its influence on their capacity to provide adequate support to student cohorts. The majority of MLP classes consisted of four to five students, with a fraction of them being remote participants.

> *"Don't put as many kids in one classroom. When you are dual, the total number of students in a class should be maintained as low as possible so that they can have your undivided attention. Online should only be one. Never more than one."- Hayley*

**Reliable equipment, technology, and online resources**

Technological advancements are essential for enhancing the BSLE. Suggestions have been put forth regarding the incorporation of visualisers to streamline the sharing of written materials among remote students and educational facilitators. Additionally, it is recommended to utilise functional iPads and similar devices to enhance the online presence of remote learners during class sessions. An optimal learning experience can be achieved by simultaneously displaying video content and class materials on the screen, allowing students to engage with the lesson seamlessly.

The inclusion of high-quality cameras and microphones is crucial for providing students with an immersive learning environment. In cases where laptops and iPads are not suitable, educational therapists propose installing an LCD screen or Apple TV near the whiteboard to project video conferences. This approach could boost remote students' engagement, facilitate eye-level interactions, and minimise the chance of missing digital cues.

> *"To think of it as a benefit for students, I think it comes along with a lot of assumptions. Assumptions that the student has the proper technology at home, Wi-Fi connectivity and the technology that they're using, whether it's a desktop or a laptop, right, it has working audio too. And the camera is good and they know how to position the camera so that they can be seen." — Jane*

In addition to enhancing classroom equipment, it is essential for remote students to be in conducive learning environments with access to quality technology and reliable internet connections. Furthermore, educational therapists advocate for tools with easy navigation and user-friendly annotation features. Various digital platforms such as Google Documents, Google Slides, Jamboard, Trello, KAMI, Quizizz, Classkick, Bamboozle, Wordwall, and Liveworksheets.com have proven invaluable for assigning tasks to remote learners. Additionally, applications like Padlet, Wakelet, and Trello facilitate collaboration and brainstorming activities among student cohorts.

Importantly, educators encourage the use of familiar tools by students and the integration of more teacher-guided resources to mitigate navigation challenges and obstacles encountered with online tools.

> *"We have to stick to what we have been using in class. Stick to that same variety when you go dual mode so that the students are familiar with the interface. Once they go online, it's not a time to try something new unless the teacher shares the screen and the teacher controls the system." — Jane*

**Adapting to suit the student's learning needs**

Educational therapists exhibited adaptability and flexibility in evaluating the proficiency of remote learners in utilising online tools and adjusting to digital learning environments. They employed diverse strategies, such as sending lesson materials via email to aid younger students struggling with platform navigation and integrating modifications tailored to the needs of remote learners compared to their face to face peers. Notably, efforts were made to streamline tasks, particularly in activities like sound drills and spelling exercises, by simplifying instructions and providing necessary phonograms to reduce cognitive load. This approach aimed to lessen the typing workload and instead introduced a drag-and-drop activity. For learners encountering challenges with spelling, visual aids were leveraged, with one practitioner utilising Google Slides to enhance comprehension through imagery. Additionally, thematic instruction focused on topics like environmental issues, pollution, and sleep hygiene was favoured by some educators, emphasising reading comprehension and writing tasks over phonics instruction.

> *"It's a challenge to actually teach phonograms. Reading Comprehension and writing is much easier to do dual mode." — Tracy*

To enhance student engagement, a variety of visual aids and interactive online activities were integrated into the lessons. This approach aimed to foster active participation among students in the digital learning setting.

**Support from stakeholders**

Support from stakeholders, notably from parents and the DAS, was deemed crucial for the success of BSLE. Fostering a strong rapport with students' guardians through frequent communication was identified as essential for garnering assistance for remote learners, encompassing supervision and creation of an optimal learning setting.

Nevertheless, it is crucial for parents to maintain a delicate balance in their involvement, being able to discern when to offer support and when to step back. Excessive surveillance by parents could evoke discomfort in students, thereby detrimentally impacting their educational engagement and involvement in a BSLE.

Beyond parental engagement, the DAS Educational Technology team supported the initiative by suggesting online materials, supplying templates, and maintaining a resource repository. Nonetheless, educational therapists voiced a necessity for more holistic support, encompassing training sessions and curated educational materials.

> *"DAS has to train teachers in how to handle things like correction procedure, student engagement, student motivation and give us a standard set of tools like if I want to do reading comprehension for a dual class and I have a PDF of the reading*

*comprehension, how should I share it with the student because PDF printed out would look better than a PDF on the screen." — Jane*

**Theme 4: BSLE's impact on educational therapists**

The implementation of the BSLE had significant adverse effects on the mental and physical well-being of educational therapists, stemming from heightened work demands and the challenges of experiential learning.

**Experiential learning**

Introducing BSLE proved challenging because of the educational therapists' lack of experience and their diverse individual approaches. They encountered uncertainties when pushed beyond their comfort zones, facing a steep learning curve marked by trial and error as they advanced through each lesson.

*"How I prepare is, I over prepare because I don't know what will work and what will not work. It took me some time to really know what, how the students do well…To be honest, I just over-prepare and then I decide on that day. Like, OK, this works and this doesn't and then let's move on." — Hayley*

**Increased workload**

The extended preparation period was a result of accommodating the diverse learning requirements of both student groups, which increased the workload for educational therapists.

*"If I were to do it on paper for them , then in terms of preparation for me is double work. The same activity, I have to plan it in two ways. I think it's a lot of preparation. Like for every component you need to think." — Jane*

**Negative after-effects**

Educational therapists admitted to not finding the BSLE enjoyable and experiencing emotional difficulties, including a range of conflicting emotions such as regret, guilt, anxiety, and even feelings of dissatisfaction and resentment towards the BSLE due to associated stress.

*"Whenever I finish my dual mode lesson, I will not be satisfied with what I've done for the day. There's always a void. The reflection part was lacking when I did dual mode, because I'm so conscious about all other things and I'm so stressed about how things are going to go on. You know, there are so many things going on compared to a physical lesson." — Tracy*

The emotional strain also impacted their teaching approach, as they struggled to address students' learning needs, maintain focus, and deliver lessons effectively. This led to doubts about whether they were adequately meeting students' needs and treating them fairly. While acknowledging areas for improvement, therapists empathised with remote students who did not receive the same level of support as those in physical classrooms. Moreover, the lack of connection with remote students and challenges in maintaining engagement during teaching diminished the enjoyment of the teaching process and made it challenging to deliver lessons with care.

> *"Because my mind is just so conscious about managing, handling the whole thing like the technical issue and all, sometimes I don't really put my heart and soul out for teaching." — Tracy*

## DISCUSSION

### Benefits

The implementation of BSLE ensures ongoing support for students with dyslexia, which is crucial for maintaining, enhancing, and reinforcing their educational progress. This assertion is supported by the findings of the National Reading Panel (2000) and Torgesen et al. (2001), who conducted research on students facing challenges in reading. Additionally, the consistent provision of support guarantees that remote learners encounter fewer educational gaps upon their return to physical classrooms. This observation is corroborated by Olsen-Reeder's (2022) two-year investigation at a university in New Zealand, which implemented BSLE during the pandemic period. However, the overall quality of instructional sessions was subpar, impacting student learning outcomes negatively. Nonetheless, the flexibility and convenience offered by BSLE allow students to engage in learning from their residences, reducing the risk of exposure during the pandemic. This phenomenon is highlighted in Lakhal's (2021) research, where students appreciated the flexible nature of remote learning, especially those residing far from the campus.

### Challenges

Numerous challenges arose during the execution of the BSLE. Technological impediments impacted the auditory and visual components within the BSLE, thereby influencing the overall learning experience. Previous studies by Olsen-Reeder (2022), Zydney (2020), Szeto and Cheng (2016), and Lakhal et al. (2021) have also documented similar challenges. For example, a two-year case study involving 150 undergraduate students revealed recurrent disruptions in lessons due to delays and poor quality transmission of audio and visual content (Szeto and Cheng, 2016). Furthermore, students were required to navigate the technological aspects of the BSLE as educational therapists observed the

necessity to guide remote learners in utilising online learning platforms, consequently affecting lesson progression and meeting students' learning requirements.

**Challenges in Multi-sensory Learning Environments**

Although a multi-sensory learning environment is deemed beneficial for students with dyslexia to enhance their understanding and acquisition of concepts and skills (Birsh, 2005), implementing this approach online posed significant challenges. Incorporating tactile and kinesthetic activities was particularly limited. Likewise, Olsen-Reeder's (2022) research illustrates an educator's decision to omit kinesthetic lesson components for face-to-face students in favour of promoting inclusivity for remote learners. Instead, both cohorts received digital lessons, which were initially well-received but declined over time. While Olsen-Reeder's (2022) study was limited to the perspective of one teacher, the findings align with the present study, in which an educational therapist noted the preference of her face-to-face students for tactile learning compared to the digital learning materials used by remote students.

**Challenges in Correction Procedures and Student Engagement**

Effective correction procedures for remote students posed challenges, potentially impacting their learning and retention of concepts. Previous research by Torgesen (2006), Lindamood and Lindamood (1998), and Alexander et al. (1991) underscored the significance of explicit instructions in decoding and encoding skills for students with dyslexia. However, difficulties in correcting remote learners may have led to a decline in learning quality, compounded by therapists' inability to assess remote students' progress due to passive participation and task lag. These challenges hindered the provision of necessary support, contradicting an essential Orton-Gillingham principle (Sayeski et al., 2018). Furthermore, educational therapists have adjusted their teaching focus from phonics to thematic concepts due to the acknowledged challenges of teaching phonics. This shift highlights potential difficulties for dyslexic students in a remote learning environment. Existing research supports the notion that dyslexic students often struggle with phonological processing (Snowling, 1998; Navas et al., 2014). Therefore, auditory issues in online learning may compound these challenges. Additionally, managing students' attention and engagement during lessons proved challenging, with remote students exhibiting higher disengagement compared to face-to-face peers, potentially due to limited participation opportunities. The disparity in interactions between face-to-face and remote students further emphasised the complexities of a BSLE .

Creating an inclusive environment also presented obstacles, with therapists inadvertently focusing more on face-to-face students, overlooking remote participants. Similar studies highlighted challenges faced by remote students in actively engaging, as they often muted themselves and hesitated to contribute unprompted. This lack of engagement led to feelings of disconnect and reduced participation. Notably, the remoteness of online

learning further hindered natural engagement, impacting the presence of remote students in the learning environment. As a result, remote students faced challenges in actively participating in lessons, leading to restlessness and diminished motivation.

Addressing these challenges necessitates a nuanced approach that considers the diverse needs of both face-to-face and remote students to foster an inclusive and engaging learning environment for all participants.

**BSLE's impact on educational therapists**

The integration of BSLE has significantly influenced the teaching approaches, workload, and emotional well-being of educational therapists. Through an iterative experiential learning process, these professionals have continuously modified their lesson plans and teaching strategies. This adaptation has resulted in an increase in workload and lesson preparation time as they strive to meet the diverse learning needs of their students, aligning closely with the findings of Bower et al. (2014). The research conducted by Zydney et al. (2019) further supports this notion by highlighting the exhaustion experienced by educators due to the high demands and multitasking involved in the implementation of BSLE.

It is noteworthy that educational therapists have expressed strong concerns against the adoption of BSLE, pointing out more disadvantages than advantages. This negative perception has been shaped by their encounters with various challenging situations, including stress, burnout, and feelings of guilt. The survey responses from 600 language teachers by MacIntyre et al. (2020) accentuate this sentiment, indicating that the shift to online teaching during the COVID-19 pandemic has amplified stress levels and negative emotions. MacIntyre suggests that educators are frequently required to adapt swiftly to changes in teaching practices and instructional delivery, often without adequate acknowledgment from educational institutions regarding the added stress and workload pressures placed upon them.

## RECOMMENDATIONS

The study identified key strategies and factors for enhancing the implementation of BSLE. Firstly, it suggests that BSLE is most effectively utilised with upper primary or secondary school students due to their familiarity with technology, which ensures a smoother learning experience. Moreover, considering the unique learning needs of students with dyslexia, it is advisable to limit the number of remote students to one as suggested by one of the educational therapists. This allows for tailored adjustments based on the dynamics of the classroom. While many studies did not specify class size limitations, possibly because they focused on tertiary level students who are generally more independent, Zydney et al.'s (2019) study revealed that larger class sizes demand more effort from teachers, such as multitasking and setting up additional equipment. Notably,

teachers in their study delegated some duties to face-to-face students to handle technological problems and monitor remote students' chat. However, this approach may not be suitable for students with dyslexia, who are often perceived as having limited "cognitive flexibility" and may struggle with transitioning between tasks (Poljac et al., 2010, p.402).

In contrast, Lakhal et al.'s study reported instructors' varying preferences regarding class size. Thus, the ideal class size may depend on the dynamics of a particular classroom, students, and educators. Secondly, ensuring reliable equipment, technology, and online resources is crucial for a smooth learning experience. While most studies emphasise educators' familiarity with technology (e.g. Yang et al., 2019; Olt, 2018; Zydney et al., 2019), this study highlights the importance of educational therapists understanding their students' abilities and utilising familiar tools and resources to ensure students navigate online resources without difficulty. Therefore, integrating online tools frequently in physical classes can prepare students for remote learning.

Thirdly, educational therapists should adapt and practice flexibility by tailoring their planning and execution of BSLE to accommodate students' learning needs. One key consideration is minimising cognitive load for remote students by reducing typing activities, especially considering that students with dyslexia often have poor working memory (Kizilaslan and Tunagur, 2021; Menghini et al., 2011). Thus, demanding tasks on working memory such as navigating online learning platforms and following instructions simultaneously could potentially impact their learning.

Lastly, the study emphasises the invaluable support from students' parents and the Dyslexia Association of Singapore (DAS) for educational therapists. Evidence shows that parental involvement in students' online learning is crucial (Black, 2009), especially in providing an ideal learning environment and resources (Lawrence and Fakuade, 2021). Educational therapists have frequently cited a lack of control as a major factor affecting their intervention with remote students. Therefore, relying on parents could alleviate this strain and help with monitoring students' at-home learning.

Furthermore, educational therapists suggest that DAS could further support them through training opportunities, equipping them with the skills to confidently implement BSLE. Similarly, Gacs et al. (2020) recommend that educators receive sufficient time to create online lessons of good quality and have the opportunity to undergo training to enhance their skills. Hence, with support from training opportunities and sufficient time for lesson preparations, it could substantially alleviate stress, potentially enhancing the emotional well-being of educational therapists implementing BSLE.

## LIMITATIONS AND SUGGESTIONS FOR FUTURE RESEARCH

The implementation of BSLE amidst the pandemic was not widespread among educational therapists at the time of the study. Consequently, the data collected depended on the ability of educational therapists to recollect experiences from the previous year. To address this constraint, interview questions were meticulously formulated to facilitate memory recall. Moreover, the limited sample size in the study hinders broad generalisation of the findings, particularly as only three educational therapists were interviewed from a potential pool of at least 140. Nevertheless, future investigations could gain from a more extensive and diverse sample group, encompassing various stakeholders like students and educational institutions, to offer a comprehensive outlook on students' encounters and the enduring impacts of BSLE on their intervention. Additionally, exploring the suitability of DAS training programs and resources, and assessing the influence of parental assistance in BSLE implementation for remote learners, are crucial for grasping the complete context and efficacy of this instructional approach. Furthermore, engaging in lesson observations could yield valuable insights into lesson delivery and challenges, thereby augmenting the depth and quality of forthcoming studies.

## CONCLUSION

This study explores the perspectives and experiences of educational therapists who implemented BSLE, with a focus on the challenges, opportunities, and potential improvement strategies. The findings offer valuable insights into current BSLE research, particularly from a SEN perspective. Through qualitative analysis, it is evident that BSLE presents both benefits and challenges. The challenges primarily revolve around technological obstacles, access to online resources, lesson delivery, and student engagement. Despite these hurdles, remote students enjoyed advantages such as flexible learning, convenience, and ongoing support during the pandemic. However, the adoption of BSLE also increased the workload for educational therapists, leading to negative impacts as they grappled with implementation and associated emotions. Nonetheless, the study identifies strategies to enhance BSLE. Tailoring technology and online resources to students' age, ability, and class size could alleviate challenges for both therapists and students. Additionally, adaptability and flexibility are crucial qualities for therapists, while parental support in creating a conducive learning environment and receiving professional training for BSLE implementation are seen as essential elements for improvement. The identified benefits, challenges, and recommendations for BSLE could have broader implications for the field of online education, influencing instructional design, teacher training, and policy-making.

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## APPENDIX—INTERVIEW QUESTIONS

| NO | INTERVIEW QUESTIONS |
|---|---|
| 1 | Please share your teaching background. |
| 2 | Share with me some preparations required to plan and deliver a dual-mode class? |
| 3 | Share with me some resources or tools that you used for dyslexic learners and why?<br>A. Which tools or resources were effective or not effective? |
| 4 | How did you adapt your lesson materials or lesson delivery to cater to the learning needs of dyslexic learners?<br>A. Application of Orton-Gillingham principles |
| 5 | How has the teaching and learning process been impacted by dual-mode teaching?<br>A. Students' ability to fully participate in a dual mode class |
| 6 | Share with me some significant areas of challenges that you or your students faced in a dual-mode class?<br>A. How did you address these challenges? |
| 7 | Share with me your students' motivation and engagement level during a dual-mode class |
| 8 | In your opinion, what strategies are key for implementing a successful dual-mode class? |
| 9 | Tell me about your learning experiences from adopting dual-mode teaching in the classrooms.<br>A. Share your perceived advantages or disadvantages of dual-mode teaching based on your own experiences |
| 10 | How can the implementation of dual-mode teaching be improved for future practices? |
| 11 | Would you like to share anything else about dual-mode teaching before we end the interview? |