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An exploration of the perspectives of students with dyslexia regarding the factors that affect their learning

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1. Dyslexia Association of Singapore

Abstract

The Main Literacy Programme (MLP) at the Dyslexia Association of Singapore (DAS) offers a comprehensive curriculum for dyslexic students (Dyslexia Association of Singapore, 2022). However, some students may show better progress in the DAS than in schools. The present study explored the different contributing factors that affect learning in dyslexic students and their perceptions on the impact that these factors have in their learning. Semi-structured interviews were conducted with 6 participants (aged 14 -15) who are currently receiving intervention from the DAS. Thematic analysis of the results generated three themes: factors which are helpful to learning, factors which are barriers to learning, and factors which do not affect learning. Recommendations are made to encourage service providers to review and improve on their interventions, as well as encourage educators, parents and students to talk about these factors openly at the end of each term to help these students reach their truest potential. The findings have implications for dyslexia worldwide, to achieve more dialogue around effective outcomes for learning.

Keywords: Dyslexia, Children's Perspectives, Challenges, Dyslexia and Learning, Dyslexic Students, Factors Influencing Learning

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INTRODUCTION

Learning is natural for most students, but some require more effort and time to acquire skills and knowledge (Maurer-Smolder, Hunt & Parker, 2021). In Singapore, as in many other countries, they are often pulled out from their classrooms to attend additional remediation or interventions to help them keep up with the school's curriculum (Shaywitz, Morris & Shaywitz, 2008). They are often identified as having additional learning needs (ALN) with dyslexia being the most common learning disability (Kesherim, 2023).

Good spelling skills are crucial for forming other literacy skills (Treiman et al., 2019). In Singapore, primary students have to study and memorise words for weekly spelling tests (Nanavati, 2015) and students struggling with literacy are required to attend the Learning Support Programme (LSP) or School-based Dyslexia Remediation (SDR) (Toh, 2018) to improve their skills. Those needing more support may enrol themselves in specialized remediation.

The Main Literacy Programme (MLP) at the Dyslexia Association of Singapore (DAS) provides a comprehensive curriculum for dyslexic students which includes phonemic awareness, phonics, reading fluency, reading comprehension, language and vocabulary and writing (DAS, 2022). This aligns with the five elements identified by the National Reading Panel for an effective reading instruction (Rep. Natl. Reading Panel, 2000). Furthermore, Shaywitz, Morris and Shaywitz (2008) mentioned that interventions focusing on these areas are more effective than those focusing on only one.

Studies on the effectiveness of classroom interventions (Adams & Carnine, 2003; Foorman et al, 1998; Fuchs & Fuch, 2005), pullout remedial approaches (Blachman, 1997; D'Agostino & Murphy, 2004; Torgesen et al., 1999; Vellutino et al., 2006) and combinations of both (O'Connor, 2000; Simmons et al, 2003; Vaughn et al, 2003) found that interventions focusing on phonemic awareness, phonics and vocabulary improve core reading skills and lower the probability of students with reading difficulties by 5%. For older students, metacognitive strategies must be included to bring about an effective intervention (Sercenia et al., 2023; Yong et al., 2020).

AIMS OF RESEARCH

As students enrol themselves in higher institutions, they focus more on achieving the best grades in subjects instead of mastering new skills which might be more relevant to their careers (Brilleslyper et al, 2012; Jacobs et al, 2014; Pippin, 2014). Grades are crucial for students' success (Tocci, 2010; Schneider & Hutt, 2013; Schinske & Tanner, 2014; Higher Education Academy, 2015) but the pursuit of them can also lead to stress and diminish the learner's joy if they continue to keep getting grades which fall below their expectations (Dahlgren et al., 2009; Demirel, 2009; Tippin, Lafreniere & Page, 2012). Therefore, if having a grading system results in more stress than joy (Xiao et al., 2023), it

is worth exploring the views of students as to the impact of such stress and how it might be diminished in their learning experience.

Furthermore, experience shows that students learn differently in different environments (Lowyck, 2004), leading some parents to question why their children show better progress in the DAS than in schools. It is important to investigate whether students show improvement after attending interventions, why they consider those interventions to be effective, and whether learning and progress should be solely associated with grades and examinations.

Learners, teachers, educational therapists (EdTs) and parents need to truly understand the factors that may coexist to either support or impede learning as not every student will respond positively to the same type of interventions (O'Brien et al., 2023).

Therefore, this research aims to explore factors affecting learning based on dyslexic students' perspectives. Most of the existing studies focus on parents', teachers' and dyslexic adults' perspectives (Csizer, Kormos & Sarkadi, 2010; Goodacre & Sumner, 2020; Carroll & Iles, 2006) which may not accurately represent the struggles faced by dyslexic students (aged 13 to 17) in learning.

Research Questions

The two research questions for this investigation are

1. What are the different contributing factors according to existing research that may affect learning in dyslexic students?
2. What are the students' perceptions on the impact these factors have in their learning?

The different contributing factors will be identified by exploring students' perceptions of what they perceive the contributing factors to be. The findings could enhance existing intervention programmes by considering children's voices. It could also help to create more awareness in educators and parents about the factors that need to be addressed to support students' learning. It hopes to encourage educators and parents to hear students' voices and thereafter, consider the different lessons that they can take from it.

LITERATURE REVIEW

What is dyslexia?

Dyslexia is a contested term. Lopes et al (2020) analysed eight hundred peer reviewed journal articles published over the last 20 years. They found that most researchers identified persons with dyslexia as having a lower-than-average intelligence quotient (IQ)

even though this criterion alone is inadequate to prove that an individual has dyslexia (Beaujean et al., 2018). In fact, most researchers have debunked the myth that dyslexia and IQ are connected (Tanaka et al., 2011; Ferrer et al., 2010). Peterson and Pennington (2015) mentioned that it has often been assumed that IQ determines academic achievement. Hence, students with low IQ are thought to be poor readers. Wadsworth et al. (2010) however, found that genetic differences contribute more to high-IQ dyslexic children as compared to low-IQ dyslexic children. Additionally, Friend et al. (2008) found that dyslexia tends to be more genetically based in children from high socio-economic status (SES). These studies therefore, suggest that even with high IQ, dyslexic children may still struggle with reading while showing better progress in other areas due to the ease of accessibility to resources in which dyslexic children from low SES may not have access to.

Zhou (2023) suggested that there are four factors that cause dyslexia: (1) neurological and genetic; (2) cognitive; (3) environmental and finally (4) cultural. It is believed that dyslexia may be caused by irregularities in the brain (Ramus, 2003), impairment in the cognitive ability to correlate letters to sounds (Stoodley & Stein, 2012), substance abuse and complications during pregnancy (Wajuihian & Naidoo, 2011), as well as differences in languages and diagnostic procedures (Maunsell, 2020). This suggests that dyslexia can be caused by many factors and to depend on only one factor to diagnose an individual with dyslexia is insufficient. A study conducted by Faudzi and Cheng (2022) on 99 teachers from different teacher training institutions in Malaysia even found that a majority of the teachers were not familiar with the symptoms and interventions for dyslexia. Most of them were not even trained in providing proper interventions for this group of students.

Furthermore, Reid (2011) suggested that no two students with dyslexia display the same characteristics. Flecher et al. (2007) further supported this by suggesting that the term 'dyslexia' is difficult to define due to two reasons: 'dyslexia' is a condition that exists within a person, thus making it an unobservable condition and 'dyslexia' is dimensional in that it exists on a continuum, ranging from mild to severe.

Even the Diagnostic and Statistical Manual of Mental Disorder, 5th edition, (DSM-5) definition of 'dyslexia' has been criticized. The DSM-5 defines 'dyslexia' as a "difficulty in mastering the relationship between the spelling patterns of words and their pronunciations" (Snowling & Hulme, 2012). The DSM-5 further suggests that children with dyslexia read aloud inaccurately and slowly, and they make spelling mistakes due to the weakness in phonological processing skills (Snowling & Hulme, 2012). However, Snowling and Hulme (2012) argued that the failure to include reading comprehension as part of the definition has failed to acknowledge that children with dyslexia are facing difficulties in this component. This has brought about a challenge in diagnosing any individual with dyslexia as well as creating a holistic intervention that focuses on all the important components.

Finally, the DAS defines dyslexia as “a type of specific learning difficulty identifiable as a developmental difficulty of language learning and cognition. It is a learning difficulty that primarily affects the skills involved in accurate and fluent word reading and spelling.” (DAS, 2019).

How does dyslexia affect learning?

Some dyslexic children struggle with word recall (Al-Lamki, 2012) due to poor working memory (Kaluyu & Ooko, 2016), with some displaying letter reversals and reading words backward (Zhou, 2023). This makes it difficult for them to read and comprehend passages, and they struggle with processing and remembering concepts. These challenges lead to delays in learning (Kaluyu & Ooko, 2016), low academic grades and high drop-out rates in school (Tops et al., 2012). In Singapore, it was found that educational experience for entrepreneurs with dyslexia was negative especially during their primary and secondary school education such as obtaining low academic grades and getting bullied due to their results which eventually leads to some of them giving up in their studies (Hewes, 2020).

Factors that affect learning in individuals with dyslexia

Individuals interact with various environments and are exposed to coexisting factors that either support or impede learning. The key factors identified in the literature are explored in turn below although it should be remembered that no two students are the same so the presence and impact of such factors will vary, sometimes greatly.

The first factor is the type of reading materials. To encourage dyslexic students to read early, it is important to use relatable reading materials that align with their personal interests (Nur et al., 2022) or experiences (Hadhrami et al., 2022). This approach helps them to quickly identify unfamiliar words due to their developed schema (Fink, 1995). Dyslexic adults can recognise unfamiliar words as accurately as those without dyslexia as long as there is context (Lefley & Pennington, 1991).

The second factor is the level of self-esteem. Negative experiences can bring about anxiety in dyslexic individuals (Csizer, Kormos & Sarkadi, 2010; Goodacre & Sumner, 2020; Carroll & Iles, 2006; Haft et al., 2019). Haft et al.'s (2019) study which compares the level of anxiety and attentional biases in dyslexic children (aged 9 to 16) and typically developing children found that dyslexic children avoid reading task due to difficulties, thus increasing their anxiety. Together with their sensitivity towards the feedback received from others, this may affect their self-esteem. This can lead to a vicious cycle where difficulties lead to an increase in anxiety, coupled with avoidance in attempting tasks which may cause stress and decreased motivation (Csizér, Kormos & Sarkadi, 2010; Łodygowska, Chęć & Samochoweic, 2017) especially in students who do not go through any intervention. Additionally, dyslexic students often have low self-concept (Csizér,

Kormos & Sarkadi, 2010; Pitt & Soni, 2018; Burden & Burdett, 2005; Zisimopoulos & Galanaki, 2009; Goodacre & Sumner, 2020) which is a combination of perceived competence and reflecting their difficulties in making progress without support.

The third factor is motivation. Wang, Chen and Solheim (2020) found that intrinsic motivation, such as perceived control, ease of use and usefulness of learning platforms is crucial for dyslexic students to engage in e-learning. They suggest that students should have the freedom to choose and progress at their own pace. The platforms should be easy for students to access and use, and the acquired knowledge and skills should be transferrable to other subjects. Under extrinsic motivation, Wang, Chen and Solheim (2020) found that attitude towards learning plays an important role in ensuring that students remain engaged in learning. As mentioned above, negative experiences can lead to students avoiding reading and writing tasks due to low levels of motivation and high levels of anxiety. This may create disengagement and boredom, as it might take them a longer time to show improvement in their progress.

The fourth factor is perceived support from family and teachers. While dyslexic students may receive significant support from their families and teachers, it does not necessarily mean that it is enough (Nalavany & Carawan, 2011). The perception of support varies, with some viewing it as 'being cared for' while others see it as 'being provided assistance from others'. (Turner, Frankel & Levin, 1983; Turner, Sorenson & Turner, 2000). A study by Nalavany and Carawan (2011) found that family or social support should be provided throughout childhood to early adulthood, as positive emotions experienced by dyslexic adults and the support provided can improve their self-esteem.

Csizer, Kormos and Sarkadi (2010) conducted interviews with fifteen Hungarian students to understand their language learning experiences to help educational institutions develop effective instructional programmes. They found that dyslexic students are often exempted from taking a second language, often the English Language, without being provided with adequate support to help them overcome their challenges. This affects their opportunities to enrol in universities and secure better careers. Another study conducted by Moriña (2019) on university dyslexic students, the importance of teachers building rapport with students outside of the classrooms was emphasized by asking about their personal lives such as simply asking them about their days.

Rappolt-Schlichtmann, Boucher and Evans (2018) conducted a focused literature review that included the strategies for Universal Design of Learning. They concluded that intervention programmes should focus on students' strengths to achieve academic success. They believed that defining dyslexic students by their deficits, prevents them from developing their strengths and therefore, prevents them from being successful.

Finally, dyslexic students may exhibit dispositional perfectionism (Stoeber & Rountree, 2020) which is characterised by having exceedingly high standards that are difficult to

meet (Stoeber, 2018b). These students exhibit a high level of self-stigmatization and maladaptive coping. Negative experiences such as poor academic achievement and unsupportive parents and educators, can lead to low open-mindedness, agreeableness and conscientiousness in students with dyslexia (Gagliano et al., 2014) leading to the feeling of helplessness and lack of self-worth. However, long-term research has not been conducted to determine whether this change in personality will further affect learning in these readers. Tops et al.'s (2013) study found that there is no difference in personality traits in adults with and without dyslexia.

Summary of factors that influence learning

- ◆ Type of reading materials
- ◆ Level of self-esteem
- ◆ Motivation
- ◆ Perceived support from family and teachers
- ◆ Dispositional perfectionism personality

Present study

Previous studies demonstrated that individuals with dyslexia are affected by different factors. This study hopes to understand the perceptions of school students in the Singaporean context as to how different contributing factors have influenced their learning and hopefully help to improve the current intervention by considering children's voices.

METHODOLOGY

Introduction to research

Research was undertaken to (a) identify the different contributing factors that may affect learning in dyslexic students and (b) understand students' perceptions on the impact that these factors may have on their learning. The research aimed to identify additional factors in existing studies and understand the perspectives of students aged 13 to 17 on learning.

Design

This study utilized a qualitative research approach to investigate the factors influencing learning in dyslexic students and their perspectives on them. This allows room for exploration (Alchemer, 2010) and provides us with a deeper understanding on how people perceive their social realities which affect their behaviours (Mcleod, 2023).

This research followed the abbreviated approach of the grounded theory in which the data collected were analysed using thematic analysis. Thematic analysis was more

relevant as there was no return to the field for data collection or coding processes. Thematic analysis was guided by the steps as outlined by Braun and Clarke (2006) which include (1) familiarisation with the data, (2) generate initial codes, (3) search for themes, (4) review themes, (5) define and name themes and (6) produce report.

Pool and Ansems (2022) suggest that thematic analysis provides the foundation when it comes to analysing data in any qualitative research including grounded theory. The main tenet of grounded theory: "social phenomena can be explored and understood by using a research process that is led and guided by participant experiences, resulting in a coherent theory that reveals and explains patterns reflected in those experiences" (Glaser & Strauss, 1967) was not violated.

Participants

Seven participants from the DAS agreed to participate in the research. However, due to sickness and hectic schedule, one participant decided to withdraw. They were diagnosed with dyslexia by the DAS SpLD Assessment Services (SAS) or by external specialists and had been attending MLP for at least 6 months. Table 1 shows the background of participants.

Table 1. Participants' Background

Participant	Age	Gender	School (Stream)	Receive Bursary	Months in MLP	Are parents working?
A	14	M	S2NT	Yes	53	Yes (both)
B	15	F	Y3	Yes	40	Yes (both)
D	15	M	S3NT	No	49	Yes (both)
E	14	M	S2NA	No	16	Yes (both)
F	15	F	S3NT	No	57	Yes (both)
G	14	F	S2NA	No	77	Yes (father)

Key: Gender (M-Male, F-Female)
 School (Stream):
 S2NA (Secondary 2 Normal Academic)
 S2NT (Secondary 2 Normal Technical)
 S3NT (Secondary 3 Normal Technical)
 Y3 (Year 3)

Participants below the age of 12 were not included as they may not have developed adequate comprehension skills to be able to understand the tasks assigned and the questions asked (Zisimopoulos & Galanaki, 2009). For each participant, only one face-to-face semi-structured interview session was conducted, and all participants together with their parents gave permission for their responses to be used in this research. As compared to other participants who attend normal schools which follow the normal school curriculum, Participant B attends a technical school in which students are equipped with hands-on vocational education which includes Institute of Technical Education (ITE) Skills Subjects such as Culinary and Restaurant Operation (CRO) and Mobile Web Applications (MWA) (MOE, 2024).

Ethical Considerations

Research involving children may usually give rise to power disparities and dynamics (Gallagher, 2008 & Holland et. al., 2010). Children may view researchers as authoritative and provide appropriate responses to please the researchers (Einarsdóttir, 2007). Lane et. al. (2009) emphasized the importance of not assuming that rapport between participants and researchers has been established.

To reduce social desirability bias,

1. participants were informed that their responses were crucial in helping parents and educators understand their strengths and struggles in learning,
2. interview session was conducted in a familiar environment (DAS Bishan Learning Centre classroom),
3. pseudonyms were used to replace their names and
4. interview questions were first vetted by the Faculty Research Ethics Committee at University of South Wales (USW) and the DAS Research Committee.

This research was also guided by the commitments listed by the International Charter for Ethical Research Involving Children (Graham et al., 2015). Participants were informed that they could choose not to answer any question that might cause discomfort. Constant check-ins were carried out throughout the interview to ensure that participants were comfortable to move forward with the remaining questions. Debrief was conducted at the end of the interview session.

Pilot Study

Castillo-Montoya (2016) emphasized that pilot studies help researchers to identify the flaws and limitations in the interview design. She further explained that this would allow researchers to make any modifications to the interview questions. Majid et al. (2017) also believes that this will help researchers to prepare themselves for the main study by practicing their interviewing skills. Therefore, a pilot study was conducted to ensure that

questions asked would not trigger any discomfort to the participants and that the questions were valid for the purposes of the study. This is important so that participants would be willing to share their responses openly with a calm mind, thus generating better research outcome. Two participants went through a 20 minute face-to-face semi-structured interview, 3 weeks before the main study. The procedure for this was the same as the main study.

Data collected were analysed using thematic analysis. It was found that the questions set for the interview were relevant and appropriate. Some minor changes were made to the interview questions in which there would be a follow-up question, "Do you think that this affects your learning?" to the following questions: (1) Do you get nervous when you have to complete certain assignments or work? and (2) Do you get anxious before, during or after a test or an examination?

Procedures and materials

Convenience sampling was carried out in which emails were sent to EdTs from DAS Bishan Learning Centre to explain what the study was about and to ask them to assist in the recommendations of students to participate in the study. These were followed up with further emails with information sheets and consent forms attached which were sent out to parents whose children fit into the above age group. Parents and children who expressed their interest to participate were contacted via phone call, Microsoft Teams or face-to-face to provide them with opportunities to ask any questions that they might have before giving their consent. In order to participate, children and parents should state their agreement to participate and give their consent. Participants were informed of their rights to withdraw from the study at any time. They were also informed that pseudonyms would be used to replace their names and their responses would be encrypted with passwords to ensure confidentiality and anonymity.

Schedules for the 20-minute one-to-one interview sessions were arranged with the participants. Semi-structured interviews allow us to understand participants' experiences better through conversation (Ruslin et al., 2022) as it allows room for new questions to emerge during the interview as a follow-up to the participants' responses. Each participant received the interview questions a week before their scheduled interview session to give them ample time to prepare their answers. During this period, they were allowed to clarify their doubts.

On the day of the interview session, participants were reminded that they have the right to not answer any question that might cause discomfort and it would not put them at any disadvantage or have any impact on them as students with the DAS. Each interview session was conducted face-to-face at DAS Bishan Learning Centre classroom. It was audiotaped and transcribed. Participants checked the accuracy of the transcripts before they were analysed.

Semi-structured interview questions

Participants answered a total of 25 questions. The 17 open-ended questions began with questioning participants about their own definition of 'learning' to understand whether they associate learning with just the academic domain. Participants were asked to share and elaborate on factors that have helped to make learning easier or challenging for them. It then went on to trying to understand how the DAS and schools have helped and supported them in their learning and what else can be improved to help them in their learning further. Questions were set to understand their perspectives on how dyslexia has either helped or impeded their learning. Participants were also asked to think about the way that concepts were taught or presented in different subjects and share their views on this. These questions also asked participants for the kind of support that they had received and hope to receive.

Participants were asked to define what 'success' means to them. They were given the opportunity to share what they hope others will know about them which include their emotions, mental well-being and thoughts with regards to their strengths and weaknesses. Finally, participants were told to consider whose expectations matter the most and whether being given the opportunity to set their own expectations will help them in their learning.

Finally, the 8 close-ended questions focused on what matters to the participants when they received back their results, their perceptions on who they found as more approachable and was able to understand them better. These questions also focused on their feelings before, during and after an examination as well as when they have to complete certain assignments and tasks.

RESULTS

Thematic analysis of the interviews generated three overarching themes:

1. factors which are helpful to learning,
2. factors which are barriers to learning and
3. factors which do not affect learning.

1. Factors which are helpful to learning

1a. High aptitude

Most participants defined learning as the acquisition of new knowledge, skills and experiences from teachers:

"Learning means to take in knowledge that my teachers teach me." (Participant G);

"And education to get knowledge." (Participant E).

When prompted, only three participants defined learning as the acquisition of skills in the non-academic domain which includes daily activities:

"Yes ... Like learn how to wash your clothes, do the dishes and all those." (Participant G)

Four participants considered learning to be beneficial for their future, both financially and socially. For example.

"It helps you earn money in a way." (Participant A);

"Can have more options in the future." (Participant E).

Learning has helped Participant F build her confidence and improve her abilities:

"make you more confident in that topic, helps me to study better." (Participant F).

Two participants believed that dyslexic students learn things differently and they are smarter:

"They say I have a computer in my brain. It's just that I'm different in a good way." (Participant G).

1b. Good learning attitude and behaviour

Participant D believed that without determination, students may not have the willingness to attempt assignments or concentrate during lessons which may affect their examinations:

"If your learning attitude is not there, you won't like want to do the work that is given to you or concentrate in class. Then when the exam come, you won't know how to do it." (Participant D).

Participant F remained positive during the examination period:

"When you think that you will pass, then you might actually pass if you study for it." (Participant F).

Participant A suggested on learning from mistakes:

"if I make a mistake, I just learn from it." (Participant A).

Three participants believed in perseverance:

"Like at first they are like cannot make it at all but then they slowly slowly do then after that they become successful." (Participant B).

Two participants took the initiative to ask their teachers for help:

"Like if I don't know how to spell a word right, I will ask them for help." (Participant B);

"If I don't understand, I go to tuition to ask them" (Participant D).

1c. Supportive social environment

Participants would want to be given the opportunity to choose which subjects to focus on after being exposed to all subjects:

"I think ya you should have a choice." (Participant D);

"Some subjects I really don't need them in my future. It's useless." (Participant G);

"Just take. After that if you cannot do, then you don't do." (Participant B).

Most students felt that it is important to set realistic expectations:

"It's achievable and like cause everybody learns at their own pace so I can set like my goals at my own pace." (Participant D);

"Like Chinese, I always fail but then I got improve so my teacher and parents are very proud of me." (Participant G).

Two participants set higher expectations for themselves so that they would put in more effort:

"the higher the expectation, the more hardworking I will be." (Participant G).

Additionally, teachers should have the ability to teach and help students:

"The teacher will know how to teach properly" (Participant B);

"Or more better teachers that can understand me and help me." (Participant G).

Participant D found it easier to understand the concepts taught if he understands what his teachers are saying:

"If you understand whatever the teacher is saying then ya it's easier." (Participant D).

Participant G found her non-DAS tuition teachers approachable due to the good support that they provide:

"The teachers are really nice. They give free consultations whenever I need them and they are understanding of me." (Participant G).

Participant D's tuition teacher helped him understand concepts covered in school:

"I think they will help us in understanding the topics that school covers and if I don't understand, I go to tuition to ask them." (Participant D).

Five participants perceived that they received good support from DAS teachers.

Participant G found the lessons fun and engaging:

"It's fun and engaging." (Participant G).

Participants found that the DAS has helped to improve their grades, reading abilities and understanding of words:

"It moves my grade higher." (Participant B);

"Help me understand the words better like reading difficult words." (Participant E).

Participant E perceived that he received good support from his school teacher in the form of remedial lessons:

“Having remedial lessons.” (Participant E).

Participant D found that it was better to approach teachers as they are more knowledgeable in the subject matter:

“Teacher, I think they know more, like the specific things you want to ask them and they can answer to you.” (Participant D).

Most participants perceived dyslexic friends to be supportive as they are non-judgemental:

“You will not get judged easily because a lot of people I know, they are dyslexic also.” (Participant F).

Participant D and B felt that friends were able to understand them as they spent most of the time with them:

“friends are like the people you spend most time with and you feel comfortable going to them” (Participant D);

“Friends like they are close to you enough to just share about things.” (Participant B).

1d. Supportive learning environment

When asked to choose two easiest subjects, participants chose subjects with concepts and contents that are easy for them to understand such as English, Mathematics, Science and Literature.

Participant B learned and understood concepts better when they were being taught by topics:

“The teacher will go by topic by topic.” (Participant B).

Furthermore, eleven strategies were found to be helpful:

1. revise consistently,
2. repetition,
3. less memory work,
4. direct and simpler strategy,
5. exposure to similar questions,
6. transferrable knowledge,
7. setting different expectations for each student,
8. implementing different coping strategies,
9. breaking down of concepts,
10. providing examples and,
11. encouraging independence.

Two participants believed in the importance of practice and revision:

"Erm, I try studying for like 1 hour." (Participant A);

"Do my own practice." (Participant E).

Participant F found repetition helps in memorising of concepts:

"When we did the question and then they may repeat the solutions and make it like more easier by memorising." (Participant F).

Participant E, however, felt that he could learn better when the subject involves less memory work:

Researcher: *"Okay, but it (literature) requires a lot of memory work, right?"*

Participant E: *"No."*

Participants found that it is useful for teachers to expose students to direct and simpler methods and break them down into manageable chunks:

"they say like subject like this Math. Then they put it in a way that I can understand." (Participant A);

"If they somehow find an easy, a slightly easier method to teach." (Participant F);

"Like they break it down for me and give examples." (Participant G).

Additionally, two participants felt that being exposed to similar question types will help them to answer such questions easily.

Participant F also believed that concepts learned in learning centres should be transferrable to the school context. Participant F believed that teachers should set different expectations for each student:

"At least set a motivation for each student." (Participant F).

Three participants revealed that they had different coping strategies such as not revealing their diagnosis, ignoring people who judge them, listening to music and participating in sports:

"it's just no point of telling someone if it doesn't concern them anyway."

(Participant A);

"Ignore." (Participant F);

"It (music) makes me more focused." (Participant B);

"Why do you love PE?" (Researcher).

"I can release the stress, release the anger." (Participant B).

Participant D felt that teachers should encourage students to be independent in their learning:

"Like teachers help us to learn things by ourselves like this thing called SIL – Self-Initiated Learning." (Participant D).

Participants identified five teaching aids that are useful to their learning:

1. games,
2. electronic devices,
3. lesser worksheets,
4. hands-on activities, and
5. worksheets applicable to school's curriculum.

Three participants believed that learning through games would make the lesson fun and less boring.

Three participants preferred to use electronic devices such as laptops:

"Like more electronic related instead of worksheets every time" (Participant F).

Participant B explained that with the computer, there is less writing, and there is a spelling and grammar checker:

Participant B: *"Just no need to write so much, we can type."*

Researcher: *"Is it because computer helps you to like correct your spelling and mistakes and all?"*

Participant B: *<nodded>*

Two participants also found that they enjoyed learning when it involved hands-on activities:

"the other is like craft things." (Participant A);

"My school more hands-on." (Participant B).

Worksheets assigned at DAS should be applicable to the school's curriculum:

"Some of the worksheets is like similar to what I did in school." (Participant F).

Participants also preferred learning in such environment:

1. conducive class,
2. quiet class,
3. face-to-face lessons,
4. student's condition understood and,
5. fun and interactive.

Participant A preferred an air-conditioned classroom:

"If there is air-con, basically, it will be relaxing." (Participant A).

Participant B preferred to have music in the background:

"Music. It makes me more focused." (Participant B).

In contrast, Participant D preferred a quiet, face-to-face class:

"I think as long as it is quiet, face- to-face." (Participant D).

Participant G would like to be in classes where teachers could understand her condition:
“Or more better teachers that can understand me and help me.” (Participant G).

1e. Extrinsic motivation

External motivation specifically rewards has encouraged students to achieve the goals:
“If someone says if I were to do something, in return, I can get something back then I will just say, “Oh, okay, I’ll do it.” (Participant A);
“And then after that they can get a small prize if they reach their goal.”
(Participant F).

Participant F, however, also emphasized on the importance of being internally motivated even if she fails an examination:

Researcher: *“If you study very hard for something right, but then you fail, will your attitude change towards it?”*

Participant F: *“No because I’ve tried.”*

2. Factors which are barriers to learning

2a. Poor learning attitude and behaviour

Negative emotions may affect students’ mood for learning:
“Because if angry then no mood to do anything. Then sad, still don’t want to do because no mood.” (Participant B).

Participant D mentioned that laziness and inability to remain focused during lessons have affected his learning:

“Sometimes I will do it, sometimes I’m lazy to do it after school. Usually I doze off like think of something else.” (Participant D).

2b. Unsupportive learning environment

Four participants found it difficult to remember heavy content especially if there is no benefit in learning them:

“if there is a lot of subjects and topics and you have to like memorise everything that you have learned then when there’s a test, sometimes you might not remember” (Participant A);

“Cause they have a lot of topics and it’s very hard” (Participant F);

“It’s too hard and it’s kind of useless.” (Participant G).

Participant B found it unhelpful for teachers to add topics to the already existing curriculum:

“They will see how if they can teach finish one topic first or not. They will shift up to Sec 4.” (Participant B).

Four participants found certain concepts especially Chinese confusing and incomprehensible:

“I’m very bad in Chinese since young and I can’t remember the words. I can’t speak the words. I can’t read the words. I can’t write the words.” (Participant G);

“Because there is a lot of random lines. Some of the pronunciations are the same but they are a totally different word.” (Participant F).

Some participants felt that certain words, concepts or questions were difficult to understand:

“when you set the questions too difficult.” (Participant F);

“Long words ‘cause my brain cannot process.” (Participant G).

Three participants found that memorising too much content was unhelpful:

“some people cannot memorise too many things, at the same time forget other things.” (Participant E);

“Because there is a lot of topics and then they all have different solutions and different methods.” (Participant F).

Participant F found her teachers’ method confusing:

“Usually, they make me more confused.” (Participant F).

Additionally, two participants found it challenging to elaborate on their answers:

“It’s the way you phrase the answer.” (Participant E);

“‘cause you need to elaborate in writing. I’m bad in elaborating” (Participant D).

Participant F struggled to keep up due to the fast teaching speed:

“and it’s also hard to follow up.” (Participant F).

Participant G preferred worksheets to electronic devices due to the confusing functions:

“Not really cause they also use electronic devices and they are too heavy. I don’t want to bring them to school and it kind of confusing to use sometimes like making slides and google docs and all those. So I prefer tuition cause it’s all on paper.” (Participant G).

However, Participant F would want teachers to use fewer worksheets as she described her teacher as using too much textbook:

“More textbook and more SLS.” (Participant F).

Participants also preferred not to learn in the following environments:

1. boring and not interactive,
2. online lessons and,
3. noisy class.

Participant F found that having many students in her class was unhelpful as everyone learns at different speeds:

“also a lot of people. Some people learn in different speed. Some people already know how to do then some people still don’t know how to do.” (Participant F).

2c. Unsupportive social environment

Most participants perceived that they did not receive good support from their school teachers. Participant G assumed that her teachers did not understand her condition:

“Get better teachers that can understand my condition.” (Participant G).

Participant E found his teachers fierce and not approachable:

“Some teachers might be fierce.” (Participant E).

Two participants felt that teachers did not set aside time to meet before school ends:

“most of them are really free after school.” (Participant D).

Participants also felt that teachers only paid more attention to other students:

“They still pay attention but lesser.” (Participant B).

Participant F did not have good rapport with her teachers as she perceived her teachers as judgemental which made it awkward for her to ask for help:

“I don’t like the teachers there because it’s awkward.” (Participant D).

Participant F noted the consequences of having a dull and boring teacher:

“Because the teacher is too boring. Everyone all falls asleep in his lesson.”
(Participant F).

Participant B did not want teachers to skip topics and shift them to the next curriculum:

“Most of the teachers will jump topics. They will see how if they can teach finish one topic first or not. They will shift up to sec 4.” (Participant B).

Participant G mentioned that she was uninterested in what her teachers were saying:

“Because the things that they talk about is not what I’m interested in.”
(Participant G).

Two participants found that teachers have unrealistic teaching expectations:

“if there is a lot of subjects and topics and you have to like memorise everything that you have learned then when there’s a test, sometimes you might not remember.” (Participant A).

Participants perceived that they did not receive good support from their parents due to the huge age gap, strictness and their inability to guide them:

“Is it because of the age factor?” (Researcher)

“Ya.” (Participant E); “Strictness”. (Participant E);

“My parents didn’t finish school so I can’t really trust them and when I tell them things I learned, they will be like, “Oh, what is that? I didn’t learn that in secondary school.” (Participant G).

Only one participant perceived poor support received from friends as she perceived herself to be smarter than them:

“My friends are dumber than me. I’m normally the one that teach them.” (Participant G).

Most participants felt that parents set expectations that were unachievable which leads to stress:

“Cause like they will set it higher than mine and then I find it like stressful but if I set mine and I achieve mine, I will be like happier.” (Participant D).

Participants hoped that parents hear them out when setting expectations especially if they consistently fail the same subjects:

“Because they know I am bad at that subject. Ya, they know I never pass at that subject before and I still didn’t.” (Participant F).

2d. Motivation

Two participants found that praise would not encourage them to learn better:

Researcher: “Is giving praises enough? Like maybe you don’t get a prize right for example then you get a praise.”

Participant F: “No.”

2e. Low aptitude

Three participants felt that they were unable to read and spell as well as non- dyslexic students:

“I will be able to read better.” (Participant D);

“cannot spell a lot of words.” (Participant B).

Participant D felt that he learned slower and was unable to complete the paper on time due to his difficulty:

"I guess we learn slower. I cannot finish the paper because maybe I don't understand sometimes." (Participant D).

3. Factors which do not affect learning

3a. Negative emotions

The negative or neutral emotions felt by other participants did not affect their learning except for one participant who felt that panic during an examination might affect her ability to answer the questions:

"Panic. If it is something that I didn't learn, I might panic and everything will go downhill from there." (Participant G).

3b. Different school curriculum

Despite the differences in curriculum between normal schools and technical schools, such curriculums do not seem to affect their learning. Instead, their learning is affected by a combination of factors as discussed under 'Factors which are helpful to learning' and 'Factors which are barriers to learning'.

DISCUSSION

The current study explored children's perceptions of various factors influencing their learning. Participants' responses shed important light on helping educators and parents understand the factors that students found to be useful or not useful to their learning. Three themes were generated: factors which are helpful to learning, factors which are barriers to learning, and factors which do not affect learning. Below, results of the primary research are discussed in the light of findings analysed in the literature review section above.

This study found that positive learning attitudes such as determination, optimism and calmness, helps students stay engaged and less distracted, while a negative attitude can negatively impact their learning. This aligns with Wang, Chen and Solheim's (2020) research which suggests that learning attitude is crucial for student engagement. However, participants did not view learning attitude as part of external motivation. External motivation was viewed as receiving rewards from parents or teachers. Findings also suggest that goals should be set differently for each student as every student learns at a different pace. Participants also valued physical rewards more than verbal praise to reinforce their positive behaviour such as getting good grades or improved marks.

The study by Wang, Chen and Solheim (2020) found that students' intrinsic motivation in e-learning is influenced by perceived ease of use, usefulness and control. However, participants defined intrinsic motivation as their ability to acknowledge their effort regardless of their examination results. Furthermore, most participants preferred using electronic devices as there is less writing and they could use spelling and grammar checkers. However, some participants found such applications confusing. Additionally, some participants preferred face-to-face to online lessons as they were able to focus better.

The results also suggest that participants prefer to focus on subjects they excel in, rather than those they find less useful. This finding is new and should be taken into consideration when students select their subjects in Secondary three.

Findings also showed that some participants view dyslexia as a strength, while others view it as a weakness. Intervention should focus on their strengths instead of their weaknesses as suggested by Rappolt-Schlichtmann, Boucher and Evans (2018). Strategies such as consistent revision, repetition, using direct and simpler strategies, exposing students to similar questions, providing relevant examples, breaking down concepts and, implementing different coping strategies should be implemented in interventions. Strategies which focus on too much memory work and do not allow room for flexibility should be minimized. Most participants felt that they have poor cognitive functions due to poor working memory (Kaluyu & Ooko, 2016). This made it difficult for them to remember or recall concepts or suggested solutions.

Students who exhibit a perfectionism personality often set high expectations for themselves which are often impossible to meet, leading to anxiety and helplessness (Stoeber & Rountree, 2020). However, the current research shows that participants set high expectations so that they would put in effort in their revision. Negative or positive emotions felt during examinations did not affect their performance. Only one participant experienced this downward spiral effect due to her inability to answer questions that she did not study for. Hence, to prevent students from falling into this vicious cycle, good coping strategies should be introduced to help them manage stress (Csizér, Kormos and Sarkadi, 2010). Some of these strategies include hiding their dyslexia, ignoring those who judged them, listening to music for focus and participating in sports to release frustration.

Additionally, school teachers were often perceived as strict and busy. Participants often felt that they were lacking attention due to large class sizes. Building good rapport is important between teachers and students (Moriña, 2019) and teachers should not rush through teaching without considering students' learning difficulties. It was also not helpful for teachers to skip or add topics due to the struggle that they have in remembering information. Additionally, while participants understood that certain content could be confusing and incomprehensible, they valued teachers who assisted them in breaking down complex concepts. Nalavany and Carawan (2011) also suggest that while dyslexic

students may receive support from their families and teachers, it does not necessarily mean that the support is enough.

Similar to Fink (1995) who believed that students learn better when teachers use interesting materials, participants also preferred fun and interactive lessons which include games and hands-on activities. Despite that, most participants would still prefer a smaller class size and, a quiet and conducive learning environment.

Nevertheless, participants acknowledged the significance of good learning behaviour such as attentiveness, perseverance and, learning from mistakes. They believed that laziness and inattentiveness could make them less focused. Participants also understood that good study habits could lead to better opportunities such as a good salary and job. However, some participants believed that success extends beyond academic achievements.

It is also important to note that different participants viewed different factors as important. Therefore, it is recommended for service providers to look at these factors to help dyslexic students improve and succeed in both normal and technical schools.

Although a wealth of data has been considered here, it is important to acknowledge the limitations of this research. Firstly, participants were recruited from one service provider which is known for providing intervention to dyslexic students. It would be beneficial to consider participants from other service providers who may provide similar intervention. Secondly, the sample size was small and might not reflect the full dyslexic population. Future research could choose a wider pool of participants so that findings could be more generalised to a wider dyslexic population. However, due to the depth of qualitative research, it could also be argued that a larger sample size would not be needed.

A practical implication of the current research findings is to help educators and parents understand the underlying factors that affect learning in dyslexic students. Service providers should continue to review and improve the interventions that they provide based on students' voices. Having a supportive learning environment for dyslexic students is also recommended. Conferences for parents and educators should encourage the discussions of students' goals in both academic and non-academic domains. Termly discussion between parents, educators and students can help parents and educators understand the kind of support needed for students.

In conclusion, different learning environment such as learning centres, home and school, have resulted in the co-existence of multiple contributing factors which either help or impede learning in dyslexic students. Since a child's development is affected by the interaction between multiple layers of the surrounding environment (McLeod, 2023), it is therefore important for educators, parents and students to come together and discuss these factors so as to help these students reach their truest potential.

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