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Effectiveness of support for speech-writing and presentation skills for students with learning differences: Teachers and students perspectives

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1. Dyslexia Association of Singapore

Abstract

During the transition from upper secondary to tertiary education, developing effective study skills becomes a crucial skillset for efficient learning, especially so for dyslexic and struggling learners. Dyslexia, a formally diagnosed lifelong learning difference (Ramus et al., 2003), is a neurological condition that primarily impacts reading, writing, and spelling abilities. Struggling learners, on the other hand, have no formal diagnosis of learning difficulties and may face challenges in areas like foundational knowledge, attention, focus, emotional and behavioural regulation. Both groups need intervention when they transition to tertiary education to cope with the increasing demands and maximise their learning capabilities. This paper explores teachers' perspectives on speech-writing and presentation skills within the Dyslexia Association of Singapore's iStudySmart™ programme, which is an online and technology-aided programme that focuses on time management, prioritisation, planning, organisation, and tertiary-level writing and presentation skills for higher education learners. The programme employs the Universal Design for Learning framework, catering to diverse learning styles. Teachers apply the Orton-Gillingham principles for dyslexic learners, offering a diagnostic, prescriptive, cumulative, multi-sensory, and emotionally-sound learning environment. These versatile teaching methodologies allow students to select learning tools like relevant educational applications, videos, quizzes, and note-taking to attain their desired learning outcomes. Using these frameworks and principles, teachers assess students' progress through personalised and informal assessments, which are then woven into the learning materials and learning experience during the course of the programme. This paper also shows educators how technology-aided online learning, combined with personalised teacher intervention, enables dyslexic and struggling learners to self-monitor and attain their learning goals.

Keywords: executive function, higher education, dyslexia, specific learning difficulty, study skills, perspectives, online learning, special educational needs

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INTRODUCTION

In Singapore, there have been multiple pushes to support learners with special educational needs (SEN) or those who might learn differently and are struggling to cope with the demands in Institutes of Higher Learning (IHLs). The Ministry of Education (MOE) in Singapore has begun to inculcate a more inclusive society including its education system in light of all the challenges that students with SEN might face (Ministry of Education, Singapore, 2023)

There are more students identified earlier in pre-school, primary school and secondary school. These students can access specialist programmes and services such as the early intervention programme in pre-schools, and the school-based dyslexia remediation programme offered in mainstream schools by MOE to those diagnosed with dyslexia. In addition, students with dyslexia, including those without a formal diagnosis, can access educational therapy at the Dyslexia Association of Singapore (DAS).

For the general population of students in DAS, they are diagnosed with dyslexia. This learning difference affects 10 percent of the population of which 4 percent have dyslexia severe enough to warrant immediate intervention according to international prevalence rates. Similarly, based on prevalence rates reported by the European Dyslexia Association (n.d.), dyslexia occurs in every part of the world regardless of culture or language, and affects 9 to 12 percent of the population of which 2 to 4 percent of the population are severely affected.

Like other learning differences, even though individuals might learn compensatory strategies to overcome their learning challenges starting from a young age, it is a lifelong learning difference (Ramus et al., 2003). Cognitive challenges associated with dyslexia and other learning differences will continue into post-secondary education, also known as higher education, tertiary education, IHLs, and adulthood (Hatcher et al., 2002). Therefore, awareness, specialist support, and resources should continue to be made accessible to students with learning differences such as dyslexia even as they progress to be made accessible beyond secondary school.

In a recent study by Moats (2019) and Texas Academy Performance Report (Texas Education Agency, 2022), it was found that 5 to 17 percent of the student population in higher education will have dyslexia or some form of learning difficulty. However, only 2.9 percent was reported which means that the number of students struggling and experiencing difficulties are being under-identified and under-reported.

The Persistent Gaps in Singapore's Higher Education Landscape

Singapore's MOE aims to support post-secondary learners who have a diagnosis in IHLs and aims to support and provide guidance to students from pre-enrolment to graduation

(Ministry of Education, Singapore, 2023). However, the efforts remain inconsistent in different IHLs (Carlisle, 2022a; 2022b).

A study conducted in Singapore showed that participants who achieved a university education reported a positive tertiary learning experience (Hewes, 2020). Reasons include that they have become more mature, developed compensatory strategies, and learning has become much more manageable (Hewes, 2020). In addition, they also pursued subjects and specialisations about their interest and passion (West, 2014). However, while a group of students may have a positive experience, others may not. The issue with lifelong learning differences like dyslexia, is that it persists throughout one's lifetime and one might experience many difficulties. The issue of under-identification might also be widespread.

For some, compensatory strategies learned when younger might not be useful or sufficient to help one cope in a different situation such as the more demanding and rigorous academic landscape in the post-secondary or higher education landscape.

In other situations, as learners transition to higher learning, academic demands might increase; in contrast, specialist support, resources, and awareness may not. This may prove to be a struggle for those with learning differences (Dobson Waters & Torgerson, 2021; MacCullagh et al., 2017; Mortimore & Crozier, 2006; Olofsson et al., 2015; Pino & Mortari, 2014).

Therefore, the iStudySmart™ (iSS) programme was developed by DAS to support learners who learn differently, including those with dyslexia, in higher education.

The DAS's iStudySmart™ programme

iSS is a 20-week online learning programme to support tertiary students, and upper secondary students transitioning to tertiary education who learn differently, including those with dyslexia, to gain study skills, executive functioning skills, and life skills such as time management and prioritisation, planning and organisation, tertiary writing skills and presentation skills. The acquisition of these skills is particularly important especially at the tertiary level to help empower students with learning differences and struggling learners.

The first two modules, namely time management and prioritisation as well as planning and organisation, guide and teach learners to use computer and handphone related educational applications to manage their time effectively for school and/or work. Additionally, the tertiary writing module supports students on how to do their research effectively based on their research topic, evaluate the validity and reliability of sources, and cite and reference the sources used in their research, which can be applied to their own assignments and research projects in school. Lastly, developing good public speaking/presentation skills, i.e. being able to present confidently has become an

expectation at the tertiary level (Nash et al., 2016). Being able to express thoughts and ideas well are critical communication skills that are part of the 21st-century skill frameworks which help tertiary learners be in good stead when preparing to enter the workforce (Hunt et al., 2009). The programme culminates in a final presentation where learners present their chosen research topic to their fellow peers, teachers, and parents.

iSS is a combination of elearning on a learning management system (LMS) with customised Sharable Content Object Reference Model (SCORM) packages and online consultations for personalised coaching and mentoring. During elearning weeks, students access content material uploaded on the LMS at their own learning pace and convenience and complete their elearning assignment; while during the online consultation sessions, the teachers will touch base with the students to clarify doubts, check for understanding, and help the students catch up on their elearning assignments. At the same time, the teachers will work closely with the parents to make sure that the students have well-rounded support while on the programme. As the elearning and online consultation sessions are all online, the paper will use the term 'online learning' throughout the paper.

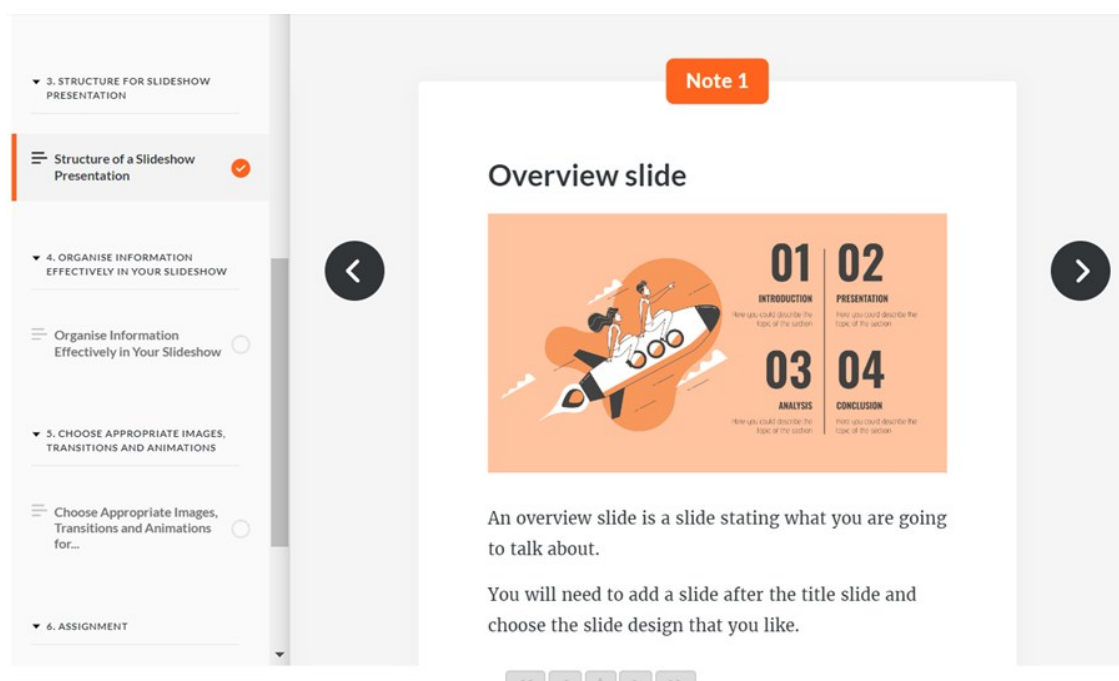


Figure 1: iStudySmart's SCORM package on the elearning platform

The pedagogical approaches that form the core of the iStudySmart™ programme, include multi-modalities and Orton-Gillingham (OG) teaching principles traditionally used in literacy instruction for learners with dyslexia (Gillingham & Stillman, 1997). The OG teaching principles include being direct and explicit, diagnostic and prescriptive, structured, sequential and cumulative (Gillingham & Stillman, 1997). In addition to the OG principles, Universal Design of Learning (UDL) is employed

Since the inception of the programme in 2019 till the end of 2022, 108 students who have varied learning profiles and learning needs have received specialist intervention on iStudySmart™. The majority of the students were from Institutes of Technical Education (ITEs) and Polytechnics and most of them have a dyslexia diagnosis. Some of them also have other co-occurring challenges which include speech and language impairment (SLI), Autism Spectrum Disorder (ASD), Attention Deficit Hyperactivity Disorder (ADHD), and Mild Intellectual Disability (MID) in addition to their dyslexia diagnosis. Further, the common learning challenges observed in most students include gaps in executive functioning skills i.e. poor time management, prioritisation and organisation skills, difficulties in communication, tertiary writing and presentation skills. For this paper, we have also included a learner - Student H, who was struggling in a local polytechnic but had yet to get a professional diagnosis on the nature of his needs. He was not diagnosed with dyslexia and showed difficulties with verbal expression and articulation. He struggled to speak in proper sentences by omitting words, using the wrong word, and making frequent grammatical errors.

LITERATURE REVIEW

As the amount of literature on teachers' perspectives on the effectiveness of such programmes is nascent, research was gathered on the considerations made for college readiness or transition programmes for learners with difficulties, diagnosed or undiagnosed.

Definition of Dyslexia

DAS adheres to the definition of dyslexia led by Rose's report (2009) from the United Kingdom, and the United States Department of Education Report on the Individuals with Disabilities Education Act (2011).

"Dyslexia is 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. Characteristic features of dyslexia are difficulties in phonological awareness, verbal memory and processing speed. Co-occurring difficulties may be seen in aspects of language, motor coordination, mental calculation, concentration and personal organisation, but these are not, by themselves, markers of dyslexia."

Dyslexia in IHLs

There is little literature and research on students with learning disabilities and how they are coping despite their increasing number in higher education settings (Carlisle, 2022a; 2022b; Heiman & Precel, 2003; Sparks & Lovett, 2009). This is especially true in the Singapore context (i.e. Carlisle, 2022a; 2022b). Despite this, we can gather that in IHLs, there are various factors that shape a struggling learner's experience.

Teacher perceptions or misconceptions of SEN may affect how students eventually get support on programmes (MacCullagh et al., 2017; Mortimore & Crozier, 2006; Olofsson et al., 2015; Peltier et al., 2022; Pino & Mortari, 2014). This may be why some students with learning challenges in higher education feel that they do not receive enough support (Dobson Waters & Torgerson, 2021; Griffin & Pollak, 2009).

Other challenges and difficulties that students may also face would be understanding course materials and the understanding and writing of complex text types that use a higher level of written language such as journal articles (Tops, et al., 2023), taking notes during lectures (Olofsson et al., 2012) and preparing for tests (Kirby et al., 2008). It may therefore, be important, for students to learn and master compensatory strategies which include study skills, time management skills and deep learning approaches (Kirby et al., 2008).

Writing

In addition to word reading and spelling difficulties that learners with dyslexia face, they also have difficulties with writing. Neuroimaging studies have shown that both reading and writing processes overlap similar regions in the brain (Pugh et al., 2006). Therefore, like reading comprehension, writing is also a complex process that involves translating ideas into writing and transcription skills (Hayes & Berninger, 2010).

According to a study by Mortimore and Crozier (2006), 62 out of 136 male students in a British tertiary setting, diagnosed with dyslexia, reported that they had difficulties in note-taking, organisation of essays, and expressing their ideas in the written form, as opposed to their counterparts without dyslexia. Their writing difficulties have persisted since they were in elementary school.

The writing difficulties are further explored in another study by Tops et al. (2013) when they compared the writing of 100 learners with dyslexia and another 100 learners without dyslexia studying in institutes of higher learning in Belgium. Students were reported to show that writing produced by learners with dyslexia had difficulties with structure and fluency. Therefore, both studies show that lecturers and tutors in tertiary institutions would need to provide more support to these struggling learners through remedial intervention.

Presentation skills (Oral and public speaking issues)

Other than the difficulties mentioned above, learners with dyslexia also have difficulties with oral and presentation skills. In a survey conducted of Singapore entrepreneurs, entrepreneurs with dyslexia reported lower levels of self-reported public speaking ability compared to their peers without dyslexia even though the scores for public speaking were still positive and above the midpoint score of 3, which is neutral. This scoring attribute may have been negatively impacted by their negative learning experiences and ongoing struggles with literacy. (Hewes, 2020).

Furthermore, oral presentations are commonplace in tertiary levels and workplaces and being able to present confidently and coherently has become an expectation (Wee & Abdullah, 2023). In a study on the utilisation of study skills support among 136 male students in 17 British higher education institutions in the United Kingdom, Mortimore and Crozier (2006) showed that 24% of the dyslexia group reported difficulties expressing ideas orally, compared with 10% of the comparison group (Stanton, 2019). As such, there is a need to teach oral presentation skills to students in the tertiary group who will be transitioning to the working world where such skills are indispensable.

Self-esteem and anxiety

Students with dyslexia alone or with other SEN also often struggle with self-esteem, anxiety, lower self-concept and behavioural issues. Humphrey and Mullins, as cited in Antonelli et al. (2014) states that "students with dyslexia experience significant challenges and difficulties with regard to self-esteem and self-perception". Bazen et al. (2022) also states that socio-emotional factors, such as coping skills and self-perceived literacy skills and environmental factors also have a stronger influence on the student's perceived consequence of dyslexia than their actual literacy abilities. These challenges are further reinforced by Zuppardo et al. (2023)'s study, which showed that students with dyslexia tended to show lower levels of self-esteem, higher levels of anxiety and more behavioural problems, compared to their counterparts with no dyslexia.

A literature review by Livingston et al. (2018) also outlines how dyslexia negatively affects their self-esteem, mental well-being, behavioral issues and social problems. Individuals diagnosed with dyslexia have primary consequences such as poor work and academic achievements, which in turn can lead to negative self-evaluation, poor self-esteem and self-concept. These affect their emotional well-being, behaviour and their social relationships. Klassen et al. (2011) and Livingston et al. (2018) found that anxiety and depression may continue from childhood into adulthood as language and academic skills are still important in adulthood. Additionally, individuals with dyslexia and poor self-efficacy in social skills may have trouble with making friends, and this also persists when they become adults (Carroll & Iles, 2006, as quoted by Livingston et al., 2018).

In a review done by Arts et al. (2022), adolescents with Developmental Language Disorders (DLD) are found to have more social anxiety and shyness as compared to their peers. They also struggle to form and maintain friendships, are at risk of being bullied and are at a higher risk of developing depression. These struggles are explained by Arts et al. (2022) that as adolescents with DLD have cognitive deficits and difficulty with social and inner dialogue (Vissers and Tomas, 2020), this language difficulty affects them such that they are not able to internalise beliefs and perspective of others in their social dialogue. They are also unable to regulate their behaviour based on their internal dialogue. This may result in them either not forming good friendships or causing them to encounter problems or have higher levels of hyperactivity. As such, it is more likely for them to feel isolated and misunderstood. This may result in them either not forming good friendships and/or causing them to encounter problems or have higher levels of hyperactivity.

All these factors conspire to make the demands of tertiary education especially challenging for students with special educational needs. In order to address these, iSS was developed, building on the principles below.

Pedagogical Approaches

Orton-Gillingham Principles

Previous research has demonstrated the efficacy of OG, which was a teaching approach specifically designed for students to significantly improve academic performance for those with dyslexia in areas such as reading and writing (e.g. Lim & Oei, 2015). The fundamental principles of OG primarily encompass multisensory techniques, diagnostic and prescriptive methods, cognitive strategies, structured, sequential, and cumulative instruction, as well as being emotionally sound (Rose & Zirkel, 2007).

Numerous studies have demonstrated the positive impact of OG on students not only with dyslexia but also with learners with other learning disabilities (e.g. Stebbings & Kline, 2020). Similarly, to assist students in overcoming learning obstacles, particularly dyslexia, numerous institutions, such as DAS, have adopted the OG principles not only into its English Main Literacy Programme (MLP), benefiting learners who learn differently, including individuals with dyslexia as well as those who are not formally diagnosed, but also in different programmes such as the Mathematics and Chinese programmes, and iSS (DAS, 2024).

Universal Design of Learning

Other than the OG principles, it is also critical that interventionists take into account the students' preferred ways to learn such as the Universal Design of Learning (UDL)

approach. As written by Johnson-Harris and Mundschenk (2014, p. 168), “UDL encompasses an effective approach to classroom procedures, ensuring that instruction is designed to be accessible to all potential learners”, including those with learning differences and those who are at risk of school failure.

In alignment with the UDL principles, students are provided with various choices to actively participate in the learning setting (CAST, 2020). This approach aims to motivate learners across diverse learning needs, including those with dyslexia or struggling learners, by sparking their interests and encouraging engagement in the learning process. Educators facilitate learning by removing learning obstacles, adjusting and adapting the curriculum to assist the educational progress of both students with and without learning disabilities (Nicholl et al., 2013).

In a meta-analysis done by Dewi and Dalimunthe (2019), it was found that UDL was applied across all kinds of subjects of studies, and even across different age groups. UDL helped students in kindergarten express themselves better (Mavrou, Charalampous, & Michaelides, 2013), allowed students on the Autism Spectrum with moderate to severe intellectual disabilities to better understand lesson materials (Knight et al., 2013). In addition, UDL was effective in increasing reading and student engagement for high school students (Hall et al., 2015).

Computer-mediated learning/online learning

The benefits of adopting suitable pedagogical approaches and principles for online delivery support for learners with learning challenges are captured in several studies. Students with dyslexia frequently utilise multimodal approaches and could thus find multi-sensory methods in learning beneficial. (Andreou & Vlachos, 2013). It was found that when educational content is presented in different modalities and forms, there was an activation of positive emotional and motivational states encouraging the processes of analyses and synthesis.

Such content presentation features include text video lectures, illustrative and cognitive graphics, mind maps, interactive visual schemes with drag-n-drop operations, educational clarification animation, interactive multimedia presentations, etc. (Rembach et al., 2019). By having flipped classrooms using e-learning as part of the online learning approach, students who are underachieving can help improve their motivation, learning attitude and engagement, which in turn allows them to learn more effectively (Al-Otaibi, 2017; Chou et al., 2021; Nouri, 2016; Cheng et al., 2020). The iSS modules incorporate a variety of learning methods including videos, interactive drag-and-drop quizzes and animation to deliver educational content.

Neurodiversity and Co-occurring difficulties

Executive Function

Smith-Spark and Gordon (2022) examined automaticity and executive abilities in dyslexics in a theoretical review. They found an impairment in the Supervisory Attentional System in the brains of those with dyslexia, hence leading to challenges with their working memory (Jeffries and Everatt, 2004), executive functioning (Booth, Boyle and Kelly, 2010), strategy use (Meltzer, 2012) and prospective memory (Khan, 2014). These challenges and the lack of automaticity – such as having to allocate attentional resources to otherwise automatic functions also lead to difficulties in adapting to new or unfamiliar cognitive tasks, and therefore, affecting problem-solving and decision-making abilities.

Rosello et al. (2020) studied the impact of persistent and remittent Attention Deficit Hyperactivity Disorder (ADHD) in adults. They found persistent ADHD severely impacts executive, behavioural, and functional impairments across life domains, highlighting the importance of continued monitoring and support of these individuals. For adults with ADHD in remission, the impact was more subtle, giving rise to problems related to attention and hyperactivity, and impulsive behaviours. The differences in impact highlights the complexity of ADHD symptoms in adulthood. Their findings show that there is a need for targeted intervention to address the diverse challenges faced by these individuals with ADHD. Townes et al. (2023), conducted a meta-analysis of various studies on ADHD and Autism Spectrum Disorder (ASD) children and adolescents, and found that there were no significant differences in executive function profiles between the ADHD and ASD groups. There were distinct differences as compared to typically developing individuals, highlighting the importance of tailored interventions and support strategies for the ADHD and ASD individuals.

Memory

Smith-Spark and Lewis (2023) note that dyslexia-related deficits in memory are likely to have a deleterious impact on life chances and life satisfaction. To find out more, they conducted research into the lived experience of people with dyslexia. One such area was to find out the way in which tools and assistive technologies were used by adults with dyslexia to support their memory in both everyday life and in their university studies. Adults with dyslexia self-reported that they are more dependent on tools and technology to support their memory compared to adults without dyslexia. (Smith-Spark, Zieciak and Sterling, 2017). Yet, university students with dyslexia have reported that they are resistant to or have a disdain for training related to assistive technologies. (Draffan, Evans, Blenkhorn, 2007). In Smith-Spark and Lewis's study conducted on twelve female university students exploring the various memory techniques they developed, participants were found to prefer traditional pen and paper tools while they also used digital technology

tools such as phones and laptops to write reminders. As such, the participants used a combination of traditional and digital tools. For example, the participants used phone reminders in combination with diary and calendar entries. They also expressed a preference for easy-to-use technology and found that navigating specialist technology took a lot of effort, was over-complicated and overwhelming.

iSS was designed to address these issues in order to help tertiary students with difficulties progress further in their education journey. However, it is important to evaluate the efficacy of this approach and therefore, for this research project, feedback was obtained from a) the teachers administering the programme and b) the students undertaking the programme.

METHODOLOGY

Research Design

The research undertaken adopted a quasi experimental, mixed-methods, phenomenological approach, leading to both quantitative and qualitative data. Phenomenology is an approach to qualitative research that describes the meaning of a lived experience of a phenomenon for several individuals (Finlay, 2012), which in this case are the teacher perceptions of the online technology-aided programme for students with learning differences in the area of speech-writing and presentation skills.

Research Questions

Taking all these factors into consideration, a study was conducted to find out the effects of iSS:

- ◆ **RQ1:** Does applying the Orton-Gillingham principles for dyslexic and struggling learners in elearning and online consultation lessons result in changes to speech-writing and presentation skills?
- ◆ **RQ2:** Does technology-aided online learning combined with personalised teacher intervention enable students with learning differences to self-monitor and attain their learning goals in terms of speech-writing and presentation skills?
- ◆ **RQ3:** Is there a difference in terms of pedagogical instruction between Secondary School learners and IHL learners in the areas of speech-writing and presentation skills?



Figure 2: Teachers' experience in terms of years

Research Participants

Participants included four teachers on the programme who also happened to be the researchers of this paper.

- ♦ **Teacher 1:** 5.5 years of teaching experience, 3.5 years of teaching iSS
- ♦ **Teacher 2:** approximately 10 years experience of teaching, 2 years of teaching iSS
- ♦ **Teacher 3:** 6.5 years of teaching experience, 2 years of teaching iSS
- ♦ **Teacher 4:** 15 years of teaching experience, 1-2 years of curriculum development of iSS, 7 years of teaching experience on iSS

In addition to the teachers, the students from the 2022 cohort also took part in the research study. Students included upper secondary and tertiary students ($n=29$; figure 3

by school levels) enrolled on iSS. There were a total of two intakes and each intake lasted for 20 weeks each with the first intake from January to June and the second intake from July to November. All students came from mainstream secondary schools and were from 14 to 17 years old. The tertiary students included those who attend Institutes of Technical Education (ITEs) which provides technical and vocational training, spanning a total of two to three years. Students who attend Polytechnics learn through a project-based approach which spans approximately three to four years. Lastly, there was a student from a special education school, which is a social service agency that provides special education, vocational training and employment support services for post-secondary school students with mild intellectual disability (IQ 50-70).

While most of our students have a diagnosis of dyslexia, we also work with students who may be diagnosed with ADHD, ASD as well as students with speech and language impairment. This generally means that they would struggle with executive functioning skills as well as have gaps in their communication skills.

Apart from students with diagnosis, the teachers also supported another group of students who may face similar issues, but may not necessarily have a diagnosis of a learning difference. At DAS, support also extends to students who learn differently, as they also face challenges in areas like foundational knowledge, attention, focus, and emotional and behavioral regulation.

Population for Pre- and Post- survey respondents n=29

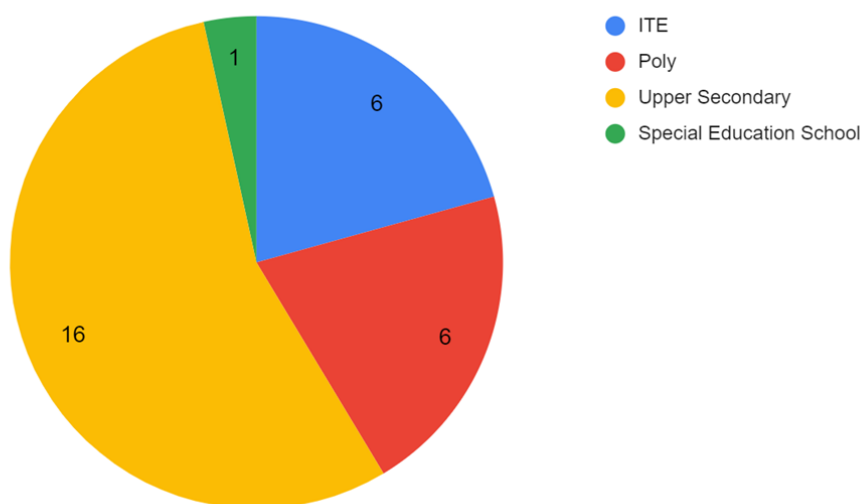


Figure 3: Demographics of the 2022 student cohort across two intakes (January to June and July to November)

Student who learns differently - Student H

Student H, a pseudonym, is an iSS student who does not have a formal diagnosis of any SEN, who similarly shows difficulties in terms of articulation, verbal expression and the general use of English.

Instrumentation

For RQ1 and RQ3, a teacher questionnaire was administered (Refer to Appendix A) comprising qualitative and quantitative questions. It involved asking the teachers' perspectives on how the OG principles were used to support the students through various methods such as using the elearning platform and online consultations. It involved asking the teachers on how they accommodated different students with different learning challenges such as those with no diagnosis, MID, and dyslexia. Feedback from was also obtained on how they taught secondary school students as opposed to tertiary school students in terms of the various skills, especially with regards to speech-writing and presentation skills.

For RQ2, qualitative teacher feedback was also gathered to evaluate the progress of the students. Thematic analysis was conducted using Braun and Clark's (2006) framework to analyse whether students develop self-monitoring skills and improve in their writing and speaking skills. Semantic themes using colour codes were derived using a top-down approach or theoretical thematic analysis after looking at the data corpus. If self-monitoring was seen, it will be coded in light green in the overall behaviour. Otherwise, it will be light pink. Any positive themes derived from writing and speaking will be in light green as well while any negative themes will be in light pink. If there are no changes to be seen, then it will be left uncoloured.

Step 1	Become familiar with the data
Step 2	Generate initial codes
Step 3	Search for themes within the data corpus
Step 4	Review themes and determine whether there were any other semantic
Step 5	Define final themes
Step 6	Write-up

Figure 4: Adaptation of Braun and Clark's framework (2006) to doing thematic analysis for the purpose of doing research paper.

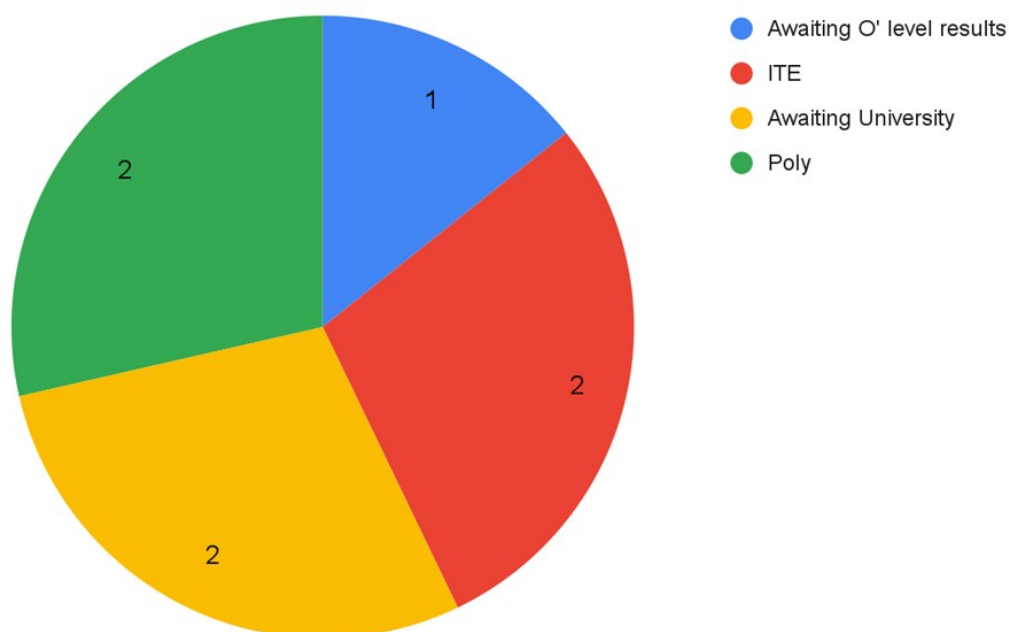


Figure 5: Demographics of the 2022 student cohort across two intakes (January to June, July to November) who participated in the six months post-intervention interview

For triangulation, pre- (Appendix B) and post-intervention questionnaires for secondary school students (Appendix C) and IHL students (Appendix D) were created and administered for each intake after referring to various questionnaires on presentation skills (Higgins-Opitz & Tufts, 2010), areas of learning difficulties (Learning Disabilities Association of Minnesota, n.d.), and self-efficacy (Research Collaboration, 2015). The pre-intervention questionnaire was administered before the intervention started and the post-intervention questionnaire was conducted during the last session of the programme.

Post-intervention interviews were also conducted with the students at least six months after their intervention ended on Zoom due to convenience. All students were invited to participate in the interview but only seven responded that they were comfortable doing the interview. The interview responses provided a glimpse into what the students thought had helped them the most to cope with the expectations and demands in their school.

Table 1: Breakdown of e-learning and online consultation weeks with speech writing and presentation skills in bold.

Weeks	E-learning Modules/Online Consultations	Weeks	E-learning Modules/Online Consultations
Week 1	Executive Function: Time Management and	Week 11	Tertiary Writing Part 4
Week 2	Executive Function: Time Management and	Week 12	Online Consultation 5
Week 3	Executive Function: Time Management and	Week 13	Tertiary Writing Part 4
Week 4	Online Consultation 1	Week 14	Tertiary Writing Part 6
Week 5	Executive Function: Planning and Organisation Part 1	Week 15	Online Consultation 4
Week 6	Executive Function: Planning and Organisation Part 2	Week 16	Presentation Part 1
Week 7	Online Consultation 2	Week 17	Online Consultation 5
Week 8	Tertiary Writing Part 1	Week 18	Presentation Part 2
Week 9	Tertiary Writing Part 2	Week 19	Online Consultation 6
Week 10	Tertiary Writing Part 3	Week 20	Final Presentation

Intervention

The students received intervention for approximately 20 weeks, in 2022. The first intake took place from January to June and the second intake was from July to November. The online intervention combined both e-learning and computer-mediated approaches. Multi-modalities and key teaching principles such as OG and UDL have also been built into the design and content of the e-learning course materials as well as the online consultation sessions.

The e-learning elements were designed and developed with careful consideration for secondary school students with learning difficulties transitioning to IHL and for IHL students to cope with the increased demands in the higher education landscape.

For students who showed more learning needs and challenges, extra consultation sessions maybe arranged to support them. The teachers also conducted weekly check-ins with the students and parents using emails, phone calls, or texts.

Towards the end of the 20 weeks intervention period, students were trained on how to write a speech, improve their draft, create slides and deliver their speech in front of a live audience. In addition to their speech delivery, the students were also trained to answer questions on the spot during the Question-and-Answer segment posted by the judges from the judging panel who received the students' speeches before the live presentation.

RESULTS AND DISCUSSION

RQ1: Does applying the Orton-Gillingham principles for dyslexic and struggling learners in elearning and online consultation lessons result in changes to speech writing and presentation skills?

The teachers used various instructional and teaching strategies in line with the OG principles to help students understand the modules' content on speech and presentation skills.

The module on speech and presentation was presented in a structured, sequential and cumulative format where students learned the features of a speech, the importance of purpose, audience and context, research and draft their speeches. The teachers would often use scaffolding and step-by-step instructions in order to make sure that the instructions are diagnostic and prescriptive, meeting the varying needs of the students. While one student may need more demonstrations of the use of an application, another student may need instructions typed down for them to use the same application.

Qn 8) As facilitators of the programme that teaches speech writing and presentation skills, have you noticed any changes in the following areas? Click all that apply.

4 responses

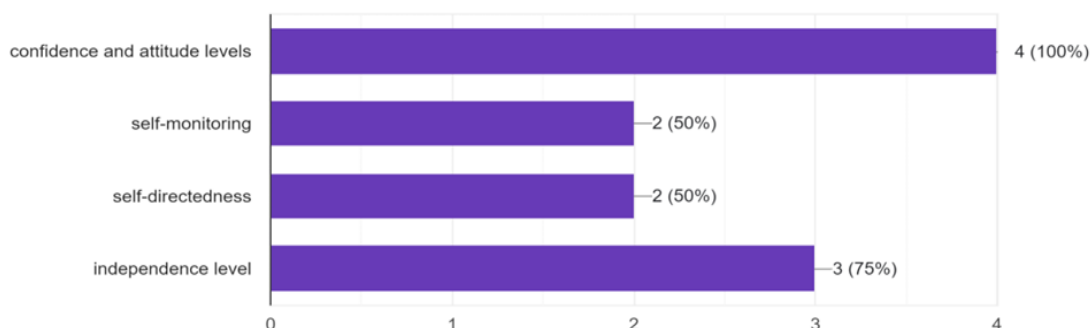


Figure 6: Graph to show teachers' perceptions of gains made by students in post-survey

In addition, the teachers ask concept checking questions to make sure the content is cognitive, and that students are able to understand the concepts being taught.

Multisensory methods in the form of videos and pictures are used to not only engage students, but also make the task requirements direct and explicit. The teachers would also make sure that the lessons are emotionally sound and would give praise and encouragement to their students to boost their confidence and self-esteem.

As depicted in Figure 6, the teachers responded to the question of whether they noticed any changes in the areas of confidence and attitude levels, self-monitoring, self-directedness and independence level. Most of them saw a change in the students' confidence, attitude and independence level, but not all facilitators saw a change in the areas of self-monitoring and self-directedness.

By applying the OG principles, the teachers supported the students through a journey of learning how to research, draft and present a speech. The teachers shared the following observations about their students:

"Student T was quite wary about joining the programme. She was quite soft spoken too and was quite unsure about herself. However, after going through the programme, she shared with me that she had improved in her confidence and self-esteem. She was also able to monitor time on her own to prepare for the N' and O' level examinations."

“Student K joined the programme after his parents asked him to do so. He was very worried about his preparedness for the N' levels and was wondering how iSS might help. After he attended the programme in 2022 Run 1 from January to June, he improved in how he scheduled his revision study time to get ready for his exams. In the recent post six months interview, he also shared that he used the time management strategies he had learnt to manage his time while in ITE as well.”

“Student C is already someone who is rather outspoken as compared to her peers in her same class but she was still not confident enough to speak up in a larger group of audience. After attending the programme, her confidence level is much higher as she knows what to take note of and how to portray herself better. She has now become a speaker with confidence to speak up and express her thoughts through her speech.”

“Another student, HJ, is very reserved and not confident of herself. She knows that she is a muddlehead sometimes and has difficulties completing assignments on time due to her lack of prioritisation. After the programme, she improved a lot in terms of her independence and confidence. She is now someone who crossed the hurdle and is able to present in front of a huge audience even though she was trembling beforehand. She now knows how to better manage her time and prioritise her commitments so that she can complete her tasks in time.”

“Student D has become more confident in the process of presentation and speech writing after attending the program, as she has shared her personal experience in another DAS “programme. Student D’s mum has also shared with me about how he has practiced his own speech over and over again during the days leading up to the final presentation, which was something she said he would have not done on his own previously.”

“Student G is a student who started out being very shy and quiet. He would frequently nod his head and smile but would not answer most of my questions. He would use the chatbox more often. As time went on, he started to speak a little more, became more verbally responsive, being confident of his opinions and expressing them and overcame his shyness which allowed him to progress in his confidence and attitude. He did well in his final presentation and won best speaker.”

“Student M is a student who was very busy and found it difficult to set aside time to access the iSS portal and complete the assignments. However, he would attend the consultations regularly. He was receptive to feedback but was still poor in his self-monitoring of logging into the portal or asking follow-up questions in the first term. When we started working on his speech, he was more engaged and monitored his progress in researching/writing out his speech and working on the slides for the final presentation. More importantly, he was aware of the need to improve his time management skills.”

RQ2: Does technology-aided online learning combined with personalised teacher intervention enable students with learning differences to self-monitor and attain their learning goals in terms of speech-writing and presentation skills?

Teachers' Perceptions

Based on the teacher feedback obtained from the teacher questionnaire, all shared that the online consultations were effective with three teachers stating that the online consultations were "very effective" and one responding that it was "effective" in helping students understand the key concepts in the preparation of speech-writing and presentation skills. One of the teachers had this to share,

*"The online consultations **allow immediate feedback from the facilitators** when going through **materials/assignments** from the **speech-writing and presentation skills [modules]**. It also **allow[s] live demonstrations/examples** to let students **better understand** what to do and also learn from their peers during the online consultation."*

The teachers collected the observations throughout the intervention and shared their thoughts about their students in terms of self-monitoring in order to improve their speech writing and presentation skills.

Some students were able to be more aware of their abilities and asked questions whenever they were in doubt.

*"... was a **conscientious learner who took initiative in asking me questions when she was in doubt** about what she learnt during e-learning."*

*"provided him with **some examples** of how the structure of the speech should be, based on the KWL chart. He was able to write out the three main points in the KWL chart and also **elaborate on the first two main points in the speech planner with my guidance**. He **sourced for the online links on his own**. He **finished writing the third main point and conclusion on his own**"*

*"after his **rehearsals and tips**, he was more fluent."*

They also observed that majority of the students still needed a lot more guidance when it comes to improving their speeches and presentation skills.

*"...able to handle tasks given to him **with guidance**, and has a good learning attitude."*

*"...not able to write out a speech on his own but was **guided on how to do research using the keywords** and find appropriate **pictures for slides**."*

*"... able to write and express her ideas, but **needed help to make her ideas more succinct**."*

Qn 2) How effective are the online consultations in helping students understand the key concepts in speech writing and presentation skills?

4 responses

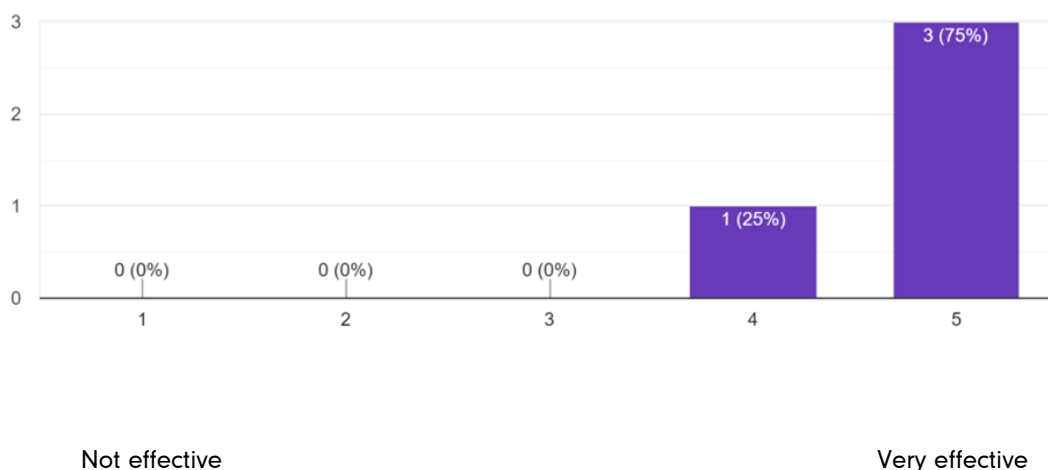


Figure 7: Graph to show how effective the online consultations were in helping students understand key concepts in speech writing and presentation skills

Students' Perceptions

The observations from the teachers were further triangulated with the results from the pre - and post-intervention questionnaire responses by the students. Students were asked to rate their responses on a Likert scale of 1 representing "never" and 5 "all the time" before and after the intervention.

T-scores and effect sizes were also calculated on selected questions for the Tertiary Writing and Presentation modules to have a better understanding of the level of progress i.e. significant, minimal or no improvement demonstrated by the students. Effect sizes are used where sample sizes are moderate, in order to compare between different questions, with an effect size of 0.2 representing a small effect size, 0.5 a moderate effect size, and 0.8 a large effect size (Cohen, 1988). T-scores were calculated to show the difference between the student population before and after the intervention.

Table 2 details how students felt that they completed the intervention knowing how to source for more relevant information and how to create more appealing slides to aid their speech. However, the students need more guidance with the texture structure and language features of a speech before they are able to be more confident of their knowledge. Also, it is clear that the students require to develop more self-awareness and better self-monitoring to ascertain their own progress from the question "I feel confident presenting after having lots of practice".

Table 2: T-scores, P-value and Effect Sizes for various modules

Module	Tertiary Writing Skills		Presentation Skills	
Questions from the pre- and post-intervention questionnaires	I know how to find relevant information from various sources (e.g. internet, newspapers & books, etc.).	I know the structure and language features of a speech.	I feel confident presenting after a lot of practice.	I know how to create appealing visual aids (i.e. Google Slides) to help me in my presentation
T-scores	0.04	0.91	0.06	0.01
P-value interpretation	*	nil	nil	**
Effect sizes	0.54 moderate	0.03 -	0.44 small	0.61 moderate

I know how to find relevant information from various sources (e.g. internet, newspapers and books)

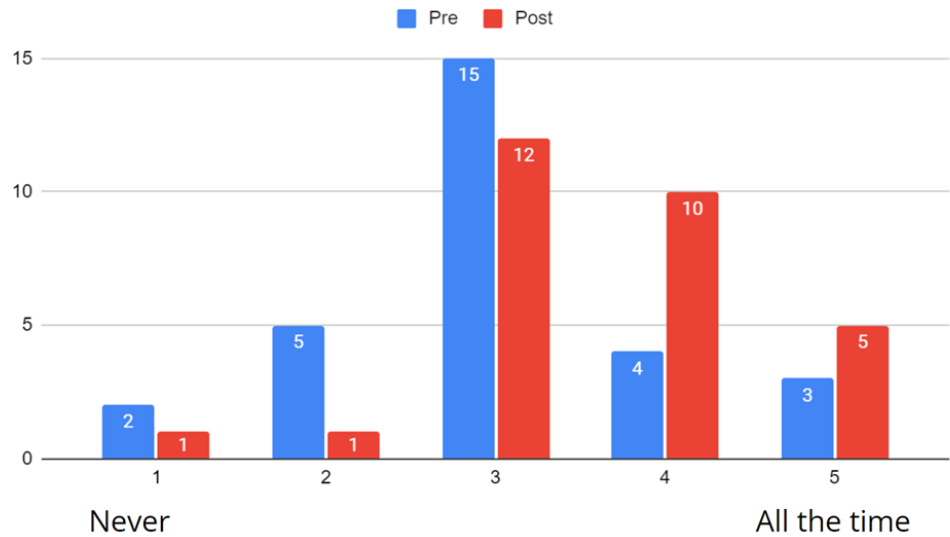


Figure 8: Students’ perceptions of their ability to search for information to write a speech before and after the intervention

Although there were a high number of students who felt neutral about their research skills before the intervention, more students confidently chose the option that they were able to find relevant information “all the time” after having gone through the intervention. Students may have chosen more neutral options initially as research is a relatively new area of learning for them. They may not have known the steps such as defining search terms and verifying the validity and reliability of sources. Hence more students chose scores “4” and “5” in the post-survey which indicates their improved self-perception of their ability to search for relevant information to write a speech.

The students also improved in their knowledge of the text structure and language features of a speech after the intervention with a positive trend (Figure 9).

I know the structure and language features of a speech

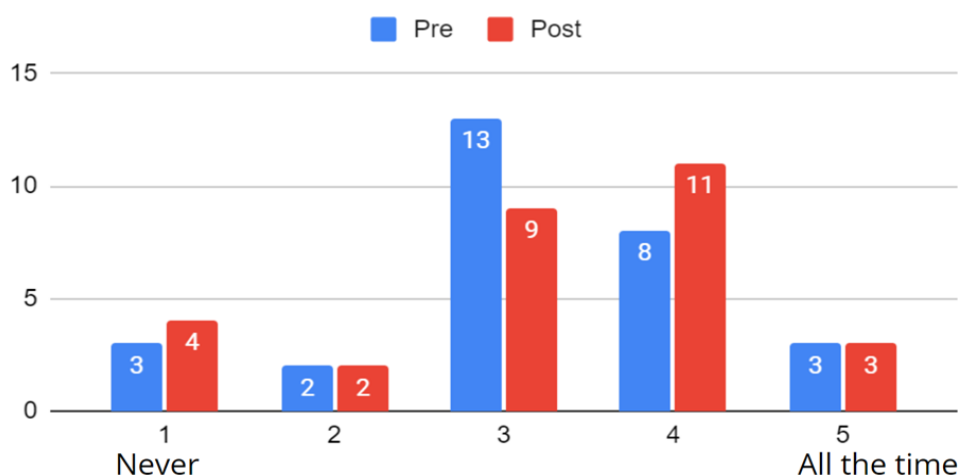


Figure 9: Students' perceptions of their ability to write a speech before and after the intervention

A higher number of students felt more confident presenting after a lot of practice during the intervention (Figure 10). The student who rated his confidence level as 1 before, rated his confidence level as 5 after the programme. This was a student from IHL, diagnosed with dyslexia and observed to have several comorbidities. His teacher described him as someone who needed one-to-one intervention, and that he was passionate about his presentation topic, leading to him becoming more motivated in putting together his thoughts and creating engaging slides for the final presentation.

I feel confident presenting after a lot of practice

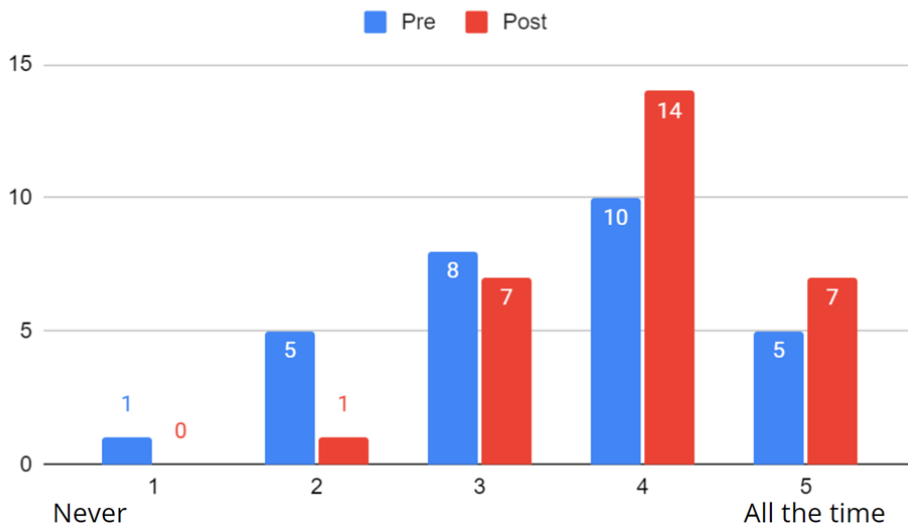


Figure 10: Students' perceptions of their confidence when presenting before and after the intervention

I know how to create appealing visual aids (e.g. Google Slides) to help me in my presentation

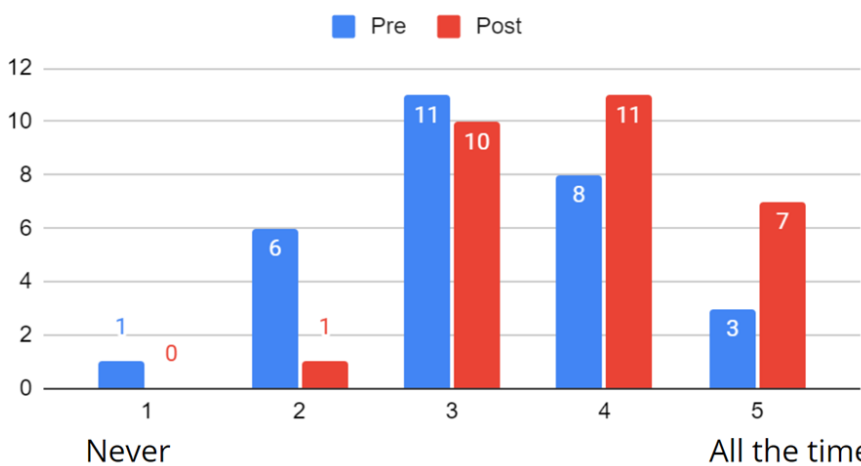


Figure 11: Students' perceptions of their ability to create slides before and after the intervention

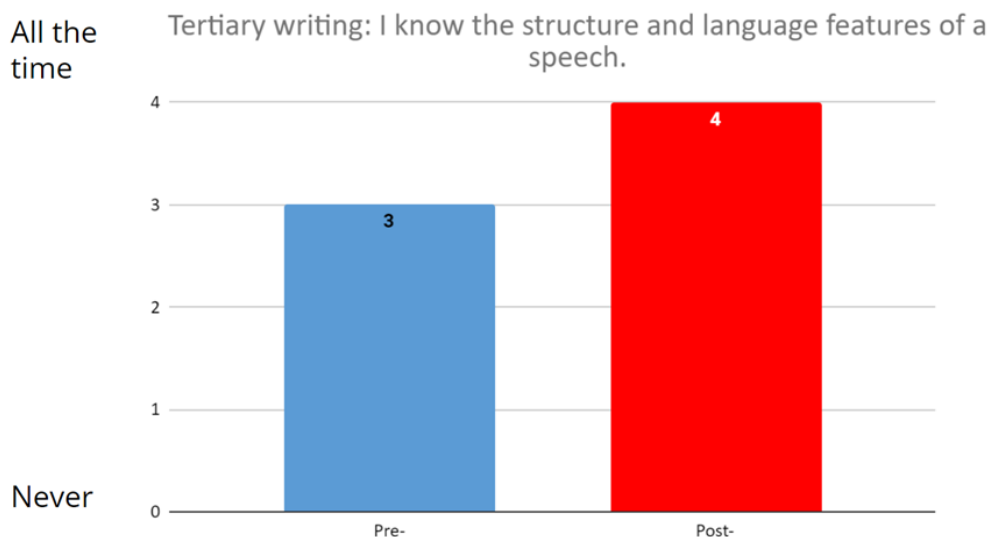


Figure 12: Student H's self-awareness of his speech-writing skills

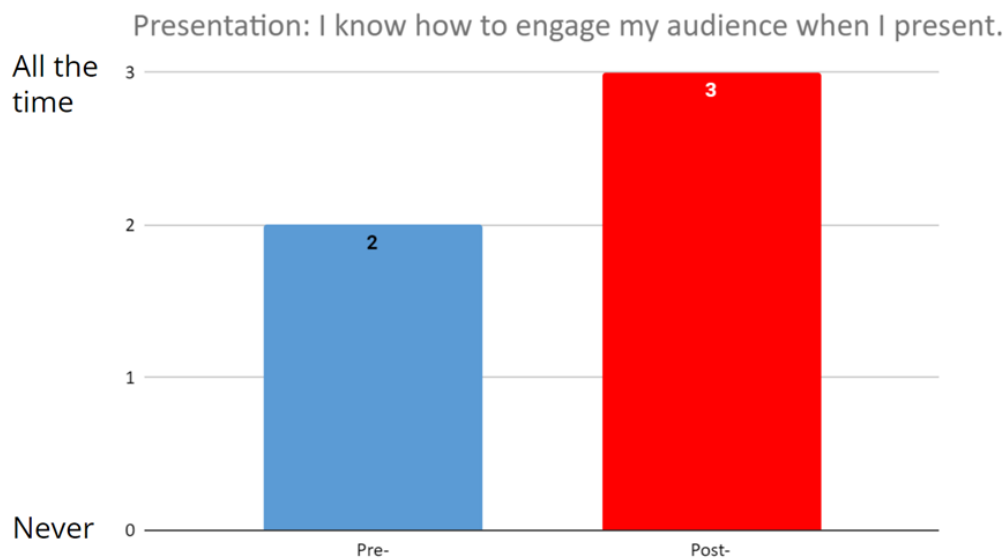


Figure 13: Student H's self-awareness of his presentation skills

The student who rated his confidence level as 3 before the programme, and as 2 after the programme was a student from the Institute of Higher Learning as well. His teacher described him as having a busy schedule due to his school and part-time work commitments. His busy schedule meant he could not complete his assignments on time. This may have affected his confidence.

Most of the students also learnt how to create appealing visual aids (e.g. Google slides) to help them in their presentations after the intervention.

During the six-months post-interview conducted with Student H, the non-diagnosed struggling learner, he shared his thoughts on the speech-writing and presentation skills while going through the intervention.

Student H also shared in the pre-survey and post-survey that he improved in his knowledge of the structure and language features of a speech (Figure 12).

Student H also noted that he improved in knowing how to engage the audience when presenting (Figure 13).

Student H also shared the following::

Speech-writing: *“For organisation, Trello, you all taught, quite useful to use, it helped me to manage all the different information I had in my project.”*

Presentation: *“A very good course, it cover topic on how to do research... to present...”*

Teacher observation of student H:

“H was always enthusiastic about learning and doing his best during lessons. He was not able to express his thoughts clearly and often felt limited by it. However, he could complete his assignments on time management and organisation, planning and organisation, tertiary writing (speech) and presentation with my guidance delivered in various forms such as verbal prompts, demonstrations, videos, chatbox and normative feedback.”

The students' responses in the pre-survey need to be considered in light of their self-perception. Before the pre-survey, students may not be clear about how well they know what is required in reality when it comes to speech-writing and presenting. Students may have underestimated or overestimated themselves when answering the pre-survey questions. After going through the real-life scenario of preparing a speech and delivering it, they would have gained greater self-awareness and self-esteem and become more aware of what skills they have.

RQ3: Is there a difference in terms of pedagogical instruction between Secondary School learners and IHL learners in the areas of speech writing and presentation skills?

The teachers of the programme have shared in the teacher questionnaire about how they manage their students and the varying levels of needs for the different profiles. One of the teachers shared that

"it depends on the level of the students... as (some) IHL students may have more experience in writing a speech as compared to the secondary school students, the depth in (the explanation of) how to write a speech to a student more unfamiliar with speech writing will be slightly deeper."

Similarly, another teacher shared her thoughts on varying the mode of instruction for her students, stating that

"I usually differentiate by showing more videos, demonstrations and presentation-feedback for IHL students... allowing engagement with multi-sensory elements. For secondary school students who are more used to receiving verbal instructions from their teachers, I use more verbal instructions, illustrations and assignment feedback."

The results in the effectiveness of differentiating instructions for students of varying levels (across school levels and within school levels) are also seen in the work produced. The first secondary school student shown in the example required more help in ideas generation, and hence, his teacher met with him separately to help him brainstorm more ideas that he wanted to add to his brainstorming assignment. With additional promptings and guidance with his research, he also managed to fill in the writing organiser with more substantial information.

Another secondary school student in the same cohort required more help in terms of organising the flow of his ideas, as idea generation was not an issue for him. With guidance from his teacher, he was able to whittle down to the points that were relevant and followed a more logical flow. (See Figure 15)

After comparing the differentiated instructions for students, we found the learning needs of students to be similar. However, the difference was in terms of the input the teachers needed to give. This student from IHL required slightly more help in the research and prompts to add more content to her speech, which is similar to the first secondary school student. However, she managed to do so, with fewer prompts as compared to the prompts required for secondary school students.

Table 3: Secondary student 1's initial brainstorming work with additional guidance from his teacher (in black)

My Research Topic	Is gaming good for the body
What is the problem/issue?	Most parents say that gaming is bad for the body and the mind.
Why and How did this problem arise?	When I was gaming Why are parents concerned about gaming - Violent video gameplay was linked to increased aggression in players, but there's no link between playing violent videos games and criminal violence. - Students or children spend too much time playing games until they forget to do their work—chores and study
Where/When did it happen?	All around the world
How was it before?	Bad
How is it now/	Bad
What should it be?	Good. https://edition.cnn.com/2020/11/16/health/video-games-mental-health-study-wellness-scli-intl

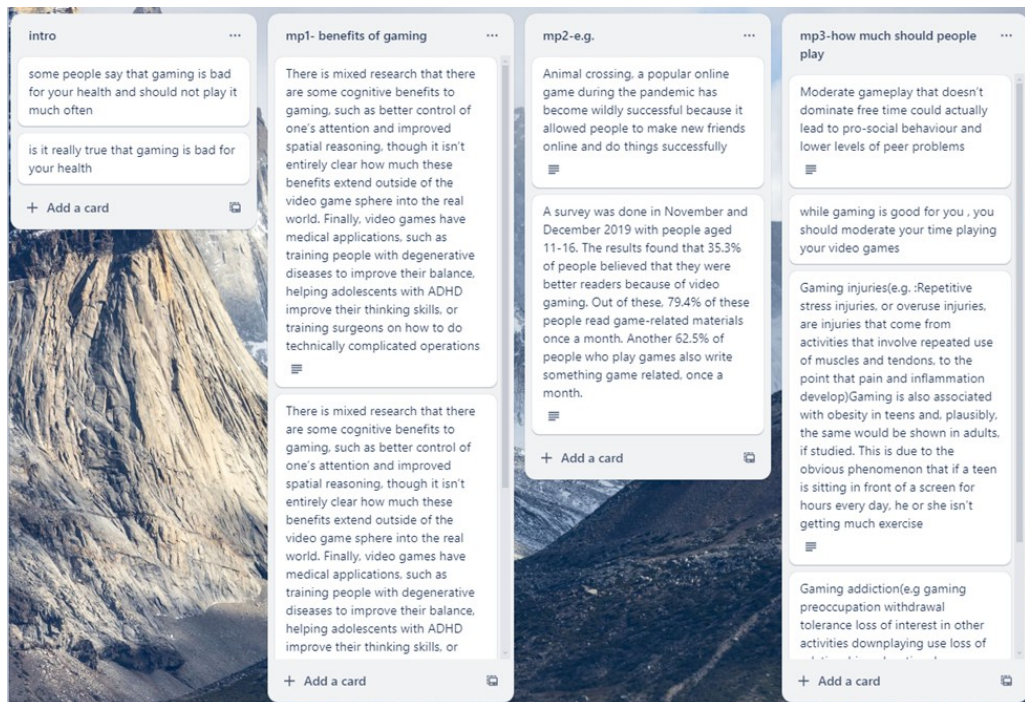


Figure 14: Secondary school student 1's filled in work, with further prompting and help with research

My Research Topic	Environment (inform)
What is the problem/issue? Can you give some examples of some animals?	How some animals remained unchanged after millions of years fish found on the coast of Madagascar coelacanth and the alligator
Why and How did this problem arise? Why don't these animals need to change? And what was the stimulus (trigger or thing around them) that should have made them change?	They did not need to change their ways in order to survive Sometimes some animals may need to adapt to the new conditions around them, but some animals already have what they need
Where/When did it happen?	Over 120 million years ago
How was it before? Based on the animals given above can you describe some features they have?	They look similar to how they do today

Figure 15: Secondary School student 2's initial brainstorming assignment with teacher's prompts in red.

Main point 1- Intro

- some animals remained largely unchanged after millions of years fish found on the coast of madagascar: coelacanth and the alligator (A)
- they look similar to how they do today compared to over 120 million years ago
- they did not need to change their ways in order to survive. Unlike many animals which have to adapt to the new conditions around them, but these animals already have what they need at their disposal in their ever changing world. (B)
- They survived many mass extinctions and changes to their environment and the earth
- Some of this animals have survived multiple mass extinction
- This adaptations have made this animals so successful that they have survived up till now

MP 1- Animals that did not change

- can you give some examples of some animals? Crocodiles, Coelacanths, Nuatilus, Horseshoe crab, Turtles
- 1 animal that is not changed - alligator
- why exactly has nature kept them intact? why have these animals been able to last such a long time without having to change? Why don't these animals need to change? How is that they did not undergo change
- they had adaptations that allowed them to survive so long without the need to change: alligator hibernation
- However, almost all of this animals are difficult to study especially for their evolution due to them being to dangerous, elusive, rare or near extinct
- + Add a card

Similar points MP 2

- And what was the stimulus (trigger or thing around them) that should have made them change? (B)
- Global warming and ice age period
- what kind of change would they have to develop? (B)
- 1 animal that changed - usually mammals or birds (more recent)
- Develop thicker fur to trap more heat in areas with extreme cold, eg: (extinct) woolly rhino, (living) muskox, wild cattle
- Especially in new conditions, animals have to develop new adaptations or trade off preexisting perks so as to adapt to their environment. On the other hand, those that do not undergo significant change already has said adaptations to conquer their new environment as they developed

Figure 16: Secondary School student 2's writing organiser filled in with help in the organisation of his ideas

My Research Topic	Sleep (motivate)
What is the problem/issue?	People not getting enough sleep
Why and How did this problem arise?	Why poor sleep hygiene, lifestyle choices, work obligations, sleep disorders, and other medical conditions How—people with multiple jobs or other responsibilities
Where/when did it happen?	When—early 1990 Where—Any napping area (bed/sofa/table)
How was it before?	They were able to get their task done without getting tired
How is it now?	People are not able to finish their work and most of them drink energy drinks to help them stay awake.
What should it be?	Not a need for energy drinks need good sleeping cycle

Figure 17: IHL student's brainstorming assignment, with inputs from the facilitator

Main point 1- introduction to sleep

- people not getting enough sleep
- people started having sleep deprivation in the early 1990
- it is happening everywhere
- how was it like before -they were able to get their work done without a lack of sleep, because things have modernized, and we have to make ends meet for the young children at home
- how it is now-people are unable to finish their work and most of them drink energy drinks to help them stay awake

Main point 2- why it happens and consequences

- why- poor sleep hygiene, lifestyle choices, work obligations, sleep disorders, and other medical conditions → how- people with multiple jobs or other responsibilities
- being tired can be a coping mechanism
- what should it be- no need for energy drinks and having a good sleep cycle
- Energy drinks have too much caffeine that affects your heart and blood vessels. It also interferes with developing children's cardiovascular and nervous system

Main point 3- what should we do about it?

- is there anything we can do to help sleep? Several natural remedies may help you to sleep better, including melatonin, magnesium, and valerian root. But even natural sleep aids should not replace good sleeping habits. Getting a good amount of sleep is incredibly important for your health. Sleep helps your body and brain function properly.
- what defines a good sleeping habit? Go to bed at the same time each night and get up at the same time each morning, including on the weekends. Make sure your bedroom is quiet, dark, relaxing, and at a comfortable temperature. Remove electronic devices, such as TVs, computers, and smart phones, from the bedroom.

Figure 18: IHL student's writing organiser filled in, with prompts for research given by the facilitator

CONCLUSION

Overall, positive results were observed among students, teachers and parents. More self-monitoring, awareness and self-confidence needs to be gathered before the students know their progress made during the course of the intervention in the areas of writing and presentation skills this is similar to Hewes's (2020) study whereby even though the participants made progress, they may not be aware due to years of negative experiences. This may also suggest that students who have SEN and who learn differently like Student H might also need more help with writing and presentation skills. Nevertheless, perceptions from the teachers have been favourable. This is evident from the teachers' perspectives where teachers have observed positive changes in their students' attitudes and confidence, independence levels, self-monitoring and self-directedness.

It was also apparent that after analysing the students' work and the interactions with the students that instructions, regardless of whether they are from IHL or secondary school, were based on the learning needs of the students rather than the educational institution they are currently studying at. Teachers also needed to thoroughly understand the students' learning needs. For instance, the teachers would need to look at each student's pre-intervention survey results to thoroughly understand their students' learning needs before guiding the student such as looking at each student's pre-intervention survey, parent's input, class observations, weekly check-ins, observations during online consultations.

Therefore, after a 20-week intervention on the various areas of executive function, writing and presentation skills, it was found that an online programme using pedagogical principles such as the OG principles and UDL principles, computer-mediated learning and in small class sizes will help students with SEN and without a diagnosis in the areas of speech-writing and presentation skills.

LIMITATIONS AND FUTURE RESEARCH

Research findings from this study have shown that the students are unaware of the progress they have made while and after attending the programme and there may be several reasons that contribute to this.

Firstly, there may be a lack of opportunities to demonstrate and practice the skills taught on iSS and in school due to the short intervention time as not all of the 20 weeks were devoted to just writing and presentation skills and the majority of the time was spent getting them prepared for their speech and presentation. Therefore, some of the students might have difficulties applying and transferring the taught skills to their school environment. It would be good for the intervention period to be longer for the speech-

writing and presentation skills so that the students can demonstrate the skills learnt to another similar assignment while on the intervention programme.

Next, a limited meta-awareness of their current skills or ability may influence how they think they are progressing and this may affect how they view themselves and the intervention programme. Students will need to feel success on the programme before they feel confident to progress further or even apply the skills learnt.

As the sample size was determined based on the cohort, more studies need to be done by reviewing and monitoring the trends and observations with incoming batches of students. Also, there was only an experimental group, no control group, that consists of upper secondary and IHL students who have been enrolled on iSS. Hence, a comparison could not be made between the different groups to see if any positive effects were due to other confounding factors.

To counteract some of the limitations described above, future research can be explored by changing the intervention to just to focus solely on writing and presentation skills, to further study the effects of the targeted skills.

As the students have limited metacognition of their own ability, it may be useful to include constructive teacher feedback influences students' progress and how metacognition may be improved by providing more communicative feedback by more communicative feedback through the intervention with the introduction of different judging criteria for writing speeches and presentations.

At the same time, it may be worthwhile to study the differences between two different groups of students (control and experimental) to see whether any effects is the result of the intervention and not the presence of other external variables.

Another post-intervention study that could be conducted would be to see how stable the improvements made by the students remain after they completed the programme. The study could look at whether the students continued to feel positive about themselves and their writing and presentation skills or if they have regressed in any areas. This study may be hindered by the lack of student responses, which can happen once they complete the programme.

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