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Identifying Training Needs in Using Educational Technology: a New Integrated Model

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Abstract

This research critically examines the imperative of systematically training Educational Therapists for optimal educational technology integration within the Dyslexia Association of Singapore's (DAS) Main Literacy Programme, accelerated by the COVID-19 pandemic's shift to remote learning. Employing a multifaceted approach, including surveys, observations, focus groups, and interviews, the study identifies seven principal performance issues among therapists, categorizing them into skills, knowledge, and attitude. Recommendations for targeted training efforts offer actionable insights for DAS management, acknowledging the intentional exclusion of student voices in this phase. Future research will address this limitation by exploring student perspectives post- implementation of interventions for teachers, aiming for a comprehensive understanding of technology's impact on the learning environment. The study's limitations encompass a specific sample (DAS Educational Therapists) and setting, potentially restricting generalisability. However, the proposed Integrated Model and solutions may prove adaptable to diverse educational contexts. The research design, employing varied data collection methods, mitigates response bias concerns, enhancing the authenticity of findings. Time constraints impact the study's depth, warranting future longitudinal investigations. The absence of student perspectives regarding technology's impact and learning goals is acknowledged, prompting future research directions. While providing valuable insights into DAS Educational Therapists' needs, this study advocates for future endeavors that include student perspectives, exploring the effectiveness of interventions post-teacher training. The Integrated Model can serve as a foundation for broader applications in diverse educational settings, contributing to industry- wide best practices. Longitudinal studies are proposed to capture evolving attitudes and practices, offering a nuanced understanding of technology integration's dynamic nature in educational settings. Future research should prioritise student engagement, ensuring a holistic exploration of technology's impact on learning outcomes across diverse educational landscapes.

Keywords: Educational technology, instructional technology, technology integration technology adoption, systematic training, performance issues, targeted training for teachers, performance analysis, training needs assessment

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1.0 INTRODUCTION AND SUMMARY OF PART 1 OF STUDY

The coronavirus global epidemic compelled over 190 countries to cancel traditional face-to-face classes and transition to remote learning - suddenly, unexpectedly, and unevenly (UNESCO, 2021). According to UNESCO (2021), at the height of the crisis, more than 85% of students around the world were absent from regular school, and by October 2020, 108 nations reported missing an average of forty-seven days of face-to-face instruction - or approximately a quarter of the academic year. Digital technologies have the potential to revolutionise education worldwide if used properly in the classroom.

The COVID-19 pandemic has had some positive effects, such as accelerating the adoption of digital technologies in schools. The extensive use of remote learning opened the door to further digitalisation, including the fusing of digital tools with conventional teaching techniques. But bringing traditional pedagogies or approaches online is only one aspect of effective digital learning. The pandemic demonstrated how digital tools were thrown into remote learning carelessly and unevenly. Digital solutions frequently rested on the creativity of a single teacher or the commitment of a single school administrator. Teachers required assistance and instruction on how to use digital technologies effectively if they are to do so. Training for an educational culture that uses digital technologies to improve its operations has become more and more crucial.

This paper looks at three prominent training needs analysis models before formulating a new integrated model in the second part. The function of analysing training needs is one that is acknowledged as being a crucial element of all effective training programs. In its simplest form, requirements assessment is the act of determining "what is" and "what should be" and proposing solutions to close the gaps between them. This method produces information that can be used to help with planning, decision-making, and problem-solving initiatives. This information can be used internationally to investigate educators' current use of technology and desired level of use of technology, and then propose training and non-training solutions to bridge the identified gaps.

AIM OF PART 2 OF STUDY

In this second part, a complete analysis of the use of the new integrated training needs analysis model with educational therapists will be presented. In order for Dyslexia Association of Singapore (DAS) to plan and get ready for training routes based on the determined training needs of the therapists, the findings from this research and the suggested solutions will be communicated with the organisation.

The purpose of this Training Needs Assessment (TNA) study is to determine any differences (gaps) between what the educational therapists at DAS should be knowledgeable and skilled in, versus what they currently know and can do regarding the integration and utilisation of educational technologies for dyslexic learners in the DAS Main Literacy Programme.

Overview of the Integrated Training Needs Analysis Model

Human performance has a direct impact on organisational performance, and performance problems can occur when task performers lack the required capability and knowledge. To investigate the training needs for educational therapists in the DAS, an integrated model using Mager and Pipe's performance analysis model, Wile's human performance technology, and Rossett's model has been developed. Mager and Pipe's model assesses desired and actual performance states and identifies necessary interventions, while Wile's technology diagnoses root causes of performance gaps.

Rossett's holistic approach gathers information on optimal and current performance, sentiments, and solutions to problems.

In part 1 of this study (Mubarak, 2023), the article described an Integrated Training Needs Assessment (TNA) approach consisting of five major steps to identify performance deficiencies and recommend solutions. The first step involves identifying the real problem and its importance, followed by determining the gap between actual

and optimal performance levels, investigating possible causes of the gap, and determining if training is the solution. The final step involves recommending solutions based on data collected from various stakeholders, including the identification of possible causes for the performance problems, and considering the acceptance, cost effectiveness, practicality, and feasibility of proposed solutions. The article concludes by emphasising the importance of human performance to organisational performance and the need for a systematic approach to TNA.

METHODOLOGY

This section explains the background for the study as well as the methods, instruments, sources of data, and research questions that guided the investigation.

The TNA process entails identifying actual performance gaps between the therapists' current knowledge and abilities and optimal expectations for the integration of educational technologies into the Main Literacy Programme. Subsequently, recommendations are proposed to narrow the performance gaps that were identified. The outcomes and recommendations from this study will be communicated to DAS to enable the organisation to plan and implement training programs based on the identified training needs of the therapists.

Training Needs Assessment Plan

To accomplish the objective of the Training Needs Assessment, the Integrated Model will be applied using the five-step approach specified in Table 1 in section 4.2. This table

outlines each step of the approach, along with corresponding guiding questions (a to i) to assist in the implementation of the model.

Training Needs Assessment Guiding Questions

This study will focus on the following 9 guiding questions shown in Table 1:

Table 1. Training Needs Assessment Guiding Questions

TNA FOCUS	STEP IN INTEGRATED MODEL	GUIDING QUESTIONS
Organisational Goals	Step 1	A. What is/are the goals of the organisation in terms of adopting and integrating educational technologies in the Main Literacy Programme?
Identification of critical Performance Problems	Step 2	B. What ar the real performance problems related to the adoption and integration of educational technologies in the Main Literacy Programme? C. Are the identified performance problems important to warrant a TNA study?
Realisation of Performance Gaps **Realisation of the causes of Performance Gaps**	Step 3	D. What Educational Technology related skill, knowledge and attitude should DAS Therapists have in order to purposefully integrate I into the Main Literacy Programme curriculum to suit the learners with dyslexia? E. What Educational Technology related skill, knowledge and attitude do DAS Therapists currently have? F. What are the Performance Gaps? G. What would be the possible causes for the Performance Gaps?
Nature of Solution (Training or Non-Training)	Step 4	H. Is training required to close the identified Performance Gaps?
Suggestions	Step 5	I. What are the suggested solutions?

RESEARCH DESIGN

The main approach employed in this research is qualitative, with the aim of obtaining a comprehensive understanding of the perceived training needs in DAS. To achieve this, the researcher conducted various methods such as surveys (provided in Annex 1), interviews with DAS management personnel (provided in Annex 2) and Dyslexia Association of Singapore Academy (DAC) lecturer (provided in Annex 3), focus group discussions (provided in Annex 1), observations (provided in Annex 5), and subject matter expert interviews (provided in Annex 4). These methods were used to provide an opportunity for detailed discussions of the matters raised in the survey and interviews and to corroborate self-reported data obtained in the initial stages of data collection.

Procedure

The researcher communicated the intent, objectives, and process of the TNA to the DAS research committee, who then invited participants based on the profiles described in Section 4.3.2 of this paper below and their availability. The participants were given the Study Information Sheet, which outlined the study's terms, and they consented to participate. The researcher scheduled one-to-one online meetings for interviews and conducted the focus-group discussion online due to the COVID-19 pandemic. The survey was distributed via email, and participants were notified of observation dates at least two weeks in advance, with confirmed class selection at least one week prior. The researcher provided her contact information at the end of each data collection method.

Participants

This paper gathered input from 23 participants with diverse backgrounds through interviews and surveys. Diversity among the backgrounds of participants in the study significantly enriched the research by providing a holistic and comprehensive understanding of the subject matter. Involving perspectives from various roles within and outside the organisation, such as management, subject matter experts, and ground personnel like lecturers and educational therapists, ensured a well-rounded exploration of the challenges and opportunities related to the integration of educational technologies. DAS Management perspectives offered insights into overarching organisational goals and expectations, guiding the study towards aligning technological integration with broader objectives. External subject matter experts contributed specialised knowledge, shedding light on the theoretical aspects and best practices. In contrast, the input of ground personnel brought forth firsthand experiences and practical challenges faced in the classroom and during training. This diversity allowed for a triangulation of data, enhancing the reliability and validity of findings and ultimately facilitated the development of targeted and effective solutions applicable at different organisational levels.

The table presented as Table 2 displays the different groups of participants consulted in the data collection process along with their roles and backgrounds.

Table 2. Participants

Position		No.	Category
1	Director of English Language and Literacy Division, Staff Professional Development and SpLD Assessment Services	1	Management Personnel
2	Assistant Director, Curriculum and Resource Development	1	
3	Assistant Director, Quality Assurance and Audits	1	
4	Lead Therapists	3	Educational Therapists teaching the DAS Main Literacy Programme
5	Senior Therapists	5	
6	Therapists	5	
7	Curriculim and Resource Developers	1	Educational Leaders in DAS
8	Educational Advisors	1	
9	Educational Technology Leaders	2	
10	Lecturer of DAS Academy	1	Lecturers in DAS
11	Subject Matter Expert from Society for Persons with Disabilities	1	Experts for Educational Technology and Training
12	Subject Matter Expert in Educational Technologies and Adult Training	1	

Management Personnel of the DAS

The Director of the English Language and Literacy Division, Staff Professional Development and SpLD Assessment Services, was a crucial participant in this study and

was interviewed due to her position overseeing areas that are vital to this research. Having spent 16 years at DAS and worked as an educational therapist for 7 years, she was well-equipped to provide guidance on the organisation's objectives regarding the use of educational technologies in the Main Literacy Programme, as well as insights into the expected and actual performance standards of therapists. Her contributions were particularly valuable in determining the success of potential solutions.

Additionally, two Assistant Directors of the English Language and Literacy Division, who had been with DAS for 13 and 14 years, respectively, were identified as key participants for their leadership positions in critical areas such as curriculum and educational advisory. Their input through interviews on topics such as the current resources available to therapists and potential causes of performance issues played a significant role in shaping the proposed solutions in this study.

Educational Therapists in DAS Main Literacy Programme

A group of 13 educational therapists with varying levels of experience, ranging from beginners to experienced leaders, was selected to take part in this study. An open call was made via email to all educational therapists. Including therapists with different levels of experience could offer valuable insights crucial for the study. These participants were asked to complete a survey and actively engage in a focused group discussion. Additionally, therapists were observed using educational technologies in their classes on two occasions. These observations were conducted live or based on recorded sessions, depending on class availability and feasibility.

Educational Leaders at DAS

Four educational administrators were recognised to furnish their perspectives and insights for this investigation. Their selection was predicated upon their specialised domains: encompassing curriculum development, educational consultancy, and the execution of pedagogical technologies. These instructional leaders allocated approximately 3-4 days weekly to supervisory responsibilities, reserving 1-2 days for direct engagement with dyslexic pupils. This configuration enabled them to retain a hands-on involvement in practical instructional matters, concurrently affording them the capacity to extend guidance and assistance to educational therapists primarily dedicated to instructional delivery.

Lecturer at DAS Academy

An interview was conducted with an instructor affiliated with DAS Academy, the educational training subsidiary of DAS. This instructor's insights were garnered regarding training aspects. Notably, DAS Academy undertakes the training of all therapists upon their induction and prior to their active service. Moreover, the academy facilitates

ongoing professional development courses. This interview served as a valuable resource for comprehending the extent to which the present and prospective training trajectories incorporate the application and integration of educational technologies within instructional settings.

Subject Matter Experts

The first subject matter expert is a National Institute of Education-trained teacher who currently serves as an Assistive Technology (AT) Specialist. In her role within a multidisciplinary team, she offers AT support for literacy and numeracy interventions tailored to clients with complex communication needs. Additionally, she conducts workshops on assistive and learning technologies and provides assistance to schools in integrating AT into their classroom teaching. Her primary focus lies in developing training programmes and support systems for educators and caregivers in both Mainstream and Special Education (SpEd) schools. These programmes aim to facilitate the practical implementation of technologies in both school and home settings to enhance learning outcomes. Furthermore, she provides guidance on adapting classroom assessments to accommodate diverse learning needs.

The second subject matter expert is a Chief Architect of Learning Circles and the visionary mind behind Wiztango.com. He is a prominent figure in the intersection of technology and education management. Boasting a global background, he has made significant contributions as an entrepreneur in both these domains. Throughout his illustrious career spanning three decades, he has played key roles in the digital transformation of various industries. In Singapore, he contributed to a community-led learning initiative, showcasing his commitment to lifelong learning. His current focus revolves around implementing the digitally-blended learning model through the Wiztango platform. His vision is rooted in transitioning traditional training to a digitally-facilitated learning approach, emphasising equal opportunity and knowledge sharing for all participants.

While these experts did not possess exhaustive insights into the specific training requisites of educational therapists within the DAS context, their reservoirs of experience rendered their perspectives on prospective remedies for mitigating performance gaps exceptionally valuable to this research endeavor.

Data Collection Instruments

This research employed a variety of data collection approaches, encompassing surveys, observations, focus group dialogues, and interviews. Both open-ended and closed-ended question techniques were utilised to enhance the comprehension of diverse viewpoints originating from different participant groups within DAS.

Survey

The survey design (refer to Annex 1) has been adapted from Fan's work (2001) for its user-friendly format, simplicity, and incorporation of a 5-point self-rating scale. This scale effectively captures responses from participants across both present and anticipated scenarios for the same query. This design intends to ensure convenience for educational therapists during survey completion, minimising time consumption and survey length. The choice of survey as the data collection method for educational therapists was informed by its comprehensive reach, ensuring a more precise cross-section of participants to yield targeted data outcomes. This strategic approach enhances the accuracy of data analysis and informs significant decisions.

By maintaining survey responses in an anonymous format, DAS educational therapists can provide candid and valid input without concerns about potential identification. This accommodates those therapists who might be hesitant to express opinions due to apprehensions about recognition.

The survey enlisted the participation of a total of 10 educational therapists in this study. Among these, 5 were identified as senior educational therapists, boasting a tenure exceeding 5 years within DAS. Conversely, the remaining 5 participants did not hold senior therapist positions.

Interview

To amass information from 3 members of DAS management (see Annex 2), 1 representative from DAC (see Annex 3), and 2 subject matter experts (see Annex 4), interviews have been chosen as the preferred methodology. This selection is based on interviews' efficacy in extracting comprehensive insights, particularly concerning the expected utilisation of educational technologies by Educational Therapists. Interviews offer the advantage of posing detailed inquiries and facilitating real-time elucidations, utilising the respondents' own expressions to address ambiguities or incomplete replies. Given the potentially demanding schedules of these chosen participants, alternatives such as surveys or focus group discussions may not align as well with their availability.

Observation

In addition to the information gathered through surveys and interviews, classroom observations serve as a means to validate actual behaviors, bridging responses that may reflect participants' perceived expectations rather than their genuine classroom practices. For this study, a twenty-minute observation period has been sanctioned by the DAS research committee for specific reasons. Firstly, since literacy lessons encompass multisensory approaches with designated manipulatives like phonics card decks and finger-spelling exercises, which do not necessitate the use of educational technologies,

observations are targeted during these components. Secondly, given the numerous requests for classroom observations from various entities, DAS educational therapists were more amenable to shorter observation intervals. The decision for a twenty-minute observation was reached after consultation with the DAS Research Committee, and three classes were chosen for observation.

The observation form (refer to Annex 5) was developed with several key considerations. Firstly, it aims to document the types of devices employed in classrooms and the learning circumstances of the students. The initial section of the form presents a list of various devices for the observing researcher to indicate usage. Subsequent space is allotted to briefly note any specific learning needs of students, if applicable. This feature enables the assessment of whether educational therapists accommodated differentiated instruction based on individual student learning profiles, a detail provided by DAS educational therapists before the observation commenced.

The second page of the observation form delineates observable actions systematically compiled by the researcher, with the intention of covering a broad spectrum of aspects. For instance, it assesses whether the educational therapist is capable of independent troubleshooting and whether the activity could be carried out without the use of technology. If the activity can be performed without the selected technology, the educational therapist could be deemed to be operating at the substitution level of the SAMR model (Puentadura, 2013), which represents the initial tier of technology utilisation. Illustratively, tasks categorised under the substitution level might encompass composing a written piece on a Word document without employing autocorrect or formatting tools, given that this activity can be accomplished sans technology. The SAMR model delineates four levels of technology integration: substitution (S), augmentation (A), modification (M), and redefinition (R), each progressing in terms of the transformative impact of technology on task execution when compared to its absence.

The researcher also endeavored to make observations on student engagement during instances of technology integration. This entailed monitoring for behavioral indicators among students, encompassing disruptions, anxiety, and attentiveness within five- minute intervals throughout the twenty-minute observation period.

Focus Group Discussion

A focus group discussion was also undertaken, involving three educational therapists and four educational leaders. This was done to cross-reference responses obtained from other data collection methods. Furthermore, the researcher strategically scheduled the focus group discussion after the interviews and survey to ensure that certain insights, such as expectations for technology use in classrooms gleaned from interviews with DAS management personnel, and the self-reported actual technology usage from the survey by DAS educational therapists, could be raised.

This discussion was conducted within a single session. Collectively, a minimum of three distinct data collection methods were employed at each stage of the Training Needs Assessment (TNA) process within this study. This approach serves the purpose of cross-validating data from multiple sources and gaining a richer understanding through diverse perspectives. The ensuing table (Table 3) delineates the assortment of techniques and tools employed across the various stages of TNA within this study.

Table 3: Data collection techniques and tools used in this study

Tools	Integrated TNA Processes				
	STEP 1: What is the real problem?	**STEP 2: Is it important?**	**STEP 3: What is the performance gap?**	**STEP 4: Is training required?**	**STEP 5: What are the possible solutions?**
Interview	✓	✓	✓	✓	✓
Survey			✓	✓	✓
Focus Group	✓	✓	✓	✓	✓
Observation	✓	✓	✓		

Table 4 presents a concise overview of the strengths and limitations associated with the diverse data collection tools employed in this study. The compilation of this table drew upon insights gleaned from existing literature as well as discussions with experts in the research domain. The shortcomings identified in these instruments will be conscientiously addressed within the study, with corresponding measures taken to mitigate any potential adverse impacts. These mitigation strategies are outlined within the same table.

Data Analysis

The formulation of interview questions, survey queries, focus group discussion prompts, and observation criteria adhered to the structured guiding questions outlined in section 4.2 within this paper. The essential data hailing from individual interviews (refer to Annex 2, 3, and 4), focus group discussions (refer to Annex 1), observation of lessons (refer to Annex 5) and the survey (refer to Annex 6) were principal reservoirs of information in addressing the research questions. In terms of analytical methodology, the researcher

Table 4. An overview of the strengths and limitations associated with data collection.

Instrument	Advantages	Disadvantages	Follow- Up
Survey	♦ Relatively inexpensive Relatively time-saving ♦ Participants can do it at their own time ♦ Yields relevant, quantifiable data that can be summarised and analysed ,easily. ♦ Anonymity may encourage honesty	♦ Low response rates or inaccurate responses No opportunity to clarify ♦ May restrict freedom of response ♦ Requires time and skill to develop targeted questions	♦ Reminders will be sent to follow-up on colleagues who are yet to submit their responses ♦ Survey & questionnaires to be kept simple lo avoid contusion or misunderstandings ♦ An option called "others" to be, available to relevant questions so that respondents may clarify themselves
Focus Group Dimension	♦ Build involvement and support ♦ Provide relevant data ♦ Provide visibility ♦ May elicit key topics not expected ♦ On-the-spot sharing and synthesis of different views	♦ Moderately time-consuming (but less so than individual interviews) ♦ Difficult to conduct - both logistically and in terms of conducting the session smoothly ♦ May be difficult to analyse and quantify data	♦ Invitations will be sent early lo participants and dales will be chosen based on their availability
Individual Interview	♦ Allow for clarification Provide relevant data ♦ Easier to conduct than group interviews ♦ May uncover information that would not be brought up in a group	♦ Expensive in terms of time and travel costs Requires interviewing skills ♦ May be difficult to analyse and quantify results ♦ May make interviewees self-conscious	♦ Conversation will be kept casual and light-hearted ♦ Interviewer will ask broad questions and support with prompts where clarifications are required
Observation of Work Situations	♦ Builds employee involvement ♦ Provides excellent information when coaching an individual ♦ Builds credibility ♦ Generates relevant quantifiable data May provide excellent real scenarios	♦ Requires s a skilled observer Time-consuming ♦ May change performance or be perceived as spying ♦ May be logistically difficult	♦ A detailed observation sheet will be used Recorded lessons can also be used. if available ♦ Observation arrangements will be made in advance to facilitate logistical concerns

applied the constant comparative method (Glaser and Strauss, 1967) to examine qualitative data and descriptive statistics extracted from these sources.

In dissecting the qualitative data and descriptive statistics derived from interviews and surveys, the researcher scrutinised and interpreted the expressed viewpoints and perspectives, aiming to incorporate them into the nine guiding questions guiding this study. The constant comparative method facilitates the ongoing identification of emerging themes, supplementing the predetermined key categories deemed pertinent to this study's objectives through the nine guiding questions.

For instance, in addressing the fifth guiding question—pertaining to the current educational technology skills, knowledge, and attitudes possessed by DAS educational therapists—the researcher analysed responses from interviews and the survey. The subsequent examples illustrate how these data were dissected and categorised: Example 1, "Educational therapists have effectively employed projectors to enhance lessons with videos," and Example 2, "Based on my observations, iPads have been utilised for dictionary access and playing games." These instances were coded and classified as "current skill" since the predominant aspect highlighted was the current capability (skill) of DAS educational therapists to incorporate educational technology for enhanced student engagement. Example 3, "DAS educational therapists currently lack sufficient motivation to use educational technologies," was categorised as "current attitude" and subsumed under an emergent theme "Needs positive reinforcement," underscoring the need for more incentives in this domain.

The process of analysing theme-oriented data aggregation advanced until each emerging category reached saturation—a point where novel insights ceased to emerge within the same theme (Glaser and Strauss, 1967).

This analysis commences with an initial set of broad predefined categories, including "organisational objectives," "present skill level," "optimal skill level," "identified gaps," and "potential solutions," while also embracing an inductive approach to uncover nascent themes. Responses to the guiding questions drew substantiation from quantitative and/or qualitative data generated through analysis. Furthermore, data from observations and focus group discussions were utilised to corroborate the responses to the guiding questions.

RESULTS AND FINDINGS

Introduction

This section delineates the process of data analysis, subsequently summarising the principal discoveries concerning the identified tangible issue's significance within the context of DAS. This pertains to the incorporation of educational technologies by

educators. The section further discloses the extant performance disparity between the anticipated expectations from educators and their current utilisation of technology. Lastly, the chapter investigates the necessity for training and explores potential remedies to bridge this performance gap. The pivotal findings have been drawn from an analysis of data culled from five distinct sources:

- Individuals in DAS Management roles,
- DAS Educational Therapists,
- DAS Educational Leaders,
- Lecturer at DAS Academy,
- Subject matter experts.

The information assimilated from these sources constitutes the basis for this discourse.

Findings According to Integrated TNA Model

Within this segment, the researcher responds to the nine guiding questions for Training Needs Assessment (TNA) as outlined in section 4.2 of this paper. These responses adhere to the structure of the Integrated TNA model employed in this study, namely, the 5-Step Integrated Model.

Step 1: What is the real problem?

- TNA Guiding Question 1of 9: What is/are the goals of the organisation in terms of adopting and integrating educational technologies in the Main Literacy Programme?

Upon analysing the insights extracted from the interview session involving DAS management personnel, it emerged that the roles and responsibilities of DAS Educational Therapists have undergone substantial transformation over the years. The division director noted a shifting approach, referring to it as an "evolution" and "upgrades" rather than mere changes (personal communication, March 10, 2020). The assistant directors also concurred that the core job nature—teaching dyslexic learners—has evolved to encompass greater attention to students with additional learning challenges beyond dyslexia. This includes heightened focus on accurate data collection regarding students' learning progress (personal communication, March 11, 2020).

Assistant Director (1) articulated the shift, stating that there has been a notable rise in awareness of speech-language impairment (SLI) issues, ADHD (Attention Deficit Hyperactivity Disorder), behavioral concerns, and emotional needs over the last five years. These aspects were not as pertinent or included when they initially began (personal communication, March 11, 2020).

Currently, the integration and utilisation of educational technologies are in preliminary stages, given that the adoption of such technologies is relatively nascent. DAC perceives that greater use of educational technologies can enhance the support for students with learning differences. Consequently, it has become imperative for DAS educational therapists to intentionally incorporate educational technologies into their lesson plans, adapting to diverse learning needs and the evolving demands of their role. The director emphasised the necessity for therapists to demonstrate and rationalise their selection and usage of suitable educational technologies to attain lesson objectives (personal communication, March 10, 2020).

Similar descriptions of the organisation's technological integration objectives emerged during the focus group discussion with DAS educational leaders. The group highlighted the significance of effective technology use with clear rationales for instructional enhancement, teaching, learning facilitation, and behavior management in the classroom (personal communication, May 4, 2020). Moreover, the discussion revealed that educational therapists face stress and require guidance and scaffolding for successful technology integration.

Regarding training, a DAC lecturer conveyed during the interview that the academy aims for educational therapists to proficiently design lessons with integrated technology to support students with learning differences beyond dyslexia. Therapists should understand the purpose and how technology aligns with this integration to provide access to learning for all learners (personal communication, March 3, 2020).

Upon discerning common themes and recurring patterns outlining DAS's integration goals, it was discerned that the overarching objective is for DAS Educational Therapists to deliberately incorporate educational technologies into their instruction. This integration should be developmentally and educationally suitable, aiding dyslexic learners in achieving desired learning outcomes outlined in the DAS Main Literacy Programme—both within the classroom and in independent home settings.

Step 2: Is it important?

- TNA Guiding Question 2 of 9: What are the real performance problems related to the adoption and integration of educational technologies in the Main Literacy Programme?

- TNA Guiding Question 3 of 9: Are the identified performance problems important to warrant a TNA study?

When inquired about the perceived significance of the identified expectations for the organisation, DAS management personnel affirmed their importance. They highlighted the increasing reliance on educational technologies in the foreseeable future and

stressed the need for DAS educational therapists to meet these expectations. The Director of the Main Literacy Programme articulated intentions to enhance technology utilisation within the programme. This entails initiatives like online parent-teacher communication, progress monitoring, and remedial solutions. She emphasised the absence of a one-size-fits-all approach in the realm of special education, including educational technology usage. Her priority, shared with the DAS general management team, is that educational therapists can make well-informed choices when selecting technology for their students, thus facilitating the educational advancement of dyslexic learners (personal communication, March 10, 2020).

However, she noted that this vital objective is not currently resonating strongly among the Educational Therapists instructing the Main Literacy Programme. On the topic of technology integration's importance to DAS educators, educational leaders expressed unanimous and strong agreement. They indicated that technology integration matters to educational therapists, though at varying levels, primarily due to awareness of its benefits for students, but a perceived lack of confidence in implementation (personal communication, May 4, 2020).

Independent subject matter experts, interviewed separately, corroborated this perspective. They elucidated that considering the trajectory of education guided by the Singapore government– where students are expected to possess digital proficiency in preparation for a digital-driven economy—educators must elevate their competencies to cater to students' learning needs. In the domain of special education, one subject matter expert emphasised the heightened importance of educational technologies, as they provide an array of tools to level the educational playing field for learners with diverse learning profiles (personal communication, March 12, 2020). However, a key challenge lies in the fact that learners need time to become familiar and comfortable with these tools, a process that doesn't occur overnight.

In response to the query of whether these expectations would be met organically over time without intervention, all DAS management personnel and the DAC lecturer disagreed. They pointed out that, at present, while educational therapists recognise the importance of educational technologies, they perceive the integration as optional rather than a pressing priority. Consequently, they are not actively advancing in this realm (personal communication, March 3, 2020). This indicates that the performance issues identified carry substantial significance for DAS management personnel, underscoring the need for this Training Needs Assessment.

Step 3: What are the identified performance gaps and their possible causes?

The gathered data indicates the presence of disparities between the current performance and the desired optimal performance of DAS Educational Therapists concerning the integration of educational technologies into their instructional approach.

Based on the accumulated data, a total of seven discrepancies emerged between the anticipated (optimal) and present (actual) practices, which will be expounded upon in this segment.

In alignment with the Integrated TNA Model adopted for this research, this section will be addressed through the utilisation of four guiding questions.

- TNA Guiding Question 4 of 9: What educational technology related skill, knowledge and attitude should DAS therapists have in order to purposefully integrate it into the Main Literacy Programme curriculum to suit the dyslexic learners?

- TNA Guiding Question 5 of 9: What educational technology related skill, knowledge and attitude do DAS therapists currently have?

- TNA Guiding Question 6 of 9: What are the performance gaps?

- TNA Guiding Question 7 of 9: What could be the possible causes for the performance gaps?

Within this segment, the outcomes will be presented following the sequence of the four guiding questions (4, 5, 6, and 7). The recognised disparities in performance will be organised into distinct categories, namely: a) skill, b) knowledge, and c) attitude, as illustrated in the following table (Table 5).

Table 5: Overview of gaps, optimals, actuals and causes

	GAP	OPTIMAL	ACTUAL	CAUSE(S)
SKILLS	Skill-Gap 1 Skill-Gap 2 Skill-Gap 3 Skill-Gap 4	Skill-Optimal 1 Skill-Optimal 2 Skill-Optimal 3 Skill-Optimal 4	Skill-Actual 1 Skill-Actual 2 Skill-Actual 3 Skill-Actual 4	Skill-Cause 1
KNOWLEDGE	Knowledge-Gap 1 Knowledge-Gap 2	Knowledge-Optimal 1 Knowledge-Optimal 2	Knowledge-Actual 1 Knowledge-Actual 2	Knowledge-Cause 1 Knowledge-Cause 1
ATTITUDE	Attitude-Gap 1	Attitude-Optimal 1	Attitude-Actual 1	Attitude-Cause 1

In Table 5, we can observe a breakdown of identified performance gaps based on skills, knowledge, and attitude. Let's delve into these performance gaps and their underlying causes as well as potential solutions. These insights will be categorised as Skills-Related

Performance Gaps and addressed according to the Integrated TNA Model's guiding questions.

Skills-Related Performance Gaps:

Skill-Gap 1: Manipulate and Integrate Educational Technologies in Teaching
DAS Educational Therapists are not incorporating educational technologies as extensively as expected. The divergence between the anticipated and actual performances is evident in their ability to effectively use and merge these technologies into their lessons.

Skill-Optimal 1: DAS management envisions therapists leveraging a variety of educational technologies in lessons, ideally justifying their choices and demonstrating relevance and value in their teaching methods (personal communication, Mar 10, 2020).

Skill-Actual 1: In both the focus group discussion and survey findings, which comprised 7 agreements and 2 strong agreements out of a total of 10 responses, educational therapists conveyed their acknowledgment that incorporating educational technologies into their lessons is vital to address the learning needs of dyslexic students. In the survey, they self-assessed their current competency levels, with most responses falling within the ratings of 1-3 (unsure, rarely, sometimes). Simultaneously, they indicated higher expected performance levels, with ratings of 4-5 (often, always) for these competencies. For more straightforward tasks involving common applications like MS Word, Google Docs, and MS PowerPoint, their self-rated competencies were generally higher, with ratings of 4-5, aligning with their perceived expectations.

However, when it came to basic functions such as connecting iPads to projectors, 6 out of 10 survey respondents expressed a lower self-assessment, selecting ratings of 1-2 (1 - unsure and 2 - rarely). Consequently, educational therapists expressed a collective sentiment that they felt inadequately prepared to meet these expectations, emphasising the need for additional support to enhance their readiness.

Skill-Gap 2: Plan and Develop Ability-Appropriate Lessons with Educational Technologies
Discrepancies exist between the projected and actual capacities of DAS Educational Therapists to design lessons tailored to student abilities using educational technologies.

Skill-Optimal 2: Educational therapists should be adept at selecting age and skill-appropriate technologies, recognising the significance of accessibility features in addressing dyslexic students' learning needs (personal communication, Mar 11, 2020).

Skill-Actual 2: The results also revealed that DAS Educational Therapists faced challenges in both skill and confidence when it came to planning and implementing differentiated instruction using educational technologies in the classroom. A significant portion of the survey respondents (6 out of 10) expressed uncertainty and infrequent use

(rating of 1-2) regarding their knowledge of accessibility features on iPads and laptops, as well as their proficiency in utilising interactive whiteboards, specifically the Mimio Teach Interactive System. Interestingly, they acknowledged the disparity between their perceived expectations (rated at 4-5) and their actual performance in using the interactive whiteboard system.

Although these therapists were familiar with basic educational technologies such as Microsoft Word, PowerPoint, Google Slides, Google Docs, Kahoot, and Quizizz, the majority (6 out of 10) rated themselves as uncertain or rarely using (rating of 1-2) accessibility features and advanced tools like Flippity, Plickers, and Google Classroom. This aligns with the observations made during the study, where one therapist demonstrated technology integration by using a projector to display a video to students. Additionally, troubleshooting proved challenging for another therapist, who abandoned the process midway, citing time wastage, and continued the lesson without the intended technology component.

Skill-Gap 3: Differentiate Instruction with Educational Technologies Educational therapists struggle to adapt instruction using technology. The capability to deliver tailored instruction, particularly for dyslexic learners with diverse comorbidities and distinct learning needs, is a crucial requirement for all DAS Educational Therapists (Skill-Optimal 3). Despite the emphasis on integrating educational technologies to facilitate differentiated instruction, the observed performance of DAS Educational Therapists falls short of meeting the outlined expectations for differentiated instruction, as indicated in Skill-Actual 3.

Skill-Optimal 3: DAS management personnel emphasised the importance of DAS Educational Therapists conducting lessons with differentiated instructions, involving modifications to lesson objectives and instructions for specific students in the class due to comorbidities, as highlighted by the divisional director during a personal communication on March 10, 2020. The divisional director stressed that the ability of educational therapists to "differentiate instruction using technology" is crucial, given the highly individualised nature of their programme tailored to each learner. Additionally, Assistant Director (1) underscored the necessity for differentiation in the classroom, pointing out that student profiles are becoming increasingly diverse with various co-morbidities. They highlighted the importance of addressing differences in processing speeds and learning abilities among students, including their capacity to retain previously learned concepts.

Skill-Actual 3: The DAS Academy lecturer shared insights into the training provided for Educational Therapists, highlighting the current structure involving two three-hour sessions. The first session focuses on the Student Management System for attendance and administrative tasks, while the second covers the basics of an iPad, conducting digitised assessments, and general classroom applications like Kahoot and Quizizz. These sessions are part of the initial training, but they lack pedagogical training on

utilising educational technologies for differentiated instruction and advanced tools. The survey data, specifically question 4 on ranking training priorities, indicated that DAS educational therapists consider differentiation in the integration of EduTech resources as a top priority. This aligns with the confirmation from the DAS Academy lecturer that differentiation has not been explicitly taught in training sessions for educational therapists. Observations revealed that some therapists attempted instructional differentiation using technology, but these attempts were often simplistic and may not represent the most effective use of technology for differentiation. For example, one therapist had a dyslexic student type a paragraph on an iPad, while others wrote on paper. Although the therapist recognised the need for an alternative platform, more suitable functions, such as speech-to-text, could have better catered to the student's learning needs.

Skill-Gap 4: Assess and Evaluate Students' Learning Progress: DAS Educational Therapists exhibit limited proficiency in assessing and evaluating students' progress using educational technologies, despite self-reported awareness of these tools.

Skill-Optimal 4: DAS Educational Therapists are anticipated to assess and evaluate their students' learning at the conclusion of each lesson while preparing for the next one. According to both assistant directors in the interview, educational technologies are expected to serve a purpose and offer feedback to therapists on students' work. This feedback, as emphasised in a personal communication on March 11, 2020, is considered essential, and it is exemplified in applications like Quizizz, where educators can view students' results, including time taken and whether they reviewed incorrectly answered questions, on their dashboard.

Skill-Actual 4: DAS Educational Therapists displayed varied responses regarding evaluating students' learning progress through educational technologies, with no instances observed during observations. In the focus group discussion, educational leaders noted therapists' awareness of available tools and their timing for assessing and evaluating students' learning. Despite being aware of various tools, therapists tended to stick to their preferred ones, often chosen for their ease of use. However, the selected platform might not offer the necessary information for assessing students' understanding effectively. Consequently, therapists resort to traditional methods, such as paper-based activities, for assessment. Contrarily, in observations, students demonstrated engagement without disruptive behaviors when therapists either utilised or attempted to use technology.

Cause of Skills-Related Performance Gaps:

Skill-Cause 1: Lack of Training
Both the survey and focus group discussions highlighted the deficiency in training for DAS Educational Therapists. Participants emphasised that they lacked the necessary skills and

knowledge to effectively employ educational technologies for differentiated instruction. They expressed a need for more practical examples and demonstrations illustrating how these technologies can facilitate differentiated instruction and how to implement it effectively. A conversation with the DAC lecturer further revealed that training efforts were primarily focused on basics, leaving a gap in equipping therapists with comprehensive technology integration skills. The current training programme involves two three-hour sessions, covering foundational iPad usage and digital assessment administration (personal communication, Mar 3, 2020). 9 out of 10 Educational Therapists indicated in their survey forms that they were keen for training and preferred to attend small-group training sessions with hands-on experience.

Causes of Knowledge-Related Performance Gaps:

Knowledge-Cause 1: Lack of Time

DAS Educational Therapists encounter difficulties in allocating sufficient time for thorough exploration, planning, and selection of educational technologies for their lessons. While recognising the value of technology for dyslexic learners, therapists reported time constraints preventing them from adequately integrating technology into lesson plans. Survey responses indicated unanimous agreement among respondents that they lacked time for both lesson planning and evaluating the appropriateness of educational technologies for their students. Focus group discussions echoed these challenges, attributing the time crunch to a growing administrative workload that curtailed opportunities for comprehensive lesson planning with integrated technology.

Knowledge-Cause 2: Lack of Direct Access to Hardware and Software

The lack of access to requisite hardware (e.g., iPads, Interactive Systems) and software emerged as an additional obstacle for DAS Educational Therapists. Survey responses revealed concerns about limited device availability, with therapists sometimes forced to share or borrow devices due to inadequate supply. Focus group participants shared instances where a class had more students than available devices, leading to cumbersome device-sharing arrangements. Challenges also arose from inconsistent software availability across different devices, impeding seamless application access.

Cause of Attitude-Related Performance Gaps:

Attitude-Cause 1: Lack of Incentive and Recognition

While recognising the significance of educational technologies, DAS Educational Therapists reported a lack of motivation stemming from inadequate incentives, recognition, and support. Survey results demonstrated that 90% of respondents identified these factors as barriers to technology adoption. Focus group discussions emphasised that therapists felt overwhelmed by administrative demands and technology-related information, hindering their capacity to effectively integrate technology into their teaching. Annual audits evaluating lesson completion and quality further dissuaded

therapists from investing significant effort into technology adoption. As a result, many therapists leaned towards traditional teaching methods, using technology only when less stressed.

Step 4: Nature of solutions

In this segment, we will assess whether the determined performance gaps and their underlying causes necessitate instructional or non-instructional remedies. Guided by the Integrated TNA Model employed in this study, this section will be explored through the lens of the following research inquiry:

Guiding Question 8 out of the 9 TNA Queries: Is there a need for training to address the recognised performance gaps?

In alignment with Wile's Comprehensive Human Performance Technology (HPT) Model, the performance challenges linked to DAS Educational Therapists' integration of educational technologies encompass both internal and external factors influencing the therapists. The ensuing table (Table 6) classifies the various performance issues based on the required solution type and whether training is deemed necessary or not.

Training is required to tackle the performance challenge arising from insufficient knowledge and skills in incorporating educational technologies into lessons. Moreover, as indicated in the aforementioned Table 6, there are additional remedies available to tackle the various performance issues encountered by DAS Educational Therapists. These solutions will be thoroughly examined in the subsequent phase.

Step 5: Suggested solutions

In this section, proposed remedies for the identified performance challenges and their underlying causes will be outlined. The purpose of these suggested solutions is to bridge the performance gaps and enable DAS Educational Therapists to meet the expectations set by the management. As guided by the Integrated TNA Model employed in this study, this section will be addressed through the following research question:

Research Question 9 of 9: What are the suggested remedies for the identified performance gaps? Proposed solutions for the first of seven performance gaps: Integrating and Using Educational Technologies in Teaching

All survey participants pointed to a lack of time as a hindrance to their incorporation of educational technologies into lessons. This issue was further deliberated upon during the focus group discussion, where participants explained that Educational Therapists are burdened with considerable administrative tasks that often come with tight timelines. Activities such as parent communication, email responses, meetings, attendance tracking,

Performance Gap	Cause(s)	Possible solutions: Instructional or non-instructional?	
Skills Related			
Manipulate and integrate educational technologies in teaching	Lack of Time	Non- instructional	♦ Provision of editable templates ♦ Repository for educators
Plan and develop ability-appropriate lessons with educational technologies	Lack of Access to Technology	Non- instructional	♦ Redistribute devices Create channels for soft/hardware request
Differentiate instruction with the aid of educational technologies	Lack of Training	Instructional	♦ Training Small Group Practical! Sessions Mentoring
Assess and evaluate students' learning progress		Instructional	
Knowledge Related			
Possess basic troubleshooting knowledge	Lack of Training	Instructional	♦ Instructional Videos on troubleshooting ♦ Job aids
Make appropriate recommendations to parents	Lack of Awareness	Non-Instructional	♦ Promote a supportive and sharing culture
Attitude Related			
Embrace educational technologies with positivity	Lack of incentive and recognition	Non-instructional	♦ Recognise and reward exemplary performance ♦ Include educational technologies in Observational Reports ♦ Peer Coaching ♦ Include the 'whys' when promoting technology

and manual attendance calculations contribute to their non-teaching workload. To encourage Educational Therapists to integrate educational technologies while managing administrative duties, more support can be provided.

Supply of Editable Templates

A viable approach is to offer Educational Therapists templates for games and activities that can be incorporated into their lessons. These templates, which are adaptable, can be modified and reused as lessons are structured within the DAS Main Literacy Programme.

E-Resources Repository

Creating a repository of digital resources would prove advantageous as it serves as a valuable resource hub for ideas and materials. These resources could also include examples and guidance for differentiated instruction.

These suggestions are supported by the research by Cohen, Kalimi and Nachmias (2013). In Cohen et el, 2013, the study delved into the adoption of local learning material repositories by teachers, investigating attitudes, training, and patterns of use. The research involved 103 teachers from four schools, each representing a distinct approach to repository development and integration. 96% of teachers across all four schools were found to actively utilise various repositories. Despite variations in usage patterns, local repositories played a crucial role, supporting a range of activities, including exams, worksheets, presentations, videos, and interactive online resources.

In the study, an in-depth analysis of teachers' use of their schools' repositories revealed varied yet consistent usage across schools. The spectrum of usage ranged from background utilisation (averaging 4.25 on a scale where 1 signifies slight extent and 5 denotes great extent) to offline use for printing worksheets and tests (averaging 4.29). Additionally, teachers employed online materials from the repositories during class lessons for presentations (averaging 4.12), videos and music files (averaging 3.86), and interactive resources like animations and applets (averaging 3.22). Teachers also employed the resources as a foundation for constructing new, adapted lessons (averaging 3.95) or created a blended assortment of various teaching resources (averaging 3.72).

The examination extended to the types of materials contributed to the local repositories. Predominantly, the contributed resources comprised office files of working pages, lesson plans, learning units, tests, and exams (averaging 3.03), along with administration files like calendars of events and holidays, board exams, weekly programs, and timetables (averaging 2.96). Approximately 40% of contributors significantly contributed these resources. Additionally, contributors uploaded links to selected websites and repositories

(averaging 2.79), online assignments (averaging 2.63), links to online tools and applets (averaging 2.31), detailed descriptions of curriculum and special programs (averaging 2.38), and students' works and outcomes (averaging 2.5).

The findings of the study underscored that teachers primarily uploaded resources derived from the general curriculum. However, unique resources related to special programs offered at the school, as well as resources on Google Docs, videos, educational tasks, documentation of processes through images, presentations, and forms, were also contributed to the repositories.

The extensive utilisation of local repositories by teachers can be attributed to the distinctiveness of the materials uploaded and tailored to their specific needs. These materials hold significant relevance and meaning for surveyed school teachers as they are specifically adapted and controllable to align with the curriculum. Teachers highly valued these repositories for their time efficiency and contributions to school knowledge management, ensuring the retention of valuable insights within the organisation.

The study showed that local repositories emerge as integral components of teaching and learning processes, addressing both administrative and pedagogical needs within the school. They facilitate effective use of the organisation's information resources, creating a shared pool of experiences characterised by a common language. Local repositories offer timely responses when searching for information, establish internal standards through a control process, foster the professional development of teaching staff, and preserve organisational knowledge. Recognising the strategic significance of implementing a local repository in an educational institution, it necessitates time for teaching staff to acculturate to the transformative process. Consistent and systematic guidance and training for teachers are vital to managing knowledge effectively and acquiring new skills for the successful implementation of this process (Ayalon et al., 2007).

Solutions for the second of seven performance gaps:

Developing and Planning Apt Lessons with Educational Technologies

To address the challenge of limited access to hardware and software, DAS could a) share devices and b) establish avenues for software requests.

Device Sharing

It is important for Educational Therapists to have easy access to Educational Technologies. Ideally, when an Educational Therapist requires additional iPads beyond their allocated quantity, accessing these extra devices should be feasible. Easy access promotes extensive use, while complicated access discourages integration. It would

therefore be good for Educational Therapists to pre-arrange a buddy system so that they can approach the identified colleagues to loan additional devices if necessary.

Create Software Request Channels

During the focus group discussion, it was mentioned that Educational Therapists lacked access to the iTunes account for downloading iPad applications for lessons. By establishing channels for Educational Therapists to request specific software, both parties benefit. For instance, Google Forms could be implemented within digital repositories for this purpose.

Solutions for the third, fourth, and fifth performance gaps:

Gap 3: Differentiating Instruction with Educational Technologies Gap 4: Assessing and Evaluating Students' Learning Progress Gap 5: Acquiring Basic Troubleshooting Knowledge

DAS could address the proficiency gaps in integrating educational technologies within the Main Literacy Programme by employing a combination of instructional strategies: a) small group practical sessions, b) one-on-one mentoring or buddy systems, and c) the provision of job aids. Survey responses and focus group discussions demonstrated that DAS Educational Therapists favored options a and b.

Structured Training

It is advisable to supplement the rollout of new technologies with formal training sessions, such as webinars or pre-recorded sessions. These sessions provide insight into Educational Therapists' confidence levels in executing tasks as anticipated, indicating the necessity for clarification or improved resources.

Small Group Practical Training Given the dispersion of Educational Therapists across 14 learning centers in Singapore, conducting face-to-face training for all is challenging. Instead, small group practical sessions are more appropriate. These sessions can focus on different lesson components and various student levels.
One-on-One Pairing (Mentoring)

In addition to small group sessions, a buddy system or mentorship can be valuable for Educational Therapists who lack confidence in independently creating and implementing the solutions demonstrated. Peer collaboration ensures that Educational Therapists have a support system for sharing ideas and building confidence in integrating educational technologies. Accomplished Educational Therapists can mentor their colleagues, positively influencing their readiness to embrace technology.

Instructional Videos

Instructional videos provide a reference point for less experienced Educational Therapists. These videos showcase step-by-step troubleshooting processes for new technologies.

Supplying Job Aids

DAS could consider providing job aids as resources to assist Educational Therapists. These aids might encompass operational and troubleshooting guidelines for projectors, iPads, Mimio Teach Interactive Systems, and other upcoming equipment.

It will also be important to bear in mind that aside from supplying training, mentoring, videos and job-aids, teachers' beliefs about the use of technology as a teaching and learning tool needs to be factored in as well.

Kim et al. (2013) showed that when teachers had access to technologies, workshops, and help with technical and teaching methods, the levels of technology use varied. It wasn't just about having technology; what mattered more was the teachers' beliefs about teaching. Teachers who believed in student-centered teaching were better at using technology in their classes. On the other hand, those who believed in teacher-directed teaching were more likely to see technology as an extra, not a central part of their lessons (Kim et al., 2013).

Moreover, if teachers don't know how to use technology, their efforts to use it effectively are often limited (Koehler et al., 2014). This idea builds on the earlier work of Vannatta and Fordham (2004), who found three things that best predicted how a teacher used technology: how much time they invested, their willingness to change, and the amount of training they had in technology.

In the context of science, Guzey and Roehrig (2009) found similar results to Kim et al. (2013). They studied four new secondary science teachers after they attended a summer program on technology integration in science. Two teachers, who were already familiar with technology, felt comfortable using it and actively looked for ways to incorporate it into their science teaching. They also had a teaching style that focused more on students. The other two teachers struggled with integrating technology and had a less student-centered teaching approach.

Besides, instead of only focusing on skills, the suggestions above should include content and pedagogy to have a greater impact on teachers. Putting together content-specific training, videos, and learning groups may offer more value to teachers, which is in line with the TPACK framework. Jimoyiannis (2010), Niess (2005), and Guzey and Roehrig (2009) discovered that teachers became more confident in integrating technology with

science content when they gained experience using technology in subject-specific ways. Also, through observing classrooms at Caldwell, it became evident that teachers in the school had varying levels of technology knowledge, indicating the need for different types of professional development tailored to their specific requirements. The structure that solely emphasises one skill while neglecting pedagogy and content is problematic.

Solutions for the sixth of seven performance gaps:

Making Appropriate Recommendations to Parents

Educational Therapists sometimes lack the confidence to recommend software and applications to parents of DAS students due to their limited knowledge of targeted solutions for dyslexic students with specific learning differences. So having bi-annual handouts with a variety of tools or applications categorised for young and older learners; learners with specific learning differences and ability levels can help. Over time, the therapists would have the confidence to even add their own recommendation in their sharing with parents.

Promotion of a Supportive and Collaborative Culture

To address the rapid pace of updates and new applications in the tech landscape, a supportive work culture that encourages sharing and mutual assistance can prove invaluable. Peer sharing can keep Educational Therapists informed about the latest developments, facilitating their adoption of new technologies.

Solutions for the seventh of seven performance gaps:

Embracing Educational Technologies with Enthusiasm

To encourage technology integration, DAS can acknowledge those who excel in using educational technologies and highlight their achievements in newsletters or emails. Demonstrating the achievements of peers can instill a sense of perseverance and a "can-do" attitude. According to Wyatt (2013), the school environment and climate, and consequently, teachers' sense of relatedness, are influenced by the relationships among colleagues. Carson & Chase (2009) discovered that praise from colleagues can boost teachers' perceived competence and sense of relatedness. Support and assistance in learning from peers can fulfill the needs outlined in Self-Determination Theory (SDT), particularly by improving competence and relatedness. Therefore, the integration of technology practices in schools can be encouraged through the provision of learning support and recognition of efforts in terms of praise or other forms of recognition within the school context (Wyatt, 2013).

Inclusion of Educational Technologies in Evaluation Reports

Educational Therapists mentioned during the focus group discussion that they are assessed during audits based on lesson quality and accurate execution of structured instruction. Including educational technology components in evaluations could motivate Educational Therapists to explore and integrate them into lessons, ultimately fostering familiarity and comfort with such tools.

According to research, high-quality teacher evaluation systems can provide important information about education, work to ensure teacher quality, create a common language around quality instruction, and provide a structure for accountability (Danielson, 2010). To ensure the effectiveness of teacher evaluation, it is crucial that the methods employed and the purpose behind the evaluation are clearly defined (Darling-Hammond, Wise, & Pease, 1983). The process of establishing an effective evaluation system necessitates discussions and agreements on what constitutes excellent teaching and the anticipated outcomes for students (Danielson, 2010). These conversations and the subsequent alignment can guide a teacher evaluation system toward best practices and a comprehensive understanding of quality education.

Once the teacher evaluation system is established, the outcomes derived from evaluations influence decisions ranging from teacher retention and bonuses to professional development opportunities (McDougald, Griffith, Pennington, & Mead, 2016).

Peer Coaching

For Educational Therapists who lack confidence or ability, informal coaching arrangements can be helpful. Coaching ensures deeper, more consistent application of learning compared to independent efforts. This method supports self-reflective practices and rapid integration of learning into lessons.

Stress the "Why" in Technology Promotion

Educational Therapists are primarily motivated by their students' improvement and well-being. Therefore, highlighting the rationale behind adopting educational technology and how it benefits students can increase their motivation to embrace it. This can be tied to the discussion portion of the teacher evaluation - so that it is clear to the teacher how technology can elevate student achievement and lesson objectives.

In summary, a comprehensive range of fourteen potential solutions has been presented in this section to address the three skills-related, two knowledge-related, and one attitude-related performance challenges.

DISCUSSION AND CONCLUSION

Recognising the pivotal role that educational technologies play in equalising opportunities for students with dyslexia, DAC instructors are keen on enhancing educational therapists' utilisation of technology and elevating the depth of meaningful tech integration within the Main Literacy Programme sessions. Therefore, the primary objective of this research was to pinpoint disparities between the expected knowledge and actions of educational therapists regarding the incorporation and utilisation of educational technologies within the DAS Main Literacy Programme, in contrast to their current proficiency and capabilities.

To achieve this, the researcher employed a variety of data collection methods, including surveys, observations, focus groups, and interviews, to gather pertinent information from designated groups within DAS and external subject matter experts. Upon analysing the amassed data, it became evident that seven principal performance issues were contributing to these performance shortcomings. Among these seven issues, four were identified as pertaining to skills, two to knowledge, and one to attitude. Furthermore, the researcher provided recommendations for bridging these performance gaps, along with addressing other challenges faced by DAS educational therapists while integrating educational technologies in line with DAS management's expectations.

With the insights garnered from this Training Needs Analysis (TNA), DAS can allocate resources such as time and personnel for targeted training efforts. This approach aims to create a supportive pathway for DAS Educational Therapists, fostering a heightened and more focused incorporation of educational technologies into the Main Literacy Programme. To fully harness the transformative potential of educational technologies within DAS, a greater emphasis must be placed on evaluating the effectiveness of their integration into the Main Literacy Programme. The intentional integration of educational technologies is not solely driven by the availability of devices and resources; rather, it hinges on how these technologies enhance the learning process. This encompasses a thorough understanding of why Educational Therapists opt for technology integration, how such integration can yield effective outcomes, and how they can be better assisted in embracing and seamlessly integrating educational technologies into their instructional practices.

LIMITATIONS OF STUDY

Sample Size and Generalisation:

One notable limitation of this study is the reliance on a specific sample, namely the teacher population within DAS. The study's outcomes may be constrained by the size of this sample and its specific characteristics. It is essential to acknowledge that the student population was not directly consulted in this research. The decision stems from the study's primary focus on identifying training or non-training-related needs to gauge the current

level of technology usage and its potential among teachers.

The exclusion of student voices is intentional, aligning with the study's objectives. Subsequent research endeavors will address this gap by examining the effectiveness and preferences of learning and teaching materials post-implementation of training or non-training interventions for teachers. Including student perspectives will provide a comprehensive view of the impact of technology on the learning environment.

Contextual Specificity:
Another limitation arises from the study's focus on a specific educational setting, DAS. Consequently, not all of the findings may be directly transferable to other educational institutions with distinct structures, resources, or student populations. However, it is anticipated that the training needs evaluation model (The Integrated Model) and the proposed solutions for addressing identified gaps could prove beneficial for organisations outside the DAS structure but within the broader education industry. These entities may find the model adaptable to their unique contexts.

Self-Report Bias:
The study employed surveys and self-reports for data collection, a method susceptible to response bias, where participants may offer socially acceptable answers. To mitigate this concern, the research design incorporated multiple data collection instruments and employed varied question phrasing. This approach, aimed at eliciting consistent sentiments, provided a degree of triangulation in the gathered data. Additionally, observations were included in the study to enhance the authenticity of reported responses and ensure a more comprehensive understanding of the participants' perspectives.

Time Constraints:
Conducting the study within a specific timeframe introduces limitations regarding the depth and breadth of the investigation. Long-term effects and evolving perspectives over time might not be fully captured. Moreover, the study did not encompass the student perspective concerning meeting learning goals and preferences through technology. The subsequent section will delve into potential future projects that aim to address these aspects and extend the scope of this research.

DIRECTIONS FOR FUTURE RESEARCH

While this study has provided valuable insights into the training and non-training needs of educators in integrating technology within the specific context of DAS, future research endeavors could extend the scope to encompass a more comprehensive understanding of the impact of technology on student learning outcomes. Given the lack of engagement with the student population in this study, it is imperative to include their perspectives in subsequent research. Exploring the effectiveness and preferences of learning and

teaching materials implemented by educators after their training needs are addressed could offer a holistic view. Additionally, future studies might benefit from investigating technology integration in various educational settings beyond DAS. The training needs evaluation model (The Integrated Model) developed in this study could serve as a foundation for assessing and enhancing technology integration practices in diverse educational institutions, contributing to a broader understanding of best practices across the education industry.

Furthermore, longitudinal studies could be employed to track the long-term effects of technology integration and changes in attitudes and practices over an extended period, providing a more nuanced perspective on the dynamic nature of technology use in educational settings.

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ANNEX 1 - FOCUS GROUP DISCUSSION QUESTIONS

FOR EDUCATIONAL THERAPISTS & LEADERS

Focus Group for Educational Therapists and Educational Leaders.

Name of Participant: _____(optional)

Learning Centre: _____(optional)

Dear Educational Therapists / Educational Leaders,

Thank you for participating in this focus group and your responses are very valuable to this study. The information you provide will be kept strictly confidential. You may choose to withdraw from this research participation at any point of time. Please feel free to contact me at soofrina@das.org.sg should you have further questions about this survey or the research.

Expected Involvement:

This focus group discussion will focus your training and support needs in incorporating educational technologies (Educational technologies) into your lesson designs. The session will be approximately 90-minutes long.

Background of Research:

This research is conducted by Soofrina, the Educational technologies Coordinator of Dyslexia Association of Singapore, for the purpose of the dissertation for Master of Arts (instructional Design and Technology). The information you provide will be used for analysing the training needs among DAS Educational Therapists in their efforts to integrate Educational technologies resources into the MLP programme.

Thank you for putting aside some time to complete this focus group. Your responses are very valuable to this research and will help to shape the Educational technologies initiatives in the near future.

Focus Group with Educational Therapists (EdTs) and Educational Leaders

I thank you for taking time off your busy schedule to provide some valuable insights about the perceptions and actual integration of Educational technologies resources in the MLP Programme.

Rest assured that your responses to me will be kept strictly confidential and anonymous. Your individual names nor any identifiers will not be captured in the report. These questions will take us about forty-five minutes.

*Educational technologies = Educational Technologies

Research Focus	TNA Integrated Model Step
Organisational Goals	Step 1: Determination of real performance problem

Understanding of Organisation's goals for Educational technologies Integration:

1. What does the term Educational technologies (Educational Technologies) mean to you?
   a. (PROBE) How would you define Educational technologies? (if answer to (1) is no1 clear)

   b. (PROBE) Can you comment on the organisation's vision for the use of educational technologies in the MLP classroom?

2. Could you please describe to me briefly how you envision the use of Educational technologies in DAS classrooms to be in the next 3-5 years?
   (if participant is not clear of organisation's goals in(]))

3. Does integrating Educational technologies in MLP lessons really matter to EdTs?
   PROBES:
   a. Is there a favorable outcome for integrating Educational technologies tools?

   b. Is there an undesirable outcome of not integrating Educational technologies tools?

   c. Is there a source of satisfaction or pride in conducting a MLP lesson by integrating Educational technologies tools?

Research Focus	TNA Integrated Model Step
Identification of real and critical performance problems	Step 2: Determination of the importance of the problem

4. Is there a difference between what is being done and how you have envisioned it (what is supposed to be done)?

5. How beneficial or important is the integration of Educational technologies in MLP lessons for dyslexic students?

6. How important then, is the therapists' readiness to embrace and adopt these educational technologies?

7. If the current usage of Educational technologies tools are left status quo, would it affect the goal of the DAS in integrating Educational technologies into the MLP lesson?

Research Focus	TNA Integrated Model Step
Realisation of performance deficiencies (gap)	**Step 3: Realising the gap between the optimal and actual performances and possible causes**

Optimals:

8. How might the integration of Educational technologies tools and devices elevate learning for dyslexic learners?
(PROBE)
    a. What possible pedagogical or practical benefits to learning and teaching can educational technologies bring?

9. What educational technologies related skills and knowledge do you think a therapists teaching the MLP lesson needs to have in order to achieve the benefits in (1)?

10. I am sure we can agree that we will never be able to catch up with technology due to its constant evolvement. How can this relate to the attitudes of the therapists in embracing and integrating educational technologies in the MLP classes?

Actuals:

11. What resources (educational technology devices and softwares) are currently available to therapists teaching the MLP classes?

12. Would you be able to share on the take-up rate of these hardware and software?

13. How would you describe the typical integration of Educational technologies in the DAS MLP classroom?
    a. In your experience or observations, how are the Educational technologies tools integrated in the classrooms? (if answer to (2) is not clear)

Causes:

14. What are some of the reac;;ons (barriers) you can identify for low motivation in integrating educational technologies in MLP classes?

15. How incentivised are the therapists to use educational technologies in the MLP classroom?

Research Focus	TNA Integrated Model Step
Nature of solution (training or non-training)	**Step 4: Deciding if bridging the gap requires training**

Is the problem internal or external to the therapists?

16. Could therapists integrate educational technologies at the desired level if they were really required to do it?

17. Are the therapists' present skills adequate for the desired performance (level of tech-integration)?

18. Are there obstacles to integrating Educational technologies tools in the MLP classroom PROBES:
    a. What prevents/ acts as barriers for EdT to integrate Educational technologies tools in the MLP classroom?
    b. Do EdTs know what is expected in terms of Educational technologies integration in the class?
    c. Are there conflicting demands on EdTs' time?
    d. Do EdTs lack time or tools?
    e. Are there restrictive policies or practices? (eg a "right way of doing it"?)

19. Are information pertaining to integration of educational technologies sufficiently and readily available to the therapists?

If external, is it a tangible or intangible factor to the therapists?

Identify which 3 of the following 10 attributes would be of importance to enable therapists to integrate educational technologies at the ideal standards: (Researcher to take a vote)

- ☐ Provision of clear goals on the use of educational technologies
- ☐ Availability of educational technology related policies
- ☐ Appropriate workload for therapists
- ☐ Provision of timely feedback on therapists' use of educational technologies
- ☐ Provision of positive reinforcements for therapists' use of educational technologies
- ☐ Availability of instructional manuals to operate educational technologies
- ☐ Provision of sufficient tools (iPads, Mimio Teach Interactive Systems etc)
- ☐ Proper classroom layouts (wall PowerPoints) for the integration of educational technologies
- ☐ Sufficient on the job training to integrate educational technologies
- ☐ Structured training on the integration of educational technologies

Research Focus	TNA Integrated Model Step
Suggestions	**Step 5: Providing possible solutions**

Possible Solutions:

20. Given the tight schedules of the therapists, what mode of training do you think would best suit the therapists? Some examples include face to face training, e-learning

21. How well do you think EdTs would respond to such training approaches?

22. Is there a down-time for therapists (a period where they are usually more available) to attend training sessions?

23. How can EdTs be evaluated in their use of Educational technologies resources.

ANNEX 2 – INTERVIEW QUESTIONS

FOR MANAGEMENT PERSONNEL

Interview with Management Personnel

Name of Management Personnel: _____ (Optional)

Position _____ (Optional)

Dear _____

Thank you for participating in this interview. Your responses are very valuable to this study. The information you provide will be kep strictly confidential. You may choose to withdraw from this research participation at any point of time. Please feel free to contact me at soofrina@das.org.sg should you hae further questions abou this survey or the research.

Expected Involvement

This interview will focus on your thoughts and beliefs with regards to EdTs' training support needs in incorporating Educational Technologies into lesson designs as well as what is expected of them in this aspect. The session will be approximately 45 minutes long.

Background of Research:

This research is conducted by Soofrina, the Educational Technologies Coordinator of the Dyslexia Association of Singapore, for the purpose of the dissertation for Master of Arts (Instructional Design and Technology). The information you provide will be used for analysing the training needs among DAS EdTs in their efforts to integrate Educational Technologies resources into the Main Literacy Programme.

Thank you for putting aside some time to do this interview with Soofrina. Your sharing is very valuable to this research and will help to shape the Educational Technologies initiatives in the near future.

Interview with Management Personnel

I thank you for taking time off your busy schedule to provide some valuable insights about the perceptions and actual integration of educational technologies at the DAS. The following questions will help me to understand the current and optimal Educational technologies integration. This interview will take approximately forty-five minutes. Please feel free to let me know if you need a break or of you want to end this interview.

Introduction:

1. Could you please share how long you have been with the DAS?

2. Of these number of years, how many years were you directly teaching dyslexic learners?

3. Do you think the approach to teaching dyslexic learners has evolved over the years? If yes, how so?

Thank you for the introduction and for sharing your overall views. I will now ask you some questions pertaining to your perception of Educational technologies - the abbreviation for educational technologies.

Research Focus	TNA Integrated Model Step
Organisational Goals	Step 1: Determination of real performance problem

Understanding organisational goals:

4. What does the term Educational technologies (Educational Technologies) mean to you?

5. How would you define Educational technologies? (if answer to (I) is not clear)

6. How would you describe the ideal integration of Educational technologies in the classroom?

7. In your opinion, what is a right mix of Educational technologies tools in the lesson design? (if answer to (3) is not clear)

8. Could you please describe to me briefly how you envision the use of Educational technologies in DAS classrooms in the next 3-5 years?

Understanding the performance problem:

9. Do you think training is required for the successful integration of Educational technologies in MLP classrooms?
   PROBES:
   a. Why do you think there is a training need?

b. What is the difference between what is being done and what is supposed to be done (discrepancy)?

c. What will happen if the discrepancy is left alone?

d. Do you suppose there's dissatisfaction about the current performance (of integrating Educational technologies in MLP lessons?)

10. Is the inability/not integrating Educational technologies related to skill deficiency? PROBES:

a. Could EdTs do it if it was made mandatory/ really required to do it?

b. Arc EdT's present skills adequate for the desired level of Educational technologies usage?

If participants agree that it is a skill deficiency, use the following questions and prompts:

10.1. Could the EdTs demonstrate a good level of use of Educational technologies tools in the classroom in the past?

10.2. How often is the skill of integrating Educational technologies tools in the MLP lesson used?

10.3. How do EdTs find out if about how well they are integrating Educational technologies in the classroom?

10.4. Is there regular feedback on the integration?

10.5. Could there be a simpler solution - ie: provision of job aids, storing of information somewhere more accessible, demonstrations instead of trainings, informal coaching sessions?

11. Is the inability/not integrating Educational technologies related to knowledge deficiency?

(f participants agree that it is a knowledge deficiency, use the following questions and prompts):

11.1. Did EdTs know how to integrate Educational technologies tools in the past?

11.2. How has the knowledge been lost/ misplaced?

If participants disagree that it is a skill nor knowledge deficiency, use the following questions and prompts:

11.3. Is the desired performance punishing? What is the consequence of performing as desired?

Research Focus	TNA Integrated Model Step
Identification of real and critical performance problems	**Step 2: Determination of the importance of the problem**

12. How important then, is the therapists' readiness to embrace and adopt these educational technologies?

13. If the current usage of Educational technologies tools are left status quo, would it affect the goal of the DAS in integrating Educational technologies into the MLP lesson?

Research Focus	TNA Integrated Model Step
Realisation of performance deficiencies (gap)	**Step 3: Realising the gap between the optimal and actual performances and possible causes**

Optimals:

14. Could you identify some pros and cons relating to the integration of Educational technologies inthe classroom?

15. How might the integration of Educational technologies tools and devices elevate learning for dyslexic learners?

16. At your level, you would have seen and evaluated your therapists' lessons. What would you like to see more of - with the use of Educational technologies in the classrooms?

17. If we were to establish a base-level standard for the integration of Educational technologies tools, how would you describe that?

18. Tn order to achieve that (3), what skills, knowledge and attitude do therapists need to be equipped with?

19. I am sure that you will agree with me that not all therapists would have the same baseline knowledge and skills in using and integrating Educational technologies tools. What support would therapists need to integrate Educational technologies appropriately?

20. If Educational technologies training is provided at the DAS for therapists, what skills and knowledge should therapists have gained after the training?

Actuals:

21. What Educational technologies resources are available to therapists and students at the DAS?

22. How is the distribution of these resources like? (iPads and Interactive Smart Boards)

23. What percentage of the time are these resources used in teaching the dyslexic learners?

24. What Educational technologies skills and knowledge do your therapists have currently?

25. How are these therapists currently supported?

26. Can you describe a typical classroom scenario where the therapists has appropriately used the Educational technologies resources?

27. How competent are the therapists in integrating Educational technologies resources into the lesson plan?

28. Are therapists incentivized to use Educational technologies resources in the classroom?

29. What type of support are available to therapists to integrate Educational technologies resources appropriately?

30. Are there upcoming plans to expand the use of Educational technologies at DAS?

Research Focus	TNA Integrated Model Step
Nature of solution (training or non-training)	**Step 4: Deciding if bridging the gap requires training**

Is the problem internal or external to the therapists?

31. Could therapists integrate educational technologies at the desired level if they were really required to do it?

32. Are the therapists' present skills adequate for the desired performance (level of tech-integration)?

33. Are there obstacles to integrating Educational technologies tools in the MLP classroom? PROBES:

    a. What prevents / acts as barriers for EdT to integrate Educational technologies tools in the MLP classroom?

    B. Do EdTs know what is expected in terms of Educational technologies integration in the class?

    c. Are there conflicting demands on EdTs' time?

    d. Do EdTs lack time or tools?

e. Are there restrictive policies or practices? (eg a "right way of doing it"?)

34. Are information pertaining to integration of educational technologies sufficiently and readily available to the therapists?

Research Focus	TNA Integrated Model Step
Suggestions	**Step 5: Providing possible solutions**

35. What mode of training do you think will suit the therapists the best given their current work load? e-learning, face to face 3 hour training sessions, a mixture of both (blended learning)

Others:

36. Do you have any other comments?

ANNEX 3 – INTERVIEW QUESTIONS

FOR DAS ACADEMY LECTURERS

For subject matter experts in the field of Special Educational Needs:

DAS Academy Lecturer

Interview with DAS Academy Lecturer

Name of Lecturer: _____ (Optional)

Position _____ (Optional)

Dear _____

Thank you for participating in this interview. Your responses are very valuable to this study. The information you provide will be kep strictly confidential. You may choose to withdraw from this research participation at any point of time. Please feel free to contact me at soofrina@das.org.sg should you hae further questions abou this survey or the research.

Expected Involvement

This interview will focus on your thoughts and beliefs with regards to EdTs' training support needs in incorporating Educational Technologies into lesson designs as well as what is expected of them in this aspect. The session will be approximately 45 minutes long.

Background of Research:

This research is conducted by Soofrina, the Educational Technologies Coordinator of the Dyslexia Association of Singapore, for the purpose of the dissertation for Master of Arts (Instructional Design and Technology). The information you provide will be used for analysing the training needs among DAS EdTs in their efforts to integrate Educational Technologies resources into the Main Literacy Programme.

Thank you for putting aside some time to do this interview with Soofrina. Your sharing is very valuable to this research and will help to shape the Educational Technologies initiatives in the near future.

Interview with DAS Academy Lecturer

I thank you for taking time off your busy schedule to provide some valuable insights about the perceptions and actual integration of educational technologies at the DAS. The following questions will help me to understand the current and optimal Educational technologies integration by the MLP EdTs in their interventions for dyslexic students. This interview will take approximately forty-five minutes. Please feel free to let me know if you need a break or of you want to end this interview.

Introduction:

1. Could you please share how long you have been with the DAS?

2. Of these number of years, how many years were you directly teaching dyslexic learners?

3. Do you think the approach to teaching dyslexic learners has evolved over the years? If yes, how so?

Thank you for the introduction and for sharing your overall views. I will now ask you some questions pertaining to your perception of Educational technologies - the abbreviation for educational technologies.

Research Focus	TNA Integrated Model Step
Identification of real and critical performance problems	**Step 2: Determination of the importance of the problem**

Importance of Educational technologies in the MLP Classroom:

4. What is/are the goals of the organisation in terms of adopting and integrating educational technologies in the Main Literacy Programme?

5. On a scale of 1-5, how would you rate the importance of Educational technologies integration in the MLP classroom? (1= not important at all, 5 = very important)

   If participant selects options 1-2, use the following prompts:

   5.1. Why do you think that the integration of Educational technologies tools are not important in the MLP classroom?

   5.2. If you feel that the integration of Educational technologies in MLP classrooms is not important, how do you think the needs of today's dyslexic student (who are infamously known to be more tech savvy than adults) can be met without the Educational technologies tools?

5.3. Would you then agree that a lesson without Educational technologies tools can be as equally engaging for the dyslexic student as compared to a lesson with the integration of Educational technologies tools?

If participant selects options 4-5, use the following prompts:

5.4. Why do you think that the integration of Educational technologies tools are important in the MLP classroom?

5.5. How do you think Educational technologies tools support and/or enhance the dyslexic learner's learning experience?

5.6. If things remain the way they are, do you think

4. **Therapists' readiness in integrating Educational technologies tools in MLP classroom**

6. Could you tell me about the coverage of educational technologies in the initial training?

7. Do you think EdTs understand the benefits of integrating Educational technologies tools in the classroom?

8. How soon do you think an EdT is ready to integrate Educational technologies tools in the classroom, upon the initial EdT training (DELA)?

Research Focus	TNA Integrated Model Step
Suggestions	Step 5: Providing possible solutions

EdTs' training needs

9. How are trainings usually planned for therapists? (what is a good time period)

10. What motivates a therapist to attend training?

ANNEX 4 – INTERVIEW QUESTIONS (S.M.Es)

For subject matter experts in the field of Educational Technologies

Interview with Subject Matter Experts

Name of Expert: _____ **(Optional)**

Position _____ **(Optional)**

Dear _____

Thank you for participating in this interview. Your responses are very valuable to this study. The information you provide will be kep strictly confidential. You may choose to withdraw from this research participation at any point of time. Please feel free to contact me at soofrina@das.org.sg should you hae further questions abou this survey or the research.

Expected Involvement

This interview will focus on your thoughts and beliefs with regards to EdTs' training support needs in incorporating Educational Technologies into lesson designs as well as what is expected of them in this aspect. The session will be approximately 45 minutes long.

Background of Research:

This research is conducted by Soofrina, the Educational Technologies Coordinator of the Dyslexia Association of Singapore, for the purpose of the dissertation for Master of Arts (Instructional Design and Technology). The information you provide will be used for analysing the training needs among DAS EdTs in their efforts to integrate Educational Technologies resources into the Main Literacy Programme.

Thank you for putting aside some time to do this interview with Soofrina. Your sharing is very valuable to this research and will help to shape the Educational Technologies initiatives in the near future.

Interview with Subject Matter of Educational Technologies

I thank you for taking time off your busy schedule to provide some valuable insights about the perceptions and actual integration of educational technologies at the DAS. The following questions will help me to understand the cunent and optin1al standards of Educational technologies integration by educators in their interventions for dyslexic students. This interview will take approximately forty-five minutes. Please feel free to let me know if you need a break or of you want to end this interview.

Introduction:

1. Could you please share how long you've been an advocate for the integration of Educational technologies tools for learners with special needs?

2. What keeps you motivated or makes you passionate about the advocacy?

3. Could you share with me a success story of how Educational technologies helped a learner (dyslexic if possible) when Educational technologies tools were introduced in the classroom?

Skills and knowledge:

4. In your Line of work, you would have managed and helped to estabUsh training standards for the integration of Educational technologies tools. What skills and knowledge should educators have in order to integrate Educational technologies into the lesson?

5. Could you provide some examples from the people you have worked with?

Support:

6. What forms of support do educators need in order to integrate Educational technologies tools in the lessons?

7. What about training - how rigorously or frequently should trainings take place?

8. In what other forms can support come in?

9. Could you share with me a success story of how educators embraced Educational technologies tools after some training or non-trnining initiatives were put in place?

ANNEX 5 – OBSERVATION SHEET

Name of Observer:_____ Date: _____ Class Code: _____

- 1 Observation sheet per Observation
- Other details about the class: _____

Lesson Description: ♦ Software used ♦ Materials used ♦ Hardware used ♦ Objective / Approach	**Observation and Notes on Perceived Student Engagement**	**SAMR** ♦ Substitution ♦ - Augmentation ♦ - Modification ♦ Redefinition	**Duration and other remarks** (EdT's competence in utilising hard/software/ Appropriateness of hard/ software for activities etc)

	Remarks	Not Observed	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
The Educational technologies tool(s) used meets the need of the learner.							
The Educational technologies tool/ material is a replication of existing activity that can be carried out without technology							
The students prepared/ briefed on how to use the Educational technologies tool appropriately.							
The students are aware of how to manipulate the technology to suit their learning needs on their own.							
The EdT is able to manipulate the technology to suit the learning need of the students.							
The EdT is able to deliver differentiated instruction to the students using Educational technologies tool(s).							
The Educational technologies tool meet the students at their current skill levels.							
The EdT is able to perform troubleshooting on the spot.							
The EdT spent minimum/ acceptable time in preparing the Educational technologies tools/ materials during class time.							

ANNEX 6 - SURVEY FOR EDUCATIONAL THERAPISTS

Interview with Educational Therapists

Name of Therapist: _____ **(Optional)**

Learning Centre: _____ **(Optional)**

Dear _____

Thank you for participating in this interview. Your responses are very valuable to this study. The information you provide will be kep strictly confidential. You may choose to withdraw from this research participation at any point of time. Please feel free to contact me at soofrina@das.org.sg should you hae further questions abou this survey or the research.

Expected Involvement:

This survey consists of 3 parts (Section A, B and C). All 3 parts will require approximately 10 minutes for completion altogether. Please provide your honest feedback.

Background of Research:

This research is conducted by Soofrina, the Educational Technologies Coordinator of the Dyslexia Association of Singapore, for the purpose of the dissertation for Master of Arts (Instructional Design and Technology). The information you provide will be used for analysing the training needs among DAS EdTs in their efforts to integrate Educational Technologies resources into the Main Literacy Programme.

Thank you for putting aside some time to do this interview with Soofrina. Your sharing is very valuable to this research and will help to shape the Educational Technologies initiatives in the near future.

SECTION A: Understanding therapists' current task-related performances

Please read the task-related questions below and tick the box that which best represents you.

		Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
1	I can use most of the Educational technologies resources fairly well to integrate them into my lessons.					
2	I generally learn new technologies fairly easily.					
3	I have the technical skills I need to operate most of the educational technologies.					
4	I know how to solve my own technical issues (basic troubleshooting for Wi-Fi connectivity, printing etc).					
5	I am able to use web-based collaboration tools in my lesson plans.					
6	I am able to use a wide range of online tools in my classroom (Kahoot, Padlet, Google Docs etc)					
		Strongly Agree	**Agree**	**Neutral**	**Disagree**	**Strongly Disagree**
7	I am able to use Educational technologies to stimulate my students' critical thinking about real world problems.					
8	I am able to use Educational technologies to guide my students to manage their own learning.					
9	I am able to use Educational technologies to help my students reflect on their own learning.					
10	I am able to facilitate students to engage in collaborative knowledge construction with Educational technologies resources.					
11	I am able to guide my students to construct representations of learning using Educational technologies.					
12	I can use appropriate technologies for the content I have developed for my teaching (eg: multimedia, interactive activities)					
13	I can teach lessons that appropriately combine the subject matter, Educational technologies resource and teaching approach/pedagogy.					
14	I can use strategies that combine content, Educational technologies resources, and teaching approaches that I learnt about in my trainings.					
15	I can select Educational technologies resources to use in my classroom that can enhance what I teach, how I teach and what my students learn.					
16	I can provide leadership in helping other EdTs coordinate the use of Educational technologies resources, content and teaching approaches at the DAS.					

SECTION B: Therapists' Current and Expected Educational Technologies related performances

Please read the questions below and circle the number that which best represents you. On the left side, indicate what your current levels are. On the right side, indicate which level is expected of you. Please provide two (2) responses for each item.

Circle the number that represents your current level of competency.					(1) Unsure (2) Rarely (3) Sometimes (4) Often (5) Always	Circle the number that represents your expected level of competency.				
1	2	3	4	5	Apply basic skills on iPad (save/print/share a working document, etc)	1	2	3	4	5
1	2	3	4	5	Connect the iPad to the laptop to transfer files	1	2	3	4	5
1	2	3	4	5	Connect the iPad to the projector	1	2	3	4	5
1	2	3	4	5	Set up and operate the Mimio Teah Interactive System	1	2	3	4	5
1	2	3	4	5	Teach and deliver activities through the Mimio Teach Interactive System	1	2	3	4	5
1	2	3	4	5	Connect the iPads to the Munio Teach Interactive System	1	2	3	4	5
1	2	3	4	5	Apply basic skills on the Minuo Teach Interactive System (save/print/modify a working document, etc)	1	2	3	4	5
1	2	3	4	5	I can perform simple troubleshooting on the iPad	1	2	3	4	5
1	2	3	4	5	T can perform simple troubleshooting on the Mimio Teach Interactive System	1	2	3	4	5
1	2	3	4	5	Perform simple troubleshooting on the projector	1	2	3	4	5
1	2	3	4	5	Evaluate the appropriateness of an Educational technologies tool for dyslexic learners.	1	2	3	4	5
1	2	3	4	5	Use a simple software to create worksheets (MS Word / Google Doc etc)	1	2	3	4	5
1	2	3	4	5	Use advanced software to create lesson materials (Powtoons / Plickers etc)	1	2	3	4	5
1	2	3	4	5	Enhance lesson materials with appropriate pre-designed multi-media (images, videos etc)	1	2	3	4	5
1	2	3	4	5	Enhance lesson materials with self-designed multi- media (images, videos etc)	1	2	3	4	5
1	2	3	4	5	Present information to students via simple software (MS PowerPoint, Google Slides etc)	1	2	3	4	5
1	2	3	4	5	Present information to students via advanced software (Trello, Google Site etc)	1	2	3	4	5
1	2	3	4	5	Draw a picture/diagram using Google Drawing, MS Paint	1	2	3	4	5
1	2	3	4	5	Use Educational technologies to improve students' work (spell-check, text-to-speech, etc)	1	2	3	4	5
1	2	3	4	5	Match Educational technologies resources to students' learning needs	1	2	3	4	5
1	2	3	4	5	Share with parents appropriate Educational technologies resources	1	2	3	4	5

SECTION C: Therapists' Attitudes About Educational Technologies and Refated Training

Please tick the appropriate response and write your response in the spaces provided.

"Educational Technologies (Educational technologies) should be purposefully integrated into the curriculum so that its integration is developmentally and educationally appropriate; and provides opportunities for dyslexic learners to achieve the desired learning outcomes of the DAS Main Literacy Programme."

1. Which of the following responses best describes your attitude towards the statement above?

   ☐ Strongly Agree
   ☐ Agree
   ☐ Unsure / Neutral
   ☐ Disagree
   ☐ Strongly Disagree

2. What does the term "Educational technologies should be purposefully integrated" mean to you?

   _____

   _____

   _____

3. Which of the following best describes your feelings about attending training on the use of Educational technologies for teaching and learning?

   ☐ Keen
   ☐ Neutral
   ☐ Not keen

4. Assume that training on the purposeful integration of educational technologies (Educational technologies) for teaching and learning is conducted at the DAS for MLP Programme. What would be your training priorities? Rank the following topics according to what you feel you should get trained in. Please use number 1 to represent your top priority, number 2 to represent your second priority, up to 3

	Topic	Area of Application
1	Introduction to different Educational Technology Resources - General overview of hardware, software and online resources	**What** are the Educational Technology Resources available to me? (general)
2	Lesson planning with the integration of Educational technologies	**How** can I plan my lessons with Educational technologies Resources? **Why** is the Educational technologies resource appropriate?
3	Preparing a variety of lesson materials with Educational technologies	**Where** can I access various Educational technologies resources? **How** can I put together lesson materials using Educational technologies?
4	Educational technologies for student's learning - Independent learning - Collaborative work - As an assistive tool	**How** can I differentiate the types of purposes in the integration of Educational technologies resources?
5	Assessing my integration of Educational technologies for teaching	**How** can I assess my integration level as a reflective practitioner?
6	Setup and Troubleshooting of Educational technologies hardware	**How** can I set up and troubleshoot the various hardware?
7	Other	

1. What types of educational technology (Educational technologies) related training do you prefer? Rank the top 3 topics according to your preferences. Please write the letter (A - F) according to the rank.

Training Approach	
A.	Attend formal 'workshop conducted by DAS Educational technologies representatives or external professionals (2-3 hours)
B.	Attend small group training session by DAS Educational technologies representatives with hands-on sharing
C.	Have sharing online (Educational technologies website/ emails/ e-newsletters)
D.	Learn from video tutorials only
E.	Have peer mentoring / coaching
F.	Others:

RANK 1	RANK2	RANK3

SECTION D: Factor that affect performance

The following table lists possible barriers to the efficient usage of educational technologies. Which of the following do you think will affect the use of educational technologies in DAS? Tick (against the box that correspond with your response (major factor/ factor I not a factor)

Possible causes of performance deficiencies	Factor	Not a factor
Difficulty accessing the Educational technologies software		
Difficulty accessing the Educational technologies hardware		
Lack of technical support		
Lack of Educational technologies training/ sharing		
Educational therapists are not motivated to try new Educational technologies resources / hardware		
Educational therapists lack technical skills and knowledge in using Educational technologies resources/ hardware		
Educationa.l therapists fear losing control over the lesson if Educational technologies is integrated in the lesson		
Educational therapists not having enough time for lesson planning with Educational technologies		
Educational therapists having little time to evaluate Educational technologies resources' appropriateness for specific lesson components		
Educational therapists feel that Educational technologies will be a source of distraction for dyslexic learners		
Others: (Please state)		

SECTION E: EDT's Background

Please tick the responses that best describe you.

1	What is your gender?	Male		Female										
2	What is your age group?	21 to 30		31 to 40		41 to 50		51 60		60+				
3	What is your highest academic qualification?	Diploma		Degree		Post-Graduate		Master Degree		Doctorate				
4	Years in teaching dyslexic students?	1-5 yrs		6-10 yrs		11-15 yrs		16-20 yrs		21-25 yrs		>25 yrs		