

MEANINGFUL OUTCOMES FOR SCHOOL-BASED SPEECH-LANGUAGE
THERAPY

MEASURING WHAT MATTERS: MEANINGFUL OUTCOMES FOR SCHOOL-
BASED SPEECH LANGUAGE THERAPY

By PETER CAHILL, M.Sc.

A Thesis Submitted to the School of Graduate Studies in Partial Fulfilment of the
Requirement for the Degree Doctor of Philosophy

McMaster University © Copyright by Peter Cahill, June 2023

McMaster University DOCTOR OF PHILOSOPHY (2023) Hamilton, Ontario
(Rehabilitation Science)

TITLE: Measuring what matters: Meaningful outcomes for school-based speech-language therapy

AUTHOR: Peter Cahill, M.Sc. (Dalhousie University)

SUPERVISOR: Dr. Wenonah N. Campbell

NUMBER OF PAGES: xiii, 1793

LAY ABSTRACT

School-based speech-language services provide important social and academic supports to children throughout their school years. To better understand if these services are achieving meaningful results for children and families, we wanted to know what people think is a meaningful result. In our first study, we asked speech-language therapists working in schools how they knew they were achieving meaningful results from their work. In our second study, we discussed what results were most important with family members, teachers, and speech-language therapists. Finally, in our third study, we combined all perspectives into a single list of most important service results to guide future research and quality improvement work. Together, these three studies provide important information on what results we want to achieve, which include important results for students, teachers and families, and the school system. The most important result was providing a holistic approach to support children, their families, and school communities.

ABSTRACT

Outcomes are critical for informing evidence-based, shared decision-making about health supports for children. These outcomes should be important and meaningful to all interested parties, particularly to children and their families, and should be included within research and practice. The work in the present manuscript represents three studies that 1) investigated how service outcomes were being used in school-based, speech-language therapy 2) explored what service outcomes were meaningful and important according to interested parties, and 3) identified a set of core service outcomes using the aggregate input of the interested parties to guide future research and practice.

In the first study, I analyzed interview transcripts from 24 senior, school-based speech-language therapists and clinical managers to explore how clinicians working in schools determined the impact of their services. I identified seven outcomes and common facilitators and barriers to the meaningful use of outcomes to determine service impact through this qualitative analysis.

In the second study, I interviewed 14 school-based speech-language therapists, teachers, and family members of children receiving supports. I asked participants to speak to the outcomes or impacts of these services they thought were most important or valuable. I identified six outcomes using both qualitative and quantitative analysis techniques.

In the third study, I combined the perspectives of these three groups of interested parties into a single set of core outcomes for school-based, speech-language services. The result is a suggested set of impacts to include in research and practice.

Including these core outcomes in research will improve the relevance of clinic-external evidence (research studies), providing more pertinent information to shared decision making about speech-language supports in schools. Their inclusion in clinical practice will strengthen clinic-internal evidence (data about specific programs or services) about the appropriateness of supports in context, and will assist the development of local, contextualized evidence for speech-language services.

ACKNOWLEDGEMENTS

To everyone who has made this journey possible, friends, family, and colleagues, I cannot sufficiently express my gratitude.

I want to thank my supervisory committee for their guidance, support, and patience during these past years. I am grateful to Dr. Lyn Turkstra for her disciplinary perspective, deep knowledge of the profession of speech-language therapy, and guidance in writing with purpose and clarity. I would like to thank Dr. Mark Ferro for his direction and assistance with quantitative modelling, and for his focus on real-world impact. I am also grateful to Dr. Stella Ng for her support with qualitative methods, and her focus on discovering and fostering agency for positive change.

I would like to particularly thank those who have journeyed beside me throughout this program, literally from day one: Khang Nguyen, Laura García Díaz, and Jill Van Damme. It has been an honour to walk alongside you.

Lukas Kusiak has been foundational to my wellbeing and success. This journey would have been impossible with his unfailing support. Particularly given the timing of this journey, I am beyond grateful for the company and empathy throughout.

Finally, I would like to thank my exceptional and irreplaceable supervisor, Dr. Wenonah Campbell. Her support, guidance, and constant scaffolding provided the essential context which allowed me to explore, take calculated risks, and engage deeply with challenging problems and exciting solutions. I have an eternal debt to Dr. Campbell, which I can only hope to be able to pay forward to future aspiring scholars and community members.

TABLE OF CONTENTS

CHAPTER 1: SCHOOL-BASED SERVICES, TIERS, AND OUTCOMES	1
1. TIERED SERVICES	2
i. <i>Tier 1 services</i>	3
ii. <i>Tier 2 services</i>	4
iii. <i>Tier 3 services</i>	5
2. EVIDENCE FOR TIERED MODELS	6
3. CURRENT PROGRAMME THEORY FOR TIERED MODELS	9
4. IDENTIFYING THE VALUED OUTCOMES OF TIERED MODELS IN SCHOOLS	10
5. PROJECT OVERVIEW	12
6. REFERENCES	15
CHAPTER 2: OUTCOMES MANAGEMENT PRACTICES IN TIERED SCHOOL-BASED SPEECH- LANGUAGE THERAPY: A CANADIAN EXAMPLE	27
7. BACKGROUND	35
8. AIMS	40
9. METHODS & PROCEDURES	41
iv. <i>Ethics approval</i>	43
v. <i>Data analysis</i>	44
vi. <i>Trustworthiness</i>	46
10. FINDINGS & RESULTS	46
vii. <i>Student-level outcomes</i>	51
viii. <i>Relational outcomes</i>	53
ix. <i>Systems-level outcomes</i>	55
x. <i>Successes of outcomes management</i>	57
xi. <i>Challenges of outcomes management</i>	59
11. DISCUSSION	64
12. LIMITATIONS	68
13. CONCLUSION & IMPLICATIONS	69
14. REFERENCES	70
CHAPTER 3: EXPLORING THE VALUED OUTCOMES OF SCHOOL-BASED SPEECH-LANGUAGE THERAPY SERVICES: A SEQUENTIAL ITERATIVE DESIGN	78
15. BACKGROUND	82
16. METHODS	85
xii. <i>Ethics</i>	86
xiii. <i>Sampling strategy</i>	86
xiv. <i>Participants</i>	87
xv. <i>Materials and procedures</i>	87
xvi. <i>Data analysis</i>	88
xvii. <i>Legitimizing inferences</i>	91
17. RESULTS	92
xviii. <i>Step 1. Data familiarization</i>	92
xix. <i>Step 2. Structural topic modeling</i>	92
xx. <i>Step 3. Qualitative interpretation and categorization</i>	98

18. DISCUSSION	109
19. LIMITATIONS.....	113
20. CONCLUSION	114
21. REFERENCES	118
CHAPTER 4: CORE OUTCOMES FOR SPEECH-LANGUAGE SERVICES IN SCHOOLS: A GROUP CONCEPT MAPPING STUDY	
22. INTRODUCTION	128
23. OBJECTIVES	132
24. METHODS	132
xxi. <i>Ethics</i>	132
xxii. <i>Sampling</i>	133
xxiii. <i>Participants</i>	133
xxiv. <i>Materials</i>	134
xxv. <i>Procedures</i>	134
xxvi. <i>Data analysis and modelling</i>	135
25. RESULTS	138
xxvii. <i>Sorting</i>	138
xxviii. <i>Rating</i>	142
26. DISCUSSION	150
27. LIMITATIONS.....	154
28. CONCLUSION	156
29. REFERENCES	159
CHAPTER 5: PROJECT OUTCOMES AND FUTURE DIRECTIONS.....	
30. SUMMARY OF KEY FINDINGS.....	169
xxix. <i>Integrated findings</i>	171
31. MAJOR PROJECT LIMITATIONS	177
32. IMPLICATIONS FOR PRACTICE AND POLICY	180
33. RECOMMENDATIONS FOR IMPLEMENTATION	182
34. RECOMMENDATIONS FOR FUTURE RESEARCH.....	183
35. CONCLUSION	186
36. REFERENCES	188

LIST OF FIGURES

Figure 1: Visual representation of outcomes management, assessment, and measurement	36
Figure 2: Semantic coherence and exclusivity per topic model	94
Figure 3: S-LT topic proportion differences compared to teachers with point estimates and 95% confidence intervals.....	97
Figure 4: S-LT topic proportion differences compared to families with point estimates and 95% confidence intervals.....	98
Figure 5: Point map showing accepted multidimensional scaling solution.....	139
Figure 6: Cluster map for seven-cluster solution.....	141
Figure 7: Pattern match graph of overall importance and feasibility ratings for each outcome on absolute scale	143
Figure 8: Pattern match graph for outcome importance by participant group on a relative scale	144
Figure 9: Pattern match graph for outcome feasibility by participant group on a relative scale	145

LIST OF TABLES

Table 1: Deductive coding matrix	44
Table 2: Outcomes and illustrative quotes organised by outcome domain	47
Table 3: Associated words per topic for six-topic model.....	95
Table 4: Core Outcome Set for school-based speech-language services with recommended and promising indicators.....	146

LIST OF ABBREVIATIONS AND SYMBOLS

COS – core outcome set

GCM – group concept mapping

S-LP – speech-language pathologist

S-LPs – speech-language pathologists

SLT – speech-language therapy

S-LT – speech-language therapist

S-LTs – speech-language therapists

STM – structural topic modeling

DECLARATION OF ACADEMIC ACHIEVEMENT

The present document contains a manuscript-style dissertation, where Chapters 2-4 represent three empirical studies, each building upon the previous, to develop a programmatic line of inquiry regarding meaningful outcomes management for school-based, speech-language therapy services. I am the first and lead author on all papers included in this dissertation, providing original and significant contributions to advancing research and clinical practice in my field of speech-language therapy. Chapters 2-4 have been prepared for submission as stand-alone manuscripts to peer-reviewed journals in speech-language therapy and health services research. Chapter 2 has been published in the International Journal of Language and Communication Disorders. Further details on the empirical chapters follows.

Chapter 2

I conceptualized the study aims. With the guidance of Dr. Wenonah Campbell and Dr. Stella Ng, I selected the most appropriate qualitative research design and analysis techniques. This study was a secondary data analysis of data from a previous study conceptualized by Dr. Wenonah Campbell and Leah Dix. Dr. Wenonah Campbell and Leah Dix developed the interview guide which generated the data, and Leah Dix also performed all interviews. I performed all data analysis with the support and critique of Dr. Wenonah Campbell. All co-authors (Dr. Mark Ferro, Dr. Stella Ng, and Dr. Lyn Turkstra) provided critical feedback to improve the manuscript in significant ways.

Chapter 3

I conceptualized the study aims with the guidance of all co-authors. I designed the study with the input of Dr. Wenonah Campbell and Dr. Stella Ng, particularly regarding the use of mixed methods. I obtained ethics approval, collected all data, performed qualitative and quantitative data analysis, and prepared the manuscript. Dr. Wenonah Campbell provided peer debriefing support. I prepared the manuscript with the guidance of Dr. Wenonah Campbell. All co-authors (Dr. Mark Ferro, Dr. Stella Ng, and Dr. Lyn Turkstra) reviewed the manuscript and provided substantive, critical feedback on the same.

Chapter 4

I conceptualized the study aims and design with the guidance of all co-authors. Similar to Chapter 3, I obtained ethics approval, collected all data, performed qualitative and quantitative data analysis, and prepared the manuscript. Dr. Wenonah Campbell participated in all peer debriefing. I prepared the manuscript with the assistance of Dr. Wenonah Campbell, and all co-authors (Dr. Mark Ferro, Dr. Stella Ng, and Dr. Lyn Turkstra) provided critical review.

Chapter 1: School-based services, tiers, and outcomes

School-based health services play a crucial role in supporting child health and wellbeing (Noland et al., 2004) by improving both health and educational outcomes (Kolbe, 2019). Indeed, school-based services frequently fill gaps in other clinical services and reach many underserved populations (Hoagwood & Johnson, 2003), providing important supports to marginalized individuals and populations. Rehabilitation professionals are one such important school-based health service (Ng et al., 2015). Physiotherapists, occupational therapists, and speech-language therapists (SLTs) aim to support children by meeting the diverse needs of all children (Anaby et al., 2019; VanderKaay et al., 2021). SLTs have an essential role in supporting the success of children in their core school activities, with communication foundational to learning and interacting at school (Ehren, 2000).

Communication disorders are the second most common disability in schools (McLeod & McKinnon, 2007), and are associated with numerous long-term effects on child wellbeing, including poor psychosocial health throughout the life span (Dubois et al., 2020), poor socio-economic outcomes (Dubois et al., 2020), reduced educational success (McLeod et al., 2019), and increased health service utilization and spending throughout childhood (Le et al., 2020). Estimates indicate that over sixty percent of children with a communication disorder will not receive any speech-language therapy services, and are the second least likely group of children to have formal accommodations and supports put in place at their schools (McLeod & McKinnon, 2007). Further, these

children consistently fall behind throughout their educational journey across domains of learning (McLeod et al., 2019). Partly in response to these intense needs, many school-based speech-language services have or are currently transitioning to tiered models of service delivery (Anaby et al., 2019; P. T. Cahill et al., 2022; Sanger, Mohling, et al., 2012; Sanger, Snow, et al., 2012; VanderKaay et al., 2021).

Tiered services

Tiered models of service delivery are designed to offer several types of supports to students (Grosche & Volpe, 2013; McIntosh et al., 2011). Tiered models contrast with traditional, biomedically oriented service delivery models based on identification of diagnosable conditions and placement on health service caseload for intensive intervention (Grosche & Volpe, 2013; McIntosh et al., 2011). Such traditional approaches to health service supports in schools reinforce all-or-nothing thinking, where children either do or do not qualify for supports (Grosche & Volpe, 2013; McIntosh et al., 2011). They also promote a one-size-fits-all approach, where children, regardless of the intensity of their needs, are pulled out of their social and academic learning in the classroom to receive a specified dose of therapy, frequently one-on-one with the clinician or paraprofessional (Grosche & Volpe, 2013; McIntosh et al., 2011). By contrast, tiered models offer a range of supports to better match student needs. Although there are several tiered models currently in practice across the globe, including Response to Intervention (Grosche & Volpe, 2013; McIntosh et al., 2011), Multi-Tiered Systems of Supports (Jimerson et al., 2016), and Partnering for Change (Missiuna et al., 2012), among others,

the use of *tiers* (types or levels of support) is common across all models (VanderKaay et al., 2021). In these models, children are offered school-wide health supports, with additional levels or *tiers* of support being added to match children's needs (Ebbels et al., 2019; Grosche & Volpe, 2013; McIntosh et al., 2011). Below, we further describe how SLTs may be involved in each tier, including both intervention and assessment, surveying briefly across tiered models. It is important to note that children are not assigned to a specific tier, and instead, therapists can offer services across tiers to support each student's unique learning needs.

Tier 1 services

In the first tier, all children receive evidence-based supports (Ebbels et al., 2019; McIntosh et al., 2011). These services focus on preventative or health promotion activities (Anaby et al., 2019). From a disciplinary perspective, these services should offer opportunities for communicative development and enrichment across school activities. Services may include collaborating with educators to develop classroom activities and materials, or adapting existing curricular activities to allow greater access and participation of all children, regardless of their specific skill sets (Kennedy et al., 2018). Tier 1 services may also involve facilitating or coordinating access to appropriate technologies or resources to encourage the active involvement of all children (Kennedy et al., 2018). Another Tier 1 service is advocacy by rehabilitation professionals to communicate to other stakeholders, such as administrators, educators, and families, the value that universal services can offer to students, even those without an identified disability (Kennedy et al., 2018). This tier may also include the provision of specific

enrichment programming (usually with prescribed doses and durations) which have been tested in empirical research (Campbell et al., 2016; Grosche & Volpe, 2013).

Tier 1 also includes important assessment activities for SLTs. Universal screening for educational difficulties and developmental challenges is considered a core practice of tiered models (Campbell et al., 2016; Ehren & Nelson, 2005; Sanger, Mohling, et al., 2012), and is a tier one service. There are different approaches to universal screening. For example, in RtI models this may take the form of formalized, periodic testing (Campbell et al., 2016). Although in practice in some RtI models, the SLT may not be involved in either the administration of the formal testing or the selection of the concepts to be tested, which reflects an area for professional growth and advocacy (Ehren & Nelson, 2005). For example, SLTs should have a voice in the selection of appropriate techniques to screen for communication challenges across their scope of practice and may support the implementation of the same through educator training (Ehren & Nelson, 2005). In other tiered models, dynamic performance analysis (Campbell et al., 2016; Polatajko et al., 2000) or dynamic assessment (Hasson & Joffe, 2007) is used by clinicians embedded within the classroom to determine how children respond to specific strategies within context to ground the decision making about supports in ecologically valid data from trial implementation (Campbell et al., 2016). Regardless of the specific universal screening approach used in a tiered model, the goal is similar: to determine the communication health needs of the student population and to match all children with appropriate services.

Tier 2 services

In the second tier, SLTs provide targeted interventions, frequently but not exclusively in small group formats (Ebbels et al., 2019; McIntosh et al., 2011). This tier may take the form of specific, manualized interventions (Campbell et al., 2016), the form of educator-led small group programming following professional development training by SLTs (Ebbels et al., 2019), or it may be *targeted services* and/or *differentiated instruction* (Campbell et al., 2016), with classroom activities modified to increase access to core instructional activities. Assessment activities in Tier 2 are similar to those at Tier 1, and may use diverse approaches to determining whether, given the current supports offered at Tiers 1 and 2 are adequately meeting students' needs (Grigorenko, 2009; Gustafson et al., 2014; Wagner & Compton, 2011).

Tier 3 services

In the third tier, children with complex needs and those who need additional support beyond the first and second tiers receive more intensive, individualized supports (Ebbels et al., 2019; McIntosh et al., 2011), and this includes services that are delivered directly by an SLT or under SLT supervision, such as delivery via a supervised paraprofessional (Ebbels et al., 2019). This tier may also include individually focused supports beyond traditional direct intervention, such as participation in team meetings and focused consultations with educators and parents, as well as contribution to individualized education plans. Full clinical assessments of all communication domains are also most likely to occur at the third tier (Archibald, 2017). Intervention and assessment at this tier

are most similar to traditional clinical practice and familiar across audiences, and so will not be discussed further.

Evidence for tiered models

SLTs are responsible for supporting children with speech, language, and communication needs in schools (Speech-Language and Audiology Canada, 2019) applying the most relevant and robust evidence. These professionals should be involved in evidence-based decision-making ranging from meeting the needs of an individual student to designing the service delivery model for a school or district (Speech-Language and Audiology Canada, 2019), although providing guidance regarding service delivery models and practices remains a challenge (McKenna et al., 2021). Consequently, evidence regarding the outcomes of tiered models is essential in supporting clinicians in making evidence-based decision or recommendations about how services should be structured in their schools. Practicing via tiered models is thought to have numerous benefits. Previous literature has attested to potential positive outcomes from using tiered models, including: improved student skills (Bleses et al., 2018; Ohl et al., 2013; Throneburg et al., 2000), increased student wellbeing and participation (Campbell et al., 2012; Wilson & Harris, 2018), reduced waiting lists and wait times (Camden et al., 2015), earlier identification of student needs (S. M. Cahill et al., 2014), expanded educator and family capacities to support children with diverse needs (Campbell et al., 2016; Throneburg et al., 2000; Wilson & Harris, 2018), prevention of subsequent academic or

social sequelae (Campbell et al., 2012, 2016; Wilson & Harris, 2018), and finally more responsive and tailorable services (Ebbels et al., 2019; Wilson & Harris, 2018).

However, several drawbacks to tiered models have also been noted, as tiered models can have both intended and unintended impacts (VanderKaay et al., 2021). These include: role confusion and organizational coordination challenges (Bleses et al., 2018; S. M. Cahill et al., 2014; Sanger, Snow, et al., 2012; Wilson & Harris, 2018), variable clinician skills for implementing high-quality supports at each tier (S. M. Cahill et al., 2014; Sanger, Snow, et al., 2012), and increased demands on resource utilization (Campbell et al., 2012; Sanger, Snow, et al., 2012; Wilson & Harris, 2018), such as clinician and educator time (Ebbels et al., 2019). Clearly, choice of a service delivery model is a complicated issue, with numerous competing outcomes to consider, and uncertainty about tiered models is often reported by practicing SLTs (Sanger, Mohling, et al., 2012; Sanger, Snow, et al., 2012).

There have been attempts to synthesize the existing peer-reviewed literature to generate evidence-based recommendations regarding the structuring of speech-language services in schools. In their review, Cirrin and colleagues (2010) reached the conclusion that research on the topic is highly limited and preliminary, and that clinicians must rely heavily on reason-based practice to make recommendations regarding service delivery. A recent update and expansion of this review reached the same conclusion (Archibald, 2017). Ebbels and colleagues (2019) come to more definitive recommendations in their

review,¹ producing a tiered care pathway for children with language disorders; however, they note that many, if not most, key questions remain unresolved. Indeed, what outcomes (intended and unintended) can be achieved through tiered models, and how the same can be achieved, remains unclear, in large part due to the lack of relevant theory to guide research and practice (VanderKaay et al., 2021). In response to this, VanderKaay et al. (2021) began development of a programme theory for tiered services. A programme theory is a theoretical causal model that links service inputs and activities to (a chain of) outcomes (Rogers, 2008). This programme theory (VanderKaay et al., 2021), although still in development, provides some indication of the core mechanisms that achieve programme outcomes, as well as the necessary contexts for these mechanisms to operate. Such a theory for tiered services would be immensely helpful for understanding and improving these services.

Indeed, until initial work by VanderKaay and colleagues (2021), research on tiered service delivery models would be best characterized as “black box (Rogers, 2000, p. 212)” programme evaluations. A black box programme evaluation consists of offering a programme and assessing whether it achieves desired or intended outcomes without interrogating the processes or mechanisms that generated these outcomes (Rogers, 2000). Such programme evaluations are appropriate when the programme itself is highly standardized (Rogers, 2000). If one of the benefits of tiered services is that they are more bespoke, responsive to student and school needs, then they are clearly not standardized

¹ Note that these recommendations provided by Ebbels and colleagues come generally from conflating a lack of evidence for evidence of lack, deprioritizing SLT involvement in Tiers 1 and 2 due to the fact that relatively little research has been conducted on these tiers.

and consequently understanding the processes and mechanisms is clearly essential.

Therefore, black box approaches to evaluating tiered services are inappropriate. Other fields of health, particularly public health, have recognized that understanding complex causal chains is essential to expanding the evidence base and providing meaningful and relevant research (Green, 2006, 2009; Sourial et al., 2018; Victora et al., 2004). This is particularly true for school-based practice, as organizational and social patterns within schools have been found to have a greater effect on educational outcomes than do student skills or aptitudes (Hoagwood & Johnson, 2003). Understanding the school system and how the various tiers of speech-language supports interact with said system would greatly support evidence-based decision making and provide relevant evidence to guide practicing SLTs. Consequently, a robust programme theory is critical for evaluating school-based, tiered services and generating relevant and impactful evidence to guide practice.

Current programme theory for tiered models

The initial version of the programme theory by VanderKaay et al. (2021) is an explanatory programme theory. Consistent with its underlying methodology, the goal is to understand and explain tiered services, including emergent or unintended outcomes (VanderKaay et al., 2021). To build this initial version of the programme theory, the authors conducted a realist synthesis (Pawson et al., 2005), systematically collecting and synthesizing diverse types of relevant literature to identify what works, where, and for whom (VanderKaay et al., 2021). The programme theory includes three main

mechanisms: fostering collaborative relationships, delivering authentic services, and building capacity for all (VanderKaay et al., 2021). These mechanisms operate within micro-, meso-, and macro-level contexts, and generate various outcomes. Outcomes include impacts for students, families and educators, and the school system (VanderKaay et al., 2021).

This programme theory for tiered services is descriptive, with the goal of understanding how a programme functions, rather than prescriptive, establishing how services should be structured or operated (VanderKaay et al., 2021). To build a specific programme (i.e., an actual, implemented tiered model), it is important to establish what are the desired outcomes, or success conditions by which the programme can be evaluated (Pope et al., 2010). Identifying outcomes for a programme theory are an important first step in a programme evaluation (Pope et al., 2010). For this reason, the aim of this research portfolio was to identify the important or valued outcomes of tiered models in collaboration with interested parties. This project would then set the stage for future programme evaluation, research, and quality improvement initiatives.

Identifying the valued outcomes of tiered models in schools

Identifying the most important outcomes of tiered models is therefore essential. However, this begs the question: what is important and to whom? As health services strive to become person- and family-centred, the collaborative identification of outcomes is essential (Kuo et al., 2012). Healthcare providers bring knowledge regarding the options and expected outcomes of care approaches, whereas only individuals and families

can identify which of these outcomes are the most important (Kuo et al., 2012) and should consequently guide the course of care. The perspectives of healthcare providers can differ in consequential ways from those of individuals receiving care and their families (Alaszenwski et al., 2004; Mühlbacher & Juhnke, 2013). For this reason, shared decision making between provider and client are considered an essential aspect of contemporary practice within healthcare and a core feature of evidence-based decision-making (Barratt, 2008). Therefore, SLTs and families should both be involved in selecting the most important outcomes of tiered models.

However, tiered models in schools have an additional intricacy. Specifically, SLTs work within the educational system (Anaby et al., 2019), collaborating with educational staff as a core aspect of their practice (Archibald, 2017), and striving to support children's social and academic success within their school environment as a key practice goal (P. T. Cahill et al., 2022). It is also evident that SLTs value their collaboration with educators, and report that building solid, trusting, collaborative relationships with teachers is essential to successful practice in schools (P. T. Cahill et al., 2022; Terreberry et al., 2021). Therefore, the perspective of educators is also relevant to defining the outcomes of SLT services. Including educators in the selection of relevant outcomes for SLT services in schools is additionally crucial, as a substantial divide between outcomes in SLT and educational research has been noted, with SLT studies focusing on skill deficit measures, whereas educational studies have focused on participation and environmental supports (Gallagher et al., 2019). In the context of identifying the most important outcomes of school-based services as a clinical program

rather than a specific clinical technique, the perspectives of these three groups are therefore essential, and combining their recommendations will enrich the findings and ensure that the identified outcomes are indeed important to all interested parties.

Project overview

In this project, I engaged SLTs, family members, and educators in identifying the core outcomes for tiered SLT services in schools. To ensure that the entire project is contextualized within current practice, I began the project by exploring outcomes management in Ontario schoolboards. Outcomes management is the process of interpreting outcomes data to make inferences about the success of services, or to identify the need for a change in course (Frattali, 2013; Golper, 2013), and is thought to support clinicians in their decision-making by providing direct evidence about service effectiveness and appropriateness as relevant to the specific individuals and populations served (Cohen & Hula, 2020; Hesketh & Sage, 1999; Skeat & Perry, 2008). I sought to understand how clinicians working in school boards were practicing outcomes management to ensure that identifying the core outcomes of tiered services would meet a current clinical need and to better contextualize eventual results. Consequently, I performed a secondary directed content analysis (Elo & Kyngäs, 2008; Hsieh & Shannon, 2005) of interviews with senior clinicians and clinical managers from across Ontario school boards. This work can be found in chapter two.

Next, I explored what outcomes all relevant parties (clinicians, educators, and family members) would report as important. Particularly, I used open-ended and flexible

methods that would allow for the discovery of outcomes potentially not present in the disciplinary literature. I also explored if there were differences in how participant groups would discuss outcomes, both qualitatively (what they said about each outcome) and quantitatively (how much conversational space they would dedicate to each outcome). Consequently, I conducted a study using a sequential, iterative, mixed-methods design (Teddlie & Tashakkori, 2009). I interpreted interview data from relevant parties using mixed-methods content analysis (Isoaho et al., 2021), embedding structural topic modelling (Lucas et al., 2015; Roberts et al., 2014, 2016) within multiple rounds of qualitative interpretation. This work can be found in chapter 3.

Thirdly, I constructed a core outcome set to guide future research and clinical program evaluation and quality improvement initiatives from participant perspectives. To achieve this, I conducted a group concept mapping study (Kane & Trochim, 2007; Trochim & Kane, 2005). Participants sorted outcome ideas into groups based on conceptual similarity and then rated each idea for its importance and feasibility. I aggregated and analyzed the sorting data using hierarchical cluster analysis (Orsi, 2017) and the ratings data through descriptive statistics and data visualization. The results from this study yielded a core outcome set, as well as suggestions regarding the most appropriate assessment techniques for each outcome. This work can be found in chapter 4.

Finally, I conclude this work in a summary discussion in chapter 5. In this discussion, I summarize key results and synthesize across the three empirical chapters. I further explore the implications for practice and policy and address important limitations

of the project as a whole. Finally, I make recommendations for future research and propose new directions for the profession of speech-language therapy.

References

- Alaszenwski, A., Alaszewski, H., & Potter, J. (2004). The bereavement model, stroke and rehabilitation: A critical analysis of the use of a psychological model in professional practice. *Disability and Rehabilitation, 26*(18), 1067–1078.
<https://doi.org/10.1080/09638280410001703521>
- Anaby, D. R., Campbell, W. N., Missiuna, C. A., Shaw, S. R., Bennett, S., Khan, S., Tremblay, S., Kalubi-Lukusa, J. C., & Camden, C. (2019). Recommended practices to organize and deliver school-based services for children with disabilities: A scoping review. *Child: Care, Health and Development, 45*(1), 15–27.
<https://doi.org/10.1111/cch.12621>
- Archibald, L. M. (2017). SLP-educator classroom collaboration: A review to inform reason-based practice. *Autism & Developmental Language Impairments, 2*, 1–17.
<https://doi.org/10.1177/2396941516680369>
- Barratt, A. (2008). Evidence Based Medicine and Shared Decision Making: The challenge of getting both evidence and preferences into health care. *Patient Education and Counseling, 73*(3), 407–412.
<https://doi.org/10.1016/j.pec.2008.07.054>
- Bleses, D., Højen, A., Justice, L. M., Dale, P. S., Dybdal, L., Piasta, S. B., Markussen-Brown, J., Clausen, M., & Haghish, E. F. (2018). The Effectiveness of a large-scale language and preliteracy intervention: The SPELL randomized controlled trial in Denmark. *Child Development, 89*(4), e342–e363. <https://doi.org/10.1111/cdev.12859>
- Cahill, P. T., Ng, S. L., Dix, L., Ferro, M. A., Turkstra, L. S., & Campbell, W. N. (2022).

Outcomes management practices in tiered school-based speech-language therapy: A Canadian example. *International Journal of Language and Communication Disorders*, advance on. doi: 10.1111/1460-6984.12822

Cahill, S. M., McGuire, B., Krumdick, N. D., & Lee, M. M. (2014). National survey of occupational therapy practitioners' involvement in Response to Intervention. *American Journal of Occupational Therapy*, 68(6), e234–e240.
<https://doi.org/10.5014/ajot.2014.010116>

Camden, C., Léger, F., Morel, J., & Missiuna, C. (2015). A service delivery model for children with DCD based on principles of best practice. *Physical and Occupational Therapy in Pediatrics*, 35(4), 412–425.
<https://doi.org/10.3109/01942638.2014.978932>

Campbell, W. N., Kennedy, J., Pollock, N., & Missiuna, C. A. (2016). Screening children through Response to Intervention and dynamic performance analysis: The example of Partnering for Change. *Current Developmental Disorders Reports*, 3(3), 200–205.
<https://doi.org/10.1007/s40474-016-0094-6>

Campbell, W. N., Missiuna, C. A., Rivard, L. M., & Pollock, N. A. (2012). Support for everyone: Experiences of occupational therapists delivering a new model of school-based service. *Canadian Journal of Occupational Therapy*, 79(1), 51–59.
<https://doi.org/10.2182/cjot.2012.79.1.7>

Cirrin, F. M., Schooling, T. L., Nelson, N. W., Diehl, S. F., Perry, F. F., Staskowski, M., Zoann Torrey, T., & Adamczyk, D. F. (2010). Evidence-based systematic review: Effects of different service delivery models on communication outcomes for

elementary school-age children. *Language, Speech, and Hearing Services in Schools*, 41, 233–264.

Cohen, M. L., & Hula, W. D. (2020). Patient-reported outcomes and evidence-based practice in speech-language pathology. *American Journal of Speech-Language Pathology*, 29(February), 357–370.

Dubois, P., St-Pierre, M. C., Desmarais, C., & Guay, F. (2020). Young adults with developmental language disorder: A systematic review of education, employment, and independent living outcomes. *Journal of Speech, Language, and Hearing Research*, 63(11), 3786–3800. https://doi.org/10.1044/2020_JSLHR-20-00127

Ebbels, S. H., McCartney, E., Slonims, V., Dockrell, J. E., & Norbury, C. F. (2019). Evidence-based pathways to intervention for children with language disorders. *International Journal of Language and Communication Disorders*, 54(1), 3–19. <https://doi.org/10.1111/1460-6984.12387>

Ehren, B. J. (2000). Maintaining a therapeutic focus and sharing responsibility for student success: Keys to in-classroom speech-language services. *Language, Speech, and Hearing Services in Schools*, 31(3), 219–229. <https://doi.org/10.1044/0161-1461.3103.219>

Ehren, B. J., & Nelson, N. W. (2005). The responsiveness to intervention approach and language impairment. *Topics in Language Disorders*, 25(2), 120–131. <https://doi.org/10.1097/00011363-200504000-00005>

Elo, S., & Kyngäs, H. (2008). The qualitative content analysis process. *Journal of Advanced Nursing*, 62(1), 107–115. <https://doi.org/10.1111/j.1365->

2648.2007.04569.x

- Frattali, C. M. (2013). Outcomes measurement: Definitions, dimensions, and perspectives. In C. M. Frattali & L. A. C. Golper (Eds.), *Outcomes in Speech-Language Pathology* (2nd ed., pp. 3–24). Thieme Medical Publishers, Inc.
- Gallagher, A. L., Murphy, C. A., Conway, P., & Perry, A. (2019). Consequential differences in perspectives and practices concerning children with developmental language disorders: An integrative review. *International Journal of Language and Communication Disorders*, 54(4), 529–552. <https://doi.org/10.1111/1460-6984.12469>
- Golper, L. A. C. (2013). Outcomes measurement: Converging issues, trends, and influences. In C. M. Frattali & L. A. C. Golper (Eds.), *Outcomes in Speech-Language Pathology* (2nd ed., pp. 25–57). Thieme Medical Publishers, Inc.
- Green, L. W. (2006). Public health asks of systems science: To advance our evidence-based practice, can you help us get more practice-based evidence? *American Journal of Public Health*, 96(3), 406–409. <https://doi.org/10.2105/AJPH.2005.066035>
- Green, L. W. (2009). Making research relevant: If it is an evidence-based practice, where's the practice-based evidence? *Family Practice*, 25(SUPPL. 1), 20–24. <https://doi.org/10.1093/fampra/cmn055>
- Grigorenko, E. L. (2009). Dynamic assessment and Response to Intervention: Two sides of one coin. *Journal of Learning Disabilities*, 42(2), 111–132. <https://doi.org/10.1016/j.biotechadv.2011.08.021>. Secreted
- Grosche, M., & Volpe, R. J. (2013). Response-to-intervention (RTI) as a model to

facilitate inclusion for students with learning and behaviour problems. *European Journal of Special Needs Education*, 28(3), 254–269.

<https://doi.org/10.1080/08856257.2013.768452>

Gustafson, S., Svensson, I., & Fälth, L. (2014). Response to Intervention and dynamic assessment: Implementing systematic, dynamic and individualised Interventions in primary school. *International Journal of Disability, Development and Education*, 61(1), 27–43. <https://doi.org/10.1080/1034912X.2014.878538>

Hasson, N., & Joffe, V. (2007). The case for dynamic assessment in speech and language therapy. *Child Language Teaching and Therapy*, 23(1), 9–25.

<https://doi.org/10.1177/0265659007072142>

Hesketh, A., & Sage, K. (1999). For better, for worse: Outcome measurement in speech and language therapy. *Advances in Speech-Language Pathology*, 1(1), 37–45.

<https://doi.org/10.3109/14417049909167152>

Hoagwood, K., & Johnson, J. (2003). School psychology: A public health framework. I. From evidence-based practices to evidence-based policies. *Journal of School Psychology*, 41(1), 3–21. [https://doi.org/10.1016/S0022-4405\(02\)00141-3](https://doi.org/10.1016/S0022-4405(02)00141-3)

Hsieh, H. F., & Shannon, S. E. (2005). Three approaches to qualitative content analysis. *Qualitative Health Research*, 15(9), 1277–1288.

<https://doi.org/10.1177/1049732305276687>

Isoaho, K., Gritsenko, D., & Mäkelä, E. (2021). Topic modeling and text analysis for qualitative policy research. *Policy Studies Journal*, 49(1), 300–324.

<https://doi.org/10.1111/psj.12343>

- Jimerson, S. R., Burns, M. K., & VanDerHeyden, A. M. (2016). From Response to Intervention to Multi-Tiered Systems of Support: Advances in the science and practice of assessment and intervention. In S. R. Jimerson, M. K. Burns, & A. M. VanDerHeyden (Eds.), *Handbook of Response to Intervention: The science and practice of multi-tiered systems of support* (2nd ed., pp. 1–6). Springer Science+Business Media.
- Kane, M., & Trochim, W. (2007). *Concept mapping for planning and evaluation*. SAGE Publications, Inc.
- Kennedy, J., Missiuna, C., Pollock, N., Wu, S., Yost, J., & Campbell, W. (2018). A scoping review to explore how universal design for learning is described and implemented by rehabilitation health professionals in school settings. *Child: Care, Health and Development*, *44*(5), 670–688. <https://doi.org/10.1111/cch.12576>
- Kolbe, L. J. (2019). School Health as a Strategy to Improve Both Public Health and Education. *Annual Review of Public Health*, *40*, 443–463. <https://doi.org/10.1146/annurev-publhealth-040218-043727>
- Kuo, D. Z., Houtrow, A. J., Arango, P., Kuhlthau, K. A., Simmons, J. M., & Neff, J. M. (2012). Family-centered care: Current applications and future directions in pediatric health care. *Maternal and Child Health Journal*, *16*(2), 297–305. <https://doi.org/10.1007/s10995-011-0751-7>
- Le, H. N. D., Le, L. K. D., Nguyen, P. K., Mudiyansele, S. B., Eadie, P., Mensah, F., Sciberras, E., & Gold, L. (2020). Health-related quality of life, service utilization and costs of low language: A systematic review. *International Journal of Language*

and Communication Disorders, 55(1), 3–25. <https://doi.org/10.1111/1460-6984.12503>

Lucas, C., Nielsen, R. A., Roberts, M. E., Stewart, B. M., Storer, A., & Tingley, D.

(2015). Computer-assisted text analysis for comparative politics. *Political Analysis*, 23(2), 254–277. <https://doi.org/10.1093/pan/mpu019>

McIntosh, K., MacKay, L. D., Andreou, T., Brown, J. A., Mathews, S., Gietz, C., &

Bennett, J. L. (2011). Response to Intervention in Canada: Definitions, the evidence base, and future directions. *Canadian Journal of School Psychology*, 26(1), 18–43. <https://doi.org/10.1177/0829573511400857>

McKenna, M., Castillo, J., Dedrick, R. F., Cheng, K., & Goldstein, H. (2021). Speech-

language pathologist involvement in multi-tiered system of supports questionnaire: Advances in interprofessional practice. *Language, Speech, and Hearing Services in Schools*, 52(2), 597–611. https://doi.org/10.1044/2020_LSHSS-20-00084

McLeod, S., Harrison, L. J., & Wang, C. (2019). A longitudinal population study of

literacy and numeracy outcomes for children identified with speech, language, and communication needs in early childhood. *Early Childhood Research Quarterly*, 47, 507–517. <https://doi.org/10.1016/j.ecresq.2018.07.004>

McLeod, S., & McKinnon, D. H. (2007). Prevalence of communication disorders

compared with other learning needs in 14 500 primary and secondary school students. *International Journal of Language and Communication Disorders*, 42(SUPPL. 1), 37–59. <https://doi.org/10.1080/13682820601173262>

Missiuna, C. A., Pollock, N. A., Levac, D. E., Campbell, W. N., Whalen, S. D. S.,

- Bennett, S. M., Hecimovich, C. A., Gaines, B. R., Cairney, J., & Russell, D. J. (2012). Partnering for Change: An innovative school-based occupational therapy service delivery model for children with developmental coordination disorder. *Canadian Journal of Occupational Therapy, 79*(1), 41–50.
<https://doi.org/10.2182/cjot.2012.79.1.6>
- Mühlbacher, A. C., & Juhnke, C. (2013). Patient preferences versus physicians' judgement: Does it make a difference in healthcare decision making? *Applied Health Economics and Health Policy, 11*(3), 163–180. <https://doi.org/10.1007/s40258-013-0023-3>
- Ng, S. L., Lingard, L., Hibbert, K., Regan, S., Phelan, S., Stooke, R., Meston, C., Schryer, C., Manamperi, M., & Friesen, F. (2015). Supporting children with disabilities at school: Implications for the advocate role in professional practice and education. *Disability and Rehabilitation, 37*(24), 2282–2290.
<https://doi.org/10.3109/09638288.2015.1021021>
- Noland, V. J., Troxler, C., & Torrens Salemi, A. M. (2004). School Health is Public Health. *Florida Public Health Review, 1*(3), 24–29. <http://publichealth.usf.edu/fphr>
- Ohl, A. M., Graze, H., Weber, K., Kenny, S., Salvatore, C., & Wagreich, S. (2013). Effectiveness of a 10-week tier-1 response to intervention program in improving fine motor and visual-motor skills in general education kindergarten students. *American Journal of Occupational Therapy, 67*(5), 507–514.
<https://doi.org/10.5014/ajot.2013.008110>
- Orsi, R. (2017). Use of multiple cluster analysis methods to explore the validity of a

community outcomes concept map. *Evaluation and Program Planning*, 60, 277–283. <https://doi.org/10.1016/j.evalprogplan.2016.08.017>

Pawson, R., Greenhalgh, T., Harvey, G., & Walshe, K. (2005). Realist review - A new method of systematic review designed for complex policy interventions. *Journal of Health Services Research and Policy*, 10(Suppl. 1), 21–34. <https://doi.org/10.1258/1355819054308530>

Polatajko, H. J., Mandich, A., & Martini, R. (2000). Dynamic performance analysis: A framework for understanding occupational performance. *The American Journal of Occupational Therapy*, 54(1), 65–72.

Pope, A. M., Finney, S. J., & Bare, A. K. (2010). The essential role of program theory: Fostering theory-driven practice and high-quality outcomes assessment in student affairs. *Research & Practice in Assessment*, 14(Summer), 5–17.

Roberts, M. E., Stewart, B. M., & Airoidi, E. M. (2016). A model of text for experimentation in the social sciences. *Journal of the American Statistical Association*, 111(515), 988–1003.

Roberts, M. E., Stewart, B. M., Tingley, D., Lucas, C., Leder-Luis, J., Gadarian, S. K., Albertson, B., & Rand, D. G. (2014). Structural topic models for open-ended survey responses. *American Journal of Political Science*, 58, 1064–1082. <https://doi.org/10.1111/ajps.12103>

Rogers, P. J. (2000). Program theory: Not whether programs work but how they work. In D. L. Stufflebeam, G. F. Madaus, & T. Kellaghan (Eds.), *Evaluation Models: Evaluation in Education and Human Services*, vol 49. (pp. 209–232). Springer.

https://doi.org/https://doi.org/10.1007/0-306-47559-6_13

Rogers, P. J. (2008). Using programme theory to evaluate complicated and complex aspects of interventions. *Evaluation*, *14*(1), 29–48.

<https://doi.org/10.1177/1356389007084674>

Sanger, D., Mohling, S., & Stremlau, A. (2012). Speech-language pathologists' opinions on response to intervention. *Communication Disorders Quarterly*, *34*(1), 3–16.

<https://doi.org/10.1177/1525740111408714>

Sanger, D., Snow, P. C., Colburn, C., Gergen, M., & Ruf, M. (2012). Speech-language pathologists' reactions to response to intervention: A qualitative study. *International Journal of Speech-Language Pathology*, *14*(1), 1–10.

<https://doi.org/10.3109/17549507.2011.604793>

Skeat, J., & Perry, A. (2008). Exploring the implementation and use of outcome measurement in practice: A qualitative study. *International Journal of Language and Communication Disorders*, *43*(2), 110–125.

<https://doi.org/10.1080/13682820701449984>

Sommer, M., Waltersbacher, A., Schlotmann, A., Schröder, H., & Strzelczyk, A. (2021). Prevalence and therapy rates for stuttering, cluttering, and developmental disorders of speech and language: Evaluation of German health insurance data. *Frontiers in Human Neuroscience*, *15*(645292). <https://doi.org/10.3389/fnhum.2021.645292>

Sourial, N., Longo, C., Vedel, I., & Schuster, T. (2018). Daring to draw causal claims from non-randomized studies of primary care interventions. *Family Practice*, *35*(5), 639–643. <https://doi.org/10.1093/fampra/cmy005>

- Speech-Language and Audiology Canada. (2019). *SAC position statement on the role of speech-language pathologists in schools*. https://www.sac-oac.ca/sites/default/files/resources/sac_s-lps_in_schools_position_statement_en.pdf
- Teddlie, C., & Tashakkori, A. (2009). *Foundations of mixed methods research: Integrating quantitative and qualitative approaches in the social and behavioural sciences*. SAGE Publications, Inc.
- Terreberry, S., Dix, L., Cahill, P. T., Passaretti, B., & Campbell, W. N. (2021). Moving towards a tiered model of speech and language services in Ontario schools: Perspectives of school-board speech-language pathologists. *Canadian Journal of Speech-Language Pathology & Audiology*, 45(4), 267–282.
- Throneburg, R. N., Calvert, L. K., Sturm, J. J., Paramboukas, A. A., & Paul, P. J. (2000). A comparison of service delivery models: Effects on curricular vocabulary skills in the school setting. *American Journal of Speech-Language Pathology*, 9(1), 10–20. <https://doi.org/10.1044/1058-0360.0901.10>
- Trochim, W., & Kane, M. (2005). Concept mapping: An introduction to structured conceptualization in health care. *International Journal for Quality in Health Care*, 17(3), 187–191. <https://doi.org/10.1093/intqhc/mzi038>
- VanderKaay, S., Dix, L., Rivard, L., Missiuna, C., Ng, S., Pollock, N., Whalen, S. S., Eisen, I., Kyte, C., Phoenix, M., Bennett, S., Specht, J., Kennedy, J., Mccauley, D., & Campbell, W. N. (2021). Tiered approaches to rehabilitation services in education settings: Towards developing an explanatory programme theory. *International Journal of Disability, Development and Education*.

<https://doi.org/10.1080/1034912X.2021.1895975>

Victora, C. G., Habicht, J. P., & Bryce, J. (2004). Evidence-Based Public Health: Moving Beyond Randomized Trials. *American Journal of Public Health, 94*(3), 400–405.

<https://doi.org/10.2105/AJPH.94.3.400>

Wagner, R. K., & Compton, D. L. (2011). Dynamic assessment and its implications for RTI models. *Journal of Learning Disabilities, 44*(4), 311–312.

<https://doi.org/10.1177/0022219411407859>

Wilson, A. L., & Harris, S. R. (2018). Collaborative occupational therapy: Teachers' impressions of the Partnering for Change (P4C) model. *Physical and Occupational Therapy in Pediatrics, 38*(2), 130–142.

<https://doi.org/10.1080/01942638.2017.1297988>

Chapter 2: Outcomes management practices in tiered school-based speech-language therapy: A Canadian example

This chapter presents a secondary directed content analysis of interview transcripts with clinical leaders in school-based practice to explore outcomes management in that practice environment.

This work has been published in the *International Journal of Language and Communication Disorders*. See citation below.

Cahill, P. T., Ng, S. L., Dix, L., Ferro, M. A., Turkstra, L. S., & Campbell, W. N. (2022). Outcomes management practices in tiered school-based speech-language therapy: A Canadian example. *International Journal of Language and Communication Disorders*. doi: 10.1111/1460-6984.12822

This chapter reproduces the accepted, unblinded version without journal typesetting. See Wiley policy on following page.

Wiley policy regarding re-use of published content by first authors within theses and dissertations ([additional details](#))

Do I need to request permission to use my own work as my dissertation?

If you are the author of a published Wiley article, you have the right to reuse the full text of your published article as part of your thesis or dissertation. In this situation, you do not need to request permission from Wiley for this use.

If your institution still requires a reuse license in this case, follow the steps below to request your license via RightsLink.

Request permission from Wiley

To request a reuse license, our partner RightsLink is a great place to start. You can request thesis and dissertation permissions through **RightsLink Marketplace**.

You can also find a link to a RightsLink permissions request form at the point of content on Wiley Online Library. Watch the video below to see how.



Title: Outcomes management practices in tiered school-based speech-language therapy:

A Canadian example

Authors and affiliations:

Peter T. Cahill^{1*}

Stella Ng^{2,3}

Leah Dix⁴

Mark A. Ferro^{4,5}

Lyn Turkstra¹

Wenonah N. Campbell^{1,4}

¹ School of Rehabilitation Science, McMaster University

² Department of Speech-Language Pathology, University of Toronto

³ Centre for Interprofessional Education, University of Toronto

⁴ CanChild Centre for Childhood Disability Research

⁵ School of Public Health Sciences, University of Waterloo

*Corresponding Author

Peter T. Cahill
School of Rehabilitation Science
Institute of Applied Health Sciences, Room 403
1400 Main Street West
Hamilton, ON, L8S 1C7, Canada
cahillp@mcmaster.ca
+1-905-525-9140 ext. 22867

Data availability statement:

The data used in this study are not publicly available, as consent to share de-identified data was not obtained from participants.

Funding statement:

Dr. Wenonah Campbell gratefully acknowledges support for the original study from the Ontario Ministry of Education.

Conflict of interest disclosure:

Dr. Wenonah Campbell received grant funding from the Ministry of Education of Ontario to collect the data analysed in this study. Dr. Wenonah Campbell and Leah Dix have previously implemented and evaluated school-based services for occupational therapy, using the Partnering for Change tiered service delivery model. The remaining authors have no conflicts of interest, real or perceived, to declare.

Ethics approval statement

All methods in this study were reviewed and approved by the Hamilton Integrated Research Ethics Board (Project number: 2017-3636).

Patient consent statement

Not applicable.

Permission to reproduce materials from other sources

Not applicable.

Title: Outcomes management practices in tiered school-based speech-language therapy:

A Canadian example

Background

Measuring, assessing, and managing outcomes in school practice environments is difficult due to the complex nature of school communities as well as the recent shift in service delivery models towards tiered approaches. In tiered approaches, multiple levels of service are offered to better match students' needs. Each level of service may require different outcomes and management techniques. Research to date on outcomes has focused on measuring outcomes in medical settings, leaving a substantive gap in the literature regarding practice in schools.

Aims

The first aim of the present study was to explore how school-based speech-language therapists approached outcomes management as their clinical programs transitioned to tiered service delivery models. The second study aim was to describe successes and challenges in outcomes management reported by clinicians in this context.

Methods & Procedures

A secondary deductive-inductive content analysis was performed using qualitative interviews with 24 clinical managers and senior therapists from schools across Ontario, Canada. Using a framework of outcomes measurement, assessment, and management in schools based on previous research studies, data were grouped into broad categories deductively, and then the content of each category was further explored using inductive coding. Iterative peer debriefing and reflexive journaling were key strategies to increase the trustworthiness of the results.

Findings & Results

Participants reported measuring and qualitatively assessing seven key outcomes for school-based practice. These included: 1) student progress and achievement, 2) student participation and inclusion in the school community, 3) stakeholder perspectives, 4) 'buy-in', 5) expanded capacities, 6) responsiveness to needs, and 7) accountability to systems. Participants reported more challenges than successes in outcomes management during this transition to tiered services. Challenges were attributed to idiosyncratic organisational barriers, the transition to tiered models, and philosophy of working within the educational system.

Conclusions & Implications

School-based speech-language therapists measure, assess, and manage multiple outcomes relevant to school-based practice in tiered service delivery models. Many challenges remain. Solutions to support meaningful, systematic, and proactive outcomes management in schools should address the broader set of outcomes relevant to tiered service delivery models and the unique practice context of the educational system, while

remaining responsive to idiosyncratic organisational factors. Sustained clinical-research collaboration and knowledge exchange is recommended.

What is already known: Systematic, proactive collection and interpretation of outcomes has long been encouraged within speech-language therapy. However, implementing outcomes management in clinical practice remains a substantial challenge. Additionally, research on outcomes to date has focused on medical practice environments, to the exclusion of school-based practice.

What this paper adds: This paper explores outcomes management from the perspectives of school-based clinical managers and senior clinicians. Results indicate that speech-language therapists target seven outcomes in three domains in their outcomes management. Nevertheless, outcomes management remains a substantial challenge in school-based practice.

Clinical implications: Outcomes management is valued in school practice environments; however, the current repertoire of techniques for outcomes management are a poor match for school-based practice. Clinicians in schools would benefit from the development of contextually relevant, meaningful, and feasible outcomes management tools.

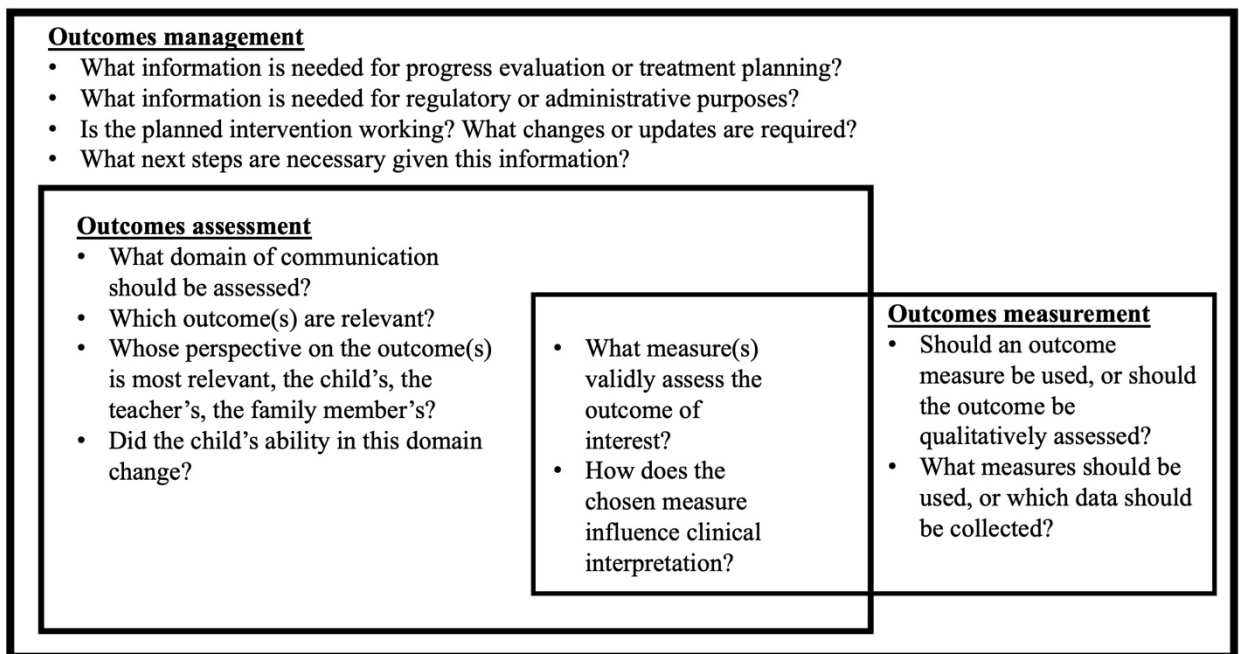
Background

Outcomes are the results of health care services (Donabedian, 1992, 2005), and can include the beneficial results of care, reductions in negative results, as well as positive experiences with care and service providers (Santana et al., 2018). The use of outcomes in practice is essential to offering high-quality services (Donabedian, 1992, 2005; McLachlan et al., 2018; Santana et al., 2018), including in school-based services (Blosser, 2013; Gallagher et al., 1998). The systematic collection and interpretation of outcomes can provide numerous benefits to all stakeholders of speech-language therapy (SLT), including speech-language therapists (SLTs), clients, families, health administrators, and service funders (Hesketh & Sage, 1999). The present study explored how outcomes were being used in school-based practice in one locale during a period of service delivery model transition.

Outcomes are used in practice through *outcomes management*, as clinicians and managers collect and interpret outcomes to inform clinical decision-making, whether at the client- or system-level (Frattali, 2013; Golper, 2013). For example, judging a new service delivery model as successful on the basis of a decrease in reported unmet health needs would be an instance of outcomes management. By contrast, *outcomes assessment* refers to the assessment of outcome concepts, such as unmet health needs or client satisfaction with care (Frattali, 2013; Golper, 2013). The choice to assess *unmet health needs* rather than *client satisfaction with care* due to the health system goal of supporting more equitable access to services would be an outcomes assessment decision. Finally, at the most concrete level, *outcomes measurement* refers to the choice of an *indicator* to

measure the specific outcome concept. The use of a self-assessed, unmet needs questionnaire (see Gibson et al., 2019) to measure the outcome of unmet health needs would be an example of outcomes measurement. Figure 1 provides a visualisation of these terms and how they are related, along with some examples of questions relevant to each level. As some level of decision-making is always involved in the use of outcome measures and in the assessment of outcome concepts, outcomes management fully contains outcomes assessment and measurement.

Figure 1: Visual representation of outcomes management, assessment, and measurement



Calls for the systematic use of outcomes in SLT have been ongoing for the past three decades (Cohen & Hula, 2020; Coyte, 1992; Cunningham et al., 2017; Enderby, 1999; Hesketh & Sage, 1999; John, 2011), although much additional work remains

regarding how to meaningfully use all relevant outcomes to inform rigorous decision making (Hesketh & Sage, 1999; Skeat & Perry, 2008). Cohen and Hula (2020) have considered the collection and interpretation of outcome measures (i.e., outcomes management) as robust clinic-internal evidence, building local evidence for the effectiveness of services as they are delivered in real world contexts. Therefore, outcomes management can form a key pillar of evidence-based practice for clinical programs. Yet despite these calls, researchers have reported numerous challenges to implementing outcome measures (Duncan & Murray, 2012; Skeat & Perry, 2008). For example, a systematic review of barriers and facilitators to rehabilitation professionals' outcomes measurement practices identified multiple influencing factors (Duncan & Murray, 2012). These included organizational support and prioritization of outcomes measurement, practical considerations (including funding, time, data collection tools, and psychometrics), patient considerations (including relevance to care and patients' comprehension abilities), and clinician knowledge and valuation of outcome measures (Duncan & Murray, 2012). Specific to SLT, a grounded theory of outcome measure implementation postulated that clinicians will attempt to achieve fit among the measure, its role, and suitability for addressing valued needs in context (Skeat & Perry, 2008). When faced with lack of fit, clinicians may tailor or accommodate the measure by altering the context (Skeat & Perry, 2008). If no fit can be found, clinicians will disengage from the meaningful collection of outcomes data (Skeat & Perry, 2008). It is noteworthy that these two studies focused on the implementation of outcome measures rather than issues of outcomes assessment or management. If outcomes are challenging at

the measurement level, it is likely that outcomes assessment and management will pose additional challenges of even greater complexity, as breakdowns at any level will impede the meaningful use of outcomes to evaluate, inform, and improve practice.

Additionally, outcomes management cannot be separated from its clinical context. As John (2011) noted, health care service structure, process, and outcome are all intricately linked, as outcomes management ‘...requires a decision on what to measure, from whose perspective, what form of measurement to use, who should undertake the measurement, how to analyse data, and, finally, how the information gained will be... acted upon (p. 37)’. This type of contextually bound decision making may be one reason for the heterogeneity in practice reported in the literature to date. Similar to choice of diagnostic measure (Fulcher-Rood et al., 2018), outcomes assessment practices depend on practice context (Skeat & Perry, 2008). Further, survey research has suggested a tendency in the profession to develop ad-hoc solutions to outcomes measurement challenges (Worrall & Egan, 2001). When asked from where the clinicians would like assistance in improving outcomes measurement, just under half identified a local interest group, 18% another department in their organization, and 16% another SLP in their department (Worrall & Egan, 2001). By contrast, assistance from more distal sources was not preferred, with universities, research centres, and clearinghouses identified by only 12% of respondents (Worrall & Egan, 2001). These response patterns appear to reflect the strong effects of practice context on outcomes, with a strong preference for local support. Further, the outcomes measured within a health system drive the behaviour and decision making of the system (Bevan & Hood, 2006). For these reasons, it is important to

approach supporting and improving outcomes management in SLT services from a local perspective, recognizing the importance of context for implementation.

A common and important practice context for SLTs are schools (Ng et al., 2015), where many children with disabilities will receive health and education support (Paul et al., 2022). SLTs have important roles within school communities, supporting students throughout their school years to attain their personal and academic potential (Speech-Language and Audiology Canada, 2019). Outcomes measurement in schools is challenging due to the large variation in practice inherent to these settings (Gallagher et al., 1998). Additionally, literature on outcomes for school-age children is sparse (Archibald, 2017; Cirrin et al., 2010). The studies included in existing systematic reviews (i.e., Archibald, 2017; Cirrin et al., 2010) primarily report outcomes related to children's impairments, such as scores on standardized tests or generalization of specific treatment targets, rather than outcomes in activities or participation. These school-based service reviews echo similar patterns found in literature on phonological disorders (Baker et al., 2022) and preschool services (Cunningham et al., 2017), where activity and participation outcomes are rarely included, nor are measures of client experience with services. Theoretical literature (Blosser, 2013; VanderKaay et al., 2021) also has suggested that school-based services necessarily involve additional outcomes beyond the student level, and include how SLTs collaborate with and support educators and school staff (relational outcomes) and the impacts that SLT services have on the school system, such as number and accuracy of referrals (systems-level outcomes). Despite the considerable interest in outcomes within the research community, little attention has been paid to educational

practice environments. For example, the grounded theory study by Skeat and Perry (2008) appeared to include only professionals working in healthcare settings. In another study, researchers surveyed rehabilitation professionals with paediatric caseloads in Northern Ireland (Harron & Titterington, 2016). However, most results were combined across practice contexts as well as professions, making parsing out outcomes management for SLTs in schools difficult. To our knowledge, no study has explored outcomes management for school-based SLT. Consequently, we sought to fill this gap in the literature through qualitative interviews with clinicians who had extensive familiarity with SLT delivered in schools, using our locale as an example to shed light on this important area of practice.

Aims

In this study, we sought to describe outcomes management practices in Ontario, Canada in preparation for the anticipated provincial implementation of the Special Needs Strategy, which aimed to provide more integrated, responsive, and child-centred rehabilitation services, particularly in schools (Ministry of Children, Community and Social Services, 2018). This planned strategy catalysed service delivery change in schools across the province, with most moving towards a tiered model (Terreberry et al., 2021). In a tiered model, services are differentiated, with children receiving different levels of service depending on their needs (Campbell et al., 2016; Grosche & Volpe, 2013; McIntosh et al., 2011; Missiuna et al., 2012). For example, a child may receive evidence-based literacy instruction (Tier 1 services), combined with targeted small group reading

enrichment (Tier 2) as well as individualized assistance with their augmentative communication system (Tier 3). Although navigating the transition to a tiered model provides opportunities both for professional growth and for the development of more effective services, substantial challenges remain (Campbell et al., 2012; Sanger, Mohling, et al., 2012; Sanger, Snow, et al., 2012). Thus, we queried whether service programs might be grappling with outcomes management issues, and if this transition provided an opportunity for SLT research to examine outcomes management as clinical leaders actively reorganised their service models. Consequently, our research aims in the present study were to:

1. describe current outcomes management practices in Ontario school-based speech-language therapy programs during the transition to tiered models of service delivery.
2. describe the successes and challenges experienced by speech-language therapy programs in schools during this period of service delivery transition regarding outcomes management.

Methods & Procedures

The present study involved a secondary analysis of previously collected interview data regarding SLT programs in Ontario schools. The overarching study used qualitative description (Bradshaw et al., 2017; Sandelowski, 2010) to explore experienced clinicians' and managers' perceptions of their services during service delivery model transition. The primary findings described facilitators and barriers to successful practice in Ontario

schools (Terreberry et al., 2021). In the study, participants were asked about many aspects of their practice as they transitioned to tiered services, including outcomes management. Initial qualitative analysis of the interviews identified data related to outcomes management as particularly rich and complex. Therefore, to fully explore the richness of the data pertaining to outcomes management, separate analysis was undertaken and reported in this paper.

In the original study, a purposeful sampling strategy (Gentles & Vilches, 2017; Sandelowski, 2010) was used to recruit participants who were considered most likely to have knowledge of both individual clinical practice within schools, as well as the broader issues facing the entire SLT department (e.g., SLT program managers and experienced school-based clinicians). Because healthcare and education are managed and regulated at the provincial level in Canada, the boundaries of the sampling strategy were limited to the province of Ontario. Only SLTs employed by school authorities were included, as it was these SLTs who were transitioning to tiered models of service delivery.

Twenty-four SLTs were recruited through an official association of experienced school-based clinicians and clinical managers. The purposeful sample included a mixture of public, Catholic, French-language, English-language, urban, and rural schools. Semi-structured interviews were completed with all participants. Interviews were audio recorded and transcribed. For member checking, initial findings for the overarching study were presented and discussed during a meeting frequented by participants for their review and comment. Further detail is provided in a previous publication (Terreberry et al., 2021).

Ethics approval

All methods in this study were reviewed and approved by the Hamilton Integrated Research Ethics Board (Project number: 2017-3636). All participants provided written consent to participate upon reviewing the letter of information and after being offered an opportunity to discuss further with a research team member. Further, a copy of the interview questions was provided to all participants prior to the interviews.

Data sampling strategy

The interview guide included two questions with four follow-up prompts relevant to outcomes management. Optional prompts are indicated below with bullets.

How do you determine that services are working or are successful?

- *What student outcomes do you achieve through your service delivery model?*
- *How do families know that services are working?*
- *How do educators know that services are working?*
- *How does the school board [a term for the local educational authority] determine the impact of this way of practicing?*

Can you describe any other impacts of your team's approach to services?

While the prompts (questions with bullet points) were discretionary, the main questions were asked of all participants. The interviewer responded contingently to participants and so few participants were asked all prompts. Additional methodological information and a complete interview guide can be found in (Terreberry et al., 2021). In this analysis, data generated in response to these two questions was purposefully sampled. Data in response

to other questions served as context and were included in the secondary analysis only if they clearly addressed outcomes management.

Data analysis

Data were divided into excerpts of meaningful units, where the communicative intent of the participant would not be clear if the text were subdivided further. Then, all content was coded within each excerpt. The interview transcripts were analysed using deductive-inductive content analysis (Elo & Kyngäs, 2008). The first author read all interviews in their entirety before coding began. A deductive data coding matrix was constructed based on relevant literature (Blosser, 2013; Frattali, 2013; Golper, 2013; VanderKaay et al., 2021). The first coding dimension reflected the level of the outcomes activity (i.e., whether the data addressed outcomes measurement, assessment, or management; see Figure 1). The second coding dimension reflected three types of outcomes relevant to schools: student-level, relational, and systems-level. Data were further described as an outcomes management success or challenge if the participants’ statements indicated a clear perspective towards the practices that they described. See Table 1 for a visual representation of the data coding matrix.

Table 1: Deductive coding matrix

Outcomes	Measurement	Assessment	Management
<i>Student-level</i>			<i>Success</i> ←→ <i>Challenge</i>
<i>Relational</i>			<i>Success</i> ←→ <i>Challenge</i>
<i>Systems-level</i>			<i>Success</i> ←→ <i>Challenge</i>

Initial coding proceeded deductively by applying these broad category codes from the deductive matrix. All data was tagged using one or more of the deductive categories. For example, an excerpt stating a dissatisfaction with current outcome measures for student progress would be tagged as outcomes measurement, a student-level outcome, and a challenge. At this point in the analysis, broad trends were evident, such as a greater frequency of challenges reported compared to successes, and a substantial focus on relational outcomes. After coding all interviews deductively, the analysis entered an inductive, second phase. Reviewing each category in the deductive matrix (e.g., student-level outcomes, outcomes measurement, etc.), the content within each category was coded inductively, applying more specific codes based on the data. Subsequent rounds of inductive coding were used to combine categories to the smallest number while ensuring that each category was meaningful and coherent. After interviews had been coded inductively, category review and revision took place through peer debriefing among three authors (PC, LD, and WC). Further discussions were held with the second author who was not familiar with the data to confirm that the emerging content analysis results were clear and coherent. As peer debriefing and coding proceeded, the content within each deductive category was iteratively grouped, categorised, and abstracted, until the categories and sub-categories became consistent and comprehensive, and analysis was deemed complete by the research team. Available data was coded and the sample size

was judged to be sufficient given density and specificity of data available to address our focused research question (Malterud et al., 2016).

Trustworthiness

Trustworthiness is critical to performing and reporting a content analysis (Elo & Kyngäs, 2008; Lindgren et al., 2020). Key strategies to support trustworthiness include clear reporting, demonstration of links between the data and the emergent analysis, and the development of rich categories that summarize key features of the data (Elo & Kyngäs, 2008). Data analysis procedures have been reported in detail to allow critique and audit. Tables have been included to connect results to the data and to reveal the diversity present therein. Rich excerpts demonstrating more interpretive findings also have been selected for reporting. Additional strategies to strengthen the trustworthiness of the analysis were used, including iterative and prolonged peer debriefing from study conceptualization through to manuscript preparation, as well as use of extensive reflexive journaling. Finally, qualitative secondary data analysis was bolstered by the inclusion of a new researcher with substantial topic knowledge to analyse uncoded transcripts, while authors familiar with the data and its context participated in all peer debriefing (Ruggiano & Perry, 2019).

Findings & Results

This content analysis yielded seven outcomes reported as relevant to school-based practice, including student-level, relational, and systems-level outcomes. Some

participants reported successes in outcomes management during the transition to tiered service delivery models; however, more participants reported challenges.

Outcomes assessment, measurement, and management in school-based speech-language therapy

Seven outcomes were identified as those used in clinical practice: 1) student progress and achievement, 2) student participation and inclusion in the school community, 3) stakeholder perceptions of services, 4) ‘buy-in’, 5) expanded stakeholder capacities, 6) responsiveness to needs, and 7) accountability to systems. These outcomes are discussed below, grouped according to the three dimensions of the deductive coding matrix. The outcomes can be found in Table 2, along with illustrative quotes. Indicators (specific measurement or qualitative assessment techniques) are summarised in the text below, with greater detail available in the online supplementary information, organised according to outcome.

Table 2: Outcomes and illustrative quotes organised by outcome domain

Domain	Outcome	Illustrative quotes
<i>Student-level outcomes</i>		
	Student progress and achievement	<i>Participant 15 ‘So, say we’re working on he/she...and they’ve achieved it after four sessions, now we’re going back to the teacher and saying, okay, this is what you should be seeing in the classroom, what activities can you probe for this and then collect data on that as well.’</i>

		<p><i>Participant 14 ‘The teacher comes back to me and says, oh, So-and-so’s doing this now, and So-and-so’s doing that now, wow, I can really see a difference. So that’s telling me that it’s helping, and then when I meet with the student, can see that they’ve made some progress, that also tells me it’s working.’</i></p> <p><i>Participant 7 ‘We do the subjective kind of update on the severity level. So...if we see that a child is severe and keeps staying severe, that there is maybe something that we need to change. But we have been seeing that a lot of our kiddies have been going from a severe profile to a more moderate profile, so that’s helped a lot.’</i></p>
	Student participation and inclusion	<p><i>Participant 16 ‘Well, improved participation or they’re optimizing their access to curriculum, they’re able to learn. And also being able to take advantage and be effective in the social learning environment with their peers and their teachers.’</i></p> <p><i>Participant 13 ‘We are hoping that we are achieving, the student is socially feeling more connected to their world, that their communication skills are improving, that they are achieving better academically, and I guess are happier in general.’</i></p>
<i>Relational outcomes</i>		
	Stakeholder perspectives	<p><i>Participant 24 ‘Mainly it’s through surveys and feedback and things like that, that’s mainly how we check to see and anecdotally what people are saying. Those are probably the main ways that we do it [see if services are successful].’</i></p> <p><i>Participant 8 ‘There was a questionnaire that went home... We had an 84 percent return rate when we sent those out to parents, which is huge.... And some of the comments on that were.... “we loved doing these activities as a family,” or “I didn’t realize that this was so important, so now we’re practicing them.” That was great.’</i></p>

		<p><i>Participant 6 'People are easy to complain if they're displeased, so that will be another measure as well. And just documenting positive feedback when we get that as well.'</i></p>
	'Buy-in'	<p><i>Participant 17 'I think the biggest piece is just that they keep asking you back.'</i></p> <p><i>Participant 8 'We work really hard with our parents. Sometimes they will call us, you know, a couple of years after we're not involved, and they'll ask for our advice. They'll say, well now they want to do a psych assessment or now they're suggesting this, even going into high school, they're saying that my child can't do these credits..., because we've built those relationships with them. I think that to me [that] means we've done our job.'</i></p> <p><i>Participant 3 'So, you know, right now, as of a week ago... we had almost 5,300 referrals since September for service. Right? So they use us.'</i></p>
	Expanded stakeholder capacities	<p><i>Participant 5 'It's sort of those little things like our social workers, you know, gaining a better understanding of what a language impairment is and then working with students that have language impairments and understanding that when they, you know, have word finding and express very extreme comments, social workers are better able to guide their therapy session to recognize that the student wasn't really meaning that, they were just really mad. So I think just improved understanding across our department for language behaviour and communication and challenges and what that means and how to deal with those kids and address those kids.'</i></p> <p><i>Participant 14 'When I meet with parents and do a feedback on a language assessment or a consultation, and they indicate to me that they now have some relief because they now have a better understanding of what this child is facing or they have a better understanding of what other resources they need to access in the community and how to do</i></p>

		<p><i>that, so my meeting worked at some level because we have more understanding and the parent feels supported, so that's another level of figuring out if things are working or not.'</i></p> <p><i>Participant 7 'We're only seeing the new teachers, because most have gotten the basics, and like you say that they can implement from one year to another.'</i></p> <p><i>Participant 19 'Are the teachers feeling like they're getting it? you know, are they getting those, ah, that's you mean, I can do that, or not. With our in-services we always do a reflection, a learning reflection for our teachers. We send them back, try things out, that kind of thing.'</i></p>
<p><i>Systems-level outcomes</i></p>		
	<p>Responsiveness to needs</p>	<p><i>Participant 7 'The whole response to intervention approach was a big one [impact] as well, because we weren't following that approach at first. I feel like when it comes to that, it's the biggest impact that we've had... we're getting more bang for our buck when it comes to what we can do for the child, and I really do feel like now we're better responding to their needs.'</i></p> <p><i>Participant 4 'I would think if it's successful, there would be less children in need of higher tiered service delivery. If Tier 1 services are implemented and are successful, that would be what I would expect.'</i></p> <p><i>Participant 22 'Getting feedback from [S-LT] staff, I mean that I get on a regular basis in regards to how staff are feeling about the services they provide.'</i></p> <p><i>Participant 16 'The early identification and programming further eliminating specific referrals down the road if they are caught early enough and have received specific programming early on, it doesn't always have to lead to a specific referral.'</i></p>

	<p>Accountability to systems</p>	<p><i>Participant 9 ‘We look at...compared to how many children were serviced, what our waiting list was like, just overall, how many referrals and how many students we identified for referrals to other agencies, how many referrals we took on because the child didn’t meet criteria for a referral to other agencies.’</i></p> <p><i>Participant 24 ‘So I can look at somebody and say, you know what, you’re really doing a lot in your schools in terms of assessments, but not much in intervention, how can we try and balance that or try and do a little more on that, or they’re doing no home programs, so I can kind of say like, how come, is there anything that you could be giving the families who are waiting for speech and things like that. So I can sort of see what that breakdown is.’</i></p> <p><i>Participant 10 ‘The school board would recognize our impact, not just on how many kids have devices, how many kids are on intervention, how many kids have had an assessment.’</i></p> <p><i>Participant 21 ‘Principals have to know that they [speech-language therapists]’re in there, they’re doing their work. They don’t have to know at a granular level because they have lots of other stuff, but they have to know that.’</i></p>
--	----------------------------------	--

Student-level outcomes

Two outcomes were identified that focused on students: 1) student progress and achievement and 2) student participation and inclusion in the school community. Student progress and achievement was the most frequently mentioned outcome within this overarching category (17 participants). This outcome included improvements in student skills and abilities, both specific communication skills targeted via clinical goals as well as educational attainment and improved behaviour in the classroom.

Many measurement techniques were used as indicators for this outcome, including standardized clinical testing, report cards and grades, standardized educational testing, frequent benchmarking assessments, parent or educator informal report, subjective clinical impressions, achievement of goals in the Individualized Education Plan (IEP) or set by the clinician, and data kept in the IEP or clinical documentation. Although student progress and achievement were frequently mentioned in the data set, most participants reported struggling with student achievement outcomes.

Participant 2 'The student outcomes...we thought about this a lot...how do I know that...these 60 kids that I saw, that things are different for them because of me? We have no really good way of tracking that.'

Student participation and inclusion in the school community was the other student-level outcome, although it was mentioned less frequently (8 participants) than was student progress and achievement. This outcome contained multiple facets, including ability to participate in classroom activities and discussions, access to the curriculum (a term frequently used but not defined by participants), ability to participate in social interactions with peers or to interact meaningfully with teachers, students' happiness, and well-being in school, as well as feelings of inclusion within the school community. Participants reported assessing or measuring this outcome using report card data and student marks, as well as informal educator observation of students in the classroom. Some participants did not report any measurement or assessment technique or contrasted traditional outcomes measurement (such as clinical goal tracking or standardised assessment scores) with the needs of contemporary clinical practice in schools.

Participants questioned the role of traditional outcomes and suggested that practice in schools was intrinsically oriented towards participation and inclusion, revealing a tension between these two student-level outcomes.

Participant 22 ‘My services are being used for a different purpose, that’s not to necessarily just get good grammar. How does that grammar impact his ability to provide information, to share his knowledge, to be able to answer on a test, how does all of that impact that educational piece?’

Relational outcomes

Three relational outcomes were identified: 1) stakeholder perspectives of services, 2) ‘buy-in’ and 3) expanded stakeholder capacities. Relational outcomes focused on the experiences that stakeholders had with SLT services. Stakeholder perspectives included satisfaction with services, as well as perceptions regarding the effectiveness and adequacy of provided services. This was the most frequently reported outcome within the relational domain (19 participants). Family and educator perceptions were reported to be assessed and measured in a variety of ways, including informal positive feedback from parents and educators (sometimes documented), formal surveys to measure satisfaction with services or stakeholder perception of service effectiveness, informal observation of clinicians’ recommendations being implemented, (lack of) complaints, and increased requests for services/referrals.

Another relational outcome was ‘buy-in’ (15 participants) to develop and implement support for these students. This term was used by participants to describe a

key facilitator for successful services in schools (Terreberry et al., 2021), and so was adopted here. Participants reported assessing this outcome through being asked back into the classroom by educators, receiving reports from parents that they were disappointed that SLT services were no longer necessary for their children, parent requests that communication goals be added to the IEP, implementation of therapists' recommendations by educators and entire schools, increased referral rates and invitations to the classroom, and observed changes in school practices. One participant highlighted the importance of being invited back into the classroom as a key indicator that services were successful.

Participant 17 'I think the other thing is people keep asking you to come back. People value what you have to say, they keep inviting you to meetings, they keep inviting you to different levels of meetings as well... Sometimes at the beginning it's about you knocking on the door and saying, 'hey, can I come in, hey can I come in'. After a while they're like, get in here... You're not knocking at all, you're not having to show them that you have that, they're inviting you into those conversations because they think of you that way.'

The final relational outcome was expanded stakeholder capacity (5 participants). This outcome included parent and educator understanding of communication disorders, the needs these children would have, what these needs could be confused with (such as behavioural challenges), as well as what strategies would be helpful to support the student. One participant expressed how expanded capacities for families to support children with communication disorders was a key outcome.

Participant 5 'I mean, for families, I often find the biggest piece...is the education. The aha moment, oh, they're not just being, their kids aren't being wilfully disobedient...it's because of their communication challenges. So, with the right supports in place, the family is better understanding, and they're providing supports to their kids at home.'

Measurement was almost never reported for this outcome, with a single suggestion that a reduced number of educators attending professional development lead by therapists indicated successful capacity building. This indicator was predicated on the assumption that teachers who had already mastered the presented material would no longer need to attend professional development offerings. In other words, once the capacities of senior staff were developed, only new hires in the school district would attend these events. Otherwise, measurement of this outcome was unclear and appeared to occur through informal observation or report.

Systems-level outcomes

Two systems-level outcomes were identified: 1) responsiveness to needs and 2) accountability to systems. Responsiveness to needs (8 participants) referred to matching services to student needs to reduce the overall burden of communication needs within the school community. To illustrate, one participant focused on support being perceived as a good match for individual student needs as an indicator of successful services.

Participant 20 'If it's a student who's struggling...and we build in supports, that system then can help, and they have visuals so that they can communicate and

they have an IEP that's addressing their needs. I think those things we do fairly well and it's easier to see if that's successful.'

On the other hand, another participant indicated that a reduction in perceived need for clinician involvement was the most important outcome for judging service success.

Participant 5 'You know, reduced direct involvement and need for SLP involvement as students achieve more success, I would say, is probably the biggest way that we determine that our services are working.'

Although this participant identified responsiveness to needs as a key outcome, they also stated that they had no way of determining whether this service outcome was indeed being achieved. This outcome was often assessed through clinician satisfaction with recommendations and IEP provisions, clinician perception of reduced need for their involvement, as well as clinician intuition about whether the system was optimizing outcomes for the school community. Sometimes measurement of this outcome was reported, including matching intervention length to student scores on standardised assessments, being able to discharge students or decrease follow-ups, children no longer qualifying for special education services, fewer children being on or waiting lists for higher tiers of service, and reductions in referrals.

The other major systems-level outcome was accountability to systems (7 participants), where the focus of the outcome was not whether the practice was achieving desired impacts, but whether specific standards or expectations were being met. Although indicators for this outcome were idiosyncratic, they appeared to focus on a corroboration of a certain number, frequency, or breadth of services, demonstration of service

timeliness, or compliance with standards, such as frequency with which reports were sent out to families. For example, monitoring the numbers of students entering and exiting services was a focus, as was the provision of a large number of services broadly across the school community. One participant noted that service numbers informed decision making about services within their program.

Participant 17 'And within our own contextual framework...we look at not so much outcome data, but there's a range of data that we can provide when it comes to making...service delivery decisions internally in terms of numbers of referrals per school and the types of referrals and the types of kids and we collect fairly robust data within our department, not so much student-specific outcomes data per se.'

Finally, this outcome seemed to preclude the management of other outcomes, as efforts were focused on demonstrating accountability, and not on substantiating other outcomes for the school community.

Participant 13 'We don't do a lot of evaluation of the service itself. We certainly record all of the work that we do according to [regulatory body] standards... We record the results of the treatment that we do and our consult notes. But in terms of a general view of evaluation, we don't have anything like that in place.'

Successes of outcomes management

Ten participants reported successes and challenges; 11 reported only challenges, and two reported only successes. When participants reported successful outcomes

management, they focused on the observation of meaningful and impactful changes within the school community. One participant focused on evidence of buy-in.

Participant 8 'We do get those calls from parents, we do build those relationships, because we're seeing the kids on a regular basis, and it's usually a very positive experience. We get feedback, not just from the parents but from the principals. They want our services. We're like a high-demand service, they want us, they value what we do, they want more of us, they want more and more and more, you know. They want more.'

Another participant instead focused on observations of changes in school practice, as other members of the school team began to adopt and implement suggestions from the SLT team.

Participant 18 'I think that a more powerful measure is the language that has begun to change in the system, and that's been our impact. How we've changed the literacy instruction... Our icons for narratives, like everyone knows where they came from, and they're in the classrooms. I mean we're not done our work, but certainly I'd say over the last 14 years that I've been with this board, it's been more and more explicit, the impact we have at a system level, and not just for individual kids with specific needs.'

Participants recognized two facilitators of success in outcomes management in schools: access to research support and participatory collaboration. Access to local research support was highlighted as a way to improve systematic outcomes management practices within schools. It was suggested that access to such support depends on their

specific school administration, and that they were fortunate in having access to this support.

Participant 21 'So, I mean, again, we're lucky that we have research people available to us, we got [speech-language therapists] that are interested in doing it [tracking outcomes] but again, that's few and far between.'

Another facilitator for successful outcomes management was reported to be participatory collaboration within the SLT team. Participants shared examples of how multiple therapists working within a school authority came together to brainstorm how to determine whether services were working. These collaborative approaches were recognized as an initial yet critical step in the right direction, towards meaningful and reflective use of outcomes data to inform decision making about care and to increase the quality of services provided within the school community.

Participant 11 'We started to build on some shared success criteria for our role and this is how you will know when you're being successful. So really it was a collaborative, shared setting of goals and we set the initial success criteria as draft and monitored it across a year.'

Challenges of outcomes management

Participants more frequently reported challenges than successes (21 participants reported challenges, compared to 12 who reported successes), which is unsurprising given that these data were collected in the context of active changes in service delivery. Many participants responded to the question about how success was evaluated within their

clinical programs by stating that this was a challenge and an area for growth within their programs but did not attribute this difficulty to a specific reason.

Participant 20 ‘...so I don’t think we really know. I think we provide program[ing] and we see gains, and I guess there’s report card data or whatever, but I don’t think [we] really evaluate effectiveness particularly well.’

When participants did state or imply a barrier to successful outcomes management in their practice contexts, they attributed it to either organisational barriers or to the change in service delivery model. Organisational barriers were described as idiosyncratic features of current practice in each local school authority, such as recent staffing changes, and could be active or passive barriers. Two barriers were reported by multiple participants. First, participants reported difficulties eliciting relevant feedback to inform outcomes management from parents or educators, whether this was due to limited access to parents or due to a lack of an established, positive relationship with educators. Second, 12 participants attributed difficulties in outcomes management to a general lack of institutional interest in systematic outcomes management to inform practice. In some cases, no one else within the school community had demonstrated interest in SLT outcomes. In others, they believed that outcomes may have been tracked and interpreted by higher levels of management but that therapists were not meaningfully involved and were uncertain of what was being done. Seven participants suspected that an unsystematic, reactive rather than systematic, proactive approach to outcomes management was the style used by their school management.

Participant 2 'I think it's actually a lack of complaints that drives our services to a large degree... you know, [if] it ain't broke, let's not fix it. Nobody ever asks, why do you do things this way? Is there a better way of doing things? Nobody ever asks that question. So, we don't really keep a lot of data about our services.'

The other major barrier to successful outcomes management was attributed to the service delivery context in schools, with participants expressing a variety of opinions on how outcomes management is necessarily different in this practice context, particularly when compared with traditional, one-on-one outpatient service delivery models. On 11 occasions, difficulties were attributed to the change to tiered services and the challenge of collecting outcomes for several service types within a tiered model.

Participant 23 'I mean certainly when you are delivering a service model that's robust and includes many different dimensions and isn't just black and white clinical therapy-based, then there lies the rub. It becomes more difficult to report more solid number-based crunching data on some of that.'

Tier 1 services stood out as challenging for outcomes measurement, with several participants suggesting that the research team could assist with this measurement challenge in the future work.

Participant 21 'How to measure Tier 1, what data do we collect in order to measure Tier 1, from making a change, yeah, completely love to hear that. I mean, we track time, we do this and that, I'm not sure, we haven't got something that we feel is, like we're trying different things, but nothing that we really think makes a difference.'

Further, there was suggestion that school-based practice was different from traditional clinical practice, introducing several potential challenges to outcomes management. Particularly, traditional measurement techniques, such as clinical goals and standardized assessments, did not match the most relevant outcomes, consequently requiring new approaches to measurement. A participant discussed the school-based practice context in depth and highlighted aspects that required a different approach to outcomes management. They contrasted practice within an education system to traditional practices in medical contexts several times during the interview.

Participant 22 ‘We’re trying to get kids to be able to be successful in the context of a group learning environment. So, some of our goals aren’t quite as tangible as, you know, here’s my grammar goal, he is going to produce the right pronoun in 90 percent at the conversation level. Like our goals aren’t that. That’s so clinical... I guess that would be a barrier too. We are working in an education system; we are not in a clinical environment.’

This participant linked the idea of practice within an education system as requiring its own approach to outcomes measurement.

Participant 22 ‘We talked about that where we’re data rich, information poor... So that’s a hard thing about being in a school board. Some of those outcome measures are there, they’re just not typical outcome measures for a speech-language pathologist [SLT]...’

According to another participant, this lack of appropriate outcomes measurement techniques for school-based services posed a serious threat to evidence-based practice

(EBP) for their services. Although the participant questioned the assumptions underlying outcomes measurement, they recognized that, at least in their practice context, an ability to quantify service outcomes was paramount for their ability to advocate for EBP. The participant reflected on the fact that clinicians were assessing outcomes informally through their interactions with educators, but the inability to transform this rich qualitative data into numbers was a critical challenge for their service context.

Participant 1 'But I find when you're trying to talk to administrators about a service delivery model that is effective and ineffective, they want stats, right. And I found that it was very difficult as a clinician to get those statistics or that measurable evidence when I was doing in-class supports. So I saw how effective it was, but rather through an educator's lens, because I would get those anecdotes from them telling me, 'you know, this has really modified my practice, I see a difference in the way that I'm reporting, recording assessments with students and how I'm approaching students... so I was getting a lot of comments like that, that I could explain to my administrators, but when it came to statistics and stuff like that, I really, really struggled with measuring effectiveness when it was like a classroom involvement. And I find that's what senior admin wants when they're deciding on a service delivery model, they want to see 'is it effective 75 percent of the time,' and 'what is the short-term forecast and long-term forecast,' it's very statistically based.'

In summary, outcomes management in schools remains a major challenge, with more reported challenges than successes. Participants reported success when they

observed impactful changes within their schools and identified local research support and participatory collaboration with their teams as facilitators of successful outcomes management. When discussing challenges, participants highlighted many context-specific challenges within their own practice. Working within a tiered model in an educational system was also identified as a core challenge, as multiple service tiers required additional attention regarding how to measure and assess outcomes. The educational focus of SLT services in schools was suggested as requiring a re-prioritization of outcomes towards meaningful student participation in educational contexts and partnership between therapists and other members of the school community. Participants further identified this re-prioritization of outcomes as necessitating new approaches to outcome measurement in greater alignment with school environments and goals.

Discussion

In this study, we aimed to better understand outcomes management practices in schools by seeking the perspectives of managers and experienced clinicians during a period of service delivery reorganization. Although exploratory, the results provide a snapshot of current practices and ongoing challenges within contemporary school-based practice, revealing broad trends and highlighting possibilities for further exploration.

First, it is clear from the participants in this study that school-based clinicians in this practice context are interested in outcomes identified in the theoretical literature (i.e., Blosser, 2013; VanderKaay et al., 2021), specifically student-level, relational, and systems-level. This confirms that appropriate research support for SLT services must

address all appropriate outcomes relevant to school-based practice, and that outcome measures for concepts beyond individual student impairments and activities are required for meaningful outcomes management in schools. Importantly, we also observed that participants reported a wide range of measurement and qualitative assessment techniques, and that there was not a clear correspondence between indicator (the specific measure or assessment tool used) and outcome. This is highlighted by the indicator of referral rates for SLT services. When linked to buy-in, an *increase* in referrals was interpreted as a positive outcome. In contrast, when linked to responsiveness to needs, a *decrease* in referrals was considered positive. This emphasizes the need for careful and reflective selection and interpretation of indicators and the measurements they provide. The meaning of these seemingly objective measures such as referral rates were in fact inseparable from their interpretation by participants.

Second, it is clear that outcomes management remains a challenging area for clinical practice. These challenges were often linked to the uniqueness of school-based practice with tiered models. This finding seems consistent with the literature on the context specificity of outcomes (John, 2011; Skeat & Perry, 2008). Participants reported successes in outcomes management when they had access to local research support and department internal collaboration, consistent with previous literature indicating a preference for local support (Worrall & Egan, 2001). These findings echo the literature to date, supporting local context and service delivery considerations in outcome measure implementation.

The present findings highlight the complexity of outcomes management in schools. Clinicians in schools must contend with multiple distinct outcomes at different levels, with the change in service delivery model introducing substantial new challenges. If a fit between an outcome measure and a meaningful role within practice is necessary (Skeat & Perry, 2008), then school-based clinicians are contending with issues of fit for multiple outcomes at different service tiers. Consequently, it seems sensible that strategies to increase the adoption of pro-active, systematic, and meaningful outcomes management should be tailored to the specific contextual difficulties of that clinical program and to the relevant outcome. To support outcomes management in practice, it is essential to understand the root causes of barriers to implementation. Catch-all solutions are unlikely to cause positive system change. Inappropriate interventions to encourage the collection of outcomes by clinicians may lead to maladaptive responses, as has been seen with ‘governance by target’ systems introduced in the United Kingdom (Bevan & Hood, 2006). Outcomes management in schools is a complex challenge, which requires solutions that respect that complexity.

Although we only asked participants about their current outcomes management practices, some chose to also express unresolved challenges regarding these practices. Participants expressed a sense of mismatch between traditional clinical outcomes management via clinical goal tracking and the philosophy of working within an educational environment. In such environments, supporting children’s wellbeing and meaningful engagement in school were the ultimate outcomes that some participants reported wanting to achieve. These comments appear to echo broader issues in SLT. For

example, tensions between health and education systems have been found to constrain clinician advocacy for students (Ng et al., 2015). Reviews of outcomes for preschoolers and for children with speech disorders showed very limited measurement of outcomes beyond impairment (Baker et al., 2022) or activity (Cunningham et al., 2017). Similar findings apply to reviews for school-age children (Archibald, 2017; Cirrin et al., 2010). Many outcomes seemed to be evident to participants in this study as rich, qualitative data (e.g., conversations with educators and parents regarding their buy-in) for which there was no available measure. The paucity in experience-based outcomes observed in reviews of SLT research (e.g., Baker et al., 2022) may contribute to this gap. Rich and valid information on several types of outcomes is essential for delivering high value care (Santana et al., 2018), and supports personalized, effective, and efficient care (McLachlan et al., 2018). Participants' excerpts revealed uncertainty about how to quantify this information, and even whether it could or should be quantified. Indeed, participants indicated a sense of mismatch between the outcomes that were relevant and meaningful for school-based practice and the repertoire of outcomes management tools currently available to them. These comments suggest that substantial gaps in outcomes measurement remain for school-based practice, and that clinically focused, individual outcome measures of student progress and achievement are only a small part of school-based outcomes management.

Limitations

In this study, we sought to describe outcomes management for school-based services at a point in time when many schools were transitioning to tiered service delivery models in a specific locale. Accordingly, this study is preliminary and can only shine light on the major concepts and challenges within this topic. Additional work could explore whether similar challenges are reported in other contexts. Further, only the perspectives of a narrowly defined stakeholder group – experienced clinicians and clinical managers of school-based SLT services – were represented. Future work should consider the perspectives of other stakeholders, such as family and educators, who may describe different ways of knowing if SLT services in schools are working. Educators and family members may have informative perspectives on SLT collaboration and consultation. Additionally, it is crucial to include the voice of children who receive school-based SLT services in future work, as children with disabilities have much to contribute to their experiences in schools (Paul et al., 2022). The data were collected as part of a larger project describing clinical practice in schools; thus, the opportunity for in-depth exploration and follow up for each question was limited. Additionally, previous scholarship on outcomes management in school-based rehabilitation informed the analysis. Alternative interpretations of the data may have been possible using an inductive approach.

Conclusion & Implications

The goal of this study was to describe current outcomes management practices for SLT services in Ontario schools during a transition to tiered service delivery models. By eliciting the perspectives of clinical managers of these services, as well as experienced clinicians, this content analysis expands understanding of how outcomes management is being performed in real-world contexts. The results of this study showed that school-based SLTs in this Canadian province are managing outcomes at multiple levels, and that the tiered service delivery model as well as the philosophy of working within an educational context introduced additional challenges as clinicians seek to make careful inferences about their service outcomes. Finally, these results demonstrated the diversity in practices and challenges faced by school-based SLTs, which suggests that bolstering outcomes management in schools requires complex solutions responsive to contextual needs. We encourage more in-depth explorations of this topic in future work, as well as research from other contexts, to help address this important area. The selection or development of measures that better correspond to outcomes such as inclusion and student well-being appear to be impactful areas for future work. Greater attention to experience measures would also appear to have great utility for practice environments similar to those explored in this study. Such measures may lay the foundations for meaningful outcomes management to support personalised, cost-effective, and more accessible services in schools.

References

- Archibald, L. M. (2017). SLP-educator classroom collaboration: A review to inform reason-based practice. *Autism & Developmental Language Impairments*, 2, 1–17.
<https://doi.org/10.1177/2396941516680369>
- Baker, E., Masso, S., Huynh, K., & Sugden, E. (2022). Optimizing outcomes for children With phonological impairment : A systematic search and review of outcome and experience measures reported in intervention research. *Language, Speech, and Hearing Services in Schools*, 53(July), 732–748.
- Bevan, G., & Hood, C. (2006). What’s measured is what matters: Targets and gaming in the English public health care system. *Public Administration*, 84(3), 517–538.
- Blosser, J. (2013). Outcomes matter in school service delivery. In C. M. Frattali & L. A. C. Golper (Eds.), *Outcomes in Speech-Language Pathology* (2nd ed., pp. 116–140). Thieme Medical Publishers, Inc.
- Bradshaw, C., Atkinson, S., & Doody, O. (2017). Employing a qualitative description approach in health care research. *Global Qualitative Nursing Research*, 4.
<https://doi.org/10.1177/2333393617742282>
- Campbell, W. N., Kennedy, J., Pollock, N., & Missiuna, C. A. (2016). Screening children through Response to Intervention and dynamic performance analysis: The example of Partnering for Change. *Current Developmental Disorders Reports*, 3(3), 200–205.
<https://doi.org/10.1007/s40474-016-0094-6>
- Campbell, W. N., Missiuna, C. A., Rivard, L. M., & Pollock, N. A. (2012). Support for everyone: Experiences of occupational therapists delivering a new model of school-

based service. *Canadian Journal of Occupational Therapy*, 79(1), 51–59.

<https://doi.org/10.2182/cjot.2012.79.1.7>

Cirrin, F. M., Schooling, T. L., Nelson, N. W., Diehl, S. F., Perry, F. F., Staskowski, M.,

Zoann Torrey, T., & Adamczyk, D. F. (2010). Evidence-based systematic review:

Effects of different service delivery models on communication outcomes for

elementary school-age children. *Language, Speech, and Hearing Services in*

Schools, 41, 233–264.

Cohen, M. L., & Hula, W. D. (2020). Patient-reported outcomes and evidence-based

practice in speech-language pathology. *American Journal of Speech-Language*

Pathology, 29(February), 357–370.

Coyte, P. C. (1992). Outcome measurement in speech-language pathology and audiology.

Canadian Journal of Speech-Language Pathology and Audiology, 16(4), 275–285.

Cunningham, B. J., Washington, K. N., Binns, A., Rolfe, K., Robertson, B., &

Rosenbaum, P. (2017). Current methods of evaluating speech-language outcomes for

preschoolers with communication disorders: A scoping review using the ICF-CY.

Journal of Speech Language & Hearing Research, 60(February), 446–464.

<https://doi.org/10.1044/2016>

Donabedian, A. (1992). The role of outcomes in quality assessment and assurance.

Quality Review Bulletin, 18(11), 356–360. <https://doi.org/10.1016/S0097->

5990(16)30560-7

Donabedian, A. (2005). Evaluating the quality of medical care. *Milbank Quarterly*, 83(4),

691–729.

- Duncan, E. A. S., & Murray, J. (2012). The barriers and facilitators to routine outcome measurement by allied health professionals in practice: A systematic review. *BMC Health Services Research*, *12*(96). <https://doi.org/10.1186/1472-6963-12-96>
- Elo, S., & Kyngäs, H. (2008). The qualitative content analysis process. *Journal of Advanced Nursing*, *62*(1), 107–115. <https://doi.org/10.1111/j.1365-2648.2007.04569.x>
- Enderby, P. (1999). For richer for poorer: Outcome measurement in speech and language therapy. *Advances in Speech-Language Pathology*, *1*(1), 63–65. <https://doi.org/10.3109/14417049909167158>
- Frattali, C. M. (2013). Outcomes measurement: Definitions, dimensions, and perspectives. In C. M. Frattali & L. A. C. Golper (Eds.), *Outcomes in Speech-Language Pathology* (2nd ed., pp. 3–24). Thieme Medical Publishers, Inc.
- Fulcher-Rood, K., Castilla-Earls, A. P., & Higginbotham, J. (2018). School-based speech-language pathologists' perspectives on diagnostic decision making. *American Journal of Speech-Language Pathology*, *27*(2), 796–812. https://doi.org/10.1044/2018_AJSLP-16-0121
- Gallagher, T. M., Swigert, N. B., & Baum, H. M. (1998). Collecting outcomes data in schools: Needs and challenges. *Language, Speech, and Hearing Services in Schools*, *29*, 250–256.
- Gentles, S. J., & Vilches, S. L. (2017). Calling for a shared understanding of sampling terminology in qualitative research: Proposed clarifications derived from critical analysis of a methods overview by McCrae and Purssell. *International Journal of*

- Qualitative Methods*, 16(1), 1–7. <https://doi.org/10.1177/1609406917725678>
- Gibson, G., Grignon, M., Hurley, J., & Wang, L. (2019). Here comes the SUN: Self-assessed unmet need, worsening health outcomes, and health care inequity. *Health Economics*, 28(6), 727–735. <https://doi.org/10.1002/hec.3877>
- Golper, L. A. C. (2013). Outcomes measurement: Converging issues, trends, and influences. In C. M. Frattali & L. A. C. Golper (Eds.), *Outcomes in Speech-Language Pathology* (2nd ed., pp. 25–57). Thieme Medical Publishers, Inc.
- Grosche, M., & Volpe, R. J. (2013). Response-to-intervention (RTI) as a model to facilitate inclusion for students with learning and behaviour problems. *European Journal of Special Needs Education*, 28(3), 254–269. <https://doi.org/10.1080/08856257.2013.768452>
- Harron, A., & Titterington, J. (2016). Use of outcome measurement by paediatric AHPs in Northern Ireland. *International Journal of Language and Communication Disorders*, 51(4), 487–492. <https://doi.org/10.1111/1460-6984.12224>
- Hesketh, A., & Sage, K. (1999). For better, for worse: Outcome measurement in speech and language therapy. *Advances in Speech-Language Pathology*, 1(1), 37–45. <https://doi.org/10.3109/14417049909167152>
- John, A. (2011). Therapy outcome measures: Where are we now? *International Journal of Speech-Language Pathology*, 13(1), 36–42. <https://doi.org/10.3109/17549507.2010.497562>
- Lindgren, B. M., Lundman, B., & Graneheim, U. H. (2020). Abstraction and interpretation during the qualitative content analysis process. *International Journal*

of Nursing Studies, 108. <https://doi.org/10.1016/j.ijnurstu.2020.103632>

Malterud, K., Siersma, V. D., & Guassora, A. D. (2016). Sample size in qualitative interview studies: Guided by information power. *Qualitative Health Research*, 26(13), 1753–1760. <https://doi.org/10.1177/1049732315617444>

McIntosh, K., MacKay, L. D., Andreou, T., Brown, J. A., Mathews, S., Gietz, C., & Bennett, J. L. (2011). Response to Intervention in Canada: Definitions, the evidence base, and future directions. *Canadian Journal of School Psychology*, 26(1), 18–43. <https://doi.org/10.1177/0829573511400857>

McLachlan, S., Potts, H. W. W., Dube, K., Buchanan, D., Lean, S., Gallagher, T., Johnson, O., Daley, B., Marsh, W., & Fenton, N. (2018). The Heimdall framework for supporting characterisation of learning health systems. *Journal of Innovation in Health Informatics*, 25(2), 77–87.

Ministry of Children, Community and Social Services. (2018). *Ontario's Special Needs Strategy*. <http://www.children.gov.on.ca/htdocs/English/professionals/specialneeds/strategy.aspx>

Missiuna, C. A., Pollock, N. A., Levac, D. E., Campbell, W. N., Whalen, S. D. S., Bennett, S. M., Hecimovich, C. A., Gaines, B. R., Cairney, J., & Russell, D. J. (2012). Partnering for Change: An innovative school-based occupational therapy service delivery model for children with developmental coordination disorder. *Canadian Journal of Occupational Therapy*, 79(1), 41–50. <https://doi.org/10.2182/cjot.2012.79.1.6>

- Ng, S. L., Lingard, L., Hibbert, K., Regan, S., Phelan, S., Stooke, R., Meston, C., Schryer, C., Manamperi, M., & Friesen, F. (2015). Supporting children with disabilities at school: Implications for the advocate role in professional practice and education. *Disability and Rehabilitation, 37*(24), 2282–2290.
<https://doi.org/10.3109/09638288.2015.1021021>
- Paul, T., Rezze, B. Di, Rosenbaum, P., Cahill, P. T., Jiang, A., Kim, E., & Campbell, W. N. (2022). Perspectives of children and youth with disabilities and special needs regarding their experiences in inclusive education : A meta-aggregative review. *Frontiers in Education, 7*(864752). <https://doi.org/doi:10.3389/feduc.2022.864752>
- Ruggiano, N., & Perry, T. E. (2019). Conducting secondary analysis of qualitative data: Should we, can we, and how? *Qualitative Social Work, 18*(1), 81–97.
<https://doi.org/10.1177/1473325017700701>
- Sandelowski, M. (2010). What’s in a name? Qualitative description revisited. *Research in Nursing and Health, 33*(1), 77–84. <https://doi.org/10.1002/nur.20362>
- Sanger, D., Mohling, S., & Stremlau, A. (2012). Speech-language pathologists’ opinions on response to intervention. *Communication Disorders Quarterly, 34*(1), 3–16.
<https://doi.org/10.1177/1525740111408714>
- Sanger, D., Snow, P. C., Colburn, C., Gergen, M., & Ruf, M. (2012). Speech-language pathologists’ reactions to response to intervention: A qualitative study. *International Journal of Speech-Language Pathology, 14*(1), 1–10.
<https://doi.org/10.3109/17549507.2011.604793>
- Santana, M. J., Manalili, K., Jolley, R. J., Zelinsky, S., Quan, H., & Lu, M. (2018). How

to practice person-centred care: A conceptual framework. *Health Expectations*, 21(2), 429–440. <https://doi.org/10.1111/hex.12640>

Skeat, J., & Perry, A. (2008). Exploring the implementation and use of outcome measurement in practice: A qualitative study. *International Journal of Language and Communication Disorders*, 43(2), 110–125. <https://doi.org/10.1080/13682820701449984>

Speech-Language and Audiology Canada. (2019). *SAC position statement on the role of speech-language pathologists in schools*. https://www.sac-oac.ca/sites/default/files/resources/sac_s-lps_in_schools_position_statement_en.pdf

Terreberry, S., Dix, L., Cahill, P. T., Passaretti, B., & Campbell, W. N. (2021). Moving towards a tiered model of speech and language services in Ontario schools: Perspectives of school-board speech-language pathologists. *Canadian Journal of Speech-Language Pathology & Audiology*, 45(4), 267–282.

VanderKaay, S., Dix, L., Rivard, L., Missiuna, C., Ng, S., Pollock, N., Whalen, S. S., Eisen, I., Kyte, C., Phoenix, M., Bennett, S., Specht, J., Kennedy, J., Mccauley, D., & Campbell, W. N. (2021). Tiered approaches to rehabilitation services in education settings: Towards developing an explanatory programme theory. *International Journal of Disability, Development and Education*. <https://doi.org/10.1080/1034912X.2021.1895975>

Worrall, L., & Egan, J. (2001). A survey of outcome measures used by Australian speech pathologists. *Asia Pacific Journal of Speech, Language and Hearing*, 6(3), 149–162. <https://doi.org/10.1179/136132801805576635>

Chapter 3: Exploring the valued outcomes of school-based speech-language therapy services: A sequential iterative design

This chapter presents a sequential iterative mixed method exploration of meaningful and valued outcomes for school-based speech-language services.

Prepared for submission to: BMC Health Services Research

*Exploring the valued outcomes of school-based speech-language therapy services: A
sequential iterative design*

Authors and affiliations:

Peter T. Cahill^{1*}

Stella Ng^{2,3}

Lyn Turkstra¹

Mark A. Ferro^{4,5}

Wenonah N. Campbell^{1,5}

¹ School of Rehabilitation Science, McMaster University

² Department of Speech-Language Pathology, University of Toronto

³ Centre for Interprofessional Education, University of Toronto

⁴ School of Public Health Sciences, University of Waterloo

⁵ CanChild Centre for Childhood Disability Research

*Corresponding Author

Peter T. Cahill
School of Rehabilitation Science
Institute of Applied Health Sciences, Room 403
1400 Main Street West
Hamilton, ON, L8S 1C7, Canada
cahillp@mcmaster.ca
+1-905-525-9140 ext. 22867

Exploring the valued outcomes of school-based speech-language therapy services: A sequential iterative design

Background: Achieving outcomes that community members value is essential to high-quality, family-centred care. These valued outcomes should inform the production and interpretation of research evidence. To date, outcomes included in studies of service delivery models for speech-language services in schools have been narrowly defined, and do not match the outcomes suggested as important by families, teachers, and children. The most important outcomes of school-based, speech-languages services have not been directly and systematically investigated. We aimed to address this gap by asking school community members what outcomes were most relevant to evaluating and improving the delivery of speech-language services in schools.

Methods: A sequential, iterative mixed-method study was conducted using interviews with 14 family members, educators, and speech-language therapists that asked what outcomes or impacts of school-based services they considered most important or valuable. Summative content analysis was used to analyse the data. Structural topic modelling between rounds of qualitative analysis was used to describe both the quality and the quantity of the interview content. School community members' perspectives were compared through estimation of topic proportions within interviews from each member group and through qualitative comparison.

Results: Structural topic modelling diagnostics and qualitative interpretation of topic output suggested a six-topic solution. This solution was estimated successfully and yielded the following topics: 1) meeting all needs appropriately, 2) teamwork and collaboration, 3) building capacities, 4) supporting individual student needs in context, 5) coordinating care, and finally 6) supporting core educational goals. Families focused on school-based services meeting all needs appropriately and coordinating care, while educators highlighted supporting individual student needs in context. By contrast, speech-language therapists emphasized building capacities and supporting core educational goals. All school community members agreed that current assessment tools and outcome measures were inadequate to capture the most important impacts of school-based services.

Conclusions: Outcomes identified by school community members as important or valuable were broad, and included individual student outcomes, interpersonal outcomes, and systems-level outcomes. Although these outcomes were discussed by all member groups, each group focused on different outcomes in the interviews, suggesting differences in the prioritization of outcomes. We recommend building consensus regarding the most important outcomes for school-based speech-language services, as well as the prioritization of outcomes for measure development.

Keywords: Outcomes; speech-language therapy; speech-language therapy; speech-language pathology schools; service delivery model; stakeholder values; content analysis; mixed methods; structural topic modelling

Background

Healthcare providers can improve family-centered care for children if they carefully and thoughtfully track and interpret meaningful outcomes [1–3]. These outcomes include the results of care, the experiences that families have with their care and their satisfaction with the same, as well as the reduction or elimination of adverse events [3]. A fundamental principal of family-centred care is the collaborative identification of desired service outcomes [4]. Although clinicians offer important perspectives and knowledge, research indicates that there are important differences in values between practitioners and patients [5–7], with each contributing to shared, evidence-based decision making [8]. Therefore, it is important to select core outcomes used to evaluate and improve health care through dialogue among all relevant parties.

Within paediatric speech language therapy (SLT), systematic reviews have highlighted important gaps in documented outcomes, including a paucity of participation-level outcomes [9,10], as well as a lack of long-term outcomes and measures regarding

family experiences with SLT services [10]. Findings from qualitative research offer guidance regarding the kinds of outcomes that children and families might value. For example, Markham and colleagues [11] interviewed school-aged children with diverse speech, language, and communication needs regarding their quality of life. Qualitative analysis of these data suggested that children wanted positive social relationships, a sense of inclusion with family and peers, and a feeling of achievement and independence [11]. Participants stated that they wanted to avoid being bullied, as well as feeling isolated or excluded [11]. Lyons and Roulstone [12] also interviewed school-age children, this time with primary speech and language impairments, regarding their experiences in schools. These participants expressed their agency and independence, wanting to be recognized and included in their school environments, and resisted attempts of labelling, removal from the classroom, and separation from their peers [12]. Similarly, these children identified difficulties with social relationships and challenges with academics as threats to their wellbeing, whereas agency and positive social relationships were supportive and protective of their health and happiness [13]. Focus groups with parents from underserved areas of England (including parents of children receiving school-based services) also provided several suggestions regarding the improvement of services, including reduced wait times and increased time dedicated to clinician-family communication and rapport-building [14]. Ethnographic research in schools has also suggested that parents want greater communication and care coordination to support their children with disabilities, including between health professionals working in schools and their children's educators [15]. In summary, qualitative research suggests that children and families focus more on

broader outcomes such as inclusion, wellbeing, and service quality than they do on children's specific skills and abilities.

Although these studies all provide windows into the perspectives of school-age children with communication disorders and their parents, few studies have explicitly and systematically asked multiple members of school communities about what they view as the desired outcomes of school-based SLT services [16]. An exception is work by Gallagher and colleagues [17] that explored meaningful outcomes for children with developmental language disorder through focus groups with educators, parents, and clinicians and interviews with children. These researchers found that all participants valued the same broad outcomes, particularly academic and social participation, as well as self-management and advocacy [17]. Nevertheless, there were important nuances among participant groups in how these broad outcomes were interpreted. For example, educators conceptualized academic participation primarily as the ability of children with developmental language disorder to participate in classroom activities and respond to teacher questions [17]. Similarly, speech-language therapists (S-LTs) emphasized building the ability of children to identify when they were struggling with classroom language, and to know when to request assistance from teachers [17]. By contrast, children emphasized being able to contribute meaningfully to classroom discussions and peer interactions, as well as navigating ethical dilemmas and complex social challenges with peers [17].

A clear opportunity remains to directly and systematically bring together diverse perspectives to identify the most valued outcomes of school-based SLT services.

Although the work by Gallagher and colleagues [17] is a valuable contribution that directly addressed this issue, their findings were focused on children with a specific diagnostic label. In contrast, we wished to expand upon this previous work by exploring desired outcomes of school-based services for any child receiving or benefiting from SLT services in schools, including children without diagnostic labels. Additionally, we wanted to explore in greater detail desired outcomes within contemporary service approaches, such as tiered models that offer services across a continuum from universal, whole class to highly individualized [20]. Prior research indicates that relevant outcomes in tiered service models may include student-, parent-, educator-, and systems-level outcomes, such as earlier identification of student needs, increased student participation in the classroom, expanded parent and educator capacities, fewer formal diagnoses, and reduced long-term burden of disabilities on the school community [18,19]. Interviews with S-LTs working in schools have confirmed that outcomes at these levels are relevant to practice and remain an area for professional growth [20]. Consequently, it is timely to consider what outcomes of school-based SLT services are valued by members of school communities. Specifically, our research questions were as follows:

1. What outcomes are identified as valued or meaningful to family members, educators, and clinicians involved in school-based, SLT services?
2. What differences in these community members' perspectives are reflected in the quality or quantity of their discussion of these outcomes?

Methods

In the present study, we explore meaningful outcomes for school-based services through a mixed-methods summative content analysis using interview data. Summative content analysis makes use of both qualitative and quantitative aspects of textual data to explore the usage and meaning of participants' words [21]. This approach is consistent with mixed methods assumptions that reject a strict duality between qualitative and quantitative data, and instead posit that data can be either qualitative or quantitative depending on how the researcher approaches the data [22]. In this study, we represented the data both quantitatively (the frequency and co-occurrence of words), as well as qualitatively (interpretation of meaning via close reading by the researcher). We used a sequential iterative design [22], allowing the qualitative and quantitative analyses to mutually inform and develop the results.

Ethics

Study methods followed ethical guidelines and regulations. All materials and procedures for this study were reviewed by the Hamilton Integrated Regional Ethics Board (Project number #13906) affiliated with McMaster University, as well as the ethics committees of all participating school boards. All participants provided informed consent prior to initiating any study activities.

Sampling strategy

We used purposeful sampling [23], initially identifying interested and motivated S-LTs who would likely have rich perspectives on the research topic. Subsequently, we used snowball sampling [24], asking recruited participants to identify educators likely to have relevant knowledge and perspectives. This combined sampling approach has been

recommended when attempting to elicit perspectives on a complex topic from the perspective of multiple member groups [25,26]. To recruit parents and caregivers, we reached out through known channels, harnessing the networks of research and clinical colleagues based at McMaster University's CanChild Centre for Childhood Disability Research. We used the concept of information power [27] to inform the final sample size, using our prior knowledge to set an *a priori* sample size and revising the same based on the variability of data collected. In this case, we originally planned on interviewing 20 participants; however, we reduced this number as the interviews rapidly reinforced the ideas from previous interviews as well as from prior work in this area [see 20].

Participants

We recruited participants belonging to three school community member groups who we anticipated would have an interest in outcomes for school-based SLT services: families of children receiving these services (n = 4), S-LTs (n = 5), and educators (n = 5). All participants were connected to school boards (a term for a local educational authority) in Ontario, Canada, with the professionals employed directly by the school boards rather than by third party health agencies.

Materials and procedures

Interviews followed a semi-structured format. A common prompt was used to open every session, with prompts prepared for contingent response to the discussion. These prompts were used to follow up on ideas brought up by participants in response to the initial common prompt. Prompts were developed based on previous literature regarding outcomes for SLT services in schools [18] and school-based tiered services

[19]. See Additional file 1 for a copy of the interview guide. One pair of S-LTs preferred to be interviewed together, and so a simultaneous interview was conducted for these participants.

All sessions were conducted using videoconferencing software and were recorded with automated transcripts. Following each, the first author listened to the recording three times and corrected the transcripts. The transcripts were simultaneously de-identified with all names and other identifying references removed and replaced with non-identifiable placeholders. Corrected and de-identified transcripts were then uploaded to relevant data analysis software (see next section).

Finally, we used qualitative surveys subsequent to the interviews to collect additional data. These surveys provided an opportunity to further develop and expand on ideas explored in the original qualitative data collection [28]. A link to these surveys was sent out to participants approximately one week following the interviews and all data was collected using Research Electronic Data Capture [REDCap: 29].

Data analysis

Step 1. Data familiarization

We performed a summative content analysis [21] using data from the interviews. The analysis occurred in three steps. In the first step, the first author read all transcripts in their entirety to make sense of the data as a whole [30]. Memo writing was used at this stage, recording initial questions and impressions of the data, and these initial impressions were discussed within peer debriefing between the first and last authors.

Step 2. Structural topic modeling

In the second stage, a quantitative analysis was performed. We used a topic modelling approach embedded within this summative content analysis, as computer-aided content categorization and counting is consistent with the paradigmatic assumptions of summative content analysis [31]. All data were uploaded to R [32] software. Subsequently, structural topic modeling [STM; 42,43] was performed using the *stm* package [35]. STM is a multi-class membership machine learning algorithm used to analyze textual data and their metadata [34]. This algorithm searches through text calculating the frequency and co-occurrence of words to identify latent topics that are present in the data set [34], and to identify the terms most likely to belong to each topic.

Step 2.1 Data cleaning

We first cleaned the data for analysis. This process removes words and morphemes that provide little content information [33], such as articles (e.g., “the,” “a”) and most inflectional and some derivational morphology (e.g., “assessments” is reduced to “assess-” with “-ment-” and “-s” removed). This approach reduces the number of comparisons required by the algorithm and avoids cluttering the results with function words that provide little semantic information [33]. To do so, we used the built-in lists with the *stm* package, and added additional conversational words, as the built-in lists were developed for use with formal written texts, as well as words unique to specific participants contexts (e.g., terms only used by their local educational authority).

Step 2.2 Model selection

We then applied STM to the data and used our understanding of the data from the original qualitative exploration of the data, as well as relevant previous literature, to

interpret topics and inform the final selection of the number of topics to be retained in the model. We used goodness of fit statistics to guide the range of ideal topic numbers; however, we retained the primacy of the qualitative interpretation to select the final algorithm solution. We focused on the fit statistics of semantic coherence and exclusivity. These fit statistics are compared in relative terms – to other topic number solutions for the same data set, rather than by reference to absolute cut-offs or reference values. Semantic coherence provides an estimate of how frequently words within the topic co-occur [34,35], and is strongly associated with human judgement of topic coherence [36]. Exclusivity opposes semantic coherence, and prefers topics structures where words are not shared among multiple topics [34,35]. Better fitting models can be identified through model solutions that optimize the values of these two opposing fit statistics [34,35]. The topics were then named based on qualitative interpretation of the top terms within each topic.

Step 2.3 Use of metadata

An advantage of STM for this project is that it does not suppose independence of the data and the data generating mechanism [34,37]. Consequently, the method allows a description of the differences in topic proportions across documents [33,34]. We postulated that different school community members may discuss different topics. This metadata would allow exploration of topic distribution among member groups. For each topic, we estimated the topic proportion differences across member groups to compare the quantity of data dedicated to each outcome.

Step 3. Qualitative interpretation and categorization

In the third step, topics from the final STM model were interpreted qualitatively by the research team using notes and memos from step 1 to help interpret the topics. The first author named the topics drawing on both the results of the quantitative model and qualitative familiarity with the data. The first author then reviewed the transcripts again with the topic solution in mind and selected emblematic quotes for each topic that illustrated the meaning and nuance of community members' discussion of each outcome topic. Finally, the quality and quantity of the data were interpreted in light of both quantitative and qualitative results, as well as previous literature in this research domain. Peer debriefing between the first and last author was used throughout this step.

Legitimizing inferences

In mixed methods studies, researchers must develop and bolster high quality inferences [38]. Inferences are the conclusions and interpretations of the research results [38]. Achieving high quality inferences is a process that occurs throughout the entire research process, and is central to rigorous mixed methods research design [38,39]. This process has been referred to as *legitimation* [39], and can be considered analogous to validity and creditability in quantitative and qualitative paradigms, respectively [38].

To legitimize our inferences, we used several strategies. In keeping with recommendations for content analysis [30], we used peer debriefing regularly throughout the project, including between each phase of the analysis. This was necessary to explore perceptions and interpretations of the data up to that point, allowing the analysis to benefit and develop from multiple perspectives throughout the analytic process. Memo writing also was used regularly to document and enhance the analysis. Critical to this

analysis, we used data analysis triangulation, using both qualitative and quantitative analysis techniques to generate and mutually inform the results. We used this data analysis triangulation as a form of weakness minimization [39], relying on qualitative reading and coding of the data to bolster inferences about the *quality* of the content, while using STM to bolster inferences about the relative *quantity* of topics and their distribution across the data set. Finally, we used both a close, human reading of topic content supplemented by a machine reading of topic quantity to make inferences from our text data [37]. This approach maximized the amount of information available to the research team when generating inferences from the data.

Results

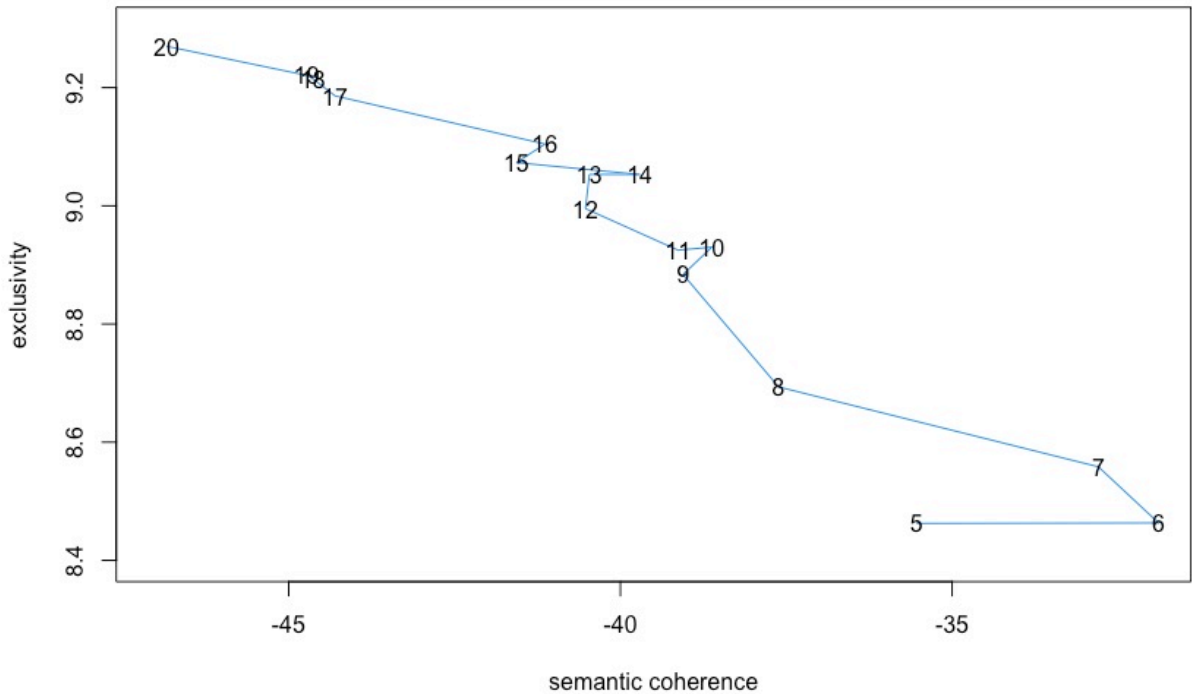
Step 1. Data familiarization

Initial qualitative impressions indicated that participants frequently focused on processes related to key outcomes (e.g., I must *collaborate with the teacher* in order to *achieve student progress*). Additionally, all participants appeared to generally agree that all outcomes were important, although the prioritization of each outcome may have differed among the member groups, as families particularly appeared to focus more on access to services and the provision of all appropriate services to students, whereas S-LTs and teachers focused more on collaboration and implementation in the classroom. Participants also appeared to discuss student-level, interpersonal, and systems-level outcomes as important and interrelated.

Step 2. Structural topic modeling

We fit topic models to the transcript data. Only three follow up surveys were completed with very brief responses that reiterated discussion points in the interviews. As topic modelling can perform poorly on short text excerpts [40], we choose to exclude this data from the analysis. We started with a five-topic solution and proceeding until a 20-topic solution and then evaluated diagnostics, focusing on estimates of semantic coherence and exclusivity for each model. See Figure 2 for a visual diagram of the diagnostic results. A good topic solution should optimally maximize both exclusivity and semantic coherence, which are in tension with each other. Potential topic solutions can be identified by point values relatively closer to the top left corner of the figure. (To illustrate, in the included figure a seven-topic model unequivocally outperforms a five-topic model.) The diagnostic results suggested four potential solutions (6, 7, 10, and 14 topics) as outperforming the remainder. We estimated each of these topic-number models and analysed the resulting topics qualitatively and eliminated the 10 and 14 topic solutions for poor interpretability. We compared the six- and seven-topic solutions more fulsomely, and eventually eliminated the seven-topic solution in favour of the more qualitatively meaningful six-topic model. Consequently, we proceeded with the six-topic solution.

Figure 2: Semantic coherence and exclusivity per topic model



The highest probability terms for each of the six topics are listed in Table 3, using four metrics for topic membership. According to the model, these words have the highest probability of belonging to the topic when they appear within the text. Additional information on the nature and calculation of each is beyond the scope of this manuscript and we refer readers to the technical literature [see 34]. To summarize, *Highest* refers to the words with the highest probability of belonging to the topic [41]. *FREX* and *Lift* reduce the probability for words that are shared amongst multiple topics, identifying the words with greater exclusivity to the topic [41]. *Score* adjusts for overall word frequency, pinpointing less commonly used terms [41]. We include all metrics here for thoroughness

and transparency.

Table 3: Associated words per topic for six-topic model

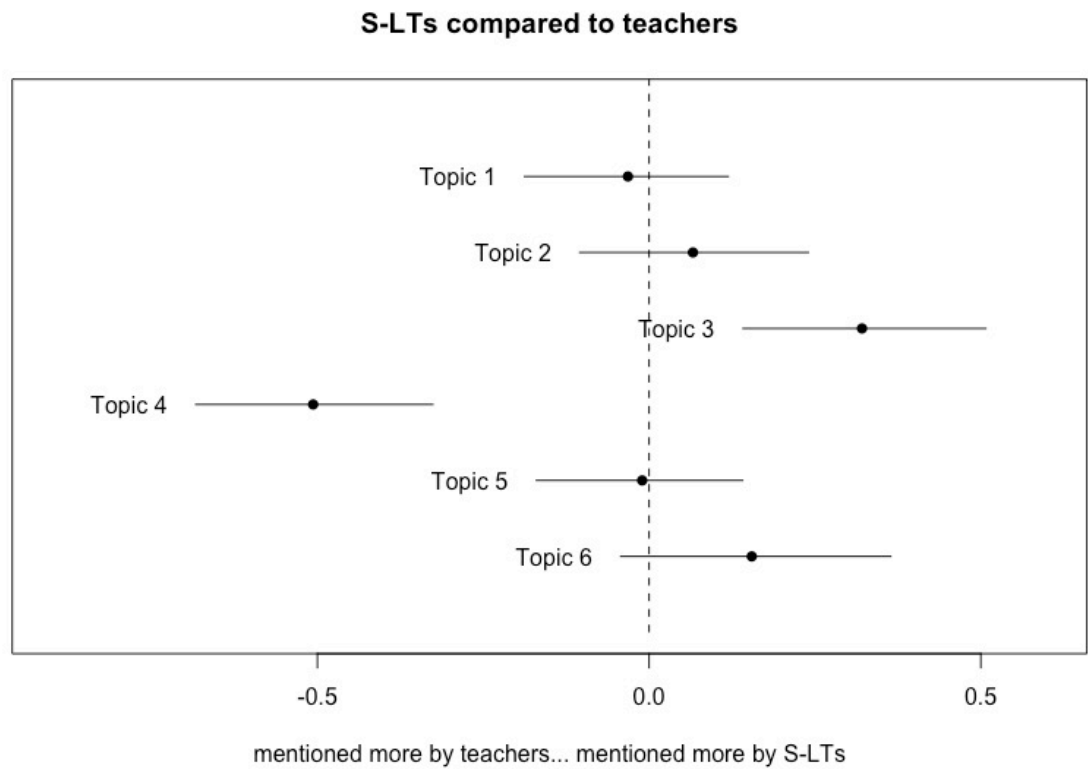
Topic number	Words with highest probability of belonging to topic	Initial interpretation by data analyst
1	Highest: need, servic, disabl, child, privat, peopl, involv FREX: disabl, privat, public, therapi, etc, evalu, spectrum Lift: cost, defin, embodi, govern, harm, ignor, unjustic Score: disabl, etc, evalu, harm, unjustic, righteous, midst	Appropriately meeting all needs
2	Highest: feel, week, languag, teacher, communic, team, need FREX: week, feel, part, sens, team, target, growth Lift: partner, valuabl, accomplish, faster, husband, incorpor, most Score: accomplish, week, incorpor, member, real, partner, connect	Teamwork, collaboration, and partnership within the school
3	Highest: tier, student, teacher, educ, program, strategi, classroom FREX: tier, strategi, referr, feedback, may, two, play Lift: check-in, guest, essenti, grammat, potenti, prior, speciali Score: tier, narrat, feedback, student, indic, strategi, potenti	Developing capacities within the classroom
4	Highest: student, languag, speech, need, classroom, servic, back FREX: languag, pathologist, back, slps, speech, student, build Lift: graduat, path, pronoun, advic, anxieti, bodi, built Score: student, stutter, languag, impact, intervent, cdas, confid	Supporting individual student needs within the classroom

5	<p>Highest: communic, child, slp, speech, need, support, children FREX: child, devic, train, name, attend, region, slp Lift: anxious, design, dress, fact, fulli, googl, offici Score: child, arrang, statist, pec, surpris, devic, except</p>	<p>Coordinating services and supports for children with greater needs</p>
6	<p>Highest: teacher, student, read, impact, want, decod, support FREX: decod, phonem, read, level, term, awar, instruct Lift: equip, instanc, product, advanc, bang, buck, checklist Score: decod, phonem, impact, benchmark, reader, instruct, three</p>	<p>Supporting core educational skills and goals</p>

We then estimated the prevalence of each topic within text from each participant group. As this work is situated within the disciplinary perspective of speech and language therapy, we used the S-LTs as the reference group for comparison. In this way, we would be able to identify topics that teachers and families discussed significantly more or less when compared to S-LTs, suggesting potential divergences in group members' perspectives. Figures 3 and 4 present the point estimates and 95% confidence intervals for topic proportions across participant groups. In both cases, positive values indicate that S-LTs discussed the topic more, whereas negative values indicate that the comparison group (educators and families) discussed the topic more. Zero (indicated in the figures with the dotted vertical line) signals that the data are consistent with no differences in topic proportions between groups. Compared to teachers, S-LTs discussed topic 3 more and topic 4 less. S-LTs may have also dedicated more attention to topic 6, although the data

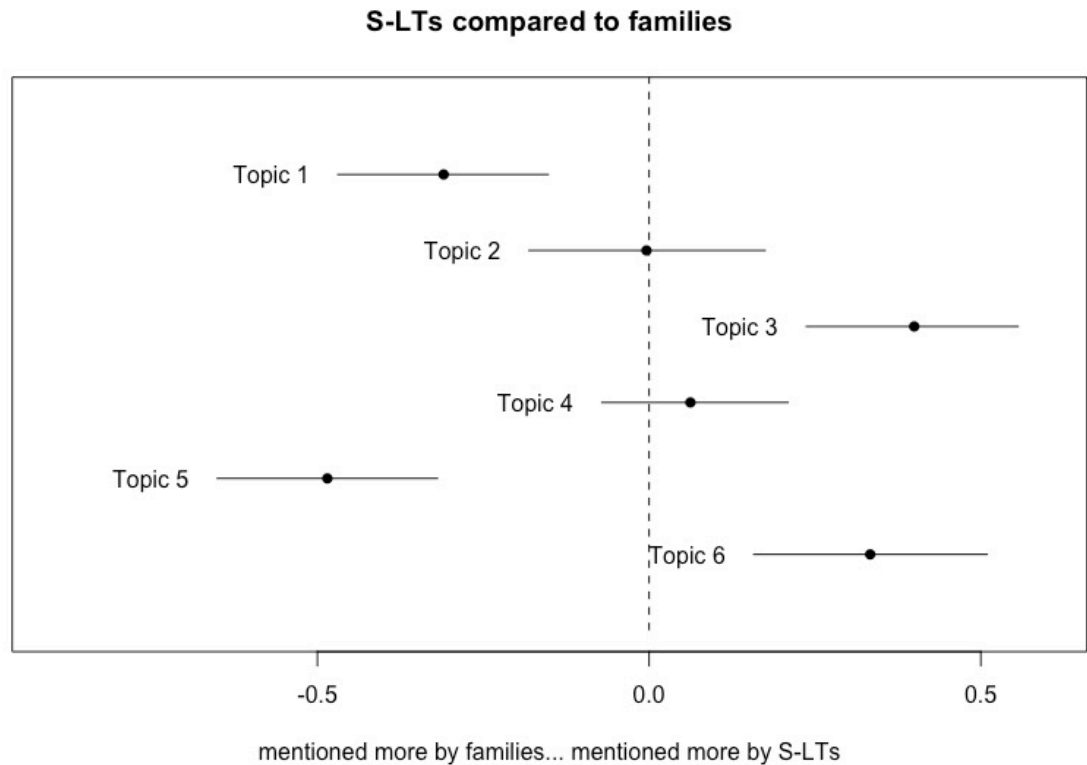
are also consistent with no difference. Topics 1, 2, and 5 did not vary in proportions between S-LTs and teachers.

Figure 3: S-LT topic proportion differences compared to teachers with point estimates and 95% confidence intervals



Compared to families, S-LTs discussed topics 3 and 6 more, and 1 and 5 less. The data were consistent with no differences in prevalence for topics 2 and 4. Specific values for coefficients, standard errors, t- and p-values can be found in the Additional file 2.

Figure 4: S-LT topic proportion differences compared to families with point estimates and 95% confidence intervals



Step 3. Qualitative interpretation and categorization

After completing data familiarization and structural topic modelling, we then qualitatively interpreted both previous steps. Greater detail regarding the quality of what was said relevant to each topic is provided below, along with emblematic quotes.

Topic 1 – Appropriately meeting all needs

The content within the topic focused on meeting all needs within the school. Family members discussed this topic more than S-LTs and indicated that sufficient supports were not available within the school system to adequately meet the needs of all students. For example, one parent stated:

“When you have these two people servicing a few individuals who need it, it shows you need so much more in order to service all these other kids that really do not need as much care and attention... But right now, it seems like it's just, this is what we are picking [the children receiving intensive services]. This is what all we have and that's who gets it and that's it. So, what about everybody else?”

Family member 7

Family members indicated that those families who could frequently turned to private speech-language services outside of the schools to meet the needs of their children, while recognizing that this was problematic and inequitable to many families. One family member reported frustration with consistently needing to access resources outside of the school, and the negative impacts the family was suffering as a result.

“I had to go through other side channels and try to get either information or like any kind of like, you know, to push things forward. Like I said, even [child's name] being transferred to a completely different platform, educational platform, has never been offered to me, or presented as an option to me by the school... She will be starting grade one, and she's not going to be on the educational plan for grade one, which is a complete disaster.” Family member 3

S-LTs and educators also expressed concern regarding meeting all needs within the school and noted the substantial staffing and resource challenges within their workplaces, albeit less frequently and forcefully compared to the family members. One S-LT suggested that there was great uncertainty in how to best allocate resources to meet needs, and that this was a major barrier to offering impactful services in schools.

“I think that having more information about the things that are impactful would be beneficial in terms of prioritizing the caseload and managing the caseload. Absolutely. You know, there, there are times when you spend a lot of time with it with a student, and the educators, and the assistants, and the parents, but in the end, you really do not know the impact that you are having. You just feel that well this is what I should be doing this is how I think it would help.” S-LT 13

Topic 2 - Teamwork, collaboration, and partnership within the school

The content of this topic focused on the importance of teamwork, collaboration, and partnership within the school. All participants discussed this topic at length. S-LTs and educators frequently emphasized the critical role that collaboration held within school-based practice. For example, one teacher stated:

“That is the most integral part of educating the student. And so, when we are just with me and my educational partners my teaching partners, it is the co-teaching, co-assessing. But then, with all of our outside support services like S-LP [S-LT], and the community services. You have to have the mindset that nobody knows more than the other but that it is like a symbiotic relationship where I am going to learn from you, and you are going to learn from me. And we kind of have that time and space to work together. It has been impactful and in my experience. I have always been open to anybody who is going to help me bring my students forward.” Educator 1

Family members discussed wanting to be more involved with the school team, and for more open and consistent communication with the S-LTs and educators. A desire for a more proactive and engaging approach from the school was also reported by family members. For example, one participant stated the following.

“It should not be me to be the expert. Even though I am not, I felt like I became one. It is supposed to be them who will be teaching and guiding me instead of me trying to figure out how to arrange a training for certain number of people, so that they will know how to support my child’s needs while she is there, and I told them that I really want us to work as a team. I do not want the burden to be on you only but at the same time you have to do something from your side.” Family member 3

Topic 3 - Developing capacities within the classroom

The content of this topic was focused on how S-LTs could support teachers, educational assistants, and other professionals working in the classroom, building their capacities to support their students’ needs. S-LTs discussed this topic more when compared to both educators and families and building staff capacity seemed to be considered a core aspect of achieving desired outcomes within school-based practice.

“For me it truly feels that when I’m able to educate the teacher around what they can do in the-every-day. I am only there once a week, most of the time. So once, once they start implementing the strategies that I give every single day, they know. They notice a difference. They notice an impact.” S-LT 5

Building staff capacity included both the skills and knowledge of teachers and other school personnel, as well as their confidence and positive attitude towards supporting children with communication difficulties within the classroom.

“There are many people who feel like, if they have a student, that they are struggling with. When I say struggling with, I mean feeling like they are not making a strong effect on and not being able to teach them and move them along. Then the feeling is, they want someone else to come in and help them. And what we really want to do is we really, really, really want to provide teachers, educators with the feeling that they have the skills.” S-LT 12

When family members discussed this topic, they included everyone within the school as benefiting from capacity and knowledge development. For example, one parent suggested that the S-LT spend time in the classroom educating peers about communication disorders and inclusive practices.

“To me, the important thing is trying to make it inclusive for the child. So, if the S-LP [S-LT] is going to come into the class, then I think it would be a great idea for them to say hey guys you know I am the speech therapist. And this is to the whole class not to my child only, to say I am a speech therapist and there is some children who sometimes have difficulty with language, with communication, with all these different things, and I am here to help. And these are some of the things that we can do.” Family member 9

Topic 4 – Meeting specific student needs within the classroom

The content of the fourth topic focused on how to support specific students within the classroom. Educators discussed the topic more than did S-LTs. Teachers emphasized the need for supports, strategies, and suggestions to make sense within the educational context. One educator emphasized how having school-based S-LTs as opposed to external professionals helped ensure impactful recommendations to support children within their educational context.

“And I think by having speech and language in the buildings, it is helping to close that gap significantly. Because especially with special education, a lot of times we have outside providers that will come in, and in the past this has been speech and language, that will make recommendations and say, you know what you can just do this, and you can do this, and you can do this, which is all great in theory and in a supervised setting or a one-on-one setting or a nice, quiet environment, it is ideal. But when you bring that into the regular chaos of the classroom, and all the other needs that are in there, it is not always applicable. And I think by having speech and language in the building, they are seeing now more what is happening in the classroom environment, and then they are adapting the programming and the services to meet to better meet those needs. And I think that has helped immensely as well.” Educator 10

Educators also reported an appreciation for the speciality skills brought into the classroom by S-LTs, and how these skills could be leveraged into specific daily practices.

“They [S-LTs] are often the ones that are able to pinpoint the specific need that a child has. So, when I’m working with a student and I know that there is gaps in

their language, or their speech, I might be able to take a guess at what areas they need to develop... But because I do not have that trained ear that you guys have when you are doing an assessment, I am really just guessing. I am guessing at what sounds are missing. And oftentimes the speech language pathologist [S-LT], they will come back, and they will be very specific and say, oh, you know what, in language, it is actually their word retrieval, or it is their sounds that they make with “tr” or something that. So, they are very specific. And then when they work with the children, they are able to give me specific ways that I can help the child improve with their language and their speech on a daily basis.” Educator 11

Topic 5 - Coordinating services and supports for children with greater needs

The content of this topic concentrated on care coordination to support individual student needs and was a major focus for family members. Families expressed a strong preference for care coordination within schools and reported negative feelings about the effort required to advocate for care coordination for their children. For example, one parent stated:

“I am expecting that that support and that implementation will be in place before even I reach out. Not once I put foot in that school and then, they are going to start to search. Okay, whom do we need? Like you cannot gather a team or try to figure out, okay, what do we need to support this child? So, you should have some sort of a process and people in place already available so that a child like mine comes in, they will know what to do from day one.” Family member 6

S-LTs being responsive to children’s holistic needs also was mentioned frequently.

Educators noted that S-LTs were frequently the point of entry for other referrals, such as to formal assessment for social communication challenges. Parents reported valuing S-LTs proactively coordinating or initiating interprofessional collaboration to support the child as a whole person.

“And then the other thing is just having that view of the child that I am going to look at a child was a whole person. And okay I am supposed to focus on his speech, but is there anything else that might be hindering him from being successful? So, if you know if you can see that my child you know cannot regulate himself or their sensory needs, you know, then you know to me the S-LP [S-LT] then should within their school team say, you know what, in my, in my sessions I am finding that you know he cannot really concentrate. He sort of looks like he needs to have a lot of movement. Or I see that he is struggling a lot with fine motor. So can we refer him for OT [occupational therapy] services, you know, so to me that is looking at the whole child or, you know, her saying, you know mom is coming to me and saying, you know, he cannot even toilet himself. So do we have supports in place for that?” Family member 9

Compared to family members, educators reported most positively about care coordination within schools and emphasized how S-LTs had impacted the ability of the system to respond rapidly to referrals. Teachers also emphasized that this care coordination is effective when conducted within the school, and that they would not expect the same outcomes from S-LTs sent from external agencies.

“Really the biggest change for any support for any kid anywhere is waitlist. I think we do a pretty good job in our [school] board though with, like, I have to say our speech and language team has been right on top of everything this year and getting in and assessing kids. We are able to start to put programming in place pretty quickly. Outside supports, there is, you know, if we have to send a kid to school-based support [provided by an external agency], then that is like a yearlong waitlist and then they only come in a few times, maybe 10 times a year, to see the student.” Educator 6

Topic 6 - Supporting core educational skills and goals

The content of the final topic focused on how S-LTs could support core educational skills and goals, with a particular focus on literacy instruction. S-LTs discussed how they felt that they could support teachers in evidence-based practices relevant to core educational skills, and provide material resources, training, and other supports to improve educational practices. For example, one S-LT reported highly valuing this outcome.

“I just really want to have more of an impact in supporting literacy development within the schools because it is a little bit disorganized right now within our school system. There is very inconsistent access to literacy supports from one school to the next, and I find that that's where a lot of the educators are coming to me for support, and we do not have the time to give as much support as I would like to. So, my biggest impact that I want to make is continuing to empower and

enable educators to enhance their literacy skills and their literacy support for students.” S-LT 5

Supporting children’s educational journeys was also reported to be a core aspect of speech-language practice in schools according to the S-LTs, and that this aspect of practice was unique to working within a school-based context. One S-LT highlighted how they considered students’ educational success as the most distal outcome of services in schools, and how practice must be oriented towards achieving this success.

“Ultimately, like I said, the goal is having them in the classroom and supporting them in the classroom. So, in terms of how successful they are in the classroom that is then, I believe, kind of an indirect reflection of how successful they are with those strategies and supports that we have recommended, and those strategies and supports are then helping them to access curriculum and to be successful in the classroom, which is our ultimate goal.” S-LT 4

Educators also discussed the importance of keeping the child in the classroom accessing core educational activities, and that S-LTs providing these supports could help educators achieve their desired educational outcomes more effectively and efficiently.

“Tier one is how the S-LP [S-LT]... is supporting the classroom teacher. So how are you supporting them so that they can deliver better material and better lessons and so on. So you are guiding their practice, as opposed to being the one to kind of directly do it... they could talk about those strategies about what we do and why we do it how it is helpful and how those spelling tests you have done every week, you know, they did have a purpose but now we can focus on this because we

want to get more bang for our buck. We want to make sure that the time we are spending on these areas with kids is actually more effective.” Educator 2

Parents discussed this topic less frequently compared to S-LTs yet indicated sentiments consistent with the outcomes the S-LTs reported as valuing, such as maintaining students within an inclusive classroom with their peers, learning with and from their classmates. However, family members connected this outcome to topic 5 (care coordination), rather than the supports to core educational skills and goals, which was highlighted by S-LTs.

Overarching issues related to outcomes

Some participants proffered perspectives on the use of outcomes in school-based practice. Multiple participants pointed out inconsistencies or challenges with indicators (specific measures for an outcome). For example, one educator reported that what was measurable was not what mattered, and that important outcomes required qualitative assessment rather than measurement.

“I need to see you know benefits in their day-to-day life that maybe are not the most measurable things but are more important. It is interesting to see like if they are collecting data in like certain ways. But I do not think everything that is always the most important thing that we, as teachers, or as parents, are looking for are always the most measurable things. They are maybe something that can be reflected on more anecdotally.” Educator 11

In contrast, a parent reported similar dissatisfaction with current measurement techniques, yet emphasized the need for a quantitative approach.

“We want to see growth, right? But how do we measure that growth? I think that is key. Like if there was some sort of assessment, or where it is streamlined, so that everyone is using it and that information is shared. Like it is hard to see growth unless it is, I don't know, numbers based, or if it is quantitative data, I guess you would say. Data that is actually real.” Family member 8

S-LTs also reported frustration with their current ability to assess and make judgements about the outcomes of their services, and that further work in this area was important for the development of the profession.

“I guess just in general I mean I think we have a lot of impact in the schools, but they are just not just really not recognized, I think. We really do not. There is not a really objective way for us to know what the impacts are.” S-LT 13

All participant groups reported that the measurement or qualitative assessment of important outcomes would contribute to improving school-based services, and there was general agreement that current measurement techniques are not sufficiently developed to provide robust, meaningful information about the impact of practice within schools.

Discussion

In this study, we interviewed S-LTs, educators, and family members about their perceptions of meaningful outcomes for school-based speech-language therapy services. After initial qualitative reading of all data, structural topic modelling was used to identify six latent topics within the interview data, and the quality of the content within each topic was explored through further qualitative analysis. The results are broadly consistent with

previous literature, confirming important areas for further work on outcomes in the discipline. However, they provide additional nuance and detail.

Consistent with previous literature [19,20,42], the participants in this study considered multiple outcomes beyond individual student clinical outcomes to be important, including outcomes related to partnership and collaboration as well as system-functioning. Additionally, it was evident that these partnership and systems outcomes were valued across participant groups, with S-LTs emphasizing collaboration and capacity building with the school team for example, and family members discussing the importance of coordinated care that was responsive to all needs. Such outcomes have been noted to be infrequently included in SLT research to date [10], and the implementation of new outcomes in research and practice remains an important area for future growth within the profession.

Similar to the work done by Gallagher and colleagues in Ireland [17], we spoke with family members, educators, and S-LTs, with similar topics present in our discussions with participants. For example, the participants in our study also spoke to the value of children participating meaningfully in the academic and social life of schools, as well as understanding how to engage with learning activities and their peers. Participants also mentioned children implementing new skills to be more independent and successful in the classroom as an important outcome. These sentiments all closely reflect the previous findings [17]. Maximizing the time students spend in the classroom with learning and interacting with their peers also was endorsed by all participant groups in this study, reflecting the previously reported desire of children with communication to remain in

inclusive environments and not to be labelled and separated from their classmates [11–13]. Therefore, an increase in the time the children spend within the classroom or a reduction in the time spent withdrawing the student for supports may be an important outcome of service delivery in schools. Our results also are consistent with previous work suggesting that proactive communication and care coordination with families was an important desired outcome of rehabilitation services in schools [15]. Ng et al.'s [15] ethnographic study was conducted in the same province where our study was completed, suggesting that care coordination may be an important outcome in this particular context. Finally, our results are consistent with the observation by Murphy [43] that the outcomes valued most by school community members are not frequently included in research. The outcomes measured in studies of school-based service delivery to date [see 44,45] have been narrowly defined clinical outcomes, such as standardized test scores and specific trained skill and generalization probes. These types of outcomes, although important, do not reflect all relevant aspects of service impact and care quality.

Inconsistent with previous work, we did not observe a substantive focus on the children's voice directing or informing the supports they receive in schools, something which has been found in other studies [17,46]. This is likely because we did not speak directly with children with disabilities, something that was a focus of these previous studies [17,46]. The content of topic one was unexpected, as family members discussed the importance of providing sufficient supports to all children in schools as a public good, and that families turning to the private sector for services was considered an indicator of unsuccessful service delivery models within schools. It is unclear if this finding primarily

reflects the context in which our research was conducted. Finally, we note that previous work [20] in this locale has identified accountability to systems as an outcome that drives decision-making, where demonstrating to managers, regulatory bodies, or funders that certain types or frequencies of services are being provided, or that certain standards are being met are an important part of determining the outcomes of services in schools. In that study, we asked experienced clinicians and clinical managers to describe what outcomes were used in their schools and local education authorities. In the present study, we asked multiple groups from school communities about the outcomes that they valued, and accountability to systems was present in the data, suggesting that such outcomes, although they may be required in certain organizational contexts, are not informative regarding whether S-LT services in schools are truly achieving valued outcomes.

In summary, this study confirmed that multiple types of outcomes, including those relevant to individual students, partnership and collaboration in schools, care coordination, and capacity building (among others) were considered valuable or important outcomes by family members, educators, and S-LTs. These topics were present in the data from all participants, suggesting that they may all be important outcomes of S-LT services in schools. However, there were difference among participants regarding the quantity they discussed each. S-LTs focused more than the other school community members on capacity building and supporting core educational skills and goals; family members focused on meeting the needs of all students and providing responsive and well-coordinated care; finally, educators focused on problem solving and strategy implementation to support individual students. These differences in emphasis by various

members of the school community should be explored further in future work, and a consensus exercise to identify the most important core outcomes of SLT services in schools may prove fruitful.

Limitations

This study has several limitations. First, although we included multiple groups from the school community who have a vested interest in school-based services, we did not include one very critical member group of this community. We did not speak directly with children. Although children appear to agree with their parents, teachers, and S-LTs regarding what outcomes they value, children also bring a nuanced interpretation of the same [17]. We hope to explore what these outcomes mean to children who receive such services in future work. Additionally, we recruited participants only from a narrow geographical area. This design choice potentially limited the diversity of included perspectives by excluding those who did not reside within a specific locale, which may suggest additional outcomes as relevant to tiered, school-based services beyond those which we identified.

Further, this study has important theoretical limitations. We approached the issue of outcomes with the assumption that quantifying outcomes of services is a meaningful method for evaluating service quality. In previous work [20], clinicians have questioned this assumption regarding the primacy of outcome quantification over rich, narrative information on student and system functioning. Interestingly, some participants who contributed to the present study also questioned this approach. Had we grounded our analysis in other paradigmatic perspectives, we may have arrived at different results about

the roles of outcomes in health service delivery and evaluation. Such perspectives may be valuable to promote reflexivity and growth within the profession of speech-language therapy.

Conclusion

In this study, we asked family members, educators, and clinicians about the most important and valued outcomes of speech-language therapy services delivered in schools. Structural topic modelling revealed six broad outcome concepts identified as important by these stakeholder participants. These outcome concepts included: meeting the needs of all students; teamwork, collaboration, and partnerships within the school; building capacities within the classroom to support student needs; supporting individual student needs within the classroom; coordinating services and supports for students with greater needs; and, finally, supporting core educational skills and goals. Although all outcome concepts were discussed by all participants, there were several differences among S-LTs relative to educators and family members regarding the quantity of data dedicated to each, suggesting differences in how different members of the school community valued each outcome concept. The outcomes identified as important were notably neither those included in research to date, nor were they considered feasibly measured with current outcome measures and assessment tools. To further build from this work, we recommend consensus and prioritization work to identify the core outcomes for school-based service delivery and the most urgent outcome measure development and implementation for school-based services.

Declarations

Ethics approval and consent to participate

Study methods followed ethical guidelines and regulations. All materials and procedures for this study were reviewed by the Hamilton Integrated Regional Ethics Board (Project number #13906), as well as the ethics committees of all participating school boards. All participants provided informed consent prior to initiating any study activities.

Consent for publication

Not applicable.

Availability of data and materials

The data generated and analysed during the current study are not publicly available as consent to share this information publicly was not obtained from participants. Relevant materials are provided as supplementary online information. Data and additional material are available from the corresponding author on reasonable request

Competing interests

The authors have no competing interests, real or perceived, to declare.

Funding

This study was supported by funding from the John and Margaret Lillie Chair in Childhood Disability Research (W.C.).

Authors' contributions

P.C. drafted and wrote the main manuscript text, with W.C. contributing to iterative manuscript revisions. P.C. prepared figures and tables and performed analyses. All authors participated in the conceptualization and design of the study, and all reviewed and provided substantive input on the manuscript.

Acknowledgements

We thank the participants for generously sharing their time and experience to inform the results of this study.

References

1. Donabedian A. The role of outcomes in quality assessment and assurance. *Qual Rev Bull.* 1992;18(11):356–60.
2. Donabedian A. Evaluating the quality of medical care. *Milbank Q.* 2005;83(4):691–729.
3. Santana MJ, Manalili K, Jolley RJ, Zelinsky S, Quan H, Lu M. How to practice person-centred care: A conceptual framework. *Heal Expect.* 2018;21(2):429–40.
4. Kuo DZ, Houtrow AJ, Arango P, Kuhlthau KA, Simmons JM, Neff JM. Family-centered care: Current applications and future directions in pediatric health care. *Matern Child Health J.* 2012;16(2):297–305.
5. Mühlbacher AC, Juhnke C. Patient preferences versus physicians' judgement: Does it make a difference in healthcare decision making? *Appl Health Econ Health Policy.* 2013;11(3):163–80.
6. Laver K, Ratcliffe J, George S, Lester L, Crotty M. Preferences for rehabilitation service delivery: A comparison of the views of patients, occupational therapists and other rehabilitation clinicians using a discrete choice experiment. *Aust J Occup Ther.* 2013 Apr;60(2):93–100.
7. Raymond MH, Demers L, Feldman DE. Differences in waiting list prioritization preferences of occupational therapists, elderly people, and persons with disabilities: A discrete choice experiment. *Arch Phys Med Rehabil.* 2018;99:35–42.
8. Barratt A. Evidence Based Medicine and Shared Decision Making: The challenge

- of getting both evidence and preferences into health care. *Patient Educ Couns.* 2008;73(3):407–12.
9. Cunningham BJ, Washington KN, Binns A, Rolfe K, Robertson B, Rosenbaum P. Current methods of evaluating speech-language outcomes for preschoolers with communication disorders: A scoping review using the ICF-CY. *J Speech Lang Hear Res.* 2017;60(February):446–64.
 10. Baker E, Masso S, Huynh K, Sugden E. Optimizing outcomes for children with phonological impairment : A systematic search and review of outcome and experience measures reported in intervention research. *Lang Speech Hear Serv Sch.* 2022;53(July):732–48.
 11. Markham C, Van Laar D, Gibbard D, Dean T. Children with speech, language and communication needs their perceptions of their quality of life. *Int J Lang Commun Disord.* 2009;44(5):748–68.
 12. Lyons R, Roulstone S. Labels, identity and narratives in children with primary speech and language impairments. *Int J Speech Lang Pathol.* 2017;19(5):503–18.
 13. Lyons R, Roulstone S. Well-being and resilience in children with speech and language disorders. *J Speech, Lang Hear Res.* 2018;61(2):324–44.
 14. Marshall J, Harding S, Roulstone S. Language development, delay and intervention—the views of parents from communities that speech and language therapy managers in England consider to be under-served. *Int J Lang Commun Disord.* 2017;52(4):489–500.
 15. Ng SL, Lingard L, Hibbert K, Regan S, Phelan S, Stooke R, et al. Supporting

- children with disabilities at school: Implications for the advocate role in professional practice and education. *Disabil Rehabil.* 2015;37(24):2282–90.
16. Kwok E, Bootsma J, Cahill PT, Rosenbaum P. A scoping review of qualitative studies on parents' perspectives on speech, language, and communication interventions. *Disabil Rehabil.* 2021.
<https://doi.org/10.1080/09638288.2021.1989061>
 17. Gallagher AL, Murphy C, Conway PF, Perry A. Engaging multiple stakeholders to improve speech and language therapy services in schools: An appreciative inquiry-based study. *BMC Health Serv Res.* 2019;19(26).
 18. Blosser J. Outcomes matter in school service delivery. In: Frattali CM, Golper LAC, editors. *Outcomes in Speech-Language Pathology.* 2nd ed. New York, NY: Thieme Medical Publishers, Inc.; 2013. p. 116–40.
 19. VanderKaay S, Dix L, Rivard L, Missiuna C, Ng S, Pollock N, et al. Tiered approaches to rehabilitation services in education settings: Towards developing an explanatory programme theory. *Int J Disabil Dev Educ.* 2021.
<https://doi.org/10.1080/1034912X.2021.1895975>
 20. Cahill PT, Ng SL, Dix L, Ferro MA, Turkstra LS, Campbell WN. Outcomes management practices in tiered school-based speech-language therapy: A Canadian example. *Int J Lang Commun Disord.* 2022;advance on. doi: 10.1111/1460-6984.12822
 21. Hsieh HF, Shannon SE. Three approaches to qualitative content analysis. *Qual Health Res.* 2005;15(9):1277–88.

22. Eickhoff M, Wieneke R. Understanding topic models in context: A mixed-methods approach to the meaningful analysis of large document collections. *Proc 51st Annu Hawaii Int Conf Syst Sci.* 2018;903–12.
23. Gentles SJ, Vilches SL. Calling for a shared understanding of sampling terminology in qualitative research: Proposed clarifications derived from critical analysis of a methods overview by McCrae and Pursell. *Int J Qual Methods.* 2017;16(1):1–7.
24. Gentles SJ, Charles C, Ploeg J, Ann McKibbin K. Sampling in qualitative research: Insights from an overview of the methods literature. *Qual Rep.* 2015;20(11):1772–89.
25. Macharis C, Turcksin L, Lebeau K. Multi actor multi criteria analysis (MAMCA) as a tool to support sustainable decisions: State of use. *Decis Support Syst.* 2012;54(1):610–20. <http://dx.doi.org/10.1016/j.dss.2012.08.008>
26. Banville C, Landry M, Martel J-M, Boulaire C. A stakeholder approach to MCDA. *Syst Res Behav Sci.* 1998;15:15–32.
27. Malterud K, Siersma VD, Guassora AD. Sample size in qualitative interview studies: Guided by information power. *Qual Health Res.* 2016;26(13):1753–60.
28. Creswell JW, Hirose M. Mixed methods and survey research in family medicine and community health. *Fam Med Community Heal.* 2019;7(2):1–6.
29. Harris PA, Taylor R, Minor BL, Elliott V, Fernandez M, O’Neal L, et al. The REDCap consortium: Building an international community of software platform partners. *J Biomed Inform.* 2019;95(103208).

<https://doi.org/10.1016/j.jbi.2019.103208>

30. Elo S, Kyngäs H. The qualitative content analysis process. *J Adv Nurs*. 2008;62(1):107–15.
31. Isoaho K, Gritsenko D, Mäkelä E. Topic modeling and text analysis for qualitative policy research. *Policy Stud J*. 2021;49(1):300–24.
32. R Core Team. *R: A language and environment for statistical computing*. Vienna, Austria: R Foundation for Statistical Computing; 2021.
33. Lucas C, Nielsen RA, Roberts ME, Stewart BM, Storer A, Tingley D. Computer-assisted text analysis for comparative politics. *Polit Anal*. 2015;23(2):254–77.
34. Roberts ME, Stewart BM, Tingley D, Lucas C, Leder-Luis J, Gadarian SK, et al. Structural topic models for open-ended survey responses. *Am J Pol Sci*. 2014;58:1064–82.
35. Roberts ME, Stewart BM, Tingley D. stm: An R package for structural topic models. *J Stat Softw*. 2019;91(2):1–40.
36. Mimno D, Wallach HM, Talley E, Leenders M, McCallum A. Optimizing semantic coherence in topic models. *Proc 2011 Conf Empir Methods Nat Lang Process Proc Conf*. 2011;262–72.
37. Roberts ME, Stewart BM, Airoidi EM. A model of text for experimentation in the social sciences. *J Am Stat Assoc*. 2016;111(515):988–1003.
38. Teddlie C, Tashakkori A. *Foundations of mixed methods research: Integrating quantitative and qualitative approaches in the social and behavioural sciences*. Thousand Oaks, CA: SAGE Publications, Inc.; 2009.

39. Onwuegbuzie AJ, Johnson RB, Collins KMT. Assessing legitimation in mixed research: A new framework. *Qual Quant*. 2011;45(6):1253–71.
40. Albalawi R, Yeap TH, Benyoucef M. Using topic modeling methods for short-text data: A comparative analysis. *Front Artif Intell*. 2020;3(00042).
41. Kuo I-C, Huang W. Does title or content matter?: Examining China’s partnerships with text classification. In: Wei W, editor. *China’s Contemporary Image and Rhetoric Practice*. London, UK: Routledge; 2021. p. 3–29.
42. Terreberry S, Dix L, Cahill PT, Passaretti B, Campbell WN. Moving towards a tiered model of speech and language services in Ontario schools: Perspectives of school-board speech-language pathologists. *Can J Speech-Language Pathol Audiol*. 2021;45(4):267–82.
43. Murphy CA. The limits of evidence and the implications of context: considerations when implementing pathways to intervention for children with language disorders. *Int J Lang Commun Disord*. 2019;54(1):20–3.
44. Archibald LM. SLP-educator classroom collaboration: A review to inform reason-based practice. *Autism Dev Lang Impair*. 2017;2:1–17.
45. Cirrin FM, Schooling TL, Nelson NW, Diehl SF, Perry FF, Staskowski M, et al. Evidence-based systematic review: Effects of different service delivery models on communication outcomes for elementary school-age children. *Lang Speech Hear Serv Sch*. 2010;41:233–64.
46. Paul T, Rezza B Di, Rosenbaum P, Cahill PT, Jiang A, Kim E, et al. Perspectives of children and youth with disabilities and special needs regarding their

experiences in inclusive education : A meta-aggregative review. *Front Education*.
2022;7(864752).

Chapter 4: Core outcomes for speech-language services in schools: A group concept mapping study

This chapter presents the development of a Core Outcome Set for school-based, speech-language services using a group concept mapping study.

Prepared for submission to: BMC Health Services Research

Core outcomes for speech-language services in schools: A group concept mapping study

Authors and affiliations:

Peter T. Cahill^{1*}

Mark A. Ferro^{2,3}

Stella Ng^{4,5}

Lyn S. Turkstra¹

Wenonah N. Campbell^{1,2}

¹ School of Rehabilitation Science, McMaster University

² CanChild Centre for Childhood Disability Research

³ School of Public Health Sciences, University of Waterloo

⁴ Department of Speech-Language Pathology, University of Toronto

⁵ Centre for Interprofessional Education, University of Toronto

*Corresponding Author

Peter T. Cahill
School of Rehabilitation Science
Institute of Applied Health Sciences, Room 403
1400 Main Street West
Hamilton, ON, L8S 1C7, Canada
cahillp@mcmaster.ca
+1-905-525-9140 ext. 22867

Core outcomes for speech-language services in schools: A group concept mapping study

Background: Establishing the most important outcomes for school-based speech-language therapy is essential to guide future research and program evaluation for these services. Many health disciplines have developed core outcomes sets (COS) for this purpose. A COS encompasses the most important outcomes for particular health services as identified by appropriate interested parties. These interested parties usually represent health care providers and those with the health condition. In this paper, we report the development of a COS for speech-language therapy services in schools.

Methods: Using a group concept mapping method, we identified the outcomes for inclusion in the COS through the elicited opinions of key interested parties: speech-language therapists, teachers, and family members of children with speech, language, and communication needs. We extracted 103 statements (potential outcomes) from a previous data set of interview transcripts. We then asked participants to sort the statements into conceptually similar groups, which were aggregated and transformed into a cluster map using multidimensional scaling followed by hierarchical cluster analysis. Participants also rated each statement on 5-point scales for importance and feasibility. We calculated mean ratings for individual statements and for all statements in a cluster, for all participants and for participant groups separately.

Results: We identified seven core outcomes for school-based speech-language services. These included: classroom-based services, a holistic approach, support for teachers, care coordination, accessible services, family supports, and student success. All outcomes were rated highly for importance. Feasibility ratings were consistently below importance ratings. All participant groups concurred that a holistic approach was the most important outcome and accessible services was the least feasible outcome to achieve.

Conclusions: The seven outcomes identified in this study are recommended as a COS to guide future research and program evaluation for school-based speech-language services. These outcomes have not been widely included in previous research and should be incorporated into future research alongside specific intervention outcomes. Data for some outcomes may be available from non-traditional sources such as administrative data sets. Consequently, their use for program evaluations should be accompanied by appropriate institutional support to allow speech-language therapists to make meaningful use of appropriate outcomes data.

Keywords: speech-language therapy; speech-language pathology; schools; core outcome set; group concept mapping; cluster analysis

Introduction

The results of health care services are called *outcomes*. The systematic collection and careful, proactive interpretation of outcomes provides the basis for evaluating and improving quality care.(1–3) Outcomes are evaluated using specific measures or target data points that are referred to as *indicators*(4–6) Indicators are necessarily partial, able to capture only a portion of the broader outcome.(6) For example, standardized scores from a language assessment battery would be an indicator for the outcome of expressive and receptive language abilities but would not capture all of the child’s language skills. Although a standardized language assessment cannot possibly tap into all language skills, scores from such an assessment may prove useful in making inferences about the broader skill of expressive or receptive language. Although indicators are supposed to provide meaningful information relevant to health care service quality and evaluation, indicators vary greatly in quality, relevance, and feasibility, and their selection requires complex, contextualized, systems-informed thinking.(4–6) Consequently, the careful selection of outcomes for healthcare services, as well as their associated indicators, is essential for supporting high quality care.

Within the field of speech-language therapy (SLT), robust and proactive outcomes use remains elusive. (7–11) In practice, successful outcomes collection depends on clinicians perceiving a need to evaluate an outcome that they value.(12) Further, it is important that patients and other interested parties have a voice in selecting outcomes for care (13) and for researchers to ensure that evidence is relevant.(14–16) Specifically, evidence regarding intervention effectiveness research would be more pertinent and

provide more relevant information if it incorporated outcomes valued by patients and communities.(16) Similarly, the selection of indicators should be in consultation with those served by the health service.(17)

One solution to ensure that outcomes and indicators are meaningful to interested parties is the creation of a Core Outcome Set (COS) wherein the most important and meaningful outcomes are selected through collaboration. For example, Morris et al. (18) collaboratively developed a COS for children with neurodevelopmental disabilities, in which interested parties (children, parents, and healthcare providers) recommended collecting patient-reported outcomes for communication, emotional wellbeing, pain, mobility, self-care, independence, community life, mental health, sleep, behaviour, safety, and toileting. Once a COS is developed, Crudgington and colleagues (19) recommended that it be used to document outcomes in clinical research and for tracking outcomes within clinical programs. However, less than 0.5% of developed COS have been within the field of rehabilitation (16), and most of those within physiotherapy. Therefore, it is relevant and timely to develop a COS to guide future work in the SLT profession.

Speech-language therapists (S-LTs) provide important supports to students in schools,(20) including for children with diverse speech, language, and communication needs.(21) Practice in schools has long been recognized as particularly complex.(22) In recent years, models of school-based health services have evolved away from individual assessment and intensive pull-out intervention towards tiered models where the whole school community is offered several different service types that are matched to students' needs.(23,24) This evolution is thought to be motivated by a confluence of factors,

including ever increasing demands for services in schools, growing recognition of historically underserved populations, intense resource allocation constraints, and a renewed focus on meaningful inclusion of children of all ability levels in social and academic life.(25) The shift to tiered models has occurred in Europe,(23,26) Canada,(24,27) and across the United States.(28) Several tiered models exist across jurisdictions, including Response to Intervention,(23,24,29) Multi-Tiered Systems of Supports,(28) and Partnering for Change.(26,30). As part of their mandate to provide evidence-based services, S-LTs must make evidence-informed decisions regarding their choice of service delivery model.(21)

Evidence to support decision-making about service delivery models is limited.(29,31,32). Multiple reviews have concluded that S-LTs are not well supported by the current research evidence.(31,32) Archibald (31) further recommended that clinicians evaluate the outcomes of their service delivery models, leaning on the traditions of program evaluation and quality improvement. Importantly, outcomes tracked in most SLT research do not generally match the types of outcomes that students and families identify as meaningful.(33) Nor are the outcomes consistent with those included in educational research into supporting these children, where educational access and success take prominence.(34) Previous theoretical work has suggested that outcomes beyond assessments of individual student abilities are relevant to making informed and meaningful decisions for services in schools,(35,36) an observation that empirical work has found to also be true of school-based practice.(37) Additionally, systems- and collaboration outcomes may be linked in outcome cascades, where changes in an outcome

at one level supports further gains and improvements to supports for children at another level.(38) Although previous reviews (31,32) considered outcomes beyond individual student abilities, such as the capacities of teachers to support children with communication disorders in the classroom, the evidence they located was limited to a narrow list of individual student outcomes (e.g., phonological awareness, vocabulary). Consequently, it is timely to establish what outcomes are meaningful to interested parties to inform future research and clinical practice regarding school-based SLT. This would help address the mismatch between outcomes included in research studies and those that families and educational research appear to identify as important. Further, selecting outcomes is an important first step in evaluating services and programs.(39) Thus, developing a COS for tiered SLT practice models is a logical first step in supporting evidence-based decision-making using the strategies suggested by Archibald,(31) as well as Cirrin and colleagues.(32)

In previous work, we interviewed clinical managers and experienced S-LTs regarding their use of outcomes to guide practice during the transition to tiered services.(37) S-LTs identified outcomes as an important area for innovation and professional growth, and recognized that tiered services required new approaches.(37) However, in that study, we limited questions to current outcomes practices. We did not inquire about the outcomes that participants valued or wanted to achieve, although some clinicians did provide spontaneous responses in that regard. Subsequently, we conducted focus groups with caregivers, teachers, and clinicians to generate ideas about what outcomes were most valued by each participant group.(40) In that study, we explored

valued and meaningful outcomes; however, we did not provide participants with the opportunity to react to ideas presented by other participants, nor did we attempt to fully synthesize the recommendations into a core set. Therefore, in the present study, we attempt to explore and build consensus among these interested parties regarding the core outcomes for speech-language therapy service delivery models in schools.

Objectives

The objective of this study was to develop a Core Outcome Set for school-based speech-language delivery models by combining the perspectives of members of three key interested parties: family members of children with speech, language, or communication needs, teachers, and school-based S-LTs.

Methods

We constructed our COS using group concept mapping (GCM). GCM is a participatory, mixed methods technique (41) that has been used successfully by other teams to construct frameworks for guiding measurement and evaluation with the input of multiple perspectives,(42,43) including in COS development.(44,45) GCM is an elicitation approach that can identify important outcomes to guide research and evaluation (46,47) by combining the stated perspectives of interested parties. This method can efficiently refine the data and clarify key points of agreement or disagreement.(43,44)

Ethics

All methods and materials for this study were reviewed by the Hamilton Integrated Research Ethics Board (project number: 13906), which is affiliated with McMaster University, as well as all the research ethics committees of all partnering

school boards. Methods and materials followed these reviewed ethical guidelines and regulations. All participants provided written informed consent prior to completing any research tasks.

Sampling

We used purposeful sampling (48) followed by snowball sampling (48) to recruit representatives for each interested party. First, we purposefully recruited those who we considered to be likely to have relevant knowledge due to their extensive personal, clinical, or professional experience with tiered services. Then, we asked newly enrolled participants who else they perceived as substantially affecting or being affected by school-based speech and language services. This snowball technique is recommended in participatory studies involving numerous groups to ensure that the participants best represent the social context of the problem under consideration.(49,50)

Participants

We recruited 22 participants who completed at least one step of data collection. Eleven were S-LTs affiliated with a school board; six were teachers; and five were family members of a child with experience receiving speech-language services in schools. All participants resided in the province of Ontario, Canada, in a locale where tiered services were being offered via school-based S-LTs. Tiered models are a common type of self-reported service delivery model used in the province.(27) Given our intended purpose of building a COS for tiered, school-based services in this context, generalizability beyond Ontario was not a specific goal of the study. Additionally, the reorganization of school-based services in the province is on-going (27) and may be considered a sensitive topic.

Consequently, we followed best-practice recommendations (51) and did not collect additional demographic information on participants beyond their participant group. Not all participants completed all tasks, and so we specify the number of participants included in each of the analyses.

Materials

In GCM studies, the materials consist of statements or ideas which are then analyzed and evaluated by participants. Participant responses are then aggregated to yield study results. In the present study, as we sought to construct a COS for speech-language service delivery models in schools, we used *indicators* as the statements. Indicators were generated from a summative content analysis (52) of 14 interviews from a previous study,(40) where participants were asked about what outcomes of speech and language services were most important or meaningful. In this content analysis, interviews were open coded with the data analyst staying close to the data (53) and using the terminology of participants (52) to tag potential indicators. Several rounds of peer debriefing (53) were conducted to review indicators and collapse categories down to a manageable level. An original list of 146 potential indicators was ultimately condensed to 103. See Online Supplementary Material for a list of the indicators that served as the materials for this study.

Procedures

Participants were sent an invitation with an anonymized link to access groupwisdom, (54) a software platform supporting digital group concept mapping. Participants first indicated whether they identified primarily as a family member, S-LT, or

teacher. Next, participants sorted indicators into virtual piles and provided suggested names for each grouping of statements. The instructions were to sort the statements into piles that made sense to each participant, putting ideas that were more similar together. The order of statements was randomized for each participant to protect against the ordering contaminating the similarity sorting. Participants then rated each indicator for its meaningfulness or importance and then its feasibility on five-point scales, with five indicating the most importance or feasibility rating and one the lowest rating. The specific questions were as follows:

1. *How important or meaningful do you think this idea is?*
2. *How feasible or doable would this idea be in day-to-day work?*

Although each task began automatically upon completion of the previous activity, participants were not required to complete all tasks, and so participant numbers were not fully consistent across each step and are reported separately below. These three tasks (demographic question, sorting and naming, and rating) represented all participant data collection procedures within this study.

Data analysis and modelling

Creating the cluster map

Sorting data was converted into a similarity matrix, identifying the number of participants who placed two statements into the same pile.(43) Then, multidimensional scaling was applied to the similarity matrix to yield a point map of all indicators, with the distance between each pair of indicators representing the probability of being sorted together.(43) This assigned each statement coordinates on a two-dimensional plane. We

assessed the multidimensional scaling for its fit to the underlying similarity matrix through stress values, targeting a value of ≥ 0.365 following guidelines.(43,55) We also considered scenarios where we removed sorting data from participants who chose to sort the data differently from the majority, specifically by grouping statements by current implementation in practice rather than the intended conceptual grouping around similarity in ideas (which was successfully completed by the majority). We ultimately decided to maximize the inclusion of data from the largest number of participants without unduly affecting the stress value, and data from all participants was carried forward into the remainder of the analysis.

Subsequently, we performed a hierarchical cluster analysis with Ward's algorithm (56,57) using these coordinates, yielding a *cluster map* with similar outcome ideas amalgamated into two-dimensional polygons. We considered a range of cluster solutions, starting at 18 (the largest number of piles used by any participant in the sorting task) and removed one cluster at a time iteratively until we reached three clusters (identified as smallest possible number based on visual inspection of the results, see Figure 5 in results). Each cluster solution was evaluated for interpretability and meaningfulness by the first author until a smaller set of potential cluster solutions was selected. This list of finalists was discussed within the research team (PC and WC) in peer debriefing, and the final cluster solution was selected through team consensus. We then calculated the mean ratings for all participants for each cluster.

Comparing group perspectives

We calculated separate estimates for mean importance and feasibility for each participant group. We used visualizations of these estimates to identify potential areas of disagreement or differential prioritization among the interested parties. We looked at the overall cluster ratings, as we were interested in how participants evaluated each outcome for importance and feasibility, rather than each indicator. Indicators were assessed separately (see next section).

Evaluating indicators

To determine which indicators best represented their respective outcome and to identify the most promising indicators for immediate implementation, we inspected the mean ratings of each indicator within its assigned cluster. Indicators that were rated above average in importance and feasibility were considered to be recommended for implementation in practice. Indicators that were above average in importance but below average in feasibility were considered promising, needing future research to investigate how these indicators could be targeted. Indicators with below average importance ratings for their cluster were discarded as not being of sufficient relevance to be included in the COS.

Constructing the final COS

Upon completing all the above analyses, we constructed the final COS by including all the clusters from the final cluster solution representing each outcome. We then appended both recommended and promising indicators to provide indications of how these outcomes could be assessed or measured within research and practice. Finally, a

tabular visualization of the COS was created to assist in interpretation and knowledge mobilization.

Results

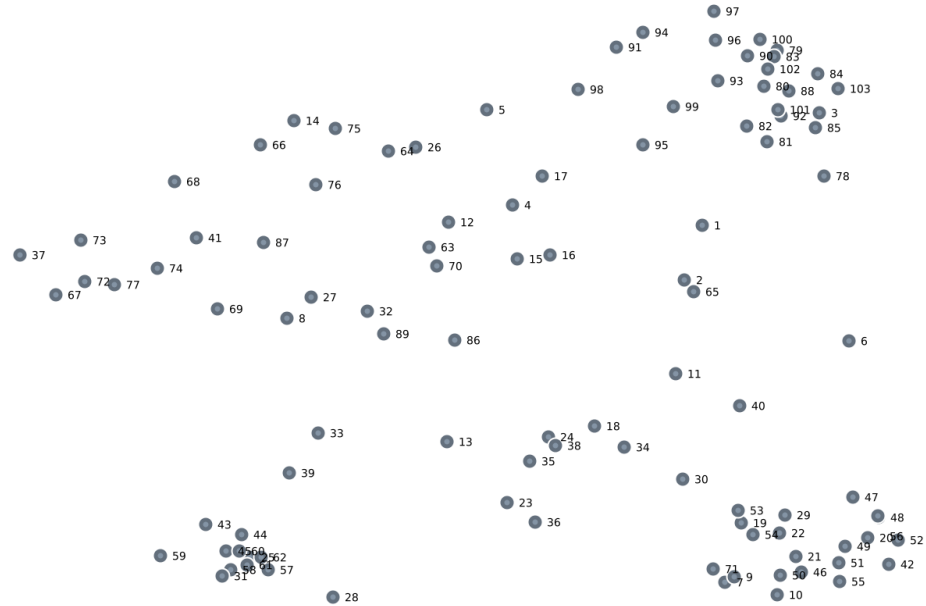
In this study, we aimed to construct a COS for school-based speech-language services using GCM to combine the perspectives of interested parties.

Sorting

Multidimensional scaling of sorting data

Twenty participants completed the sorting step. Then, the research team transformed the sorting data into a two-dimensional point map using multidimensional scaling. The solution is represented in Figure 5, where the distances between points indicate the probability of two indicators being sorted together. The closer two points are on the map, the more likely the two indicators were to be sorted together by participants. A visual inspection of the point map strongly suggests a minimum of three clusters (one in the upper right corner as well as in both lower corners).

Figure 5: Point map showing accepted multidimensional scaling solution

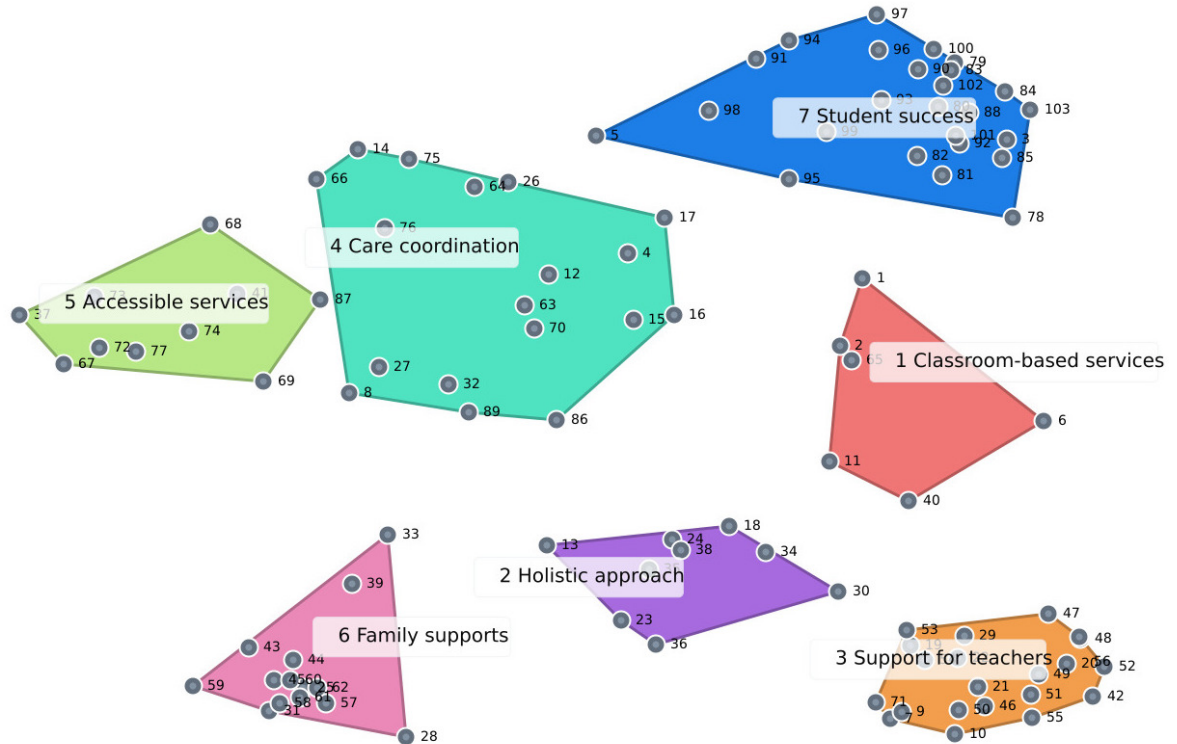


To evaluate the validity of the scaling solution, we compared the observed stress value to values obtained in previous GCM studies and to stress value cut-offs suggested in the methodological literature.(55,58) A lower stress value indicates that the multidimensional scaling solution better reflects the original data. Our observed value (0.24) was below the mean of 0.28 (95% confidence interval: 0.27-0.29) for GCM studies,(55) and well below the cut-off value of 0.39 indicating a one percent chance that the solution reflects only random information with no underlying structure.(58) Consequently, we accepted this solution and continued to subsequent steps in the analysis.

Cluster analysis of sorting data

We then analysed the scaled data using hierarchical cluster analysis,(42,43) which is an appropriate clustering algorithm for such data.(57) We estimated 16 cluster solutions (18 to 3 clusters) and reviewed all cluster solutions beginning with the 18-cluster solution and removing one cluster at a time and inspecting quantitative and qualitative aspects of each solution. We narrowed the cluster solutions to 6-8 based primarily on qualitative judgements about the conceptual clarity and consistency. These solutions were discussed in greater detail in multiple peer debriefing meetings (PC and WC). Ultimately, we selected a seven-cluster solution. We used names generated by participants to name each cluster, with minor editing sometimes required to expand abbreviations and rephrase into parallel structures. These names were also discussed and minorly revised in peer debriefing meetings. The revised names were then applied to the cluster map (Figure 6).

Figure 6: Cluster map for seven-cluster solution



Cluster one was *classroom-based services*. The indicators ($n = 6$) in this cluster were associated with personalization of recommendations and goals to match the curriculum and be feasible in and suitable to busy classrooms. Cluster two was a *holistic approach* ($n = 9$). This cluster focused on the overarching orientation and philosophy of speech-language services in schools, including having open, trusting, and collaborative relationships and fostering an inclusive school culture. Cluster three was *support for teachers* ($n = 21$), which was focused on the development of teacher capacities to support children with communication needs. This cluster also included the ability of teachers to freely access and consistently communicate with the S-LT. Cluster four was *care coordination* ($n = 18$). This cluster focused on how S-LTs could direct and facilitate

access to appropriate services, and to match recommendations and services to students' needs. Cluster five was *accessible services*, which included indicators (n = 10) of service timeliness and the adequacy of resources to provide responsive services, as well as streamlining the steps and procedures required before supports can be accessed. Cluster six was *family supports* (n = 14), which focused on family experiences and satisfaction, as well as their engagement with the decision making and implementation of supports. Cluster seven was *student success* (n = 25), where children are included in the school, are engaged in learning, are happy and thriving, and developing their functional communication skills.

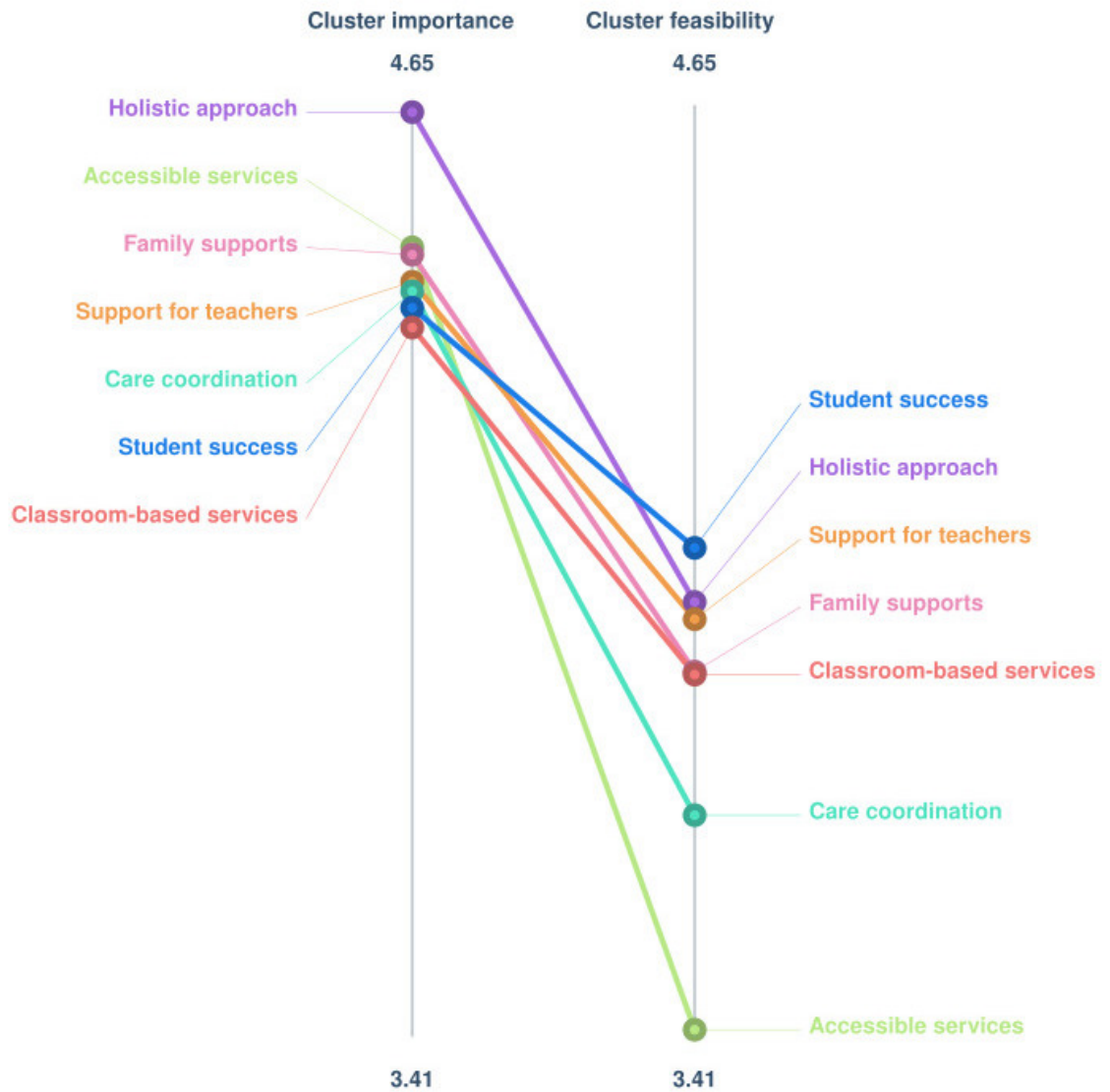
Rating

Eighteen participants provided rating data. These included: eight S-LTs, six teachers, and four family members. Pooled mean ratings for all indicators within a cluster are reported in the following sections. Individual indicator ratings can be found in the Online Supplementary Material.

Overall ratings

Combining ratings from all participant groups, all outcomes were rated highly for importance (above four on a five-point scale). Participants rated the feasibility of assessing these outcomes somewhat lower (from 4.06 to 3.41 on a five-point scale). This is illustrated in Figure 7.

Figure 7: Pattern match graph of overall importance and feasibility ratings for each outcome on absolute scale

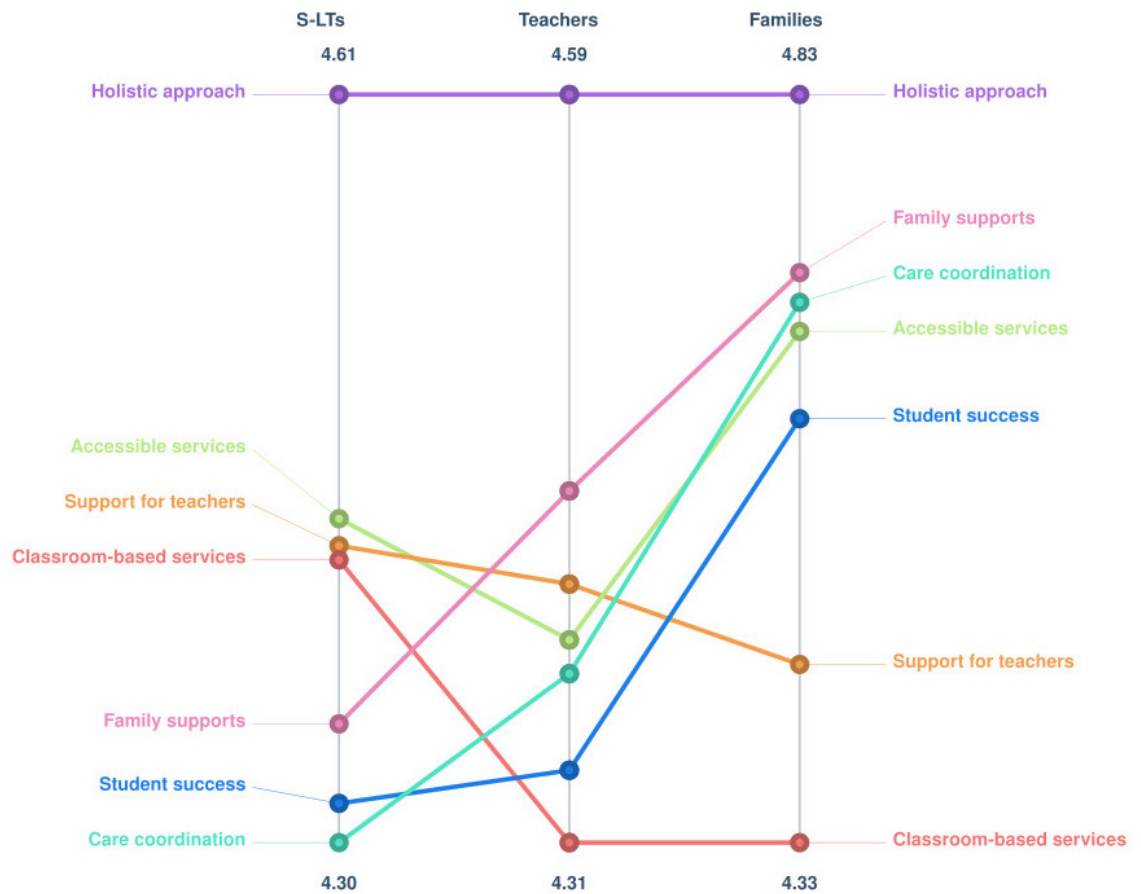


Comparison of group ratings

Participant groups rated most outcomes differently for importance as can be seen in Figure 8. It is important to note that these ratings are considered relative rather than

absolute,(42) and so it is the ordering rather than the magnitude that is of note. One notable finding was the consensus that a *holistic approach* was the most important outcome across all participant groups.

Figure 8: Pattern match graph for outcome importance by participant group on a relative scale



A similar pattern was observed for feasibility ratings, with different average ratings across most outcomes. However, there was universal agreement that *accessible*

services was the least feasible outcome to achieve. See Figure 9 for a visual representation.

Figure 9: Pattern match graph for outcome feasibility by participant group on a relative scale

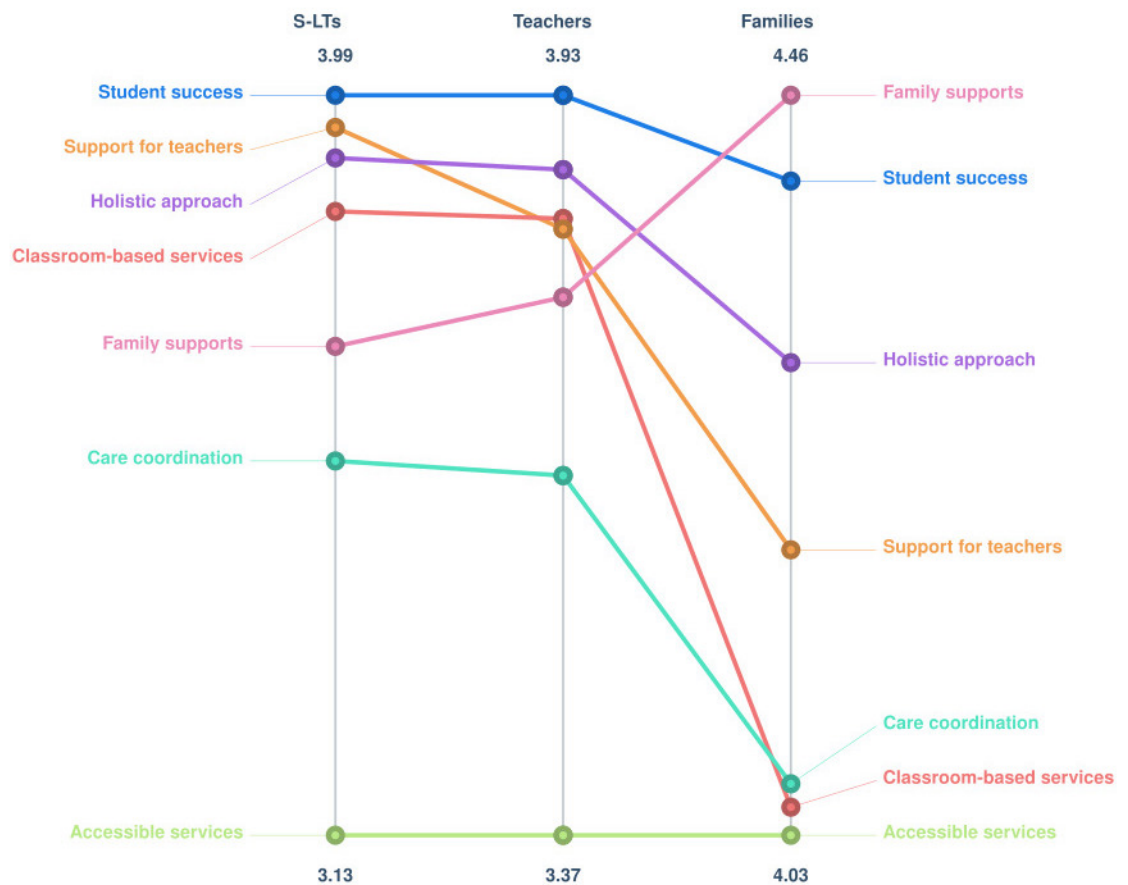


Table 4 summarizes our findings, as a guide to future research and evaluation work. We included each core outcome, accompanied by the indicators that participants rated as having above-average importance. Those on the left and in bold are those that were also rated above the mean on feasibility. We called these recommended indicators. In contrast,

indicators on the right and in italics were rated below average on feasibility, which we called promising indicators. Promising indicators may require additional consideration or exploration before they can be considered as outcomes for research or clinical evaluation activities.

Table 4: Core Outcome Set for school-based speech-language services with recommended and promising indicators

<i>Outcome</i>	<i>Recommended indicators</i>	<i>Promising indicators</i>
<i>Classroom-based services</i>	children's goals are personalized	<i>SLP supports and techniques work in a busy classroom environment</i>
	children's goals are constantly updated to reflect progress	<i>each school has a consistent, assigned SLP</i>
<i>Holistic approach</i>	SLP supports complement coursework and classroom learning	
	the school works as a team to support each child's communication development	<i>each school receives SLP services tailored to the school's needs</i>
	the school is an inclusive place that supports students with all needs	<i>the school has the staff needed to support the needs of all children</i>
<i>Support for teachers</i>	teachers pinpoint specific student needs in collaboration with SLP	<i>teachers are provided with the right equipment to support their students</i>
	teachers can access SLPs directly with questions or concerns	<i>teachers can access professional development opportunities via the SLPs</i>

	<p>teachers use SLP strategies and recommendations in the classroom</p> <p>teachers develop strategies to support communication development in the classroom</p> <p>teachers develop skills and techniques to support specific students</p> <p>teachers can use techniques independently after concrete demonstration, modelling, or training</p> <p>teachers feel confident in their abilities to support students</p> <p>teachers learn about their students' specific communication needs</p>	
Care coordination	<p>children with greater needs spend more time with SLPs and in SLP programming</p> <p>SLP programming for each student is tailored and individualized</p> <p>SLP recommendations and suggestions are not overly complicated</p> <p>SLPs advocate to meet children's needs</p>	<p><i>children's supports are carefully matched with their needs</i></p> <p><i>children receive consistent, frequent, individualized classroom-based supports</i></p> <p><i>all children with needs receive services, and not just a subset</i></p> <p><i>children do not need a formal diagnosis to access supports</i></p> <p><i>supports are implemented very early, near when children enter school</i></p>

	<p>children who need SLP supports are identified very early</p> <p>resources are carefully matched to children's needs and skills</p> <p>communication challenges are identified and not confused with behavioural concerns</p>	
<i>Accessible services</i>	<p>SLPs can access specialty training to support children with unique needs</p> <p>resources are allocated to provide maximum impact</p>	<p><i>SLP supports and services are appropriately funded</i></p> <p><i>waitlists are minimized</i></p> <p><i>gatekeeping and obstacles to supports are removed or reduced</i></p>
<i>Family supports</i>	<p>parents hear a consistent and unified message from teachers and SLPs</p> <p>families know about all SLP recommendations</p> <p>families feel included in decision-making</p> <p>families feel supported by the school professionals</p>	<p><i>appropriate services are fully supported by administration and policy</i></p> <p><i>families learn SLP strategies to use at home</i></p>
<i>Student success</i>	<p>children are more confident and independent</p> <p>children enjoy the supports they receive from SLPs</p>	<p><i>children demonstrate improvement on assessments of specific communication skills</i></p>

children who receive supports do not feel different or singled out

children learn how to include their peers with communication difficulties

children communicate more easily and willingly in class

children are able to bring together multiple skills to communicate, read, and write

children engage socially with their classmates

children find SLP supports helpful

children settle in and become more comfortable in the classroom

children use strategies and techniques taught by SLPs

children have better self-esteem

children can eventually participate in society and gain employment

children do not feel pressured or intimidated by SLP activities

children have greater quality of life

children understand others' communication

others understand the child's communication

Note: The local term *SLP* (speech-language pathologist or speech-language pathology) was used in the statements.

Discussion

In this study, we constructed a COS for school-based SLT service delivery models through GCM, using clusters to represent core outcomes. We identified seven core outcomes: a holistic approach, accessible services, family supports, support for teachers, care coordination, student success, and classroom-based services. All outcomes were rated as highly important, and no outcome was consistently rated as least important by all three participant groups. Consequently, we retained all seven outcomes in the COS. There were diverse opinions among participant groups regarding the importance and feasibility of each outcome, suggesting different groups had different priorities. However, all participant groups rated achieving a holistic approach to services as the most important outcome, indicating a striking consensus regarding the importance of centring collaboration and inclusive culture and practice within school-based speech and language services. The outcome of accessible services was rated as the least feasible to achieve by all participant groups, again reflecting an area of substantial agreement. Previous research has identified waitlists and other service barriers as a major problem to address.(38,59–61) Our results support this finding and highlight the need for creative solutions to make services accessible to all children.

In previous, related work,(37,40) we have noted a focus, particularly on the part of professionals, on *processes* when asked about *outcomes*. In other words, they discussed the ways in which they aimed to achieve their targeted outcomes. This was unsurprising,

as separating the structures, processes, and outcomes of care can be conceptually difficult (Donabedian, (2). Similarly, in this study, we noted that the core outcomes included essential processes to achieve distal outcomes. Particularly, we interpreted the three centrally located core outcomes on the cluster map (i.e., holistic approach, classroom-based services, and care coordination) as representing essential processes. In contrast, the four corner clusters (accessible services, family supports, supports for teachers, and student success) represented the ultimate outcomes of services. Tracking essential practices to achieving desired outcomes is justified within quality appraisal (1,2) and evaluation (62,63) for health services. This is also consistent with suggestions that health care providers working with schools can contribute to a cascade of outcomes, where an improvement in one outcome leads to successive improvements in other areas.(38) Consequently, we included these process-focused outcomes as core outcomes, as our participants' perspectives clearly supported these processes as essential aspects of high-quality speech-language services in schools.

The divergence between the core outcomes identified in the present study and the outcomes present in the literature to date is stark, empirically confirming previous observations in the conceptual literature,(33) as well findings from a comparison of SLT and educational research outcomes.(34) Although the reviews by Cirrin et al. (32) and Archibald (31) targeted broader outcomes such as impacts on referral rates and teacher and parent use of language facilitation techniques, the literature located by those reviews report only student-level clinical outcomes such as standardized assessment battery scores, language sample analysis measures, and bespoke skill assessments. A similar

focus on student-level clinical outcomes is evidenced in the review by Ebbels and colleagues,(29) where S-LT interventions such as professional development for teachers are only considered in so far as they produced measurable changes in children's clinical assessments, such as vocabulary or literacy skills. Not only does this focus on clinical outcomes in the primary literature exclude core outcomes identified in this review, such as supports for families or timely and easy-to-access referral systems, but it also excludes broader conceptualizations of student success, such as quality of life, student perceptions of inclusion within the school community, or inclusion in social and academic life. These broader conceptualizations were exclusively identified as important student-level outcomes in a previous study,(40) as well as with a similar study investigating outcomes valued by families, teachers, and children with communication disorders.(64) They are also more similar to the COS developed by Morris and colleagues (18) for children with a neurodisability and to the outcomes present in educational research (34) than they are with the outcomes typically found in research studies within speech-language therapy. Of particular note, the school-based S-LTs who participated in this study seemed to value the types of outcomes that predominant in the educational literature (see 34), rather than those common in the SLT literature. This highlights the need for such a COS, and an expansion by SLT research into broader service outcomes.

Our COS does not exclude clinical outcome measures. The literature on COS has consistently supported the inclusion of intervention-specific outcomes in addition to the appropriate COS.(14,16) However, research into school-based service delivery models must expand to collect information about how the service affects the school community

and its functioning. Additionally, student-level outcomes should be expanded to include assessments of participation and well-being. These recommendations echo those from reviews of other areas of paediatric speech-language therapy,(65,66) which have called for inclusion of well-being, participation, and experience measures in SLT research. These types of student-level outcomes do not appear to have been collected in previous school-based SLT research according to reviews.(29,31,32) They should be included in future work. It is also essential to include the child's individual voice in determining what these student-level outcomes look like, as *success* may look different to different children. Imposing a standardized conceptualization of success would undermine the goal of responsive and individualized services.

To use this COS in practice to evaluate or improve school-based services, there may be additional challenges and opportunities. First, many of the indicators listed in the COS require data beyond what might be collected by the S-LT. Rather, these data may exist in administrative databases and may be best collected or accessed by other professionals, such as school leadership. This echoes the words of a participant in a previous study (see 37) that outcomes data in schools are available, but not in the form that is traditionally considered clinical outcomes data. Additionally, because system-level data are necessary for this COS, collaboration within the SLT team as well as support and active involvement of school administration will be required. This is consistent with previous research indicating that SLT collaboration is an important support for the meaningful use of outcomes (37) and that administration and leadership will need to value outcomes and successful SLT practice if meaningful changes are to be

made.(27,37) With the complexity and diversity of the data required to address the seven core outcomes in this set, it would likely be necessary to mobilize substantial resources and implement an outcomes data management strategic plan, with guidance from important school community members such as S-LTs and family members. This institutional effort should be further supported by systems-informed thinking (4–6) to ensure that outcome indicators are used to meaningfully inform care.

Limitations

This study has four major limitations. First, we limited the scope of this study to a narrow geographic area. Consequently, we cannot be sure that a COS developed elsewhere would not include additional outcomes. However, this limitation is shared with most COS development projects;(19) further, simultaneously developed COS in Sri Lanka and the United Kingdom have produced similar results.(19) Consequently, we recommend that COS development for other locales use the results of the present study as a starting point to expedite and accelerate their own work. Beyond this, we did not prioritize an equity lens to approach recruitment or data interpretation. Consequently, we do not know what additional richness and nuance diverse perspectives would have brought to the results.

Second, rating data are based on a restricted scale collected from a small sample. Consequently, the mean estimates are statistically noisy and only broad patterns should be interpreted from this data. It is possible that with a larger number of respondents or a more sensitive measurement approach that the ordering and the magnitude of rating

differences would be more stable. For these reasons, we strongly urge against overinterpretation of these estimates.

Third, although we used an appropriate multidimensional scaling solution (55,58) and cluster analysis algorithm,(57) it is possible that indicators could be interpreted conceptually as belonging to more than one cluster. In other words, the algorithm we used imposes a single membership model, eliminating the possibility for overlap and multi-class membership. Therefore, it is important to focus on the overall conceptual focus of each outcome, rather than on the classification of any particular indicator. While it is possible to manually recategorize indicators into other clusters,(43) we chose to not intervene in the results of the multidimensional scaling or cluster analysis. Instead, we have chosen to reserve robust conceptual clarification for future work, where we hope to explore the most appropriate assessment methods for each outcome. This is particularly important due to the final major limitation of this study: the absence of children's voices.

Last, we did not include children with speech, language or communication needs in the present study due to our desire to use a highly structured elicitation technique, which children would likely find challenging.(67) Although this technique has been used with youth and adolescents,(67) it required substantial modifications for this purpose, and has not been evaluated for suitability for children with various accessibility needs. We suggest that these findings be further explored conceptually with more child-friendly, qualitative methods, much like those used by Gallagher and colleagues.(64) In that study,(64) the researchers were able to explore the outcomes that children valued and how these were consistent with the outcomes identified by adults, while offering a nuanced

interpretation of each outcome from the children's perspective. We suggest that such an exploration of children's interpretations should be considered for future research as an essential part of robustly conceptualizing each of these outcomes.

Conclusion

In summary, we developed a COS for school-based speech-language service delivery in Ontario schools. Having identified the key outcomes of these services, this work enables future evaluation and improvement work (39) when combined with an appropriate theory.(63,68) Specific to those working in schools within a tiered model of service delivery, the initial programme theory developed by VanderKaay and colleagues (35) may be of particular interest. Tiered models are widely used internationally,(23,24,26–28,30) and this programme theory has been developed specifically for these practice contexts and models. Consistent with COS recommendations,(14–16) we endorse incorporation of these core outcomes into university and school-based research activities where possible, complementing other outcomes specific to the intervention or service changes under investigation. Further work is required, however, to identify the most appropriate ways to assess or measure these outcomes. Judicious selection from this COS may therefore be necessary in the interim. We recommend exploring aspects of these core outcomes qualitatively, making use of methodological advancement into mixed-methods clinical trials (69,70) or program evaluations (39,62,63) to determine the impacts of service design and delivery within schools.

Declarations

Ethics approval and consent to participate

All methods and materials for this study were reviewed by the Hamilton Integrated Research Ethics Board (project number: 13906), which is affiliated with McMaster University, as well as all the research ethics committees of all partnering school boards. Methods and materials followed these reviewed ethical guidelines and regulations. All participants provided written informed consent prior to completing any research tasks.

Consent for publication

Not applicable as data is anonymized and does not include private information.

Availability of data and materials

The data generated and analysed in the present study are available, with exceptions, through the following link: doi 10.17605/osf.io/7ya62. Participant demographic information has not been shared due to the potentially sensitive nature of the issue under consideration within the participants' province of residence.

Competing interests

The authors have no competing interests, real or perceived, to declare.

Funding

This study was supported by funding from the John and Margaret Lillie Chair in Childhood Disability Research (WC).

Authors' contributions

PC performed data collection and analysis, as well as all figures and tables. PC and WC completed peer debriefing during the project and wrote the main manuscript text. All authors participated in study conceptualization and critically reviewed the final manuscript.

Acknowledgements

We thank the participants for generously sharing their time and perspectives. Their generosity made this work possible.

References

1. Donabedian A. Evaluating the quality of medical care. *Milbank Q.* 2005;83(4):691–729.
2. Donabedian A. The role of outcomes in quality assessment and assurance. *Qual Rev Bull.* 1992;18(11):356–60.
3. Schiff GD, Rucker TD. Beyond structure-process-outcome: Donabedian’s seven pillars and eleven buttresses of quality. *Jt Comm J Qual Improv.* 2001;27(3):169–74. [http://dx.doi.org/10.1016/S1070-3241\(01\)27015-1](http://dx.doi.org/10.1016/S1070-3241(01)27015-1)
4. Klazinga N, Stronks K, Delnoij D, Verhoeff A. Indicators without a cause. Reflections on the development and use of indicators in health care from a public health perspective. *Int J Qual Heal Care.* 2001;13(6):433–8.
5. Deber R, Schwartz R. What’s measured is not necessarily what matters: A cautionary story from public health. *Healthc Policy.* 2016;12(2):53.
6. Bevan G, Hood C. What’s measured is what matters: Targets and gaming in the English public health care system. *Public Adm.* 2006;84(3):517–38.
7. Cohen ML, Hula WD. Patient-reported outcomes and evidence-based practice in speech-language pathology. *Am J Speech-Language Pathol.* 2020;29(February):357–70.
8. Coyte PC. Outcome measurement in speech-language pathology and audiology. *Can J Speech-Language Pathol Audiol.* 1992;16(4):275–85.
9. Hesketh A, Sage K. For better, for worse: Outcome measurement in speech and language therapy. *Adv Speech-Language Pathol.* 1999;1(1):37–45.

10. Enderby P. For richer for poorer: Outcome measurement in speech and language therapy. *Adv Speech-Language Pathol.* 1999;1(1):63–5.
11. John A. Therapy outcome measures: Where are we now? *Int J Speech Lang Pathol.* 2011;13(1):36–42.
12. Skeat J, Perry A. Exploring the implementation and use of outcome measurement in practice: A qualitative study. *Int J Lang Commun Disord.* 2008;43(2):110–25.
13. Kuo DZ, Houtrow AJ, Arango P, Kuhlthau KA, Simmons JM, Neff JM. Family-centered care: Current applications and future directions in pediatric health care. *Matern Child Health J.* 2012;16(2):297–305.
14. Williamson PR, Altman DG, Bagley H, Barnes KL, Blazeby JM, Brookes ST, et al. The COMET Handbook: Version 1.0. *Trials.* 2017;18(Suppl 3):280.
15. Williamson PR, Altman DG, Blazeby JM, Clarke M, Devane D, Gargon E, et al. Developing core outcome sets for clinical trials: Issues to consider. *Trials.* 2012;13(132).
16. Gorst SL, Gargon E, Clarke M, Smith V, Williamson PR. Choosing important health outcomes for comparative effectiveness research: An updated review and identification of gaps. *PLoS One.* 2016;11(12):e0168403.
17. McDonald MI, Lawson KD. Doing it hard in the bush: Aligning what gets measured with what matters. *Aust J Rural Health.* 2017;25(4):246–51.
18. Morris C, Janssens A, Shilling V, Allard A, Fellowes A, Tomlinson R, et al. Meaningful health outcomes for paediatric neurodisability: Stakeholder prioritisation and appropriateness of patient reported outcome measures. *Health*

- Qual Life Outcomes. 2015;13(87). <http://dx.doi.org/10.1186/s12955-015-0284-7>
19. Crudgington H, Rogers M, Bray L, Carter B, Currier J, Dunkley C, et al. Core Health Outcomes in Childhood Epilepsy (CHOICE): Development of a core outcome set using systematic review methods and a Delphi survey consensus. *Epilepsia*. 2019;60(5):857–71.
 20. Ng SL, Lingard L, Hibbert K, Regan S, Phelan S, Stooke R, et al. Supporting children with disabilities at school: Implications for the advocate role in professional practice and education. *Disabil Rehabil*. 2015;37(24):2282–90.
 21. Speech-Language and Audiology Canada. SAC position statement on the role of speech-language pathologists in schools [Internet]. Ottawa, ON; 2019. Available from: https://www.sac-oac.ca/sites/default/files/resources/sac_s-lps_in_schools_position_statement_en.pdf
 22. Gallagher TM, Swigert NB, Baum HM. Collecting outcomes data in schools: Needs and challenges. *Lang Speech Hear Serv Sch*. 1998;29:250–6.
 23. Grosche M, Volpe RJ. Response-to-intervention (RTI) as a model to facilitate inclusion for students with learning and behaviour problems. *Eur J Spec Needs Educ*. 2013;28(3):254–69.
 24. McIntosh K, MacKay LD, Andreou T, Brown JA, Mathews S, Gietz C, et al. Response to Intervention in Canada: Definitions, the evidence base, and future directions. *Can J Sch Psychol*. 2011;26(1):18–43.
 25. Anaby DR, Campbell WN, Missiuna CA, Shaw SR, Bennett S, Khan S, et al. Recommended practices to organize and deliver school-based services for children

- with disabilities: A scoping review. *Child Care Health Dev.* 2019;45(1):15–27.
26. Kaelin VC, Ray-Kaesler S, Moiola S, Kocher Stalder C, Santinelli L, Echsel A, et al. Occupational therapy practice in mainstream schools: Results from an online survey in Switzerland. *Occup Ther Int.* 2019;2019(3647397).
27. Terreberry S, Dix L, Cahill PT, Passaretti B, Campbell WN. Moving towards a tiered model of speech and language services in Ontario schools: Perspectives of school-board speech-language pathologists. *Can J Speech-Language Pathol Audiol.* 2021;45(4):267–82.
28. Jimerson SR, Burns MK, VanDerHeyden AM. From Response to Intervention to Multi-Tiered Systems of Support: Advances in the science and practice of assessment and intervention. In: Jimerson SR, Burns MK, VanDerHeyden AM, editors. *Handbook of Response to Intervention: The science and practice of multi-tiered systems of support.* 2nd ed. New York, NY: Springer Science+Business Media; 2016. p. 1–6.
29. Ebbels SH, McCartney E, Slonims V, Dockrell JE, Norbury CF. Evidence-based pathways to intervention for children with language disorders. *Int J Lang Commun Disord.* 2019;54(1):3–19.
30. Missiuna CA, Pollock NA, Levac DE, Campbell WN, Whalen SDS, Bennett SM, et al. Partnering for Change: An innovative school-based occupational therapy service delivery model for children with developmental coordination disorder. *Can J Occup Ther.* 2012;79(1):41–50.
31. Archibald LM. SLP-educator classroom collaboration: A review to inform reason-

- based practice. *Autism Dev Lang Impair.* 2017;2:1–17.
32. Cirrin FM, Schooling TL, Nelson NW, Diehl SF, Perry FF, Staskowski M, et al. Evidence-based systematic review: Effects of different service delivery models on communication outcomes for elementary school-age children. *Lang Speech Hear Serv Sch.* 2010;41:233–64.
33. Murphy CA. The limits of evidence and the implications of context: considerations when implementing pathways to intervention for children with language disorders. *Int J Lang Commun Disord.* 2019;54(1):20–3.
34. Gallagher AL, Murphy CA, Conway P, Perry A. Consequential differences in perspectives and practices concerning children with developmental language disorders: An integrative review. *Int J Lang Commun Disord.* 2019;54(4):529–52.
35. VanderKaay S, Dix L, Rivard L, Missiuna C, Ng S, Pollock N, et al. Tiered approaches to rehabilitation services in education settings: Towards developing an explanatory programme theory. *Int J Disabil Dev Educ.* 2021; <https://doi.org/10.1080/1034912X.2021.1895975>
36. Blosser J. Outcomes matter in school service delivery. In: Frattali CM, Golper LAC, editors. *Outcomes in Speech-Language Pathology.* 2nd ed. New York, NY: Thieme Medical Publishers, Inc.; 2013. p. 116–40.
37. Cahill PT, Ng SL, Dix L, Ferro MA, Turkstra LS, Campbell WN. Outcomes management practices in tiered school-based speech-language therapy: A Canadian example. *Int J Lang Commun Disord.* 2022;advance on. doi: 10.1111/1460-6984.12822

38. Boyd V, Woods N, Campbell W, Kumagai A, Ng S. *Mapping potential outcomes of critically reflective practice*. Unpublished.
39. Pope AM, Finney SJ, Bare AK. The essential role of program theory: Fostering theory-driven practice and high-quality outcomes assessment in student affairs. *Res Pract Assess*. 2010;14(Summer):5–17.
40. Cahill PT, Ng S, Turkstra L, Ferro MA, Campbell WN. Exploring the valued outcomes of school-based speech-language therapy services: A sequential iterative design [Manuscript submitted for publication]. *Sch Rehabil Sci McMaster Univ*. 2022;
41. Burke JG, O'Campo P, Peak GL, Gielen AC, McDonnell KA, Trochim WMK. An introduction to concept mapping as a participatory public health research method. *Qual Health Res*. 2005;15(10):1392–410.
42. Trochim W, Kane M. Concept mapping: An introduction to structured conceptualization in health care. *Int J Qual Heal Care*. 2005;17(3):187–91.
43. Kane M, Trochim W. *Concept mapping for planning and evaluation*. Thousand Oaks, CA: SAGE Publications, Inc.; 2007.
44. Sjö Dahl Hammarlund C, Nilsson MH, Idvall M, Rosas SR, Hagell P. Conceptualizing and prioritizing clinical trial outcomes from the perspectives of people with Parkinson's disease versus health care professionals: A concept mapping study. *Qual Life Res*. 2014;23(6):1687–700.
45. Sjö Dahl Hammarlund C, Nilsson MH, Hagell P. Measuring outcomes in Parkinson's disease: A multi-perspective concept mapping study. *Qual Life Res*.

- 2012;21(3):453–63.
46. Orsi R. A method for articulating grassroots community organizing outcomes. *J Community Psychol.* 2014;42(4):398–413.
 47. Leeuw FL. Reconstruction program theories: Methods available and problems to be solved. *Am J Eval.* 2003;24(1):5–20.
 48. Gentles SJ, Charles C, Ploeg J, Ann McKibbin K. Sampling in qualitative research: Insights from an overview of the methods literature. *Qual Rep.* 2015;20(11):1772–89.
 49. Macharis C, Turcksin L, Lebeau K. Multi actor multi criteria analysis (MAMCA) as a tool to support sustainable decisions: State of use. *Decis Support Syst.* 2012;54(1):610–20. <http://dx.doi.org/10.1016/j.dss.2012.08.008>
 50. Banville C, Landry M, Martel J-M, Boulaire C. A stakeholder approach to MCDA. *Syst Res Behav Sci.* 1998;15:15–32.
 51. Morse JM. “What’s your favorite color?” Reporting irrelevant demographics in qualitative research. *Qual Health Res.* 2009;18(3):299–300.
 52. Hsieh HF, Shannon SE. Three approaches to qualitative content analysis. *Qual Health Res.* 2005;15(9):1277–88.
 53. Elo S, Kyngäs H. The qualitative content analysis process. *J Adv Nurs.* 2008;62(1):107–15.
 54. Concept Systems Incorporated. groupwisdom™. Ithaca, NY; 2021.
 55. Rosas SR, Kane M. Quality and rigor of the concept mapping methodology: A pooled study analysis. *Eval Program Plann.* 2012;35(2):236–45.

<http://dx.doi.org/10.1016/j.evalprogplan.2011.10.003>

56. Hair JF, Black WC, Babin BJ, Anderson RE. *Multivariate data analysis*. Harlow, Essex, UK: Pearson Education Limited; 2014.
57. Orsi R. Use of multiple cluster analysis methods to explore the validity of a community outcomes concept map. *Eval Program Plann*. 2017;60:277–83.
<http://dx.doi.org/10.1016/j.evalprogplan.2016.08.017>
58. Sturrock K, Rocha J. A multidimensional scaling stress evaluation table. *Field methods*. 2000;12(1):49–60.
59. Harding KE, Camden C, Lewis AK, Perreault K, Taylor NF. Service redesign interventions to reduce waiting time for paediatric rehabilitation and therapy services: A systematic review of the literature. *Health Soc Care Community*. 2022;(April):1–14.
60. Fryer V, Wright-St Clair VA, Bright F. Waiting for community occupational therapy services: A review. *New Zeal J Occup Ther*. 2019;66(3):15–21.
61. Gallego G, Dew A, Lincoln M, Bundy A, Bulkeley K, Brentnall J, et al. Carers' preferences for the delivery of therapy services for people with disability in rural Australia: Evidence from a discrete choice experiment. *J Intellect Disabil Res*. 2018;62(5):371–81.
62. Rogers PJ. Using programme theory to evaluate complicated and complex aspects of interventions. *Evaluation*. 2008;14(1):29–48.
63. Rogers PJ. Program theory: Not whether programs work but how they work. In: Stufflebeam DL, Madaus GF, Kellaghan T, editors. *Evaluation Models: Evaluation*

- in Education and Human Services, vol 49. Dordrecht, NL: Springer; 2000. p. 209–32.
64. Gallagher AL, Murphy C, Conway PF, Perry A. Engaging multiple stakeholders to improve speech and language therapy services in schools: An appreciative inquiry-based study. *BMC Health Serv Res.* 2019;19(26).
65. Cunningham BJ, Washington KN, Binns A, Rolfe K, Robertson B, Rosenbaum P. Current methods of evaluating speech-language outcomes for preschoolers with communication disorders: A scoping review using the ICF-CY. *J Speech Lang Hear Res.* 2017;60(February):446–64.
66. Baker E, Masso S, Huynh K, Sugden E. Optimizing outcomes for children with phonological impairment : A systematic search and review of outcome and experience measures reported in intervention research. *Lang Speech Hear Serv Sch.* 2022;53(July):732–48.
67. Dare L, Nowicki E. Engaging children and youth in research and evaluation using group concept mapping. *Eval Program Plann.* 2019;76:101680.
<https://doi.org/10.1016/j.evalprogplan.2019.101680>
68. Rogers PJ. Causal models in program theory evaluation. *New Dir Eval.* 2000;2000(87):47–55.
69. Albright K, Gechter K, Kempe A. Importance of mixed methods in pragmatic trials and dissemination and implementation research. *Acad Pediatr.* 2013;13(5):400–7.
<http://dx.doi.org/10.1016/j.acap.2013.06.010>
70. Palinkas LA, Mendon SJ, Hamilton AB. Innovations in mixed methods

evaluations. *Annu Rev Public Health*. 2019;40:423–42.

Chapter 5: Project outcomes and future directions

In this scholarly project, I aimed to generate meaningful research and practice-based evidence about service delivery of speech-language therapy supports in schools. Specifically, I identified outcomes management practices currently used by school-based SLTs, explored what outcomes of speech and language services relevant parties felt were most meaningful or important, and then combined the perspectives of relevant parties into a single, conceptual map to represent core outcomes for tiered school-based speech-language services and to compare participants' perspectives on the same. The results of this project provide rich insights into the mismatch between what is feasible and possible within current practice, and what clinicians, teachers, and importantly, family members would like to achieve via the provision of school-based, speech-language services within Ontario. The project highlights important tensions in policy and practice and suggests numerous paths for future research and clinical innovation.

Summary of key findings

In my first study (Chapter 2), I analysed qualitative data provided by senior clinicians and clinical managers from across Ontario in interviews about barriers and facilitators to successful school-based practice. I organized the outcomes that SLTs in Ontario were managing into seven overarching categories, and that techniques to measure or robustly assess most outcomes were lacking. Importantly, these outcomes included not only student success, achievement, and skill development but also multiple relational and

systems-level outcomes. This contrasts with SLT research evidence to date, which has overwhelmingly focused on individual student outcomes (see Archibald, 2017; Cirrin et al., 2010; Ebbels et al., 2019 for reviews), and those that target specific skill and deficit profiles (Gallagher et al., 2019a). Further, tiered practice allowed SLTs to target more meaningful outcomes (such as student wellbeing in the classroom), although outcomes management practices were reported to be more challenging within tiered models. Assessing and managing multiple outcomes at different tiers added a level of complexity beyond individual student data tracking. Finally, collaboration among the SLTs within the school and “buy-in” from educators, school staff, and families were important successes in current, school-based practice in school boards that had reported successful outcomes management.

In my second study (Chapter 3), I interviewed SLTs, teachers, and family members of children receiving school-based S-LT supports about what outcomes or impacts they would like these services to achieve. I analysed this text data both qualitatively and quantitatively to extract important inferences from the perspectives shared by participants. All relevant parties discussed a set of six interrelated outcomes. These outcomes were similar to those being managed in practice (see chapter 2); however, no participant identified accountability and compliance outcomes to be meaningful (necessary, perhaps, but not meaningful). Given striking differences between SLTs, educators, and families on the amount that each outcome was discussed, there appeared to be differences in prioritization. In other words, there appears to be consensus on the most important outcomes of school-based S-LT services; nevertheless, there may

be important differences in how these outcomes are ordered or ranked. The findings from this study suggest that the outcome management practices described in chapter 2 are indeed attempting to address the most valuable outcomes of practice.

In my third study (chapter 4), I further explored and confirmed findings from chapter 3, this time using group concept mapping (Kane & Trochim, 2007; Trochim & Kane, 2005) with an expanded number of participants to strengthen my inferences. Using an iterative process to explore different cluster solutions, I ultimately selected a seven-cluster solution for the outcomes map based on both qualitative and quantitative considerations (see Chapter 4, Figure 6). Participants indicated that these seven outcomes were important, but that feasibility of assessing these outcomes remained a concern (particularly those beyond student progress, similar to the types of outcomes found in the peer-reviewed literature to date). Importantly, the importance and feasibility ratings appeared to be inversely related. There were also differences in how participant groups prioritized each outcome, with different importance orderings across groups. However, one exception was the outcome of having a *holistic approach* to services. This outcome focused on core organizational attitudes towards and philosophical commitment to inclusive and collaborative services. This outcome was interestingly also located in the centre of the concept map, suggesting that it is a truly *core* or central aspect of supporting children with diverse needs in school.

Integrated findings

In this project, I have identified the core outcomes that should guide evidence creation and use for school-based services within Ontario. Although there are differences in opinion regarding prioritization and focus on each outcome across relevant parties, there seems to be broad consensus on central aspects of the findings, such as the centrality of a holistic approach, with school team members working together with families to support and include children of all abilities. The outcomes explored in Chapter 3 and then identified more concretely in Chapter 4 are strikingly more similar to the outcomes reported in educational literature than they are to those found in S-LT research (see Gallagher et al., 2019a). In fact, the types of outcomes present in S-LT research across reviews on school-based services, particularly changing in specific clinical assessment scores (i.e., Archibald, 2017; Cirrin et al., 2010; Ebbels et al., 2019; Gallagher et al., 2019a), were scarcely mentioned in either Chapter 2 or Chapter 3. Consequently, the content analysis that yielded the input materials for Chapter 4 generally did not include traditional S-LT research outcomes. Clearly, there is a disconnect between the outcomes included in research studies and those essential to practice within S-LT. Although identifying the history or causes of this disconnect is beyond the scope of this project, the stark contrast between our findings, echoing those of Gallagher and colleagues (2019a), and research outcomes suggests a pressing need within the profession. The outcomes that SLTs (as well as teachers and family members) value differ greatly from the outcomes for which school-based SLTs have research evidence. Although SLTs working in schools are able to address this paucity of relevant evidence by using reason-based practice

(Archibald, 2017; Cirrin et al., 2010), undoubtedly their services would be enhanced were research evidence available and aligned with valued outcomes.

In contrast to outcomes in SLT research to date, there is much greater concordance with the core outcomes identified in this project and those identified in research on tiered service delivery models, particularly where multiple tiers are being evaluated. The realist synthesis supporting programme theory development for tiered service delivery (VanderKaay et al., 2021) included only literature that offered services at multiple tiers. This approach excluded literature that evaluated solitary tier interventions (e.g., a tier 2 literacy enrichment program). No such criteria was present in other reviews (Archibald, 2017; Cirrin et al., 2010; Ebbels et al., 2019; Gallagher et al., 2019a). Thus, it is possible that the core outcomes identified in the present project correspond more closely to the outcomes extracted from the review by VanderKaay and colleagues (2021) owing to this shared focus. Moreover, we do acknowledge that there are many connections between the authors of that programme theory and those involved in the present manuscript, although no direct collaboration occurred between these two research projects. Nevertheless, similar epistemological and axiological perspectives also likely influenced this convergence. A further reason for the similarities between the outcomes identified here and in the programme theory may be that coordinating multiple service types requires systems-based thinking, leading to a broader conceptualization of outcomes beyond individual student skills and impairments. However, still other explanations may be possible, including VanderKaay et al.'s (2021) inclusion of interprofessional literature from across rehabilitation professions. This explanation gains

credence when coupled with the richer outcomes identified within educational literature by Gallagher and colleagues (2019a). Indeed, working and learning directly with other professions, including teaching, occupational therapy, and physiotherapy (among many others), may prove particularly fruitful. This recommendation is consistent with other trends in childhood disability, in which the utility of non-categorical approaches (Ferro et al., 2022) and collaborative, interprofessional practice (Campbell & Skarakis-Doyle, 2007) have been recognized as essential to meeting all children's needs appropriately.

I have compared the outcomes participants reported valuing and those present in the clinical literature. Beyond research, how do both relate to clinical practice? Returning to Chapter 2, we see that SLTs practicing in schools are attempting to address many of these core outcomes. Particularly, SLTs in those interviews extensively discussed family supports, support for teachers, collaboration, and inclusive practices, as well as coordinating services to ensure accessibility and responsiveness. Here, it would seem that practice has surpassed the theory present in the peer-reviewed, disciplinary literature. Formal theory, at least within rehabilitation, is instead catching up to practice with the creation and further testing of a programme theory for tiered services (see VanderKaay et al., 2021). Participants in Chapter 2 reported being invested in meaningful outcomes, and yet also reported being uncertain of how to proceed. One suggestion from Participant 22 (Chapter 2, page 12) is that there are large data sources available that could provide relevant information to inform practice, but that these have not been recognized as such as they do not have a typical presentation as an outcome measure. Although not specified by that participant, it is likely they are alluding to administrative and educational data that

schools already collect. In this case, it may be possible to develop the profession by learning to leverage data sources not explicitly or originally designed as S-LT-specific data. By contrast, the results across all three studies suggest that traditional clinical outcome measures of individual student skill are the most feasible to collect, although they do not provide the most essential information to guide clinical practice.

The results of these three studies also point to another issue in outcomes data for S-LT practice in schools. Many core outcomes are conceptually broad and may be difficult to fit within current measurement frameworks. For example, is it possible to validly measure the inclusiveness of a school community? Using a questionnaire with staff to determine the endorsement of inclusive practices could be an option. Asking children with disabilities to rate their sense of inclusion and belonging within the school community would likely be more informative. However, with such a concept, personal narratives would almost certainly provide richer, more nuanced information whether the school is achieving its desired outcome of inclusion. Participant 1 (Chapter 2, page 12) notes that they have access to such narrative information about outcomes, but that they were obliged to look for quantitative evidence of outcomes due to the sociopolitical context of their practice. The need for this quantification was revisited by participants in Chapter 3. Some questioned this need while others accepted it. In the future, it may be possible to respect the quality of the data and maintain the narrative structure and rich information, while summarizing quantitatively through an approach such as sentiment analysis (a type of machine learning that estimates the positive or negative affect expressed within text). However, whether or not this information *can* be quantified is

likely a technological question, whereas whether they *should* be is axiological. This may be an issue to discuss with interested parties once the technology has sufficiently advanced to ensure it meets their needs and expectations and is consistent with their values.

Finally, the results of all three studies provide support for emerging theory (VanderKaay et al., 2021) regarding tiered service models. The outcomes that the interested parties identified as important in both Chapters 3 and 4 are highly consistent with the outcomes identified for successful tiered service implementation in that initial programme theory (VanderKaay et al., 2021). Some examples include the following.

1. Student-level outcomes
 - a. Increased student confidence
 - b. Increased self-esteem
 - c. Earlier identification of needs
2. Relational outcomes
 - a. Increased family knowledge and skills to support children's needs
 - b. Increased teacher knowledge and skills to support all students' needs
3. Systems-level outcomes
 - a. Greater resource efficiency
 - b. Reduced importance of diagnostic labels

These outcomes are also similar to those targeted in contemporary practice as reported by participants in Chapter 2, including student well-being, expanded teacher capacities, and

more responsive and timely services. With the confluence of results from these three studies, adding to previous literature, confidence in the relevance of these inferences is warranted. Although additional research on this topic is possible, results from different studies using different methods, data sources, and participants are providing similar suggestions. Consequently, I have confirmed that the outcomes in the relevant programme theory (VanderKaay et al., 2021) are appropriate according to practice and community values. This is an important first step to allow for program evaluation (Pope et al., 2010). In the future, understanding the mechanisms and necessary contexts to achieve these outcomes will be essential, as will be identifying appropriate, valid, and feasible assessment strategies for these core outcomes.

Major project limitations

This work has important limitations due to my positionality and paradigmatic assumptions which underpinned the project. Due to my longstanding interests in advanced quantitative methods, statistical and measurement theories, and desire to pursue additional work in measure and methodological development for health services research, I adopted pragmatic assumptions (Kaushik & Walsh, 2019) about reality, knowledge, and value systems. More specifically, I assumed that that a mind-external reality exists, although it can only be accessed subjectively through human interpretation. Nevertheless, I accepted the underlying assumption that multi-faceted concepts such as having a holistic approach to services or providing appropriate care coordination, or relationship and rapport building between SLTs and teachers not only can be measured but *should* be

measured. I have assumed that by quantifying such concepts, one can achieve new and meaningful insights into the functioning of school-based services. This is both an epistemological and axiological assumption, in line with the current governance structures of health services (including school-based rehabilitation professionals), which divided the participants in the present research project. Indeed, does information become more *real* when quantified? As clearly revealed in chapter 3, some participants enthusiastically accepted the possibility of measuring such outcomes and the importance of doing so. In contrast, others critically questioned if alternatives to governance by quantitative target may be possible or more appropriate. Such critiques of this work are not only possible but are encouraged. In this project, my paradigmatic assumptions precluded substantive attention to such critiques.

Additionally, I have treated the systems within which school-based services operate as complicated but not complex. In other words, that these systems will behave with certain regularities and sufficient independence among system components that modelling changes in structure or process as leading to core outcomes is possible. This is a frequent use of programme theory (Rogers, 2008). However, it may be woefully inadequate to represent these systems. Instead, assuming system complexity, with interacting levels and recursive feedback structures, may be more appropriate for health care broadly (Plsek & Greenhalgh, 2001; Wilson et al., 2001), and even more so for health services research (Plsek & Wilson, 2001). Although programme theory and complexity theory have been interpreted as mutually exclusive in the past, it is possible to conduct complexity-informed programme evaluation (Westhorp, 2012), exploring

complex causal changes such as virtuous and vicious cycles, unintended consequences, and feedback delays (Rogers, 2000). In chapter one, I claimed that we can evaluate and improve these important services if we can identify the most important outcomes towards which we strive. Whether this claim holds may depend on the type of system that school-based services represent, and whether they are complex or merely complicated. This distinction has important clinical implications (Plsek & Wilson, 2001; Wilson et al., 2001), and misunderstanding the type of system under investigation can lead to significant social harm (Makridakis & Taleb, 2009; Taleb, 2009). Consequently, this issue has great potential real-world implications for children, and its affects are not limited to debates within the scholarly literature. Greater theoretical engagement may benefit the development of appropriate evidence and recommendations for these services.

Finally, the most important limitation to this project is who was not included: children with speech, language, or communication needs. I chose not to include child voices at this time, as I wanted to explore the perspectives and reach a tentative consensus with individuals who could engage in highly structured research activities. Group concept mapping has been completed with young people as contributors (see Dare & Nowicki, 2019), albeit not modified greatly to improve accessibility for children with diverse needs. It may have been more fruitful to follow the precedent set by Gallagher and colleagues (2019b) who explored the issue of outcomes for children with developmental language disorder using qualitative, child-friendly methods only. However, in that study, researchers found that children agreed with their family members and teachers about the outcomes they wanted to achieve; however, they conceptualized each outcome somewhat

differently (Gallagher et al., 2019b). For this reason, I decided to construct the original core outcome set with only adult voices, and to explore what each outcome meant to children in future work. Nevertheless, the absence of child voices remains the most substantive limitation of this body of research and must be addressed in future work.

Implications for Practice and Policy

This project has several important implications for policy and practice. First, student-level outcomes are important, and are the most feasible outcome to measure. This is perhaps why they predominate in research literature (see Archibald, 2017; Cirrin et al., 2010; Ebbels et al., 2019; Gallagher et al., 2019a). However, all three empirical studies reported here reiterated that these outcomes are important to evaluating service success, but not sufficient within themselves. An excellent quote in chapter 2 stated this particularly well (Chapter 2, pages 8-9, quote from participant 22). As that participant stated, student progress, achievement, and wellbeing are the ultimate goals of school-based health services embedded within schools. However, there are likely important intermediate outcomes that make this ultimate outcome possible (Victora et al., 2004). Therefore, research and quality improvement or program evaluation initiatives in practice should be sure to assess this broader list of outcomes (see Chapter 4, Table 4).

Second, it is inappropriate to put the onus of assessing these broader outcomes entirely on clinicians. There is a major paucity of feasible methods for assessing these outcomes as confirmed by participants' statements in Chapter 2 and participant feasibility ratings in Chapter 4. Further research support is essential to develop appropriate and

contextually meaningful assessment tools. In the meantime, I recommend that decision makers and administrators encourage the use of alternative, qualitative forms of evidence, such as narratives and family/student verbal or written feedback, about these core outcomes when evaluating service delivery in schools, and that they pursue local policies and broader regulations that encourage and incentivize collaboration both within S-LT departments/services and interprofessionally with other school community members, crucially including educators and family members.

Third, in this area of research, it is essential to distinguish between a *lack of evidence* for a practice and *evidence of lack* regarding the efficacy of that practice. Unfortunately, previous work within speech-language therapy has not been careful to maintain this distinction and has therefore reached premature conclusions. For example, Ebbels and colleagues (2019) argue based on their synthesis of the relevant literature that SLTs should prioritize tier three activities over those at tiers one and two, as there has been relatively little research investigating the impact of S-LT involvement at those tiers of student skills and abilities. Such an interpretation directly contradicts the expressed values of all participants groups in the present research project, who all indicated that collaboration, coordination, and teamwork at all levels of service were essential to supporting the needs of all children. Educators were particularly adamant that having access to S-LT supports at tiers one and two were helpful and produced meaningful changes in educational practice to ensure the inclusion and success of all students. While research evidence is an important pillar of evidence-based practice, true evidence-based decision making requires the integration of research evidence for local practice context

and the values and priorities of those served by health services (Dollaghan, 2007; Greenhalgh et al., 2014). Therefore, it is important to not prematurely dismiss valued service features due to a current gap in the available peer-reviewed literature. Further, it may be that practitioners have access to deep, emic, craft-based knowledge due to prolonged engagement with and immersion in the issues at hand (Aligica & Herritt, 2009). This knowledge may not (yet) be accessible to researchers in the peer-reviewed literature due to their relative distance from current practice.

Recommendations for Implementation

The results of all three empirical chapters confirm the importance of assessing these seven core outcomes for tiered, speech-language services for Ontario schools. However, the challenge of feasibility was reiterated across studies. For this reason, it is essential that researchers, administrators, and decision-makers commit appropriate supports and resources to proactive outcomes management before SLTs and other school staff begin systematically tracking these outcomes. Given the measurement challenges reported across studies, it would be iatrogenic to mandate the collection of quantitative data for all outcomes at this time. Rather, I encourage a broader perspective on outcomes, and recommend that other forms of evidence, such as qualitative narratives, be considered by administrators and decision-makers at this time. Sustained dialogue and collaboration with research and practice in education may be particularly fruitful, as education appears to have a longer tradition of engaging with these types of outcomes and considering how they are achieved in complex, dynamic environments (Gallagher et al., 2019a).

Prematurely mandating the collection of quantitative outcomes is likely to lead to maladaptive system responses, such as the collection of meaningless (but feasible) data (Skeat & Perry, 2008) or the prioritization of compliance and indicator maximization, crowding out more meaningful types of work (Bevan & Hood, 2006). Administrators and decision-makers should instead encourage collaboration with researchers to develop meaningful, feasible, and contextually appropriate assessment techniques for these outcomes, particularly those with high importance but low current feasibility as reported in the current project (Chapter 4).

Recommendations for Future Research

This project sets an important agenda for future research. It is essential that future research within the discipline of speech-language therapy: 1) develop appropriate assessment techniques (quantitative or qualitative) for meaningful outcomes, 2) include children in the assessment of these outcomes, 3) incorporate these broader outcomes in intervention research beyond the traditional clinical measures, and 3) use nuanced methodologies and more diverse epistemic and disciplinary perspectives to understand and appraise complicated/complex practices used in clinical practice.

Expanding the repertoire of outcome assessment techniques is essential. Previous research in school-based services has reported narrow, clinical outcomes (Archibald, 2017; Cirrin et al., 2010; Ebbels et al., 2019), to the exclusion of participation, satisfaction, and wellbeing outcomes. Unfortunately, these patterns in research appear to be reflected across the profession, as a similarly narrow approach to outcomes has been

reported in other paediatric practice areas (Baker et al., 2022; Cunningham et al., 2017). In this project, it is easy to see that these broader outcomes are important and meaningful to families, clinicians, and educational staff, and that efforts within clinical practice to address these gaps in the outcomes repertoire are ongoing (Cahill et al., 2022). Therefore, the profession as a whole, but particularly the research community, should urgently pursue the development of new assessment techniques to address these broader, more important outcomes. Here I use the term assessment techniques, rather than measures, intentionally. Some of these outcomes may be best assessed in ways other than traditional (clinical/patient-/proxy-reported) outcome measures. Rather, administrative data or the use of narratives or other qualitative data may prove fruitful. Cutting edge methodological techniques may also be on the horizon, such as using machine learning to quantify family satisfaction with services over time using qualitative survey data, allowing both the quantity and quality of the data to be explored for rich inference regarding service quality. Such an approach may replace burdensome and constraining quantitative survey approaches. Once these assessment techniques have been developed, it is essential that they be included consistently in future intervention research, alongside the clinical outcomes relevant to the specific intervention in question. Additionally, it would be valuable to investigate the relationships among these outcomes, and whether particular clinical indicators are closely linked to ultimate, long-term outcomes, such as child communicative participation, quality of life, or social and vocational success.

Including children's voices in this work will be essential. We know that children with disabilities have a great deal to say about the supports they are provided in schools

(Paul et al., 2022) and that they can provide nuanced and rich descriptions of the outcomes they value when asked in appropriate ways (Gallagher et al., 2019b). Child-reported outcome measures may be one way to achieve this, particularly if children were involved in the development of the measure items. However, in the case of S-LT services specifically, more creative approaches may be required, particularly to ensure that all children can provide their perspectives about the supports they are offered in schools. For example, assessment techniques that do not impose participation barriers on children who use augmentative and alternative communication strategies may be appropriate. This is an exciting area of future work, with room for experimentation, collaboration, and innovation.

Additionally, research in S-LT should expand beyond an overreliance on traditional research designs such as randomized control trials, following similar realizations in other health disciplines (Victora et al., 2004), adopting more conceptually (Rogers, 2008) and statistically (Sourial et al., 2018) rigorous approaches, particularly for health services research such as evidence regarding service delivery models. Complexity-informed programme evaluation, where the evaluators or researchers carefully explore system aspects to determine which causal chains are complicated and which are complex (Rogers, 2008), appears particularly relevant to tiered service models in schools. Additionally, across research designs, it is important to take maximal advantage of statistical advances to evaluate causal claims where traditional research designs are unethical, unfeasible, or exorbitantly costly (Sourial et al., 2018). Statistical practice within the profession is evolving in exciting directions (Oleson et al., 2019), and

innovation in this area should be encouraged by universities and journals within the discipline. The discipline of S-LT should strive to lead in grounding evidence-based practice within *practice*, as has been recommended for health research broadly (Greenhalgh et al., 2014).

Conclusion

In this project, I have addressed a key gap in the research evidence to support high-quality speech-language therapy practice within schools, particularly regarding the outcomes that should be targeted to inform evidence-based decision-making regarding service delivery models. I have grounded this research within clinical practice, confirming the relevance of these issues through interviews with senior clinicians and clinical managers across Ontario. I then explored what clinicians, educators, and families would identify as valued outcomes when asked an open-ended, semi-structured interviews. I used qualitative and quantitative analysis techniques to infer that there were six broad outcomes relevant to practice, and that there may be important differences in how participants prioritized each outcome, although there appeared to be some consensus that all six outcomes were relevant and important. Finally, I asked relevant parties to assist in developing a core outcome set for tiered service delivery models by structuring outcome indicators by conceptual similarity and then rating each indicator for importance and feasibility. This yielded a set of seven core outcomes. Here I observed that all parties agreed that the outcome they considered most important was a *holistic approach* where school culture and organizational practices are oriented towards collaboration, teamwork,

and ultimately meaningful inclusion of all children within the school community. Thus, my findings challenged dominant conceptualizations within the S-LT research community of what are the most important outcomes of school-based speech and language services and highlighted the importance of recognizing the knowledge and perspectives of school community members. Further, this final study confirmed that importance and feasibility of outcomes for tiered practice are currently inversely related, highlighting the urgent need for outcome assessment development.

This research project has important implications for practice, particularly the timeliness of innovation in measurement, methodology, and statistical analysis within speech-language therapy to support high-quality research, program evaluation, and quality improvement activities. The need for growth and innovation is great, providing an opportunity for the discipline to forge a new path and ensure that generating value for children with speech, language, or communication needs and their families is at the centre of clinical practice, evaluation, improvement, and research.

References

- Aligica, P. D., & Herritt, R. (2009). Epistemology, social technology, and expert judgement: Olaf Helmer's contribution to futures research. *Futures*, *41*(5), 253–259.
<https://doi.org/10.1016/j.futures.2008.11.010>
- Archibald, L. M. (2017). SLP-educator classroom collaboration: A review to inform reason-based practice. *Autism & Developmental Language Impairments*, *2*, 1–17.
<https://doi.org/10.1177/2396941516680369>
- Baker, E., Masso, S., Huynh, K., & Sugden, E. (2022). Optimizing outcomes for children with phonological impairment : A systematic search and review of outcome and experience measures reported in intervention research. *Language, Speech, and Hearing Services in Schools*, *53*(July), 732–748.
- Bevan, G., & Hood, C. (2006). What's measured is what matters: Targets and gaming in the English public health care system. *Public Administration*, *84*(3), 517–538.
- Cahill, P. T., Ng, S. L., Dix, L., Ferro, M. A., Turkstra, L. S., & Campbell, W. N. (2022). Outcomes management practices in tiered school-based speech-language therapy: A Canadian example. *International Journal of Language and Communication Disorders*, advance on. doi: 10.1111/1460-6984.12822
- Campbell, W., & Skarakis-Doyle, E. (2007). School-aged children with SLI: The ICF as a framework for collaborative service delivery. *Journal of Communication Disorders*, *40*(6), 513–535. <https://doi.org/10.1016/j.jcomdis.2007.01.001>
- Cirrin, F. M., Schooling, T. L., Nelson, N. W., Diehl, S. F., Perry, F. F., Staskowski, M., Zoann Torrey, T., & Adamczyk, D. F. (2010). Evidence-based systematic review:

Effects of different service delivery models on communication outcomes for elementary school-age children. *Language, Speech, and Hearing Services in Schools*, 41, 233–264.

Cunningham, B. J., Washington, K. N., Binns, A., Rolfe, K., Robertson, B., & Rosenbaum, P. (2017). Current methods of evaluating speech-language outcomes for preschoolers with communication disorders: A scoping review using the ICF-CY. *Journal of Speech Language & Hearing Research*, 60(February), 446–464.

<https://doi.org/10.1044/2016>

Dare, L., & Nowicki, E. (2019). Engaging children and youth in research and evaluation using group concept mapping. *Evaluation and Program Planning*, 76, 101680.

<https://doi.org/10.1016/j.evalprogplan.2019.101680>

Dollaghan, C. A. (2007). *The handbook for evidence-based practice in communication disorders*. Paul H. Brooks Publishing Co., Inc.

Ebbels, S. H., McCartney, E., Slonims, V., Dockrell, J. E., & Norbury, C. F. (2019).

Evidence-based pathways to intervention for children with language disorders.

International Journal of Language and Communication Disorders, 54(1), 3–19.

<https://doi.org/10.1111/1460-6984.12387>

Ferro, M. A., Qureshi, S., Van Lieshout, R. J., Lipman, E. L., Georgiades, K., Gorter, J.

W., Timmons, B. W., & Shanahan, L. (2022). Prevalence and correlates of physical-mental multimorbidity in outpatient children from a pediatric hospital in Canada.

Canadian Journal of Psychiatry / La Revue Canadienne de Psychiatrie, 67(8), 626–

637. <https://doi.org/10.1177/07067437221074430>

- Gallagher, A. L., Murphy, C. A., Conway, P., & Perry, A. (2019a). Consequential differences in perspectives and practices concerning children with developmental language disorders: An integrative review. *International Journal of Language and Communication Disorders*, 54(4), 529–552. <https://doi.org/10.1111/1460-6984.12469>
- Gallagher, A. L., Murphy, C., Conway, P. F., & Perry, A. (2019b). Engaging multiple stakeholders to improve speech and language therapy services in schools: An appreciative inquiry-based study. *BMC Health Services Research*, 19(26). <https://doi.org/10.1186/s12913-019-4051-z>
- Greenhalgh, T., Howick, J., Maskrey, N., Brasse, J., Burch, D., Burton, M., Chang, H., Glasziou, P., Heath, I., Heneghan, C., Kelly, M. P., Lehman, R., Llewelyn, H., McCartney, M., Milne, R., & Spence, D. (2014). Evidence based medicine: A movement in crisis? *BMJ*, 348(g3725). <https://doi.org/10.1136/bmj.g3725>
- Kane, M., & Trochim, W. (2007). *Concept mapping for planning and evaluation*. SAGE Publications, Inc.
- Kaushik, V., & Walsh, C. A. (2019). Pragmatism as a research paradigm and its implications for social work research. *Social Sciences*, 8(255). [doi:10.3390/socsci8090255](https://doi.org/10.3390/socsci8090255)
- Makridakis, S., & Taleb, N. (2009). Decision making and planning under low levels of predictability. *International Journal of Forecasting*, 25(4), 716–733. <https://doi.org/10.1016/j.ijforecast.2009.05.013>
- Oleson, J. J., Brown, G. D., & McCreery, R. (2019). The evolution of statistical methods

- in speech, language, and hearing sciences. *Journal of Speech, Language, and Hearing Research*, 62(3), 498–506. https://doi.org/10.1044/2018_JSLHR-H-ASTM-18-0378
- Paul, T., Rezze, B. Di, Rosenbaum, P., Cahill, P. T., Jiang, A., Kim, E., & Campbell, W. N. (2022). Perspectives of children and youth with disabilities and special needs regarding their experiences in inclusive education : A meta-aggregative review. *Frontiers in Education*, 7(864752). <https://doi.org/doi:10.3389/educ.2022.864752>
- Plsek, P. E., & Greenhalgh, T. (2001). The challenge of complexity in health care. *British Medical Journal*, 323, 625–628.
- Plsek, P. E., & Wilson, T. (2001). Complexity science: Complexity, leadership, and management in healthcare organisations. *British Medical Journal*, 323, 746–749. <https://doi.org/10.1136/bmj.323.7315.746>
- Pope, A. M., Finney, S. J., & Bare, A. K. (2010). The essential role of program theory: Fostering theory-driven practice and high-quality outcomes assessment in student affairs. *Research & Practice in Assessment*, 14(Summer), 5–17.
- Rogers, P. J. (2000). Causal models in program theory evaluation. *New Directions for Evaluation*, 2000(87), 47–55. <https://doi.org/10.1002/ev.1181>
- Rogers, P. J. (2008). Using programme theory to evaluate complicated and complex aspects of interventions. *Evaluation*, 14(1), 29–48. <https://doi.org/10.1177/1356389007084674>
- Skeat, J., & Perry, A. (2008). Exploring the implementation and use of outcome measurement in practice: A qualitative study. *International Journal of Language and*

Communication Disorders, 43(2), 110–125.

<https://doi.org/10.1080/13682820701449984>

Sourial, N., Longo, C., Vedel, I., & Schuster, T. (2018). Daring to draw causal claims from non-randomized studies of primary care interventions. *Family Practice*, 35(5), 639–643. <https://doi.org/10.1093/fampra/cmz005>

Taleb, N. N. (2009). Errors, robustness, and the fourth quadrant. *International Journal of Forecasting*, 25(4), 744–759. <https://doi.org/10.1016/j.ijforecast.2009.05.027>

Trochim, W., & Kane, M. (2005). Concept mapping: An introduction to structured conceptualization in health care. *International Journal for Quality in Health Care*, 17(3), 187–191. <https://doi.org/10.1093/intqhc/mzi038>

VanderKaay, S., Dix, L., Rivard, L., Missiuna, C., Ng, S., Pollock, N., Whalen, S. S., Eisen, I., Kyte, C., Phoenix, M., Bennett, S., Specht, J., Kennedy, J., Mccauley, D., & Campbell, W. N. (2021). Tiered approaches to rehabilitation services in education settings: Towards developing an explanatory programme theory. *International Journal of Disability, Development and Education*. <https://doi.org/10.1080/1034912X.2021.1895975>

Victora, C. G., Habicht, J. P., & Bryce, J. (2004). Evidence-based public health: Moving beyond randomized trials. *American Journal of Public Health*, 94(3), 400–405. <https://doi.org/10.2105/AJPH.94.3.400>

Westhorp, G. (2012). Using complexity-consistent theory for evaluating complex systems. *Evaluation*, 18(4), 405–420. <https://doi.org/10.1177/1356389012460963>

Wilson, T., Holt, T., & Greenhalgh, T. (2001). Complexity and clinical care. *British*

Medical Journal, 323, 685–688. <https://doi.org/10.1136/bmj.323.7314.685>