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Engaging Clinicians to Develop a Meaningful Digital Outcome Measurement Tool to Improve Implementation of The Focus on the Outcomes of Communication Under Six (FOCUS)

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Abstract

This study engaged speech-language pathologists who were familiar with an existing participation-focused paper-based outcome measure called the Focus on the Outcomes of Communication Under Six (FOCUS-34) to understand their current experiences using the tool and identify their recommendations for how a digital solution could improve their ability to use its data clinically. SLPs were actively involved in the early stages of the digital FOCUS-34 development to ensure its clinical utility and support its future implementation in clinical practice. Twenty-three speech-language pathologists participated in virtual focus groups that were run in groups of four or five. Focus groups lasted 60 minutes, were facilitated by a researcher familiar with the FOCUS-34, and were conducted using a semi-structured interview guide. Data were coded inductively and analyzed using thematic analysis. Four main themes were identified: (1) speech-language pathologists view the FOCUS-34 as having potential and some benefits in its current format, (2) FOCUS-34 data are difficult to collect and use because of the currently available formats and supports, (3) speech-language pathologists believe a digital solution could improve service efficiencies, the clinical utility of FOCUS-34 data, and the delivery of family centered services, and (4) suggested features for supporting clinical implementation of a digital FOCUS-34. Engaging clinicians early in the development process was important for ensuring a digital FOCUS-34 would be clinically meaningful and useful, which is expected to facilitate implementation and improve the collection, interpretation, and use of participation-focused data in practice.

Keywords

Focus on the Outcomes of Communication Under Six (FOCUS-34), outcome measurement, speech-language pathology, practice-based research, implementation, digital solution

Summary for Lay Audience

In Ontario, Canada, families can access freely available services from speech-language pathologists to support children's communication development through the Preschool Speech and Language Program. As part of this service, children's outcomes are monitored using a paper-based parent-report measure called the Focus on the Outcomes of Communication Under Six (FOCUS-34). This tool is well established, but recent research has identified barriers to speech-language pathologists using its data in practice, primarily because of its paper format. Speech-language pathologists have expressed the need for a digital version of the FOCUS-34 to improve its clinical utility. This study engaged speech-language pathologists from across Ontario in virtual focus groups to discuss their experiences using the current version of the FOCUS-34, the benefits of a digital solution, and to identify suggested features for a digital solution to maximize the clinical use of FOCUS-34 data. Speech and language pathologists felt the FOCUS-34 had potential and benefits; however, they found the collection and application of its data difficult due to the currently available formats and supports. Speech and language pathologists believed that a digital solution would significantly improve clinical efficiencies, family-centered services, and the clinical utility of FOCUS-34 data. Participants recommended features, layouts, and considerations to improve the clinical utility and implementation of a digital FOCUS-34, along with identifying potential implementation barriers. Clinicians were engaged early in the process of developing a digital version of the FOCUS-34 to ensure their needs would be met by the tool. Once implemented, a digital FOCUS-34 is expected to improve the collection and use of participation-focused data to inform services for children and families.

Co-Authorship Statement

This project was conceptualized with contributions from my supervisor, Dr. BJ Cunningham, and my advisory Committee: Drs. Danielle Glista, Janis Oram Cardy, and Vijay Parsa. The work presented in this thesis was carried out by me, Boshra Bahrami. Data were collected and co-analyzed by Boshra Bahrami and BJ Cunningham, with support from my fellow MSc candidate Sachin Kharbanda. Advisory committee members provided guidance and feedback on the design, analysis, and interpretation of the thesis. My supervisor, Dr. BJ Cunningham provided feedback on all chapters presented in this dissertation.

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Chapter 1: Introduction

1.1 Outcome measures

Outcome measures are evaluation tools that have been designed to track change over time (Rosenbaum, 2015). They are critical for the effective delivery of clinical services, can help with continuous care improvements, and represent the impact of a service on the health of patients (Rosenbaum, 2015). Speech-language pathologists (SLPs) are urged to employ outcome measures by their professional organizations all over the world (Mullen & Schooling, 2010). Data collected with outcome measures can be used to evaluate therapeutic effectiveness, inform quality improvement efforts, and support best practices (Kwok et al. 2021). Furthermore, data collected using valid and reliable outcome measures can be used to create evidence that can influence decisions about the type, length, and intensity of services that are offered by health systems (Kwok et al. 2021). Finding the best measure(s) to evaluate a phenomenon of interest can be a difficult task in clinical and research settings (Rosenbaum, 2015), and it is critical that tools have adequate measurement qualities to ensure data collected are valid and reliable (Kwok et al. 2021).

To document the impact of intervention, outcome measurements are required (Thomas-Stonell et al., 2013). Speech and language pathologists (SLPs) have traditionally been trained to work with children to address their speech and language impairments, and many measurement tools are available to support the assessment of impairments and outcomes related to impairments (Cunningham, Washington et al., 2017). Unfortunately, the majority of available measurement tools do not capture data related to children's functional (daily) communication skills, their ability to use their communication to participate, or their social inclusion (Cunningham, Washington et al., 2017).

1.2 Outcome measurement within the ICF framework

The World Health Organization's International Classification of Functioning, Disability, and Health (ICF) framework provides an integrated biopsychosocial approach to support thinking about outcome measurement in healthcare (World Health Organization (WHO), 2001). The ICF uses universal language to describe health issues and is divided into two sections: (a) Functioning and Disability, and (b) Contextual Factors (WHO, 2001). There are two components within Functioning and Disability (Body Functions and Structures, Activities and Participation), and two components within contextual factors (Environmental Factors, Personal Factors). Within the framework, a child's functioning and disability are considered as a dynamic interaction between health issues and contextual factors (WHO, 2001). Assessment across all components of the ICF framework is crucial for evaluating an individual's health state, but participation-focused outcome measures are scarce in pediatric speech-language pathology (Cunningham, Washington, et al., 2017). Validated measures of communicative participation are needed to support speech-language pathologists in evaluating the important functional impacts of their interventions (Neumann, et al., 2017).

1.3 The Focus on the Outcomes of Communication Under Six

The Focus on the Outcomes of Communication Under Six (FOCUS; Thomas-Stonell et al., 2010) is an outcome measure that was designed to capture change in communicative participation skills for preschool children during speech and language therapies (Thomas-Stonell et al., 2010). Knowledge users (i.e., clinicians and parents of preschoolers with speech and language difficulties) were involved in the development of the FOCUS to ensure it captured changes that were meaningful to them (Thomas-Stonell et al., 2010). The FOCUS has strong internal consistency, good reliability and validity (Thomas-Stonell et al., 2013; Thomas-Stonell et al., 2010), and provides criterion values for change in total score

that can be used by clinicians to determine whether individual children have made clinically meaningful gains in communicative participation during intervention (Thomas-Stonell et al., 2013). The tool also provides profile scores that can be used by clinicians to understand where changes in communicative participation happened (Washington et al., 2013). In 2019, a new version of the FOCUS tool was released in response to requests from SLPs for a more streamlined assessment tool (Oddson et al., 2019). The original FOCUS had 50 items, but the new version, called FOCUS-34, has only 34 items (Oddson et al., 2019). Despite the reduction in the number of items, the FOCUS-34 provides the same psychometric properties as the original FOCUS (Oddson et al., 2019). This means that SLPs can conduct assessments more efficiently without compromising the quality of their evaluations (Oddson et al., 2019).

1.4 Outcome measurement in the Ontario Preschool Speech and Language program

The Preschool Speech and Language (PSL) program is a publicly funded program in Ontario Canada that provides early assessment and intervention services for children who have a variety of communication difficulties from birth to six years of age (Kwok et al., 2022). Each year, more than 400 speech-language pathologists (SLPs) provide services to over 60,000 preschoolers at 29 regional sites (Kwok et al. 2022). Families can self-refer or be referred to the program by other service providers. Children and their caregivers typically attend an hour-long initial assessment appointment during which a SLP determines eligibility for treatment and those who are eligible are placed on a waiting list (Kwok et al. 2022). The duration of the waitlist varies and is determined by criteria including a child's age, type of communication impairment, and the availability and timing of intervention programs (Kwok et al. 2022).

In 2012, the PSL program launched a provincial program evaluation project for which all children 18-months of age and older were to be assessed using the FOCUS at six-month intervals so that

children's progress could be monitored (Cunningham & Oram Cardy, 2020). In 2019 the program began using the shortened FOCUS-34 for program evaluation purposes. Despite its good psychometric qualities and early implementation efforts, uptake and consistency of use of FOCUS in the PSL program has remained a challenge (Cunningham & Oram Cardy, 2020). Several studies have investigated the barriers associated with implementation of the FOCUS in the Ontario PSL program. In 2020, Kwok et al. conducted a concept mapping study to better understand the barriers to implementing the FOCUS and to identify methods to address or remove them (Kwok et al. 2020). This team interviewed 37 SLPs, with representatives from all PSL program regions and identified implementation barriers in three parts of the theoretical domains framework: environmental context, resources, and beliefs about consequences (Kwok et al., 2020). More specifically, SLPs reported difficulty completing the FOCUS due to organizational restrictions on the duration of assessment sessions and additional tasks they were required to complete during those sessions. They also reported that the FOCUS administration schedule (administration at six-month intervals) did not align with their practice, which was based on therapy and consolidation blocks. This schedule made it difficult for SLPs to interact with families to obtain FOCUS data. Furthermore, in order to use the data from the FOCUS clinically, SLPs and/or administrative staff had to calculate change and profile scores manually outside of the assessment appointment with the family, which made it impossible for SLPs to interpret and discuss results with families in real-time. (Cunningham, et al., 2018; Kwok et al., 2020). Because of these time, resource, and technological constraints, SLPs reported not using FOCUS change or profile scores in practice (Kwok et al., 2020). Kwok et al. emphasized the need for a digital solution that could facilitate the use of participation-focused outcome data in speech-language pathology practice (Kwok et al., 2020). More specifically, it was reported that a digital solution for the FOCUS was needed to provide SLPs with a more streamlined

and efficient way of incorporating participation-focused outcome data into their practice (Kwok et al., 2020). A digital solution for the FOCUS-34 would enable SLPs to quickly access FOCUS-34 change and profile scores so they could be used to inform goal setting and clinical decisions, as discussions with families (Kwok et al., 2020). Integrated knowledge translation (iKT) is one approach that can be used to support the successful integration of evidence-based tools like the FOCUS-34 into practice (Katharine et al., 2017).

1.5 Integrated Knowledge Translation and Clinical Tool Development

Integrated knowledge translation (iKT) promotes collaboration and shared decision making between researchers and knowledge users, and involves both researchers and knowledge users being engaged throughout the research process, from identifying the research problem through to disseminating the findings (Kothari et al., 2017). Within an iKT approach, researchers and users of knowledge collaborate to generate data and tools that are clinically meaningful, useful, and feasible (Kothari et al., 2017). Knowledge users (e.g., clinicians) have ideas about applied research questions and issues that are important to address and can contribute expertise about the practice context (Kothari et al., 2017). Researchers, on the other hand, bring methodological and content expertise to the table (Kothari et al., 2017). Collaborations between knowledge users and researchers can lead to stronger science, more meaningful and practical findings, and increased application of findings in practice and policy. (Kothari et al., 2017). One of the key objectives of iKT is to bridge the knowledge to clinical practice gap (Kothari et al., 2017), and an iKT approach has been used successfully in the past to support the implementation of new clinical evaluation tools and protocols in an Ontario health system similar to the PSL program (Cunningham et al., 2019). Involving clinicians early in the development of outcome measures and clinical protocols can help ensure results and recommendations are realistic and

relevant. Incorporating clinical expertise is also helpful for identifying practice barriers that must be overcome for new tools and protocols to be successfully implemented (Cunningham et al., 2019; Moodie et al., 2011; Olswang et al., 2015).

1.6 Study objectives

It was clear from previous research that a digital solution for the FOCUS-34 was needed in order to address the major barriers to its use in practice. This study aimed to better understand the current paper-based outcome measurement experiences and digital measurement needs of SLPs working in the PSL program so that findings could support the development of a meaningful digital FOCUS-34. In addition to ensuring a digital FOCUS-34 would be clinically useful, SLPs were engaged in this early stage of the development process to support the future clinical implementation of the digital FOCUS-34. Specific study objectives were to understand SLPs' experiences with outcome measurement using the currently available formats of the FOCUS-34, determine whether and how a digital solution could support the clinical utility of FOCUS-34 data, and identify the necessary features and formats of a digital solution that would support clinical use of the tool.

The Consolidated Criteria for Reporting Qualitative Research (COREQ) checklist was developed to ensure explicit and comprehensive reporting of the various components of qualitative studies that readers must understand to accurately interpret results (Tong et al., 2007). This checklist was used to ensure important aspects of the study were clearly reported (Tong et al., 2007). The checklist as it pertains to this study is presented in Appendix B.

1.7 Research questions

The specific research questions for this study were: (1) What are SLPs' experiences collecting and interpreting FOCUS-34 data using the existing formats of the tool? (2) How do SLPs feel a digital solution for the FOCUS-34 would improve its clinical utility? and (3) What features and formats do SLPs recommend for the digital FOCUS-34 to ensure it is clinically meaningful and easy to implement?

Chapter 2: Methods

2.1 Ethical approval

In Canada, the Tri-Council Policy Statement 2 (TCPS2) governs research ethics, stating that research must undergo ethical review. However, program evaluations and quality improvement studies are not subject to institutional Research Ethics Board oversight. The work completed for this thesis was part of a larger government program evaluation project, which was reviewed by the Western University Research Ethics Board. The board determined that the study did not qualify as research under the TCPS2 guidelines and was thus exempt from further institutional review.

2.2 Recruitment

On December 3, 2021, Dr. Cunningham attended a virtual meeting for PSL program coordinators and requested their assistance in recruiting participants for this study. Specifically, coordinators were asked to provide the research team with names and contact information for 1-2 speech-language pathologists (SLPs) from their respective regions who were willing to participate in a 1-hour focus group over a lunch hour. SLPs who volunteered were then scheduled by a research coordinator into one of five focus groups that ran between February 28 and March 10, 2022. Coordinators attempted to identify participants who were representative of geography (north, south, east, west; urban, rural), race, sex and gender, and population served (e.g., younger vs. older children, varied communication impairment types, varied functional communication levels), although it was recognized that ultimately the sample was likely to be one of convenience. SLPs who agreed to participate were contacted by a research coordinator to schedule their involvement in a virtual synchronous focus group with 4-5 other SLPs.

2.3 Participants

Twenty-three SLPs with experience completing the FOCUS-34 in Ontario's PSL program participated in this study. Inclusion criteria were that participants (1) were a speech-language pathologist in the PSL Program, (2) had completed formal or informal training for FOCUS-34 administration and scoring, (3) had completed multiple administrations of the FOCUS-34, and (4) were fluent in conversational English. This number of participants was expected to be enough to reach saturation of themes (Tran, et al., 2021, Morgan, 2018).

2.4 Materials

A focus group interview guide was developed to plot the course of the sessions from start to finish (Doody, et al., 2013). The interview guide was developed through a process that included a literature review to identify challenges related to use of FOCUS-34 in clinical practice and consultation with experts including researchers, program coordinators, and SLPs (see Appendix A). The interview guide included five broad questions, and each question had related probes that could be used to facilitate discussion if necessary.

2.5 Procedures

Before participating in their virtual focus group, SLPs completed an anonymous online survey to report demographic and diversity data (e.g., geography, race, years of experience administering the FOCUS-34). The survey was administered using REDCap, a system for secure online data collection (Harris, et al., 2019). A copy of the preliminary demographic survey is presented in Appendix C.

Focus groups took place between February and March 2022 and sessions lasted 60 minutes. Groups were conducted on Zoom and were moderated by the supervisor (BJ Cunningham) and co-moderated by the Masters trainee (Boshra Bahrami). BJ Cunningham, who identifies as female, is an

experienced Speech-Language Pathologist and was serving as an assistant professor within the faculty of Communication Sciences and Disorders at the University of Western Ontario at the time of the project. Boshra Bahrami, also identifying as female, is an internationally trained SLP and research Masters student who was also working as a speech therapy assistant during the project period. All online focus group sessions were recorded, with implied consent from all participants. The Zoom auto transcription feature was used to allow for the discussions that took place to be accurately documented. Transcripts were carefully reviewed by the Masters trainee to ensure accuracy and completeness, but were not returned to participants for comment or correction due to their busy clinical schedules.

Group sessions began with introductions, whereby the moderator and co-moderator introduced themselves and invited the SLP participants to do the same. This was followed by the moderator discussing the purpose, ground rules, and confidentiality for the session to facilitate a safe space for sharing. After the introductions, the five interview questions were asked to gauge how SLPs experienced the FOCUS-34 in its current format and to understand their needs and preferences for a digital solution. Probes were used to elicit responses to topics or issues that were not spontaneously addressed by and to make sure all perspectives were included (Doody, et al., 2013). At the end of the focus groups, the moderator asked an exit question to prompt participants to share any additional insights they felt were important that had not been discussed during the session. The moderator then thanked participants for their time and contributions (Doody, et al., 2013). Participants were sent a $30 gift card via email to purchase lunch for the meeting. Due to practical constraints and time limitations, a member check was not conducted as part of this study.

In approaching the focus groups, the researchers adopted a constructivist positionality (Coll & Chapman, 200), recognizing the importance of engaging with SLPs, and learning from their clinical

experience and expertise to inform the development of a meaningful digital solution. It is however possible that SLPs may have viewed the researchers as being aligned with the PSL program funder and their agenda or perspectives, as they requested and paid for this project. If SLPs had this perception, it could have influenced their comfort in sharing their experiences, insights, and needs during the focus groups. To address this potential concern, the researchers proactively outlined their role, positionality, and the motivation for the project at the start of each focus group. They also emphasized the confidentiality of the discussions and ensured that the participants understood the researchers' intention was to gather insights to move the development of a digital solution forward. By transparently addressing these issues, the researchers aimed to create a safe and open environment for the SLPs to share their experiences and perspectives without concerns about their insights being misused or misinterpreted.

2.6 Data Analysis

Quantitative demographic survey data were analyzed descriptively using frequency, mean, and range. All qualitative focus group data (transcripts) were first reviewed to ensure accuracy. Data were then analyzed using thematic analysis, which is a method for identifying, analyzing, and reporting patterns (themes) within qualitative data, and is the recommended method for analyzing focus group data (Braun & Clarke, 2006; Tran et al., 2021). The thematic analysis process involved identifying, analyzing, and reporting patterns/themes inductively within the data across six phases: (1) the researcher became familiar with the data through transcript review and notation of initial ideas; (2) data were systematically coded across the entire data set to generate initial codes; (3) the researcher searched for themes originating from the codes; (4) themes were reviewed; (5) themes were defined and named; and (6) the analytic narrative was set and the study was contextualized within the literature. The data

analysis process followed the guidelines outlined in Braun and Clarke's 2021 book, "Thematic Analysis: A Practical Guide". After reviewing each chapter, meetings were held with the research team (the Masters trainee (Boshra Bahrami), supervisor (BJ Cunningham), and a fellow MSc candidate Sachin Kharbanda) to discuss processes and develop a plan for completing that stage of the analysis. The Masters trainee served as the primary coder, but preliminary codes were reviewed by all team members to ensure they accurately captured participants' experiences and needs within the context of the PSL program. The Masters trainee also identified preliminary themes, which were reviewed and deliberated by the research team until consensus was reached to ensure accuracy. Various combinations of codes and themes were experimented with until a version that best captured the data emerged. This collaborative and iterative approach ensured a comprehensive and meaningful interpretation of the data. The endpoint was the reporting of themes, which were defined as 'abstract constructs identified before, during, and after analysis' (Braun & Clarke, 2021).

We utilized NVivo, a qualitative data analysis software, to code and analyze the data, which facilitated a systematic and organized approach to managing the large volume of qualitative data collected during the focus group sessions (NVivo, 2014). The first author and primary coder also maintained a reflexive journal throughout the entire research process to record personal thoughts, emotions, and potential biases that might influence data interpretation (Braun and Clarke, 2021).

Chapter 3: Results

3.1 Demographic Survey Results

3.1.1 Participant demographics.

Ninety-six percent participants were female (n=22), 4% were male (n=1), and most were between 30 and 49 years of age. Participants were 87% white (n=20), and 13% (n=3) identified as belonging to another race or chose not to answer the question. The majority (n=14, 61%) of participants had more than 10 years of experience as a practicing SLP, and the same number had more than 10 years of experience working in the PSL program. All participants held a Master's degree. See Table 1 for additional details.

Table 1.

Basic demographic data.

Variable		N	(%)
Gender	Female	22	96%
	Male	1	4%
Age		2	9%
18-29		15	65%
	30-49	4	17%
	50-64	2	9%
	No answer		
Ethnicity	White	20	87%
	Filipino	1	4%
	Other (Tamil)	1	4%
	No answer	1	4%
Highest Degree	Master’s degree	23	100%
Years practicing as a SLP	1-5 years	4	17%
	6-10 years	4	17%
	> 10 years	14	61%
	No answer	1	4%
Years in the PSL program	< 1 year	2	9%
	1-5 years	5	22%
	6-10 Years	2	9%
	> 10 years	14	61%

3.1.2 Participants' experience with the FOCUS-34.

All participants reported having received training to administer the FOCUS-34 via the FOCUS training webinars that are freely available online (https://canchild.ca/en/resources/307-focus-webinars), and 87% (*n*=20) reported having reviewed the FOCUS manual. When asked how frequently they completed the FOCUS-34 with families, most SLPs reported this was done weekly or monthly (*n*=16, 69%), and most noted that they always or often completed the FOCUS-34 according to the recommended 6-month interval (*n*=12, 52%). Most participants had more than six years' experience completing the FOCUS-34 (*n*=15, 65%), and most had completed it with more than 50 families (*n*=14, 61%). The most common communication impairments assessed and treated were language disorders (*n*=21, 91%), speech sound disorders (*n*=21, 91%) and fluency disorders (n=19, 83%). All participants reported using the FOCUS-34 with families of children who were between the ages for which the test was validated (i.e., 18 months to 5-years, 11-months), but participants also commonly reported using the FOCUS-34 with children who were under 18 months of age (*n*=20, 87%). Additional details about SLPs' training and experiences with the FOCUS-34 are presented in Table 2.

Table 2.

SLPs' training and experiences using the FOCUS-34.

Variable	N	%
Training received		
FOCUS webinars	23	100%
FOCUS manual	20	87%
Discussion with Colleagues	18	78%
Self-study	19	83%
Other	3	13%

Frequency of completing FOCUS-34 with families		
Daily	1	4%
Weekly	9	39%
Monthly	7	30%
Rarely	5	22%
Never	1	4%
Regular completion of the FOCUS-34 at/before the 6-month interval		
Always	1	4%
Often	11	48%
Occasionally	4	17%
Rarely	3	13%
Never	2	9%
No answer	2	9%
Years of experience completing the FOCUS-34		
< 1 year	2	9%
1-5 years	6	26%
6-10 years	11	48%
> 10 years	4	17%
Approximate number families SLPs had completed the FOCUS-34 with		
Less than 50	6	26%
50-100	8	35%
100-400	6	26%
No answer	3	13%
Types of communication impairments assessed and treated		
Language Delay/Disorder	21	91%
Speech Sound Delay/Disorder	21	91%
Fluency Disorder	19	83%
Voice Disorder	9	39%
Feeding and/or Swallowing Disorder	5	22%
Emergent Literacy Concerns	11	48%
Other	5	22%
Ages regularly served		
< 18 months	20	87%
18-30 months	23	100%
31-48 months	23	100%
49-60 months	13	57%
> 60 months	1	4%

3.1.3 Participants' technical experience.

Most participants owned multiple technological tools, with the most common being a laptop or desktop computer (n=22, 96%), and reporting having average to above average expertise using laptops, desktop computers, and a computer keyboard or mouse. Most also reported having average to above average levels of experience using mobile devices and video conferencing software (see Table 3).

Table 3.

Data regarding comfort using technology.

Variable	N	%
Types of technology owned by SLPs		
Tablet	14	61%
Smartphone	20	87%
Laptop or desktop computer	22	96%
IT support in workplace		
Available	22	96%
Not available	1	4%
Level of experience using a computer keyboard/mouse		
Average	11	48%
Above average	11	48%
n/a	1	4%
Level of experience using laptop/desktop computers		
Average	12	52%
Above average	11	48%
n/a	0	0%
Level of experience using mobile devices (smartphone/tablet)		
Average	17	74%
Above average	6	26%
n/a	0	0%
Level of experience using digital Applications (Apps) on mobile devices		
Beginner	1	4%
Average	16	70%
Above average	6	26%
Level of experience using videoconferencing technology		
Beginner	0	0%
Average	13	57%
Above average	10	43%

3.2 Qualitative Focus Group Results

Key qualitative findings included four major themes that described SLPs' current experiences with and future needs for outcome measurement. Each theme is described below.

3.2.1 Theme 1: SLPs viewed the FOCUS-34 as having potential and some benefits in its current formats

SLPs described their experiences administering the FOCUS-34 in its existing paper format. Experiences within this theme were categorized into four sub-themes.

3.2.1.1 Current measurement practices.

SLPs discussed their preferences for the format and administration of the FOCUS-34, specifically the strategies they used to facilitate administration in practice. They had differing perspectives on which of the currently available formats was most useful, with some preferring the fillable pdf form over the paper and pencil format, and others indicating a preference for the paper form as they felt it took less time for families to complete. However, most were frustrated by the FOCUS-34 and its administration.

"*Because the FOCUS frustrates me more than anything in the world*." (SLP 007)

Strategies used to ensure FOCUS-34 completion varied, with some SLPs describing a preference for completing the FOCUS-34 in person with families. These SLPs felt the FOCUS-34 could be completed more quickly and reliably in person, and that in-person completion improved response rates and made it easier to use the data.

"*Most of the time I do it in my session and I find that it's a lot faster*." (SLP 004)

Others asked families to complete the FOCUS-34 independently prior to their appointment to save time and/or allow the clinician time to review data.

"*Sometimes what I'm finding really easy is that if I give it ahead of time and if parents are able to return it back before that then I'm able to use and interpret the data*."

(SLP 019)

3.2.1.2 Ease of Administration.

Most SLPs reported finding the FOCUS-34 easy to administer, regardless of format (paper or fillable pdf) or modality (in person or remotely via Zoom).

"*I find it really easy to use because of the flexibility that's given to us. We can send it digitally or have parents complete a form during an in-person session*." (SLP 019)

Some SLPs had positive perceptions about whether families would complete the FOCUS-34, noting that getting FOCUS-34 data back from families was an easy task.

"*I do get a lot of FOCUS forms back. I've been successful in that regard*." (SLP 022)

However, others viewed data collection to be a real roadblock in the outcome measurement process, and reported it could be challenging to get families to complete and return FOCUS-34 forms.

"*I do think that there's a good 10 to 20% of our population that just will have an issue doing anything in that sort of way*." (SLP 005)

When questioned about their experiences with the FOCUS-34 in its present formats, some SLPs stated that they had no trouble interpreting the data.

"*It can be very easy to use and interpret*." (SLP 010)

That said, SLPs' abilities to see and use FOCUS-34 data varied by region, with some regions having more support to access data, and others having no access to data at all.

"*Well, it's fairly easy because we have an Excel spreadsheet that calculates all the scores, and let's say the coping/emotion score is a five-point whatever, our Excel spreadsheet already does that for us so it's fairly easy*." (SLP 002)

3.2.1.3 Facilitating Discussions with Families.

According to some SLPs, the FOCUS-34 profile and change score data were helpful for enabling discussions with families as they gave useful information about a child's progress.

"*I think that information is really helpful to inform a conversation with parents. When you do that initial assessment and perhaps something in the area of social communication comes up in the FOCUS, that really can help frame a conversation. Clinically it makes a difference to be able to make some recommendations to parents and I think even moving forward in clinical work just seeing changes in those categories*." (SLP 008)

Some also reported that information obtained using the FOCUS-34 (i.e., responses to individual FOCUS-34 items) gave them a better understanding of families' perspectives about their children's communication skills, and the ability to see things from a different point of view.

"*I think for me, it is looking at the FOCUS-34 to see the parents' perspectives for how they envision their child compared to what I see. So, does it change the clinical decision making? Not so much. But does it inform? Yes*." (SLP 023)

3.2.1.4 FOCUS-34 data can be helpful for practice.

FOCUS-34 data were reported to support a variety of clinical tasks, including identifying children's communication strengths and areas of need, increasing parental buy-in, facilitating decision-making, monitoring progress, and offering evidence for more informed practice. Additionally, some SLPs thought the FOCUS-34 could be useful for tracking children's development and understanding parents' perspectives.

"*I would say that one nice thing about using FOCUS-34 is that it's incorporated into some of our criteria for admitting children into different care paths.*" (SLP 001)

Moreover, FOCUS-34 elements were considered helpful in determining children's functional communication needs by some SLPs. According to these SLPs, the functional nature of FOCUS-34 items helped them stay focused on children's real-world communication skills.

"*What I do find easy is just using items to kind of get a sense of how that child is doing functionally. They do really appreciate getting that very functional sort of look at how their child is communicating*." (SLP 011)

Some SLPs thought the FOCUS-34 was clinically helpful for monitoring outcomes. They found it encouraging to know that the FOCUS-34 gathers meaningful data and they stated that they could discuss progress with parents using FOCUS-34 scores as evidence.

"*I would say, for me the overall score is a good indicator of clinical change. The scores of most sub-tests like receptive language, intelligibility, emotions and coping I think has less to do with us, but it's still important and interesting to see*." (SLP 002)

Some SLPs also believed FOCUS-34 data may be useful for programs wanting to demonstrate the benefits of parental involvement in intervention, specifically to show that parental involvement may improve children's functional outcomes.

"*That kind of information would help me clinically to be able to say we have a lot of data to show that parent involvement increases functional outcomes for their children."* (SLP 007)

A few SLPs remarked that certain regions had worked hard to achieve clinical buy-in. SLPs also mentioned their belief that FOCUS-34 scores could be helpful for parents who required buy-in.

3.2.2 Theme 2: FOCUS-34 Data are Difficult to Collect and Use because of The Currently Available Formats and Supports

This theme explored SLPs' perceptions about the collection and use of FOCUS-34 data using the currently available formats of the tool. Most SLPs believed at least some aspects of the current FOCUS-34 formats were problematic. SLPs' perceptions were categorized into eight sub-themes, which are described below.

3.2.2.1 Accessing FOCUS-34 Data.

Many participants identified issues associated with accessing FOCUS-34 data (total, change, and profile scores) that affected their ability to use it in practice, and most SLPs did not use FOCUS-34 data to inform their decision-making or in discussion with families. The ability to get scores in a timely way was another barrier preventing the clinical use of the data. In some regions, SLPs did eventually gain access to the data, but much later than would be required for it to be integrated into care.

"*I'd say that because you're getting it at our agency after the fact, I think people are not using them. I wouldn't be comparing scores because to find the previous score you've got to actually go in and search for it in the health records so that comparison is not happening*." (SLP 011)

Within this subtheme, SLPs raised additional accessibility issues, which are reported in more detail below. Although not every SLP had access to the FOCUS-34 Excel Spreadsheet, some felt it made data more accessible. However, occasionally data entered into Excel were not accessible or functional due to system errors. Therefore, even when SLPs had the Excel form, they still struggled to see change scores.

"*Personally, we don't get the change scores right now, so to go through it with the family it's not meaningful to them because I can't even see the scores*." (SLP 003)

Other accessibility challenges reported by SLPs were related to data entry and storage, and problems with the provincial data collection system. One challenge was that SLPs who were not responsible for entering their own data did not have access to FOCUS-34 data or the provincial data system. A second was challenges with the fillable PDF, including that data were not reliably saved, and some parents' technical skills prevented them from completing the form. SLPs also reported a lack of space to store FOCUS-34 data using the paper and fillable pdf formats. These accessibility issues made it difficult to compare FOCUS-34 scores at different assessment points.

"*At our center, we are submitting the FOCUS for entry into ISCIS currently. It's not in any way stored in our electronic records, so I would have to login to ISCIS (the provincial data entry system) and look at the previous values entered in order to do that comparison and that's a piece that I think is really missing*." (SLP 012)

SLPs also reported being hesitant to use the FOCUS-34 with very low-functioning (limited communication abilities) children because they believed results may not be meaningful and that families may be upset when providing many low ratings.

"*Sometimes I choose not to use the FOCUS with a family, because I guess I don't feel that it's going to be meaningful, based on the child's presentation. The FOCUS is linked to a minimum age, but I'm wondering if there should be a different criteria for when you start using the FOCUS*." (SLP 004)

Finally, there were concerns regarding accessing data when clients were transferred between SLPs. More specifically, SLPs stated that if a client switched clinicians, previously collected FOCUS-34 data were not accessible to the new clinician.

"*So, if I am the SLP who administers the first time and then the child is seen by a different SLP for their second or third or fourth FOCUS and then that SLP holds the Excel spreadsheet for only their administrations, not for mine, they can't track from mine to theirs so there's not a continuity of being able to look at data from beginning to end*." (SLP 007)

3.2.2.2 Administrative and Resource Challenges.

The excessive administrative work required to support data collection and entry was identified as a barrier to successful use of FOCUS-34 data in practice. Most SLPs indicated that they did not enter information into the provincial system themselves, but rather they submitted FOCUS-34 forms to administrative staff, who completed data entry. Because of this back-and-forth with the administrative team, SLPs reported having limited access to FOCUS-34 data. Other SLPs were required to enter FOCUS-34 data into the provincial system themselves, which meant double data entry if they had already entered the data into Excel to obtain scores. Furthermore, SLPs voiced concerns that different

regions had different administrative needs and resources, which in many cases were not sufficient to support the timely collection, entry, and use of data.

"*We have started using the Excel spreadsheet and usually it's the admin that would fill it out and then give it to me because the way we work in [region name], I'm actually in a branch office up in [town name] and my main office is in [city name]. So, I have to send all my data to [city name] for data entry into ISCIS (the provincial system). I don't personally have access to ISCIS, so they enter everything in ISCIS but before I send it off, I fill out that Excel spreadsheet*." (SLP 013)

The numerous administrative tasks SLPs were required to do to collect and submit FOCUS-34 data were also identified as a resource issue and a barrier to successful outcome measurement. For example, SLPs were required to send or share the FOCUS-34 form with families, check submitted forms for completeness and follow up if data were missing, and manually calculate change and profile scores. Currently, manual entry of scores into the Excel spreadsheet is required for SLPs to use the data, which was reportedly time-consuming. Due to SLPs' large caseloads, they were often unable to complete all these necessary administrative tasks, and many noted the need for greater administrative support.

"*At that point we don't have scheduling assistants sending it out, so it would be on the therapist make sure they remember to send it out, along with everything else we're doing. And then, to remind parents "Hey can you send it back again?" just becomes a little bit more of a barrier*." (SLP 001)

3.2.2.3 Challenges Associated with the COVID-19 Pandemic.

SLPs believed that the accuracy of outcome measurement data was significantly impacted by the pandemic, as some FOCUS-34 items were difficult for parents to rate.

"*I think it's also been challenging the last couple of years because a lot of the questions were challenging during COVID. Asking questions to parents on things that we were advised not to do was a little awkward, glossed over, laughed at because it was like the complete opposite to what we were being asked to do*." (SLP 004)

In addition to parents' difficulty responding to test items, SLPs indicated that gathering FOCUS-34 data virtually was more difficult than it had been in person, which meant the rate of return for FOCUS-34 forms was reduced. Similarly, SLPs found it simpler to review FOCUS-34 data in person prior to the COVID-19 pandemic.

3.2.2.4 Difficulty Getting FOCUS-34 Data from Families.

Getting parents to complete and return the FOCUS-34 was reportedly difficult with both the paper and fillable pdf formats of the tool. SLPs reported having to follow up with families repeatedly to get completed forms. Many SLPs were frustrated by this process, and some stopped trying to collect the data completely. There were however some SLPs who reported fewer difficulties obtaining FOCUS-34 data, particularly when families completed the form together with their SLP.

"*We are allowed to send ours out, but I find that we don't always get them back even with multiple attempts to get them back*." (SLP 016)

3.2.2.5 Continuity of Care.

Participants identified multiple issues related to care continuity that impacted their ability to use FOCUS-34 data clinically. One issue was related to the six-month assessment interval, which SLPs noted was not aligned with clinically meaningful time points, making it difficult to interpret change, and hard to give families timely feedback.

"*Okay, so I think it has to be timely, like, I know that it's every six months, and as much as we want to make that happen with our appointments that doesn't happen so one of my concerns is I might have just seen a child, but they're due for a FOCUS in two weeks, and then I can't talk to them about that FOCUS for another six months because I'll be honest my schedule is booked for months and months in advance and vacations hard to take.*" (SLP 006)

Another continuity issue related to parents' varying levels of knowledge when completing the FOCUS-34. For example, SLPs felt parents completed the FOCUS-34 differently when it was done with a SLP as compared to when it was completed independently. SLPs also felt the FOCUS-34 was completed differently after parents had received some service and education as compared to how it was completed at the initial assessment. These potential differences in the way in which the FOCUS-34 was completed made it difficult for SLPs to interpret data in some cases.

"*Especially for our younger kids' parents, a lot of clinicians are finding that the scores are actually worse on the second administration. It shows that your parent education is really working because the parents are now more aware of their child's skills, but when you look at our treatment, it looks like our treatment is not effective because children are not improving, they're actually getting worse*." (SLP 015)

3.2.2.6 Difficulty Interpreting FOCUS-34 Items.

SLPs believed some families struggled to complete the FOCUS-34 for reasons including language level, the broad focus of test items, and the perception that items may feel repetitive.

"*I still sometimes find that the language level is too high. I still think that's a barrier, so everybody doesn't understand*." (SLP 004)

3.2.2.7 SLPs Need Help Applying FOCUS-34 Data in Practice.

The vast majority of participants said they needed help to be able to integrate and apply FOCUS-34 data in their clinical practice. Help was needed in two main areas. First, SLPs reported lacking buy-in for using the FOCUS-34 as a measurement tool, with some questioning things like the validity of scores, the belief that data were either only useful for the Ministry or not even used by the Ministry, and a lack of clarity about the benefits for both families and clinicians. This lack of buy-in resulted in some stopping using the tool completely.

"*Truthfully I'm not using it at all right now*." (SLP 016)

Second, SLPs reported challenges with integrating thinking about and application of participation-focused measurement data into their practice. Some specifically described difficulties shifting their thinking away from a focus on children's impairments and normative data, and others noted specific challenges with knowing how to apply scores in a clinically meaningful way (e.g., to inform goal setting or decision-making).

"*I will see that score, but to interpret the score and the progression of the score I don't necessarily do, and so I do see progression, but to interpret and really make use of it, I don't*." (SLP 022)

3.2.2.8 Time Barriers.

Time constraints associated with using the FOCUS-34 in its current formats was the last subtheme associated with data being difficult to use. The FOCUS-34 was reported to be time-consuming, and clinicians, therefore, viewed it as inefficient. More specifically, clinicians reported time barriers associated with administering the FOCUS-34 and obtaining, interpreting, and disseminating its scores. Barriers associated with administration were related to the time required during an assessment

appointment. Barriers associated with scoring were related to the requirement for SLPs to input data into Excel in order to see change and profile scores, and difficulties obtaining previous scores from the provincial database or the electronic health record. These barriers meant most SLPs did not communicate results to families or use data to inform their practice. Those that did obtain scores, were only able to communicate them to families after a significant time delay.

"*I don't take the time, it's just too much. I don't have time to do the Excel on top of something else*." (SLP 004)

"*It's actually easy for me to flip to the previous FOCUS because it's in the file that's in front of me, but it's still very time-consuming. I don't know if you guys remember the paper, but you gotta go back and find it*." (SLP 013)

3.2.3 Theme 3: SLPs Believe a Digital Solution Could Improve Service Efficiencies, Clinical Utility of the FOCUS-34, and the Delivery of Family-Centered Services

A major theme was centered on SLPs' beliefs that a digital solution could significantly improve multiple areas of practice. More specifically, participants believed a digital solution would improve clinical efficiencies by saving time and resources, increase the clinical utility of FOCUS-34 data, and facilitate discussion with families to make services more family-centered.

3.2.3.1 Further Facilitating Conversations with Families.

SLPs believed a digital solution would result in more detailed discussions with families about their child's communication development, as immediate access to scores would allow them to share information about children's strengths and areas of need. SLPs believed these types of discussions would make services more family-centered, and that they could be further facilitated by having access to FOCUS-34 data in real-time, while the family was with them.

"*I would bring it up more to the family. Right now, it's just a score that's kind of being used for me to prepare and give me a general idea of how this child is presenting, but I think if I had more information and more results to interpret, then I would bring the results more for the family and show them that you know this tool is useful. And look at your child's progression and in what domains, so I think if yeah it would be a more family-oriented tool*." (SLP 022)

3.2.3.2 Saving Time and Resources.

Participants also believed a digital solution would improve service efficiencies, and save time (e.g., less time to receive scores) and resources (e.g., remove the need for the SLP to enter or search for data, personnel not required for data entry).

"*One of my thoughts about the benefit of a digital format is that it could save us some time in terms of entering the data. I mean off the top of my head, it could be entered into this format, and it would automatically go into ISCIS [the provincial data entry system] so that we're not doing that*." (SLP 012)

3.2.3.3 Increase Clinical Utility of Data.

Participants believed a digital tool could improve the clinical utility of FOCUS-34 data by facilitating participation-focused measurement and goal setting. SLPs also believed a digital solution could improve their ability to collect and interpret data in multiple languages and result in more data for the program.

"*Can somebody please make this version online where we can easily send it to families and then they can send it back, because it will take one thing off of our plate, and I can sincerely say that the use of the FOCUS will increase exponentially if this was done*." (SLP 009)

3.2.3.4 Increased Buy-in For Families and SLPs.

SLPs believed that a digital solution could be conveniently completed both at home and during in-person sessions and that it would increase both parental and SLP buy-in.

"*I think if we had that for the SLPs, at least that it might draw some more in*." (SLP 014)

3.2.4 Theme 4: SLPs' Suggested Considerations, Features, and Layouts for Improving Utility and Implementation of a Digital FOCUS-34

The final theme delves into the participants' suggestions for the features, formats, and layouts required to maximize the clinical utility of a digital solution. Along with recommendations, SLPs identified some potential implementation barriers to a digital solution to consider during development. Participants' specific recommendations and cautions are presented below within six sub-themes.

3.2.4.1 Accessibility for Families and Centers.

Participants stressed that the digital solution must include the ability for remote data collection, but also noted that an alternate solution would be needed for those who were unable to access the solution virtually. Multiple features were identified as necessary for ensuring a digital FOCUS-34 was accessible for families and the centers. SLPs recommended providing the digital FOCUS-34 in multiple languages and including features like page translators to support completion by families whose first language is not English. Other recommendations to support accessibility for individuals with disabilities included read-aloud, text-to-speech, and larger font options for users with low literacy levels or visual impairments. Some SLPs also suggested that FOCUS-34 items be presented one at a time for better readability.

"*Read aloud so that people can have that access if they don't speak English as a first language or can't read*." (SLP 007)

Technology costs for both centers and families were identified as another potential accessibility issue. For example, centers may be required to purchase new technology to support use of the digital solution in-house. Similarly, families may not have the technology necessary to participate (e.g., not owning a cell phone, tablet, or desktop computer). SLPs worried families that only had access to a cell phone may struggle to access a digital measure.

"*Yeah, low-income families, you know what, maybe they can't afford Internet or data*." (SLP 010)

Similarly, storage could pose an accessibility challenge for those using cell phones. While most SLPs believed families would have the technological skills to use a digital solution, some felt families may need training.

"*I get back about 30% of the FOCUS forms blank and they're like I did it there you go. So, I think that just that technological capacity that a family has*." (SLP 021)

A final accessibility challenge was Internet access, which was a concern for families in remote and northern communities and those with lower incomes, although SLPs believed access to Wi-Fi would not be an issue for most families.

"*I was just gonna say like the Internet in general and access to the Internet in northern communities is so limited. I am in a mid-sized city, but you go half an hour away, and they have no Internet whatsoever*." (SLP 014)

3.2.4.2 Consider Formats and Family Preferences.

SLPs advised considering format and family preferences when developing the digital solution. Some believed that an application (App) would be preferred if it could immediately provide data in the

clinic. Others believed an App would add extra steps to the data collection process and that SLPs and parents may be reluctant to use it. They also noted that some Apps may not be compatible with all devices, browsers and operating systems, and stressed the importance of ensuring an App would function well regardless of a user's technology.

"*Whatever it is it has to work on every browser, it has to work on cell phones, it has to work on laptops, it has to work on iPads, because I think as soon as a family clicks on something and it doesn't load, we're going to see plummeting return rates*." (SLP 021)

While SLPs recommended considering family preferences, many noted their preference for the digital solution to be a web-link over an application. SLPs believed a weblink was the most flexible option and might lead to better engagement and response rates. More specifically, SLPs believed families would like a weblink because it would be free of charge, would not require them to download anything, and may be simpler for families not comfortable with technology. SLPs also believed it was important to have an option for families to complete the FOCUS-34 without an Internet connection (e.g., complete on an iPad and upload the results later).

"*I think the link would also be probably the most flexible and versatile option. You can use different Internet browsers to open it and different devices, you know it doesn't matter if you have an Apple or not. Compared to an App, which would be that extra step of downloading and adding another App on your phone. I feel like participation might be a lot better with the link as well*." (SLP 013)

SLPs also touched on the importance of having multiple options and formats (e.g., Link, App, paper format) to support completion by the many different families they served. For instance, they believed it was crucial to keep the paper format for certain circumstances (e.g., when grandparents are

completing the FOCUS-34). Similarly, participants recommended offering an in-house option for the digital solution, such as having it available on an iPad in the clinic so that parents could complete it in person. SLPs believed this would encourage more families to complete the FOCUS-34 and that it could help families without access to technology. However, other SLPs believed that an in-house tablet-based solution may be challenging for parents to use because it could be distracting for children.

"*Or on an iPad or laptop that we can have the parents use to complete [the FOCUS] and then it will input those results immediately for us to kind of review with families*." (SLP 017)

3.2.4.3 Ensure Accessible Data and Storage.

Data storage concerns were cited by SLPs as a potential obstacle to adopting a digital FOCUS-34, and they recommended that the digital solution include a data bank that could hold all previously entered data, including previously entered demographic data. SLPs believed that having a common place to access previous FOCUS-34 scores would allow them to better track children's progress and share evidence of development with families. They also believed a feature that would allow for data syncing to the provincial database would be beneficial. Some suggested that the digital solution could be linked directly to the provincial database and children's unique anonymized identification numbers.

Having a way for FOCUS-34 data to be sent directly between the family and their SLP was another feature recommended by SLPs as they believed it was crucial for the data to go directly to the people who needed to see it. SLPs also requested that they be able to access and sort client data within the digital solution. Some SLPs have raised concerns about privacy and confidentiality, and some suggested Internet connectivity may be a challenge for rapid data sharing, even in large cities.

"*The problem is they're not able to send us stuff back, so it's really about that whole idea of how to send and how to receive. Is it going to be on iPads? If it is, it's going to be a cost but then where do the iPads go? Do they go somewhere? Do they come to us? Do we have to print it?*" (SLP 009)

3.2.4.4 Reduce Administrative Tasks.

For a digital solution to be successful, SLPs argued that it must help by reducing their numerous administrative responsibilities related to outcome measurement (e.g., multiple stages of data entry), and grant them timely access to FOCUS-34 scores. One additional suggestion was for SLPs to have administrative support to distribute the FOCUS-34, and for administrative staff to help parents to complete their first FOCUS-34 form.

"*Some way that it would potentially reduce the load of admin work, but still allow us to review it in an accessible format."* (SLP 003)

3.2.4.5 Suggested Features to Support Clinical Use of Data.

Participants identified five clear ways in which a digital FOCUS-34 could improve the clinical use of data including by reporting change scores, flagging clinically meaningful change, supporting goal setting, improving data accuracy and completeness, and ensuring immediate access to data.

3.2.4.5.1 Reporting Change Scores.

SLPs wanted to see changes in total and profile scores over time. They believed the ability to see this information would make FOCUS-34 data more clinically relevant for them, and that it would be beneficial to parents who would be able to see how much progress their child had made over time. SLPs also noted that having access to profile scores may improve families' capacity for observation and accurate reporting.

"I think it's very valuable the way that it is organized and provides those specific areas, you know as are we seeing a change in receptive language skills over time. Or if we provided intervention, I can show that it was efficacious because of their score change from this to this in this period of time. Also the reverse, you know, this is the intervention that I've been recommending and we're not seeing the changes, I think we have to look at it." (SLP 004)

3.2.4.5.2 Flagging Clinically Meaningful Change.

SLPs believed it was important for the digital solution to automatically flag clinically meaningful change. Other suggestions included flagging items with lower ratings to identify relative strengths and needs to better inform discussion and goal setting. It was however noted that age should be considered if features were included because younger children may not be expected to be rated highly on all items.

"*Having it flag significant changes in scores would be very helpful so that we can find out what was contributing to that change*." (SLP 012)

3.2.4.5.3 Goal Recommendations.

Participants believed SLPs could use FOCUS-34 data to support goal setting, and that they would benefit from goal recommendations based on FOCUS-34 data. They also believed that the digital solution should provide support for SLPs to interpret FOCUS-34 scores, and some wanted to use results to support goal setting within the "F-words" framework (Rosenbaum & Gorter, 2012). The six F-words in Child Development created at CanChild, link six key functional outcomes to the ICF framework to help clinicians consider the child in the context of their everyday lives. The six outcomes include function (what people do), family (children's fundamental 'environment'), fitness (children's preferred physical/recreational activities), fun (activities children enjoy engaging in), friends (peer relationships), and future (parents' and children's expectations and dreams for the future) (Rosenbaum, & Gorter, 2012).

3.2.4.5.4 Data Accuracy and Completeness.

SLPs believed data accuracy and completeness could be supported by incorporating specific features into the digital FOCUS-34. They recommended giving parents an optional context-setting video or audio prompt or incorporating a written paragraph to support parents' understanding of the purpose and importance of the FOCUS-34 before they completed it, which they believed may improve rates of data submission, completeness, and reliability. SLPs also suggested that descriptions or examples of FOCUS-34 items could support the reliability of parents' ratings. Additionally, SLPs suggested that the digital solution could restrict parents to one rating per item to avoid data entry errors and that it may be helpful to include a section for parents to enter comments to contextualize their ratings.

"*I also wonder if it might be useful to have a video at the beginning that's just an introduction that kind of talks about communication versus speech and language. Obviously not very long, but just a good video just because it's more engaging or a voice, maybe like just an audio that explains it*." (SLP 011)

3.2.4.5.5 Immediate Access to Data.

SLPs stressed that the digital solution must automatically and immediately score the FOCUS-34 and report results to them. To interpret and share results with families, SLPs also required a report on change from a child's previous scores. Most SLPs clearly stated that they believed parents should not receive their child's results without their SLP present, as they believed it was important to contextualize scores for families, and showing families FOCUS-34 scores without support could negatively impact parents' interpretations. SLPs wanted to decide whether and when to share results with a family, and this feeling was particularly strong for parents of lower-functioning children. While most agreed they wanted to determine whether and when parents received their child's results, some believed parents would want to/deserved to see their child's results regardless of how high or low a score was.

"*We have had the FOCUS bring some families to tears in our waiting room in the past, you know the kids who are very low. And it's so different for each family, but maybe having them not see it, so that the therapist has a choice of how they want to share that information, because the truth is, some of these kids are not going to change. It's a small group but you know, no matter how much effort their parents put in and how well they show up, they just don't change enough to see change on the FOCUS. I think giving the clinician the ability to share that information with how they think the family could best receive it would be the best option*." (SLP 018)

3.2.4.6 Suggested Features to Improve Usability.

Four key features were suggested to improve usability of a digital FOCUS-34 including the ability to generate summary reports, visual displays to support interpretation of data, reminders for families, and training for SLPs to support data interpretation.

3.2.4.6.1 Summary Report.

SLPs recommended that the digital solution offer an immediate summary report that could be downloaded, printed, and/or stored in the child's file. They believed this type of report would eliminate the need for the Excel spreadsheet.

"*I guess my first thought would be that I would hope or expect that when it's entered that the therapist would be provided with a summary*." (SLP 018)

3.2.4.6.2 Visual Display.

SLPs believed integrated visual displays would help clinicians and families in several ways. One was that visual displays could help SLPs easily make comparisons between assessment points to support clinical reporting and decisions. Another was that visuals could be used to facilitate conversations with families, which SLPs believed would increase parental buy-in for outcome measurement. They also

believed visual data may be easier for some parents to understand than numeric scores, but recommended including a written description to support interpretation for families. Although SLPs believed visuals were preferred, they recommended offering multiple display options (e.g., numbers, graphs) to address families' differing preferences.

"*I'm a visual learner so I like my little bar graphs but maybe a different learner would prefer looking at numbers as well, so it doesn't really kill to put the numbers as well as the bar graph*." (SLP 009)

3.2.4.6.3 Reminder Systems.

Participants felt it was important to include a reminder system for both families and SLPs. They believed a reminder system should prompt families to complete the FOCUS-34 at relevant clinical intervals, and that a reminder system could also ensure families rated all FOCUS-34 items once they opened a digital FOCUS-34 form. SLPs also requested a notification of results once a family had completed the digital FOCUS-34.

"*Even if they're doing it at home, it could have some sort of reminder system so that, if they don't do it, you know within 24 hours, it reminds them. And it reminds them again in a week so that they're given those reminders to complete it, and the therapists don't have to do that as additional work."* (SLP 001)

3.2.4.6.4 Training to Support Data Interpretation.

SLPs believed they needed additional training on participation outcomes and participation-focused goal setting using FOCUS-34 data. They felt FOCUS-34 training sessions could facilitate their ability to set meaningful goals and apply FOCUS-34 data in practice.

"*If we had lunch and learn sessions, with some case examples on how we could interpret data and set goals with families that might be neat for clinicians across the province. It could be like an individual study or individual workshop we could go to*." (SLP 017)

3.3 Requirements Document

In addition to being reported as qualitative study results, data were used to create a brief requirements document that could serve as a manual for developing a digital FOCUS-34 (see Appendix D). The requirements document includes the preferred formats and functions for a digital FOCUS-34 identified by SLPs, and will help guide researchers leading the development of the digital solution (Kapur & Pecht, 2014). The document also presents the rationale for each suggested feature.

Chapter 4: Discussion

This research aimed to understand the outcome measurement experiences and needs of SLPs working in a large publicly funded preschool speech-language pathology program through virtual focus groups. Four themes were identified during data analysis. The first two themes identified the successes and challenges of using the FOCUS-34 in its current formats. The second two explored SLPs' thoughts on how a digital FOCUS-34 could improve the tools' clinical utility and their suggested features for ensuring a digital FOCUS-34 could be successfully implemented. Results are discussed below.

4.1 SLPs' Experiences with the Current FOCUS-34 Formats: Successes and Challenges

One reported benefit of the FOCUS-34 in its current formats was the ability to use responses to specific items to facilitate discussions with families. SLPs in our study believed that the FOCUS-34 could be useful for gaining a better understanding of families' perspectives on their children's communication skills, and in some cases, discussing children's progress with families. This finding is consistent with an earlier study by Kwok et al. (2022) in which SLPs reported the FOCUS-34 to be helpful for involving parents in therapy and emphasizing the importance of family involvement in therapy. SLPs in our study also stated that FOCUS-34 data were useful for supporting various clinical tasks, such as identifying a child's strengths and areas of need, decision-making about goals, monitoring progress, and providing evidence to inform practice. The notion that the FOCUS-34 could be useful for monitoring progress in an evidence-informed way is supported by the validation study by Thomas-Stonell et al. (2013) which showed that the FOCUS-34 had strong construct validity and accurately reflected changes in preschoolers' communicative participation skills.

Despite the above-mentioned benefits, SLPs identified many barriers to using the FOCUS-34 in its existing formats. Generally, SLPs identified more challenges than benefits. Many SLPs reported

challenges associated with getting access to FOCUS-34 data (e.g., change and profile scores), and noted that problems with access significantly hampered their ability to apply the data clinically. Even those that were able to retrieve data could not do it in a timely manner, which prevented them from both using data to inform services and sharing results with families. This result is consistent with findings reported in a concept mapping study conducted by Kwok et al. in 2020 that explored barriers to the clinical implementation of the FOCUS-34 and identified the lack of timely access to data as a major barrier to its clinical application (Kwok et al., 2020). Like participants in Kwok et al. 's study (2020), SLPs in the current study reported confusion about the currently required six-month assessment interval for the FOCUS-34. Specifically, that it was not aligned with clinically meaningful time points, which made it difficult to interpret change and provide timely feedback to families (Kwok et al., 2020). The numerous administrative tasks SLPs had to complete in order to collect, submit, and obtain FOCUS-34 data were also identified as a resource issue and another barrier to the clinical use of data. Similar findings have been reported in other studies, which note that multiple personnel and a significant amount of clinical time is required for SLPs to gain access to FOCUS-34 change and profile scores, making it almost impossible for SLPs to interpret scores and discuss results with families in real-time (Cunningham, et al., 2018; Kwok et al., 2020).

4.2 Benefits of a Digital Health Innovation

When asked about their views of and suggestions for a digital solution for the FOCUS-34, SLPs emphasized the impact a digital solution could have on their practice and recommended specific features that would support their use of FOCUS-34 data. In terms of the impact on practice, SLPs believed a digital solution would facilitate interactions with families, save time and money, enhance their use of FOCUS-34 data, and increase clinicians' buy-in for outcome measurement. This result is similar to

reports from PSL program SLPs who identified the lack of timely access to change and profile scores as a significant implementation barrier, that if addressed, would improve the clinical utility of the FOCUS-34 (Kwok et al., 2022). Results are also consistent with those of a study that explored barriers to implementing outcome measures in healthcare more broadly, which identified the time required to complete measures as a significant implementation barrier (Dunckley et al., 2005).

A digital solution that provides SLPs with timely access to FOCUS-34 scores would improve the use of measurement data clinically, but could also be helpful for supporting the delivery of more family-centred services. In fact, SLPs in the current study believed that having timely access to FOCUS-34 scores would enable them to involve families in the care process more effectively. In speech and language pathology, family-centered services that include families as experts and key decision makers in all aspects of care are a recommended best practice (Espe-Sherwindt & Serrano, 2016; Woods et al., 2011). According to a review of existing research on family-centered care, parents place great importance on timely, accurate, and comprehensive information sharing, which was reported to support their involvement in decision-making related to their children's care (Hill et al., 2018). Consistent with the literature, SLPs in our study stressed immediate access to FOCUS-34 data as being particularly important for supporting the timely sharing of results with families. They also reported the potential for greater buy-in for both SLPs and families because it would enhance the therapeutic value of FOCUS-34 data by enabling participation-focused measurement and goal setting.

Digital Health Interventions are increasingly being integrated into clinical care, community-based primary care, and hospital settings due to their potential to improve access to services, impact health outcomes, ensure cost-effectiveness and scalability of programs, and address feasibility issues associated with the COVID-19 pandemic (Greenhalgh et al., 2020). Existing Digital Health

Interventions reported in the literature include social networks, wearables, internet- and web-based patient portals, cellphones, apps, electronic health records, decision support systems, and other innovative solutions that offer great potential for improving health (Murray et al., 2016). Thus, effective, affordable, safe, and scalable interventions to improve health and health outcomes appear possible with Digital Health Interventions (Murray et al., 2016). Both face-to-face and remote clinical care models may benefit from integrating Digital Health Interventions to support data collection and analysis, monitoring of clinical progress, clinical decision making, and providing alerts regarding changes to a person's health status (Merolli et al., 2021).

Digital health measures offer several advantages over traditional outcome measurement tools, such as being cost-effective, objective, and time saving (Cohen & Mathews, 2018). Additionally, they can address issues like the need for dedicated data collection teams that consume resources, the difficulty in reliably tracking outcomes over long periods of time, and the limited ability to collect data frequently and in real-world settings (Cohen & Mathews, 2018). SLPs in our study agreed with the benefits presented by Cohen and Matthews (2018), and believed a digital FOCUS-34 could be easily completed both in person and remotely, but noted that remote completion could allow for added flexibility for parents to complete the assessment at a convenient time. Moreover, they believed that if it had the ability to track progress over time, a digital FOCUS-34 could also improve health outcomes. Tracking progress over time could allow clinicians and families to quickly identify changes in children's communication strengths and needs, and make adjustments to their treatment plans as needed, leading to more individualized and effective interventions (Nabi et al., 2015). Our participants also reported that a digital solution would be more versatile, enhance their capacity to gather and analyze data in many languages and enable them to gather more information for the program.

Electronic health record systems are thought to increase the safety, effectiveness, and general quality of healthcare by enhancing care coordination, reducing medical errors, saving time and money, and enhancing the collection of high-quality data to support clinical research and healthcare decisions (Kabukye et al., 2020). SLPs in our study expressed a desire for a digital version of the FOCUS-34 to be linked to the Integrated System for Clinical Information Sharing (ISCIS), which is the electronic health record used in the Ontario PSL program. SLPs believed that an automatic linkage could save time and resources, and improve the accuracy and quality of data. By integrating FOCUS-34 data into the electronic health record automatically, SLPs could also have easier access to patient data to help them make more informed clinical decisions.

4.3 Suggested Features for Digital Outcome Measurement Tools

Our participants emphasized the importance of making a digital FOCUS-34 accessible (e.g., by offering multiple formats, accessibility supports, and the option to complete in multiple languages), and identified various ways in which a digital FOCUS-34 could improve the clinical use of data (e.g., immediate reporting of change and profile scores, providing goal recommendations). Existing literature supports the idea that digital measures can improve the clinical use of data in speech-language pathology. For example, Eadie, Yorkston, and Klasner (2014) found that a digital tool that tracked patient progress and provided goal setting support, improved patients' quality of care and outcomes. Similarly, a systematic review by Law et al. (2018) reported that digital tools could improve the accuracy and efficiency of data collection, which in turn could improve clinical decision making.

The generation of summary reports, visual displays, and reminders for families were a few crucial features that SLPs recommended to ensure a digital FOCUS-34 would be useful in practice. SLPs requested an instant summary report to replace the requirement for them to enter data into the

Excel spreadsheet manually. To accommodate families' various needs, SLPs also suggested providing a variety of display options (such as numbers and graphs). Participants said it was crucial to have a reminder system to notify both families and themselves when the FOCUS-34 was to be completed. The suggestion to provide a variety of display options, such as numbers and graphs, aligns with the literature on the benefits of using visual aids in healthcare. Visual aids have been found to enhance clients' understanding of information and facilitate communication between healthcare providers and families (Houts et al., 2006). Similarly, the suggestion to provide summary reports aligns with guidelines proposed by Shitkova et al. (2015) for designing digital applications that are user-friendly. These guidelines highlight the importance of incorporating reminder systems into digital tools, which can help users keep track of important information and tasks (Shitkova et al., 2015).

Surprisingly, SLPs in our study explicitly stated that they thought parents should not receive their child's FOCUS-34 results without their SLP present as they believed this could negatively impact families. Furthermore, SLPs preferred to have the option of choosing whether to communicate FOCUS-34 results with families at all. These recommendations were due to a variety of factors that SLPs believed may impact how families might interpret the scores, including the child's communicative level and the family's readiness to receive the information. This finding is supported by previous literature. For example, Neumann et al. (2017), reported that parents of children with speech and language difficulties had varying levels of readiness to receive and interpret assessment results. Similarly, Toppelberg and Shapiro (2000) reported that parents of children with communication disorders often experienced anxiety and negative emotions when receiving test results. This literature, combined with recommendations from SLPs in the current study, highlights the importance of providing families with appropriate supports when communicating assessment results. It is also crucial to note the importance of

seeking input from families regarding whether and how they would like to receive their children's assessment scores, as they may have unique preferences and recommendations.

4.4 Reflections on the selected methodology

The use of focus group methodology has become increasingly popular in health research, particularly in qualitative studies aimed at understanding people's beliefs and experiences (Rabiee, 2004). Focus group methodology was selected for this project because it allows for the collection of rich qualitative data by engaging participants in a group discussion (Rabiee, 2004). Through participatory planning and evaluation, focus groups can also inform care management and strategy (Rabiee, 2004). Our virtual focus groups engaged SLPs who were primary users of the FOCUS-34 in Ontario's PSL program. Using focus group methodology enabled a comprehensive exploration of SLPs' attitudes, opinions, and perceptions, and helped identify common themes and issues. This approach provided a nuanced and holistic understanding of the topic at hand. Additionally, involving knowledge users, such as SLPs, in the development of outcome measurement tools can ensure their feasibility and meaningfulness (Cunningham et al., 2019; Moodie et al., 2011).

It is important to acknowledge that this study engaged only one end user group (SLPs who administer the FOCUS-34 and require its data for use in practice), without considering the experiences and needs of the caregivers who are asked to complete the tool. The perspective of caregivers will be collected as part of a separate study. While we chose to engage one end user group at a time, it should be noted that another approach would have been to involve SLPs and caregivers in mixed focus groups in an attempt to integrate all end users' perspectives and needs. The decision to engage only SLPs in this study was made based on practical considerations and concerns surrounding power dynamics. In mixed groups, professionals like SLPs may unintentionally dominate the conversation due to their perceived

authority and expertise (Arnold et al., 2022). This dynamic could potentially hinder caregivers from expressing their opinions freely and impact open dialogue (Arnold et al., 2022). However, it is important to acknowledge that the decision to limit this study to SLPs may have resulted in missed opportunities for direct interaction and dialogue between these two important end-user groups. It is possible that mixed focus groups could have facilitated a deeper exploration of contrasting or contradictory opinions and fostered a more holistic understanding of all end-users' perspectives.

4.5 Study Limitations

This study did include some limitations that should be considered when interpreting the results. The first was related to our use of virtual focus groups. This methodology was selected to allow us to encourage discussion among participants from various backgrounds and geographies, but it should be noted that some participants may have felt uncomfortable talking and exchanging ideas in a group context (Stewart & Shamdasani, 2014). It is therefore possible results would have differed if SLPs were interviewed individually or surveyed anonymously. Similarly, group dynamics can impact focus groups as some participants can be more vocal than others, leading to an uneven distribution of opinions (Stewart & Shamdasani, 2014). We tried to address this limitation by using a semi-structured interview guide and deliberately providing every participant with the opportunity to give input on each question. We believe this helped mitigate at least some of the bias that can arise from a more open-ended discussion and ensured that all participants' perspectives were represented in the data (Creswell, 2014).

A second limitation was the use of convenience sampling to recruit participants. With this sampling approach, members of the target population who meet certain practical requirements are included in the study (Etikan et al., 2016). There are multiple benefits to convenience sampling such as being an easy and cost-effective method for recruiting individuals who are readily available and willing

to participate (Ponterotto, 2010). This method allows researchers to collect data quickly from a sample that is easily accessible, making it useful for studies with tight timelines or limited resources (Ponterotto, 2010). Despite these benefits, there are also known limitations such as the nonrandom selection of participants, which makes it more difficult to make conclusions about a population broadly as well as to generalize results (Emerson, 2021; Etikan et al., 2016). To mitigate some of the limitations associated with convenience sampling, we aimed to purposefully recruit individuals from various geographic locations (e.g., northern/southern, urban/rural Ontario) and individuals of varying cultural and ethnic backgrounds. Ultimately though, we were limited by the SLPs who chose to respond to our request. The sample consisted of mostly female participants who identified as white. Participants' demographics were similar to those reported in a US study of the general demographics of SLPs in North America, which indicated that 95% of SLPs identified as female, and 92% identified as white or non-Hispanic.

A third limitation was the assumption made by the researchers that speech-language pathologists would want a digital solution to improve their experience with the FOCUS-34. This assumption was made based on previous studies conducted with SLPs using the FOCUS-34, who suggested a digital solution would improve their use of FOCUS-34 data in practice (Kwok et al., 2020; Sherman et al., 2022). It is however possible that this group of SLPs would have identified alternate solutions if they were asked to generate recommendations for addressing the barriers associated with the paper-based FOCUS-34 more broadly.

A fourth potential limitation of our work was the absence of a member checking phase. Member checking has been recommended as a way of seeking participants' feedback to ensure researchers have accurately represented individuals' experiences and needs (Varpio et al., 2016). While member checking can be a valuable method for enhancing credibility in qualitative research, it is not always feasible or

necessary, and in some cases, it has been debated whether member checking adds to the quality of the research (Thomas, 2017; Varpio et al., 2016). Modern qualitative approaches recognize that member checking may be futile, as conflicting interpretations between participants and researchers can arise naturally due to their distinct perspectives and roles (Varpio et al., 2016). However, we acknowledge that because our project involved an integrated knowledge translation approach member checking may have been beneficial to further extend engagement with SLPs in the development of a digital FOCUS-34. Despite the lack of member checking, our work aimed to maintain rigor through other means, such as reflexive journaling and involving multiple coders in the data analysis process.

4.6 Conclusions And Future Research Directions

Results from this study will be used to help guide the development of a digital solution for the FOCUS-34, which is expected to address an important gap in clinical practice by improving the collection and use of participation-focused data, and the delivery of more family-centered care. Data collected using a digital FOCUS-34 is also expected to be useful for generating evidence that will help SLPs, programs, and researchers better understand how various early interventions impact children's communicative development. SLPs were purposefully engaged in this early stage of development as their expertise and experience were critical to ensuring a digital solution can be developed to be clinically meaningful, useful, and simpler to implement (Gigliardi et al., 2015; Graham et al., 2018). More specifically, by engaging SLPs, we were able to identify important clinical considerations for digital tool development that will be important to integrate so the final product meets clinicians' needs and preferences.

Findings from this study have the potential to significantly improve digital outcome measurement in the field of speech-language pathology, advance integrated knowledge translation

approaches, and influence user-centered digital test design and development. By engaging SLPs and capturing their valuable insights, we have been able to integrate their digital measurement needs into a requirements document that will serve as a knowledge product moving forward. The requirements document that will inform future iKT efforts within the PSL program and be useful for teams developing similar digital measurement tools. Within the PSL program specifically, the requirements document will serve as a manual for developers of the digital FOCUS-34, and will ensure the resulting digital solution aligns with the needs and preferences of clinical end-users. Ultimately this is likely to lead to more seamless implementation of the digital solution into clinical practice (Kothari & Wathen, 2013).

Next steps in our research will include developing a prototype of the digital FOCUS-34 and having SLPs test it in practice to assess feasibility and identify implementation barriers and facilitators. The tool will be further refined based on feedback, then implemented widely so clinicians can more easily assess children's communicative participation, and data can be better utilized to inform services and program-level decisions.

References

American Speech-Language-Hearing Association. (2018). *2018 ASHA member and certificate holder survey*. https://www.asha.org/uploadedFiles/2018-Member-Certificate-Holder-Survey.pdf

Arnold, D., Glässel, A., Böttger, T., Sarma, N., Bethmann, A., & Narimani, P. (2022). "What do you need? What are you experiencing?" Relationship building and power dynamics in participatory research projects: Critical self-reflections of researchers. *International Journal of Environmental Research and Public Health, 19*(15), 9336.

Braun, V. & Clarke, V. (2006). Using thematic analysis in psychology. *Qualitative Research in Psychology 3*(2), 77-101. https://doi.org/10.1191/1478088706qp063oa

Cohen, A. B., & Mathews, S. C. (2018). The digital outcome measure. *Digital Biomarkers, 2*(3), 94-105. https://doi.org/10.1159/000492396

Coll, R. K., & Chapman, R. (2000). Choices of methodology for cooperative education researchers. *International Journal of Work-Integrated Learning, 1*(1), 1.

Creswell, J. W. (2014). *Research design: qualitative, quantitative, and mixed methods approaches*. Sage Publications.

Cunningham, B. J., & Oram Cardy, J. (2020). Using implementation science to engage stakeholders and improve outcome measurement in a preschool speech-language service system. *Speech, Language and Hearing, 23(1), 17-24*. https://doi.org/10.1080/2050571X.2019.1711307

Cunningham, B.J., Daub, O., & Oram Cardy, J. (2019). Barriers to implementing evidence-based assessment procedures: Perspectives from the front lines in speech-language pathology. *Journal of Communication Disorders*, *80*, 66–80. https://doi.org/10.1016/j.jcomdis.2019.05.001

Cunningham, B. J., Hanna, S. E., Rosenbaum, P., Thomas-Stonell, N., & Oddson, B. (2018). Factors contributing to preschoolers' communicative participation outcomes: Findings from a population-based longitudinal cohort study in Ontario, Canada. *American Journal of Speech-Language Pathology*, *27(*2), 737-750. https://doi.org/10.1044/2017_AJSLP-17-0079

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, and Hearing Research, 60*(2), *447-464*. https://doi.org/10.1044/2016_JSLHR-L-15-0329

Cunningham, B. J., & Rosenbaum, P. L. (2015). A bioecological framework to evaluate communicative participation outcomes for preschoolers receiving speech-language therapy interventions in Ontario, Canada. International Journal of Language & Communication Disorders, 50(4), 405-415. https://doi.org/10.1111/1460-6984.12145

Doody, O., Slevin, E., & Taggart, L. (2013). Preparing for and conducting focus groups in nursing research: part 2. *British Journal of Nursing, 22(3), 170-173*. https://doi.org/10.12968/bjon.2013.22.3.170

Dunckley, M., Aspinal, F., Addington-Hall, J. M., Hughes, R., & Higginson, I. J. (2005). A research study to identify facilitators and barriers to outcome measure implementation. *International Journal of Palliative Nursing*, *11*(5), 218-225. https://doi.org/10.12968/ijpn.2005.11.5.218

Eadie, T. L., Yorkston, K. M., & Klasner, E. R. (2014). The Communicative Effectiveness Survey: a digital tool for assessing the impact of communication disorders. *International Journal of Telerehabilitation, 6*(1), 23–28. https://doi.org/10.5195/ijt.2014.6159

Emerson, R. W. (2021). Convenience sampling revisited: Embracing its limitations through thoughtful study design. *Journal of Visual Impairment & Blindness, 115*(1), 76-77. https://doi.org/10.1177/0145482X2098770

Espe-Sherwindt, M., & Serrano, A. M. (2016). It takes two: The role of family-centered practices in communication intervention. *Revista de Logopedia, Foniatría y Audiología, 36*(4), 162-169. https://doi.org/10.1016/j.rlfa.2016.07.006

Etikan, I., Musa, S. A., & Alkassim, R. S. (2016). Comparison of convenience sampling and purposive sampling. *American journal of theoretical and applied statistics, 5*(1), 1-4. https://doi.org/10.11648/j.ajtas.20160501.11

Field, B., Booth, A., Ilott, I., & Gerrish, K. (2014). Using the Knowledge to Action Framework in practice: a citation analysis and systematic review. *Implementation Science, 9(1), 1-14*. https://doi.org/10.1186/s13012-014-0172-2

Gagliardi, A. R., Kothari, A., & Graham, I. D. (2017). Research agenda for integrated knowledge translation (IKT) in healthcare: what we know and do not yet know. *Journal of Epidemiology and Community Health, 71(2), 105-106*. https://doi.org/10.1136/jech-2016-207743

Gagliardi, A. R., Berta, W., Kothari, A., Boyko, J., & Urquhart, R. (2015). Integrated knowledge translation (IKT) in health care: a scoping review. Implementation Science, 11(1), 1-12. https://doi.org/10.1186/s13012-016-0399-1

Gigliardi, L., Boisvert, M., & Kane, J. (2015). Engaging speech-language pathologists in the early stage of development of a digital aphasia therapy solution. *Journal of Medical Internet Research, 17*(1), e6. https://doi.org/10.2196/jmir.3716

Graham, I. D., Kothari, A., & McCutcheon, C. (2018). Moving knowledge into action for more effective practice, programmes and policy: protocol for a research programme on integrated knowledge translation. *Implementation Science,* 13(1), 1-15. https://doi.org/10.1186/s13012-017-0700-y

Graham, I. D., Logan, J., Harrison, M. B., Straus, S. E., Tetroe, J., Caswell, W., & Robinson, N. (2006). Lost in knowledge translation: time for a map? *Journal of Continuing Education in the Health Professions, 26(1), 13-24*. https://doi.org/10.1002/chp.47

Greenhalgh, T., Wherton, J., Shaw, S., & Morrison, C. (2020). Video consultations for covid-19. *BMJ*, 368. https://doi.org/10.1136/bmj.m998

Harris, P. A., Taylor, R., Minor, B. L., Elliott, V., Fernandez, M., O'Neal, L., ... & REDCap Consortium. (2019). The REDCap consortium: Building an international community of software platform partners. *Journal of Biomedical Informatics, 95, 103208.* https://doi.org/10.1016/j.jbi.2019.103208

Hill, C., Knafl, K. A., & Santacroce, S. J. (2018). Family-centered care from the perspective of parents of children cared for in a pediatric intensive care unit: an integrative review. *Journal of pediatric nursing*, *41*, 22-33. https://doi.org/10.1016/j.pedn.2017.11.007

Houts, P. S., Doak, C. C., Doak, L. G., & Loscalzo, M. J. (2006). The role of pictures in improving health communication: A review of research on attention, comprehension, recall, and adherence. *Patient Education and Counseling, 61*(2), 173-190. https://doi.org/10.1016/j.pec.2005.05.004

Kabukye, J. K., de Keizer, N., & Cornet, R. (2020). Assessment of organizational readiness to implement an electronic health record system in a low-resource settings cancer hospital: A cross-sectional survey. *PloS one*, *15*(6), e0234711. https://doi.org/10.1371/journal.pone.0234711

Kapur, K. C., & Pecht, M. (2014). *Reliability engineering*. John Wiley & Sons.

Kothari, A., & Wathen, C. N. (2013). A critical second look at integrated knowledge translation. *Health Policy, 109*(2), 187-191.

Kwok, E. Y., Moodie, S. T., Cunningham, B. J., & Cardy, J. O. (2022). Barriers and Facilitators to Implementation of a Preschool Outcome Measure: An Interview Study with Speech-Language Pathologists. *Journal of Communication Disorders, 95, 106166*. https://doi.org/10.1016/j.jcomdis.2021.106166

Kwok, E. Y. L., Rosenbaum, P., Thomas-Stonell, N., & Cunningham, B. J. (2021). Strengths and challenges of the COSMIN tools in outcome measures appraisal: A case example for speech-language therapy. International Journal of Language & Communication Disorders, 56(2), 313-329. https://doi.org/10.1111/1460-6984.12603

Kwok, E. Y. L., Moodie, S. T., Cunningham, B. J., & Cardy, J. E. O. (2020). Selecting and tailoring implementation interventions: a concept mapping approach. *BMC Health Services Research, 20(1), 1-13*. https://doi.org/10.1186/s12913-020-05270-x

Law, J. K., Thacker, L. R., Clark, K. A., & Clark, G. M. (2018). Technology-based measures and interventions for children with autism spectrum disorder: A systematic review. *Journal of Autism and Developmental Disorders, 48*(5), 1518–1532. https://doi.org/10.1007/s10803-017-3455-5

Merolli, M., Hinman, R. S., Lawford, B. J., Choo, D., & Gray, K. (2021). Digital health interventions in physiotherapy: development of client and health care provider survey instruments. *JMIR Research Protocols, 10*(7), e25177. https://doi.org/10.2196/25177

Moodie, S.T., Kothari, A., Bagatto, M.P., Seewald, R., Miller, L.T., & Scollie, S.D. (2011). Knowledge translation in audiology: Promoting the clinical application of best evidence. *Trends in Amplification, 15*, 5–22. https://doi.org/10.1177/1084713811420740

Morgan, D. L. (2018). *Basic and advanced focus groups*. Sage Publications.

Mullen, R., & Schooling, T. (2010). The national outcomes measurement system for pediatric speech-language pathology. *Language, Speech, and Hearing Services in Schools, 41*(1), 44–60. https://doi.org/10.1044/0161-1461(2009/08-0051

Murray, E., Hekler, E. B., Andersson, G., Collins, L. M., Doherty, A., Hollis, C., ... & Wyatt, J. C. (2016). Evaluating digital health interventions: key questions and approaches. *American journal of preventive medicine, 51*(5), 843-851. https://doi.org/10.1016/j.amepre.2016.06.008

Nabi, I. R., Shankar, J., & Dennis, J. W. (2015). The galectin lattice at a glance. *Journal of Cell Science, 128*(13), 2213-2219. https://doi.org/10.1242/jcs.151159

Neumann, S., Rietz, C., & Stenneken, P. (2017). The German Intelligibility in Context Scale (ICS-G): reliability and validity evidence. *International Journal of Language & Communication Disorders, 52*(5), 585-594. https://doi.org/10.1111/1460-6984.12303

NVivo (2014). *NVivo qualitative data analysis software* (version 12). Doncaster Australia: QSR International Ltd.

Oddson, B., Thomas-Stonell, N., Robertson, B., & Rosenbaum, P. (2019). Validity of a streamlined version of the Focus on the Outcomes of Communication Under Six: Process and outcome. *Child: Care, Health and Development, 45*(4), 600–605. https://doi.org/10.1111/CCH.12669

Olswang, L. B., & Prelock, P. A. (2015). Bridging the gap between research and practice: Implementation science. *Journal of Speech, Language, and Hearing Research, 58*(6), S1818-S1826. https://doi.org/10.1044/2015_jslhr-l-14-0305

Ponterotto, J. G. (2010). Brief note on the origins, evolution, and meaning of the convenience sample. *The Qualitative Report*, *15*(4), 1006-1014. https://doi.org/10.46743/2160-3715/2006.1666

Powell, B. J., Waltz, T. J., Chinman, M. J., Damschroder, L. J., Smith, J. L., Matthieu, M. M., ... & Kirchner, J. E. (2015). A refined compilation of implementation strategies: results from the Expert Recommendations for Implementing Change (ERIC) project. *Implementation Science, 10*(1), 1-14. https://doi.org/10.1186/s13012-015-0209-1

Proctor, E. K., Powell, B. J., & McMillen, J. C. (2013). Implementation strategies: recommendations for specifying and reporting. *Implementation Science, 8*(1), 1-11. https://doi.org/10.1186/1748-5908-8-139

Rabiee, F. (2004). Focus-group interview and data analysis. *Proceedings of the Nutrition Society*, *63*(4), 655-660. https://doi.org/10.1079/PNS2004399

Rosenbaum, P. (2015). The ABCs of clinical measures. *Developmental Medicine and Child Neurology*, *57*(6), 496-496. https://doi.org/10.1111/dmcn.12735

Sherman, V., Glista, D., & Cunningham, B. J. (2022). Engaging clinical end users in the development of an outcome measurement protocol for pediatric communicative health systems. *International Journal of Speech-Language Pathology*, 24(2), *1-9*. https://doi.org/10.1080/17549507.2022.2148741

Shitkova, Maria; Holler, Justus; Heide, Tobias; Clever, Nico; and Becker, Jörg, Towards Usability Guidelines for Mobile Websites and Applications (2015). *Wirtschaftsinformatik Proceedings* 2015. Paper 107. http://aisel.aisnet.org/wi2015/107

Stewart, D. W., & Shamdasani, P. N. (2014). *Focus groups: Theory and practice (Vol. 20)*. Sage publications.

Thomas, D. R. (2017). Feedback from research participants: are member checks useful in qualitative research? *Qualitative research in psychology*, *14*(1), 23-41.

Thomas-Stonell, N.L., Robertson, B., Walker, J., Oddson, B., Washington, K., & Rosenbaum P. (2015). FOCUS©: Focus on the outcomes of communication under six manual. Holland Bloorview Kids Rehabilitation Hospital.

Thomas-Stonell, N., Oddson, B., Robertson, B., & Rosenbaum, P. (2013). Validation of the Focus on the Outcomes of Communication under Six outcome measure. *Developmental Medicine & Child Neurology*, *55*(6), 546-552. https://doi.org/10.1111/dmcn.12123

Thomas-Stonell, N., Washington, K., Oddson, B., Robertson, B., & Rosenbaum, P. (2013). Measuring communicative participation using the FOCUS©: Focus on the Outcomes of Communication Under Six. *Child: Care, Health, and Development, 39*(4), 474-480. https://doi.org/10.1111%2Fcch.12049

Thomas-Stonell, N. L., Oddson, B., Robertson, B., & Rosenbaum, P. L. (2010). Development of the FOCUS (Focus on the Outcomes of Communication Under Six), a communication outcome measure for preschool children. *Developmental Medicine and Child Neurology*, *52*(1), 47-53. https://doi.org/10.1111/j.1469-8749.2009.03410.x

Toppelberg, C. O., & Shapiro, T. (2000). Language disorders: A 10-year research update review. *Journal of the American Academy of Child & Adolescent Psychiatry*, *39*(2), 143-152. https://doi.org/10.1097/00004583-200002000-00011

Tong, A., Sainsbury, P., & Craig, J. (2007). Consolidated criteria for reporting qualitative research (COREQ): a 32-item checklist for interviews and focus groups. *International Journal for Quality in Health Care, 19*(6), 349-357.

Tran, B., Rafinejad-Farahani, B., Moodie, S., O'Hagan, R., & Glista, D. (2021). A Scoping Review of Virtual Focus Group Methods Used in Rehabilitation Sciences. I*nternational Journal of Qualitative Methods, 20*, 1-9. https://doi.org/10.1177/16094069211042227

Varpio, L., Ajjawi, R., Monrouxe, L. V., O'Brien, B. C., & Rees, C. E. (2017). Shedding the cobra effect: problematising thematic emergence, triangulation, saturation and member checking. *Medical Education, 51*(1), 40-50.

Waltz, T. J., Powell, B. J., Matthieu, M. M., Damschroder, L. J., Chinman, M. J., Smith, J. L., ... & Kirchner, J. E. (2015). Use of concept mapping to characterize relationships among implementation strategies and assess their feasibility and importance: results from the Expert Recommendations for Implementing Change (ERIC) study. *Implementation Science, 10*(1), 1-8. https://doi.org/10.1186/s13012-015-0295-0

Washington, K., Thomas-Stonell, N., Oddson, B., McLeod, S., Warr-Leeper, G., Robertson, B., & Rosenbaum, P. (2013). Construct validity of the FOCUS©(Focus on the Outcomes of Communication Under Six): a communicative participation outcome measure for preschool children. *Child: Care, Health and Development, 39*(4), 481-489. https://doi.org/10.1111/cch.12043

Woods, J. J., Wilcox, M. J., Friedman, M., & Murch, T. (2011). Collaborative consultation in natural environments: Strategies to enhance family-centered supports. *Language, Speech, and Hearing Services in Schools, 42*(3), 379-392. https://doi.org/10.1044/0161-1461(2011/10-0024)

World Health Organization. (2001). International Classification of Functioning, Disability and Health (ICF). Geneva: World Health Organization.

Appendix A: SLP Focus Group Interview Guide

Duration Minutes	**Task**
5	● Introductions
5	● Housekeeping, review of confidentiality, and permission to record ● Purpose of focus group (brief overview) and a reminder of how the FOCUS was intended to be used ● Review of ground rules for the focus group session
10	**Interview Question 1** – Is it currently easy or difficult for you to use and interpret FOCUS-34 scores in your practice? Probes: ● *Does the current format (paper) make data collection/storage/reporting difficult?* ● *Are scores easily interpreted (i.e., can you easily collect/store/report on/interpret scores)?*
10	**Interview Question 2** – What FOCUS-34 data would be helpful for informing your clinical decision making and how can we improve the clinical utility of those data? Probes: ● *What scores do you need to see (have displayed) to help guide your clinical decision-making? (e.g., change scores, profile scores)* ● *Are there scores that may not be important?* ● *Do you want to see comparison data (e.g., compare scores to others of same age/level)?* ● *Do you want to see change within a child over time?* ● *Do you want to see profile scores (or change in profile scores)?* ● *Do you want support with interpreting scores? (e.g., what to say about change/no change)?* ● *How would you want data displayed so you can use/interact with it?*
10	**Interview Question 3 -** If the FOCUS-34 was made available in a digital format, what might be the barriers and facilitators to its clinical use? Probes: ● *What delivery format would be best (online, app, in house)?* ● *Do you feel you (or families) might have tech access challenges (e.g., remote location, IT support)?* ● *Would you (families) be comfortable with using a digital solution (e.g., App)?* ● *Would a digital solution improve your ability to use FOCUS-34 data in your practice?*

	● Are there accessibility considerations (e.g., low vision/hearing, ESL, low literacy)?
10	**Interview Question 4** - How might a digital format of the FOCUS-34 improve its clinical utility (i.e., your ability to use FOCUS-34 data in your practice)? Probes: ● *How should scores be displayed?* ● *Will there be digital storage issues?* ● *What do you need to see on screen about a child?* ● *How do you want to see those variables over time?* ● *Is there a figure that would be helpful?* ● *Would built-in analyses improve clinical utility (e.g., change or comparison scores)?* ● *Should there be different displays for clinicians/families?* ● *What info do you think parents will be able to interpret well?*
8	**Interview Question 5** - What other elements could be included in a digital version of the FOCUS-34 to improve your ability to use its data in practice?
2	Thank you and next steps
Total Time	60 minutes

Appendix B: Consolidated criteria for reporting qualitative studies (COREQ)

Item	Guide questions/description	Reported on Page #
Domain 1: Research team and reflexivity		
Personal Characteristics		
1. Inter viewer/facilitator	Which author/s conducted the interview or focus group?	Page 9-10
2. Credentials	What were the researcher's credentials? E.g. PhD, MD	Page 9-10
3. Occupation	What was their occupation at the time of the study?	Page 9-10
4. Gender	Was the researcher male or female?	Page 9-10
5. Experience and training	What experience or training did the researcher have?	Page 9-10
Relationship with participants		
6. Relationship established	Was a relationship established prior to study commencement?	N/A
7. Participant knowledge of the interviewer	What did the participants know about the researcher? e.g. personal goals, reasons for doing the research	Page 9-11
8. Interviewer characteristics	What characteristics were reported about the interviewer/facilitator? e.g. Bias, assumptions, reasons and interests in the research topic	Page 9-11

Domain 2: study design		
Theoretical framework		
9. Methodological orientation and Theory	What methodological orientation was stated to underpin the study? e.g. grounded theory, discourse analysis, ethnography, phenomenology, content analysis	Page 9-11
Participant selection		

10. Sampling	How were participants selected? e.g., purposive, convenience, consecutive, snowball	Page 8, 147
11. Method of approach	How were participants approached? e.g., face-to-face, telephone, mail, email	Page 8
12. Sample size	How many participants were in the study?	Page 9
13. Non-participation	How many people refused to participate or dropped out? Reasons?	N/A
Setting		
14. Setting of data collection	Where was the data collected? e.g., home, clinic, workplace	Page 9-10
15. Presence of non-participants	Was anyone else present besides the participants and researchers?	Page 10
16. Description of sample	What are the important characteristics of the sample? e.g., demographic data, date	Page 13
Data collection		
17. Interview guide	Were questions, prompts, guides provided by the authors? Was it pilot tested?	Page 9
18. Repeat interviews	Were repeat interviews carried out? If yes, how many?	N/A
19. Audio/visual recording	Did the research use audio or visual recording to collect the data?	Page 10
20. Field notes	Were field notes made during and/or after the interview or focus group?	Page 12
21. Duration	What was the duration of the interviews or focus group?	Page 9
22. Data saturation	Was data saturation discussed?	Page 9
23. Transcripts returned	Were transcripts returned to participants for comment and/or correction?	Page 10
Domain 3: analysis and findings		
Data analysis		

24. Number of data coders	How many data coders coded the data?	Page 12
25. Description of the coding tree	Did authors provide a description of the coding tree?	N/A
26. Derivation of themes	Were themes identified in advance or derived from the data?	Page 11-12
27. Software	What software, if applicable, was used to manage the data?	Page 12
28. Participant checking	Did participants provide feedback on the findings?	Page 48-49
Reporting		
29. Quotations presented	Were participant quotations presented to illustrate the themes/findings? Was each quotation identified? e.g. participant number	Pages 13-39
30. Data and findings consistent	Was there consistency between the data presented and the findings?	Pages 13-39
31. Clarity of major themes	Were major themes clearly presented in the findings?	Pages 13-39
32. Clarity of minor themes	Is there a description of diverse cases or discussion of minor themes?	Pages 13-39

Appendix C: Demographic Survey

SLP FOCUS-34 focus groups - preliminary survey

Thank you for agreeing to participate in our quality improvement project. This project is supported by the Ontario Ministry of Children, Community, and Social Services. It aims to understand speech-language pathologists' experiences completing the FOCUS-34 and using data to inform clinical practice. More specifically, the project aims to understand how speech-language pathologists' experiences could be improved (e.g., through the use of technology).

This initial survey is designed to collect some basic demographic data to help us describe our participants. Your name is required to confirm completion of the survey prior to your focus group but will be removed from the data and replaced with an anonymous identification number immediately after your focus group session. The information you provide may be synthesized with responses from other clinicians and reported in a publication, but individual data will never be shared beyond the research team at Western. All data shared will only ever be accessible to the research team at Western.

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Section 1: In this section, you will be asked some basic demographic questions

Please enter your first and last name: _____

Please select your age range:

- o 18-29
- o 30-49
- o 50-64
- o 65+

Please select the gender you identify with.

- o Female
- o Male
- o Self-identify _____

Please enter your PSL program site/region _____

Please enter your highest degree held (in SLP)
- o Undergraduate
- o Master's
- o Doctoral

How long have you been practicing as a SLP?
- o Less than one year
- o 1-5 years
- o 6-10 years
- o More than 10 years

How long have you worked in the PSL Program?
- o Less than one year
- o 1-5 years
- o 6-10 years
- o More than 10 years

Which ethnic or cultural background(s)/origin(s) do you identify with? You may check off more than one.
- o Arab/West Asian (e.g., Armenian, Egyptian, Iranian, Lebanese, Moroccan)
- o Black (e.g., African, Jamaican, Somali)
- o Caucasian
- o Chinese
- o Filipino
- o First Nations
- o Inuit
- o Japanese
- o Korean
- o Latin-American
- o Metis
- o Southeast Asian (e.g., Cambodian, Indonesian, Laotian, Vietnamese)
- o Other _____

Section 2: In this section, you will be asked questions about your practice and experience using the FOCUS-34

Have you received any training (formal or informal) for completing the FOCUS-34?
- o Yes
- o No

Please specify the type of training you received (check all that apply).
- o Reviewed FOCUS webinars
- o Reviewed FOCUS manual
- o Discussion with colleagues
- o Self study
- o Other _____

How often do you complete the FOCUS-34 with families?
- o Daily
- o Weekly
- o Monthly
- o Rarely
- o Never

How regularly do you complete the FOCUS-34 at or before the required 6-month interval for children on your caseload?
- o Always
- o Often
- o Occasionally
- o Rarely
- o Never

How many years of experience do you have completing the FOCUS-34?
- o Less than 1 year
- o 1 year
- o 1-5 years
- o 6-10 years
- o More than 10 years

Approximately how many families have you completed multiple administrations of the FOCUS-34 with? _____

What types of communication impairments do you assess and treat as part of your role in the PSL Program (check all that apply)?

- o Language Delay or Disorder
- o Speech Sound Delay or Disorder
- o Fluency Disorder
- o Voice Disorder
- o Feeding and/or Swallowing Disorder
- o Emergent Literacy Concerns
- o Other _____

Please indicate the age groups of the children you regularly provide services for (check all that apply).

- o Under 18 months
- o 18-30 months
- o 31-48 months
- o 49-60 months
- o Over 60 months

Please indicate the CFCS levels for children on your caseload (check all that apply).

- o CFCS level I (effective sender and receiver with all communication partners)
- o CFCS level II (effective, but slower paced sender/receiver with all communication partners)
- o CFCS level III (effective sender/receiver with familiar communication partners only)
- o CFCS level IV (inconsistent sender and/or receiver with unfamiliar/familiar partners)
- o CFCS level V (seldom effective sender and/or receiver with all communication partners)

Section 3: In this section, you will be asked questions about your comfort with using technology

Do you personally own any of the following technology? (select all that apply)

- o Tablet
- o Smartphone
- o Laptop or desktop computer
- o Other _____

At your place of work, are IT support personnel available to provide assistance with technology issues?
- o Yes
- o No

Please rate your level of experience using a computer keyboard/mouse.
- o Beginner
- o Average
- o Above average

Please rate your level of experience using laptop/desktop computers.
- o Beginner
- o Average
- o Above average

Please rate your level of experience using mobile devices (smartphone/tablet).
- o Beginner
- o Average
- o Above average

Please rate your level of experience using apps on mobile devices.
- o Beginner
- o Average
- o Above average

Please rate your level of experience using videoconferencing technology.
- o Beginner
- o Average
- o Above average

Section 4: Thank you gift cards!

We will be sending you a gift card so you can buy UberEats lunch for your focus group session. Although we planned to send UberEats gift cards, we realize that some SLPs work in areas where this service is not available. Please indicate your e-gift card preference:

- o UberEats
- o Starbucks
- o Tim Horton's
- o Other (e.g., local restaurant or coffee shop) _____

Appendix D: Requirements Document

Accessibility for families and centers	
Feature	**Rationale**
1. Translation to multiple languages	To make it accessible to multilingual families
2. Read-aloud option	To make it more accessible for people with literacy or visual impairments
3. Text-to-speech option	To make it more accessible for people with literacy or visual impairments
4. Presenting items in larger font	To make it more accessible for people with visual impairments
5. Option to present items one at a time	For better readability and to support data completeness
Considering formats and family preferences	
Feature	**Rationale**
1. Compatibility with all devices, browsers and the Accessibility for Ontarians with Disabilities Act (AODA)	To make it accessible to those with all kinds of devices and browsers, and for individuals with disabilities
2. Offering an in-house option	To encourage more families to complete the FOCUS and support families without access to technology
3. Benefits of a web link	● More flexible and adaptable than an App ● Might lead to better involvement because is free, doesn't require families to download anything, and could be simpler for families who aren't comfortable with technology
4. Benefits of a digital application (App)	● Would facilitate conversations with

	families ● Would same time and labor ● Would increase clinical utility ● Would improve FOCUS feasibility
Ensuring accessible data and storage	
Feature	**Rationale**
1. Having a data bank	● To hold previously entered demographic information from the face sheet ● So SLPs can go back and compare to previous scores ● To facilitate easy access to change scores
2. Directly linked to ISCIS	To remove the requirement for SLP or admin to enter FOCUS item scores into the provincial database
Features to support clinical use of FOCUS-34 data	
Feature	**Rationale**
1. Ability to see change scores	● To make FOCUS-34 data more clinically relevant for SLPs ● To show families progress over time
2. Flagging significant change	● To indicate when meaningful change has been made ● Identify relative strengths and needs ● Better inform discussion with families and goal setting for intervention
3. Goal recommendations	To provide support for SLPs wanting to set participation-focused goals
4. Provide an explanatory video, audio, or text explanation for parents	● To help parents understand the purpose and components of the FOCUS-34 ● To make data more reliable
5. Include section for parents to enter	To contextualize parents' ratings

comments	
6. Restrict parents to one rating per FOCUS-34 item, ensure all FOCUS-34 items are rated	To avoid data errors
7. Offer immediate access to previous scores	To help SLPs inform families of the child's progress
8. Not to show results to families without the clinician; clinician decided whether/how to share results	● To prevent parents from negatively interpreting FOCUS-34 scores ● To protect families
Features to improve usability of the FOCUS-34	
Feature	**Rationale**
1. Summary report	● To create an easy-to-use form that clinicians can print, archive, share, and store in the client file/electronic health record ● To eliminate the need for the Excel spreadsheet.
2. Visual display (e.g., graphic display of change in total and profile scores)	To improve decision-making, clinical utility of data, facilitate comparisons, facilitate conversations with parents, and increase parental buy-in
3. Reminder system	● To remind families to complete the FOCUS; to provide ratings for all items ● To notify SLPs when a FOCUS is completed

Curriculum Vitae

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Master of Science, Faculty of Health Sciences Western University, London, Ontario, Canada. 2021-2023

Bachelor of Science, Speech and Language Pathology, Tabriz University of Medical Sciences, Tabriz, Iran. 2016-2020

Related Work Experience:

Speech Therapy Assistant, Ontario Speech and Language Services – London, ON. 2022-present

Teaching Assistant in "Ethics and Policy Issues in Pandemic Response" The University of Western Ontario, 2023

Teaching Assistant in "Introduction to Speech and Language Disorders" The University of Western Ontario, 2021

Teaching Assistant in The Course "OT 9680 Fieldwork: Towards Reflection in Action (Level 3A) Preparation" The University of Western Ontario, 2021

Teaching Assistant in "Physical Therapy in Rehabilitation Settings I" The University of Western Ontario, 2022

Teaching Assistant in "Fluency Disorders and Clinical Applications" The University of Western Ontario, 2022

Speech-Language Pathologist, Rahin Rehabilitation Center- Kamyaran, Iran. 2021

Speech-Language Pathologist, Tavan Afarin Rehabilitation Clinic, Sanandaj, Iran. 2021

Teaching Assistant in "Specialized English" Course for Speech & Language Pathology Students at Tabriz University of Medical Sciences, Tabriz, Iran. 2019

Technical Writings

Leyland, Z., Bahrami, B., & Cunningham, B. J. (2023). Ontario Preschool Speech and Language Program: Clinicians' current outcome measurement experiences and future data and reporting needs. 19 pages. Ontario Ministry of Children, Community and Social Services.

Conference Presentations

Bahrami, B. & Cunningham, B. J. Empowered Kids Ontario's Spring Symposium. Toronto, Ontario. April 12-13, 2023. "Engaging End-Users to Digitize Outcome Measurement in Pediatric Speech Pathology."

Bahrami, B. & Cunningham, B. J. 16th Annual Health and Rehabilitation Sciences Graduate Research Conference. London, Ontario. February 1, 2023. "Engaging Clinicians to Develop a Meaningful Digital Outcome Measurement Tool."

Bahrami, B. 12th Iranian International Congress on Stroke. Tehran, Iran. March 4, 2020. "The Effects of Transcranial Direct Current Stimulation on Cognition Skills after Stroke."

Publications

Gharamaleki, F. F., Bahrami, B., Masoumi J. (2021). Autism screening tests: A narrative review. *Journal of Public Health Research, 11(1), 1-6*. https://doi.org/10.4081/jphr.2021.2308

Bahrami, B., Gharamaleki, F. F. (2021). The Pragmatic Assessments in Children: A Narrative Review. *Journal of Research in Rehabilitation Sciences,17(1), 1-8* . https://doi.org/10.22122/jrrs.v17i0.3526.