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Promoting consistent use of the communication function classification system (CFCS)

Barbara Jane Cunningham
Western University, bjcunningham@uwo.ca

Mary Jo Hidecker
University of Wyoming, MaryJo.CooleyHidecker@uwyo.edu

Nancy Thomas-Stonell
University of Toronto, nthomasstonell@gmail.com

Peter Rosenbaum
McMaster University, rosenbau@mcmaster.ca

Abstract

Purpose: We developed a Knowledge Translation intervention to standardize the way speech-language pathologists working in Ontario Canada's Preschool Speech and Language Program used the Communication Function Classification System (CFCS). This tool was being used as part of a provincial program evaluation and standardizing its use was critical for establishing reliability and validity within the provincial dataset.

Method: Two theoretical foundations – Diffusion of Innovations and the Communication Persuasion Matrix – were used to develop and disseminate the intervention to standardize use of the CFCS among a cohort speech-language pathologists. A descriptive pre-test/post-test study was used to evaluate the intervention. Fifty-two participants completed an electronic pre-test survey, reviewed intervention materials online, and then immediately completed an electronic post-test survey.

Results: The intervention improved clinicians' understanding of how the CFCS should be used, their intentions to use the tool in the standardized way, and their abilities to make correct classifications using the tool.

Conclusions: Findings from this work will be shared with representatives of the Ontario Preschool Speech and Language Program. The intervention may be disseminated to all speech-language pathologists working in the program. This study can be used as a model for developing and disseminating knowledge translation interventions for clinicians in paediatric rehabilitation.

Keywords: Communication Function Classification System (CFCS), Innovations, speech-language pathology, program evaluation.

Background. In Ontario's Preschool Speech and Language Program (PSLP) children from birth to five years of age with speech, language, and communication delays receive publically funded intervention services to help them develop communication and early literacy skills before they start school [1]. Recently, the PSLP adopted two new tools to be used with all preschoolers accessing the program each year. The Focus on the Outcomes of Communication Under Six (FOCUS©) [2], and the Communication Function Classification System (CFCS) [3], address how communication issues affect children's social functioning and participation, and classify levels of communicative functioning, respectively. The FOCUS© is a validated parent-report measure that captures changes in children's communicative participation [4]; the CFCS is a validated classification system that allows clinicians and families to classify children's communication skills into one of five levels of function [3]. Both tools are meant to be completed for all children receiving services in the PSLP every six months. Data collected with these tools is currently being used to understand the range of communication disorders in preschoolers across the province, evaluate the impact of speech and language interventions for those children, and inform health service delivery recommendations and resource allocation within the PSLP.

In September 2012 all clinicians working in the PSLP received standardized training in the administration of the FOCUS© but minimal training regarding use of the CFCS. Some clinicians attended a teleconference training session; however, this was not mandatory, and not all SLPs were formally trained in the CFCS. As a result, clinicians were reporting confusion about both how the CFCS was to be used and different methods for using it. Some were completing the tool themselves after seeing a child, while others were completing the tool in collaboration with families. Additionally, some clinicians considered chronological age when classifying children, while others classified based only on level of current communication

function. For example, a 12-month-old child with age-appropriate communication skills would be classified at the highest level of function (Level I) by a clinician who considered chronological age, but that same child would be classified at less functional level (e.g., Level IV) by a clinician who completed the tool based solely on level of function described by the system (the five levels of function on the CFCS are presented in Figure 1). [Insert Figure 1 about here]

This lack of consistency in how the tool was being applied and interpreted undermined the purpose of standardized tools to support accurate classification, customization of treatment, and service planning and delivery. Given that SLPs working in the PSLP had almost two years to implement the CFCS as part of their regular practice, an intervention to standardize its use was timely. To help remedy inconsistent use of the CFCS within the PSLP, a web-based knowledge translation (KT) intervention was developed and pilot tested with a cohort of clinicians working in the program. This paper describes the target audience, key messages, and conceptual framework for the KT intervention; and then the KT intervention, its implementation, and evaluation are presented.

*The Target Audience***.** The target audience for the KT intervention was a cohort of 67 SLPs working at three different PSL locations in Southwestern Ontario. The KT intervention was trialed at these three locations to evaluate its feasibility and effectiveness [5], and to ensure it was appropriate to disseminate to the over 400 SLPs working in various PSLP locations across the province.

The context of the PSLP working environment was an important consideration in the development of the intervention. Speech-language pathologists working in the PSLP are busy, and have varied schedules and responsibilities. Organizing an education session for 67 clinicians in three geographic regions would have been difficult and time consuming. Also, a formal

training session would have required time away from clients, which would have been costly and administratively challenging. Fortunately, the CFCS was already known to this group of SLPs and all that was required was a shift in the way it was being used.

The Key Messages. We identified two key messages to share with the group of SLPs. The first was that children's level of function should be **categorized in collaboration with families** whenever possible. The second was that children's communication abilities should be **categorized based on level of current function alone**, and should not consider the child's chronological age.

The rationale for having clinicians complete the CFCS in collaboration with families was twofold. First, it would help to establish a consistent approach to classification for all children in the PSLP. Typically, parents classify their children at higher levels of function than professionals [3, 6]. Including parents in the classification process as a matter of policy would improve the validity of provincial data, allowing for a more accurate interpretation of therapy outcomes. Second, we reasoned that because parents spent the most time with their children, observing them in many different environments, they were best positioned to provide an estimate of their child's "everyday communication abilities" [3, 6]. SLPs make judgments about children's functional abilities during therapy sessions, but it may be difficult for them to estimate accurately how a child uses communication to function in other situations.

The main objective in ensuring children's communication abilities were classified by level of function alone was to establish reliability within the provincial dataset. Within the PSLP, researchers were examining communicative participation outcomes using the FOCUS© by CFCS level of function. When clinicians do not classify children in the same way, information on communicative participation outcomes becomes less reliable. With reliable data, researchers can

accurately describe the preschoolers' range of communicative functions that exist across the province; follow children over time to observe changes in levels of function; determine the best interventions for children at the five levels of function; and establish a shared terminology among clinicians within the PSLP [7, 8, 9]. At present, clinicians tend to describe children's skills using terminology related to level of impairment (i.e., "mild", "moderate" or "severe"); however what is "mild" to one clinician (or indeed parent) may be considered "moderate" by another. By selecting the operationalized CFCS levels, clinicians will have a shared language for describing and understanding children's communication performances. This will help therapists to avoid labelling children's skills using value-based judgments [9].

*The Knowledge Translation Conceptual Framework***.** Using theory in the development and implementation of a KT intervention provides a rationale for study design and choice of intervention, and identifies factors that may increase awareness and behaviour change. Following implementation, theory can also be used to explain how or why an intervention was effective, and to identify future research directions [10, 11]. Our KT intervention used the Diffusion of Innovations Theory (DOI) [12] to develop and disseminate a web-based intervention to standardize use of the CFCS within a cohort of SLPs working in the PSLP. A brief description of each component of DOI and its application to the knowledge-to-practice gap in this group of SLPs is presented next. A visual representation of these ideas is presented in Figure 2. [Insert Figure 2 about here]

The Innovation-Decision Process. The innovation-decision process provides an overall explanation of how knowledge moves from being unknown to being used in practice. This process has five steps which include *knowledge* (a person learns about the existence of an idea), *persuasion* (an attitude is formed towards the idea), *decision* (the person decides to adopt the

idea), *implementation* (the person applies the idea in practice), and *confirmation* (the person seeks reinforcement for continuing to use the idea) [12, 13]. The innovation-decision process results in either the adoption or rejection of the new idea [12].

Each step of the innovation-decision process was considered in the development of the intervention to promote standardized use of the CFCS within this group of SLPs. At the *knowledge* stage, we used written information and visual reminders to increase awareness of the need for a standardized use of the CFCS [12]. At the *persuasion* stage, we provided a description of the benefits of standardizing how the tool is used to encourage positive feelings towards the idea [12]. At the *decision* stage, we anticipated that informal discussion would take place amongst clinicians, and that those discussions would facilitate decisions to use the tool more precisely [12]. At the *implementation* stage, we ensured clinicians received positive feedback about their participation to encourage consistent use of the CFCS [12]. Finally, at the *confirmation* stage, we provided motivating descriptions of how other groups had used the CFCS to promote consist use of the tool within the group [12]. Overall, the innovation-decision process explains how an idea moves from knowledge into practice.

Next, we present the four factors that influence whether that knowledge is actually adopted and maintained in practice.

(i) The innovation. Characteristics of an innovation that affect whether it will be applied in practice include *observability*, *relative advantage*, *compatibility*, *trialability*, and *complexity* [10, 12, 14]. The characteristics as they relate to the CFCS KT intervention are presented in Table 1. [Insert Table 1 about here]

(ii) Channels of communication. Channels of communication also impact whether knowledge is adopted into practice [15]. For example, mass-media channels affect the *spread* of

knowledge in practice while interpersonal channels affect the *adoption* of knowledge in practice [15]. Since in this case the CFCS had already been adopted into practice within the PSLP, we reasoned that a more passive intervention would be enough to spread knowledge about consistent use of the CFCS among the group of SLPs. As such, we developed a web-based learning tool where clinicians could independently review materials related to using the CFCS.

(iii) Time. Time affects the diffusion of innovations in three ways: the time it takes to move through the innovation-decision process (described above); the innovation's rate of adoption in a given system (i.e., the number of individuals that adopt the idea within a set time period); and the individual's comfort with innovation [12]. In DOI, individuals can be *innovators*, *early adopters*, *early majority adopters*, *late majority adopters*, and *laggards* [10, 13]. We included materials to benefit each type of individual in the KT intervention to standardize use of CFCS [15]. Characteristics of individuals at the different levels of innovation, and examples of how they were accommodated, are presented in Table 2. [Insert Table 2 about here]

(iv) The social system. Factors within a social system that influence the adoption of knowledge include cultural norms, opinion leaders and change agents, the type of innovation, and the consequences of an innovation [12]. Within the PSLP, use of the CFCS was already a cultural norm since its use had been mandated. Each PSLP location had an identified leader who was chosen to represent an opinion leader within the group. In the first location, the opinion leader was an SLP Clinical Advisor who was responsible for ensuring good clinical practice within the program. In the second location, the opinion leader was a senior speech-language pathologist responsible for leading and advising a team of SLPs. In the third location, the opinion leader was an SLP program manager.

DOI provided a solid framework for describing the stages by which consistent use of the CFCS could be achieved. It also allowed for the identification of factors that influenced the uptake of standardized methods for using the CFCS. DOI did not, however, provide direction regarding the source or content of the messages within the KT intervention. McGuire's Communication-Persuasion Matrix (CPM) [16] was therefore used to guide the decisions surrounding the source and content of the messages being delivered [17, 18].

Message source. When a message is delivered by someone who is perceived to be credible, likeable, and powerful, the audience is more likely to have confidence in, accept, and implement the ideas being presented [16, 17, 19]. Sources are perceived as being more credible when they are experts in a field and are familiar with the subject matter being presented [16]. Sources are seen as more likeable when they are pleasant, familiar, and similar to the audience [16]. Sources are powerful when they are perceived to have control over whether the audience complies with what is being presented [16]. With respect to the PSLP, we felt that clinicians were likely to perceive their local opinion leader as a credible, likeable, and powerful source, but also as someone who was similar to them. Local opinion leaders included a senior speech-language pathologist, an SLP clinical advisor, and an SLP program manager.

Message content. Personalized messages depicting concrete scenarios are more likely to influence uptake and implementation of ideas than general messages because they allow the audience to connect new concepts with their own experiences [16]. Additionally, messages with short, simple sentences and basic vocabulary, and that include graphics to augment written text, are more likely to facilitate uptake and implementation of new information than messages that are complex and include technical jargon [16]. We included concrete clinical scenarios within the KT intervention to standardize use of the CFCS. We also took great care to ensure that the

information within the intervention was written in short sentences without technical jargon; that the message was clear, concise and easy to implement; and that we included visuals to reinforce the ideas being presented [20].

The Knowledge Translation Intervention. The goal of the KT intervention was to establish fidelity of the CFCS tool so that it was used in a comparable manner by a group of SLPs [21, 22]. A web-based intervention outlining how and with whom the CFCS should be used was developed and disseminated to the 67 SLPs working in three PSLP locations in Southwestern Ontario via email [22, 23]. The intervention was a PowerPoint slideshow hosted on the website (www.canchild.ca) of *CanChild* Centre for Childhood Disability Research, a well-known and reputable leader of research in the field of children's rehabilitation. The PowerPoint tool consisted of 19 slides. First, we described the CFCS, who was currently using it, and what people liked about it. Next, we presented the two key messages to be learned (1) the tool should be completed in collaboration with families, and (2) the tool should be completed based only on the child's current level of function. We also described why it was important that those two things were done. Then we presented six clinical scenarios to be reviewed. Clinicians were asked to classify children in each scenario before being shown the correct classification and rationale for that classification. Finally, we provided links to research papers for those who wanted more information about the development of the CFCS and use of classification systems in general, as well as a link where clinicians could download a printable CFCS decision flow-chart to use in their practice.

Methods. To obtain participants, an initial email message was sent to all SLPs from their local opinion leader to introduce the knowledge translation project and to encourage clinicians to participate in the research study. The following day, the local opinion leader sent a second email

message to all clinicians reminding SLPs about the project. This email included the link to the pre-test electronic survey so that clinicians could begin participating. A reminder email was sent by the opinion leader one week later, and again one day before the KT intervention was closed. Each location had two full weeks for their clinicians to participate. Survey responses were anonymous, and use of the anonymized data for this research was approved by the Hamilton Integrated Research Ethics Board at McMaster University (Hamilton, Ontario, Canada).

A pre-test/post-test design was used to evaluate the effectiveness of the intervention [24]. Specifically, we sought to evaluate whether the intervention a) increased clinicians' understanding of the methods for using the CFCS, b) increased clinicians' abilities to classify children's communication skills accurately, and c) developed clinicians' intention to use the tool in the standardized way in the future. Clinicians were provided with a link to an electronic pre-test survey in which they answered 8 multiple choice questions related to their current use of the CFCS in practice, and how well they understood the methods for using the CFCS. Multiple choice questions were presented as 5-point Likert scales with the labels *strongly disagree*, *somewhat disagree*, *neutral*, *somewhat agree*, and *strongly agree*. Clinicians were also asked to classify two children based on brief clinical scenarios of children with age-appropriate communication skills. Multiple choice questions for the clinical scenarios were presented as 5-point Likert scales with the labels corresponding to the five CFCS levels of function (see Figure 1). This was done to help determine whether self-reported use of the CFCS matched clinicians' performance when using the tool.

After answering the 8 pre-test questions, clinicians were provided with a link to the PowerPoint KT intervention module on the *CanChild* website. Here, they reviewed the 19

PowerPoint slides described above. Immediately after viewing the intervention materials, clinicians returned to the online survey and completed 10 post-test multiple choice questions.

At post-test, clinicians were asked whether their understanding of how the CFCS should be used changed as a result of the intervention, and whether they intend to change the way they used the tool in the future. Additionally, clinicians were asked to re-classify children's skills using the same two clinical scenarios presented at pre-test. At the conclusion of the post-test, clinicians were provided with a link to the CFCS decision flow chart, which they were instructed to print off and use to facilitate collaboration and discussion with families.

Both quantitative and qualitative data were collected during pre- and post-testing. Quantitative data were analyzed using Stata Statistical Software, release 13 [25]. Text analysis was used to sort qualitative data into relevant categories [26].

Results. In total, 63 of 67 SLPs (94%) who received the email invitation participated in this study. We believe that data for the four SLPs who did not participate were missing at random, but there is no way to verify. A series of reminder emails was required to achieve this response rate. The initial email inviting clinicians to participate received 25 responses, a 37% response rate. After the first reminder email, we received an additional 22 responses (cumulative 70% response rate), and after the final reminder email, an additional 16 SLPs participated, for a total response rate of 94%.

Only 52 of the 63 SLPs who participated completed both the pre and post-tests. We believe data are missing at random for the 11 respondents who did not complete post-testing. General trends at pre-test did not appear to differ significantly when data for those individuals were removed, and not one of the 11 respondents was an outlier for any of the pre-test questions.

We suspect that these 11 SLPs simply did not realise they were to return to the survey to complete post-testing.

Since we assumed the data were missing at random, the 11 individuals who did not complete post-testing were removed from the analysis, and the final analyses were completed using the 52 complete responses.

Pre-test. A pre-test was used to determine how the CFCS was being used in practice. We wanted to learn more about how often clinicians were using it, how clear the methods of use were, whether clinicians had received formal training to use the CFCS, and whether they were completing the CFCS in collaboration with families and by level of function. Two example clinical scenarios were also included to determine whether self-reported classification by level of function matched how clinicians were actually using the tool.

1) **How often was the CFCS being used?** In response to the statement "*I regularly use the CFCS*", less than half of respondents 'strongly agreed' that they regularly used the CFCS in practice, and 15% reported they were not using the CFCS on a regular basis (see Table 3 for details). [Insert Table 3 about here]
2) **Had clinicians received formal training to use the CFCS?** When asked "*Were you formally trained to use the CFCS?*" 33 SLPs (63%) reported that they had not received any formal training to use the CFCS, and only 19 said that they had. Sixteen of the 19 were trained via the provincial teleconference. Two SLPs said that they were trained by reading materials related to the CFCS and one SLP reported being trained by talking with a colleague; seven reported they had received training via teleconference in the fall of 2013.
3) **Were the methods for using the CFCS clear to SLPs?** After reading the statement *"The methods for using the CFCS are very clear to me"*, approximately half of SLPs said they did

not have a clear understanding of the methods for using the CFCS (see Table 3 for details).

A Chi Square analysis showed that those who had received training did not rate the clarity of methods significantly higher than those who had not received training (X^2 = 0.2, p = 0.78).

4) **Did the SLPs complete the CFCS in collaboration with families?** In response to the statement "*I complete the CFCS in collaboration with families*", most SLPs said they did not complete the classification in collaboration with families (n = 31, 60%). Only 4 SLPs 'strongly agreed' that they completed the CFCS together with families. Additional details are presented in Table 3.

SLPs who said they did not regularly complete the CFCS in collaboration with families were asked why. Responses fell into one of three categories. First, clinicians reported a lack of awareness that they should have been completing the CFCS in collaboration with families (*n* = 23). Second, they cited a lack of time to complete the CFCS with families during an assessment session (*n* = 10). Finally, clinicians reported feeling that parents may not understand the tool or the terms used to describe the different levels of function (*n* = 9).

5) **Did the SLPs complete the CFCS by level of function?** When shown the statement *"I complete the CFCS based only on a child's level of function. I do not consider a child's chronological age when completing the CFCS",* only 65 percent of SLPs either "somewhat agreed" (38%) or "strongly agreed" (27%). The remainder reported that they considered things other than a child's current level of function when completing the CFCS (see Table 3 for details). The clinicians who did not agree that they completed the CFCS by level of function were asked to comment on why they were not doing this. Two SLPs reported that they were instructed to consider chronological age when completing the CFCS, and three SLPs wrote that they had recently received information on completing the CFCS by level of

function and were trying to change their practice. Most SLPs simply described their rationale for considering chronological age while completing classifications (*n* = 15).

Clinical scenarios were included to test whether clinicians' abilities to classify based on level of function were similar to their self-reported practice. The first clinical scenario was for a 12-month-old child with typically developing communication skills. If classified only by level of function without adjusting for current age, this child should be a CFCS Level IV (*inconsistent sender and/or receiver with familiar partners*). Only 26 percent of SLPs classified this child correctly (*n* = 14). Other responses included CFCS Level I (*n* = 19, 37%); CFCS Level II (*n* = 4, 8%); and CFCS Level III (*n* = 15, 29%). When asked about their practice, 14 SLPs (26%) 'Strongly agreed' that they completed the CFCS by level of function alone, which was the same as the number who classified the child in scenario 1 correctly. Considering those SLPs who either 'strongly agreed' or 'somewhat agreed' to completing the CFCS by level of function (*n* = 34, 65%), there was a discrepancy between self-reported practice and ability to classify the child in Scenario 1.

The second scenario depicted a typically developing 48-month-old child. In this scenario, all SLPs classified this child at CFCS Level I, the correct response.

Post-test. After reviewing the KT intervention materials, 52 of the 63 SLPs completed post-testing. We wanted to determine whether reviewing the KT intervention materials would increase the clarity of the methods for using the CFCS, change clinicians' intention to change practice, and increase clinicians' abilities to accurately classify children's skills.

1) **Were the methods clearer?** At post-test, when shown the statement "*After viewing this presentation I clearly understand the methods for using the CFCS*", 85% of SLPs

'somewhat agreed' (n = 26), or 'strongly agreed' (n = 18). Six SLPs were 'neutral' and two 'somewhat disagreed' that they clearly understood the methods for using the CFCS. The 52 scores in this sample had a pre-test median rating of 3.0 (interquartile range = 4.0 – 2.0), and a post-test median rating of 4.0 (interquartile range = 5.0 – 4.0). A Wilcoxon Signed Rank test showed that clinicians rated clarity of methods significantly higher at post-test than they did at pre-test (Z = - 4.90, p < 0.001) (see Figure 3). McNemar's chi-square statistic was also conducted to determine whether there was a statistically significant difference in the paired change in proportions between pre-test and post-test understanding of the methods for using the CFCS. To calculate this statistic, responses were grouped into positive (*strongly agree* and *somewhat agree*) and negative (*strongly disagree*, *somewhat disagree*, and *neutral*) responses. The test showed a significant difference in the proportion of respondents who clearly understood the methods for using the CFCS after completing the KT intervention (X^2 = 16.67, p < 0.001). [Insert Figure 3 about here]

2) **Did SLPs intend to change their practice?** In response to the statement *"Because of this presentation I will change the way I use the CFCS in my practice",* 81 percent (n = 42) of the 52 SLPs who completed post-testing either somewhat agreed (n = 30) or strongly agreed (n = 12) that they intended to change how they used the CFCS. In addition to providing a rating, SLPs were asked to comment on what would change with respect to their practice. Most clinicians commented that they now understood they were to classify based only on function and stated their intentions to do this in the future.

When asked specifically whether they intended to collaborate with families in the future *("I plan to complete the CFCS in collaboration with families"*), 42 SLPs (81%) indicated that they somewhat agreed (n = 16, 31%) or strongly agreed (n = 26, 50%) they would do this. Those who

did not 'strongly agree' they would collaborate with families were asked why. Many clinicians commented that they intended to try completing the CFCS in collaboration with families and that they felt it would be helpful to include the family in the classification process; however, many comments noted this may be difficult in their practice settings. Barriers to collaborating with families included limited time with a child, families whose first language is not English, and lack of a centre-wide procedure for completing the CFCS.

3) **Were the SLPs' classifications more accurate?** At post-test, 77% (n = 40) of SLPs classified the child in Scenario 1 at CFCS Level IV (the correct classification). Four clinicians classified this child as CFCS level I (8%), four classified this child as CFCS Level III (8%), and four classified this child as CFCS Level V (8%). A Wilcoxon Signed Rank test showed that clinicians' classifications of the child in Scenario 1 were significantly different at post-test than they were at pre-test, $Z = -5.59$, $p < 0.001$ (see Figure 4). McNemar's chi-square statistic was also conducted to determine whether there was a statistically significant difference in the paired change in proportions of correct classifications between pre-test and post-test. The test showed a significant difference in the proportion of correct classifications between pre and post-testing ($X^2 = 24.14$, $p < 0.001$). Classifications for the child in Scenario 2 were not significantly different between pre- and post-testing ($Z = 1.00$, p 0.32) which was expected since most SLPs (n= 52) correctly classified this child in the pre-test and continued to correctly classify in the post-test. [Insert Figure 4 about here]

Discussion. We developed a Knowledge Translation (KT) Intervention to close a knowledge-to-practice gap in Ontario's Preschool Speech and Language Program, namely clinicians' abilities to use the CFCS to accurately classify children's typical communication performance. The intervention was designed considering all components of Diffusion of

Innovations [12] as well as the message source and message content components of the Communication Persuasion Matrix [16].

We used a web-based KT intervention for three main reasons. First, Web-based interventions typically serve to increase awareness of the desired change [14, 27, 28]. Second, clinicians could review the materials independently at a time that fit in their schedule. Third, it was a low-cost way to reach a large number of clinicians in a short period of time [14, 27, 28]. Reaching a broad audience at a low cost was a particularly important factor, as ultimately, the tool may be disseminated to over 400 other SLPs across the province. KT interventions like ours (that use written materials only) have been found to be most effective when combined with an additional KT method [14, 28]. As such, we included a visual reminder tool in the form of a print-out of the CFCS decision flow-chart (see Figure 1 in the Appendix) that clinicians could download and print after completing the post-test. This print-out was intended both to serve as a reminder for clinicians to classify by level of function, and to be used to facilitate shared decision-making with families [27, 28].

Our intention was to use the intervention to increase the consistency with which speech-language pathologists used the Communication Function Classification System (CFCS) in practice. Specifically, we wanted to: (a) increase clinicians' understanding of the methods for using the CFCS, (b) increase clinicians' abilities to classify children's communication skills accurately, and (c) encourage clinicians' intention to use the tool in the standardized way in the future. This was a pilot test of the KT intervention, and only three regional groups of SLPs working in Southwestern Ontario participated in this phase of the investigation. Sixty-three SLPs completed pre-testing online and reviewed the KT PowerPoint Intervention materials. Fifty-two of those SLPs completed post-testing.

By clinicians' self-reports, the KT intervention successfully increased the clarity of methods for using the CFCS, clinicians' intentions to use the CFCS in collaboration with families and considering only level of function, and clinicians' abilities to accurately classify a typically developing 12-month-old child.

We used clinical scenarios of typically developing children at two different ages (12 and 48 months) to test whether clinicians' abilities to classify accurately by level of function improved after reviewing the intervention materials. Scenarios of typically developing children were used as we felt they were less prone to variation in individual interpretation than scenarios for children with communication disorders might be. Classifications were significantly more accurate at post-test for the typically developing 12-month-old child; however, classifications for the 48-month-old child were not significantly different at post-test. Classifications of older children, especially those that are typically developing, may be more straightforward decisions. In the future, it would be interesting to evaluate clinicians' abilities to classify typically developing children at 24 and 36 months as well as 12 and 48 months. Several SLPs commented they could have benefited from more practice with practice scenarios, and including these additional scenarios may improve the effectiveness of the intervention.

Limitations. We acknowledge some limitations with respect to the study design used to evaluate the KT intervention. We used a pre-test/post-test design to evaluate the effectiveness of our KT Intervention. This type of design is known to be useful for studying the effects of an intervention delivered to all members of a population [24], but there are also known drawbacks. The main disadvantage of this type of design is the lack of control group. Without a control group, we cannot definitively say that the observed changes are due to the intervention or to factors outside of the intervention [24]. However, in the case of the reported intervention,

because the pre- and post-test measures were taken in such close proximity, it is reasonable to conclude that any observed changes were the result of the intervention rather than other factors.

Many of the questions included in pre- and post-testing were self-report in nature. We know that self-report questionnaires are an effective way of evaluating KT interventions in a healthcare setting [29]; however, this method of evaluation is not without its limitations. The accuracy of data from self-report surveys can be influenced by social desirability bias, the tendency for clinicians to answer questions in the way they think their clinical practice *should be* rather than their *actual practice* [29]. This bias may have impacted the accuracy of our data. In an attempt to mitigate this bias, we made responses anonymous, so SLPs would not feel overt pressure to answer 'correctly'. We also included clinical scenarios to determine whether self-report was the same as actual ability to classify children's skills.

Implications. Our intervention was successful with this group of SLPs working in one region of the PSLP –people who in principle already knew the material being disseminated. In terms of future research, we plan to conduct a six month follow-up of the group of SLPs who participated in this study to assess whether they followed through on their intentions to change practice, and whether they sustained their ability to accurately classify typically developing children using the CFCS. We also hope to work in collaboration with the Ontario PSLP to facilitate dissemination of this intervention to their over 400 SLPs working across the province. With all SLPs using the CFCS in the standardized ways, the PSLP will be able to establish reliability and validity within their provincial database, and use this data for effective program evaluation in the future.

Conclusions. This study showed that a simple web-based KT intervention was successful in increasing clinicians' understanding of how the CFCS should be used; increasing intention to use

the tool in the standardized way; and increasing clinicians' abilities to classify clinical scenarios of typically-developing children. Further research is warranted into the effectiveness of this intervention with the larger group of SLPs, as well as with more varied clinical scenarios.

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Declarations of Interest. The authors report no declarations of interest.

References

1. Ontario Ministry of Children and Youth Services; Results-Based Plan Briefing Book 2013-14. 2013. Toronto, ON: Ministry of Children and Youth Services [2013 October 16]. Available from: http://www.children.gov.on.ca/htdocs/English/documents/about/Results_2013-2014.pdf.
2. Thomas-Stonell NL, Oddson B, Robinson B, Rosenbaum PL. Development of the FOCUS (Focus on the Outcomes of Communication Under Six), a communication outcome measure for preschool children. Dev Med Child Neurol. 2009; 52(1):47-53.
3. Hidecker MJC, Paneth N, Rosenbaum PL, Kent RD, Lillie J, Eulenberg JB, Chester K, Johnson B, Michalsen L, Evat M, Taylor K. Developing and validating the Communication Function Classification System for individuals with cerebral palsy. Dev Med Child Neurol. 2011; 53(8):704-710.
4. Thomas-Stonell N, Washington K, Oddson B, Robertson B, Rosenbaum P. Measuring communicative participation using the FOCUS©: Focus on the Outcomes of Communication Under Six. Child Care: Health Dev. 2013; 39(4):474–480.
5. Thabane L, Ma J, Chu R, Cheng J, Ismaila A, Rios LP, Robson R, Thalbane M, Giangregorio L, Goldsmith CH. A tutorial on pilot studies: the what, why and how. BMC Med Res Methodol. 2010; 10:1.
6. Morris C, Kurinczuk JJ, Fitzpatrick R, Rosenbaum PL. Who best to make the assessment? Professionals' and families' classifications of gross motor function in cerebral palsy are highly consistent. Arch Disab Child. 2006; 91(8):675–679.
7. Di Rezze B, Cousins M, Rosenbaum P. Speaking their language: developing a tool to classify the everyday social communication abilities of preschool-aged children with ASD. Autism Matters. 2012;Winter:31-32.
8. Rosenbaum PL, Palisano RJ, Bartlett DJ, Galuppi BE, Russell DJ. Development of the Gross Motor Function Classification System for cerebral palsy. Dev Med Child Neurol. 2008; 50(4):249–253.
9. Rosenbaum PL, Eliasson AC, Hidecker MJC, Palisano RJ. Classification in childhood disability: focusing on function in the 21st century. J Child Neurol. Published online 7 May 2014 DOI: 10.1177/0883073814533008.
10. Colquhoun HL, Letts LJ, Law MC, MacDermid JC, Missiuna CA. A scoping review of the use of theory in studies of knowledge translation. Cdn J Occup Ther. 2010; 77(5):270-279.
11. French SD, Green SE, O'Connor DA, McKenzie JE, Francis JJ, Michie S, Buchbinder R, Schattner P, Spike N, Grimshaw JM. Developing theory-informed behaviour change interventions to implement evidence into practice: a systematic approach using the Theoretical Domains Framework. Implement Sci. 2012; 7:38.
12. Rogers EM. Diffusion of innovations (5th ed.). New York: Free Press; 2003.
13. Sahin I. Detailed review of Rogers' diffusion of innovations theory and educational technology-related studies based on Rogers' theory. *Turkish Online J Educ Tech.* 2006; 5(2):14-23.
14. MacDermid JC, Graham ID. Knowledge translation: putting the ''practice'' in evidence-based practice. Hand Clinics. 2009; 25(1):125-143.

15. Robinson L; A summary of Diffusion of Innovations [internet]. Enabling Change; 2013 Aug 22; Available from: www.enablinghcange.com.au/Summary_Diffusion_Theory.pdf.
16. McGuire WJ. Public Communication Campaigns, Third Edition. Thousand Oaks CA: Sage Publiscations; 2001. Input and output variables currently promising for constructing persuasive communications; 22-48.
17. Kreuter MW, McClure SM. The role of culture in health communication. *Ann Rev Public Health.* 2004; 25:439-455.
18. Wilson PM, Petticrew M, Calnan MW, Nazareth I. Disseminating research findings: what should researchers do? A scoping review of conceptual frameworks. Implement Sci. 2010; 5:91.
19. Corcoran N. Communicating Health: Strategies for Health Promotion. Thousand Oaks CA: Sage Publications; 2007. Theories and models in communicating health messages; 5-31.
20. Gitlin LN. Introducing a new intervention: an overview of research phases and common challenges. Am J Occup Ther. 2013; 67(2):177-184.
21. Dumas JE, Lynch AM, Laughlin JE, Phillips Smith E, Prinz RJ. Promoting intervention fidelity: conceptual issues, methods, and preliminary results from the early alliance prevention trial. Am J Prev Med. 2001; 20 Suppl 1:38-47. 1
22. MacDermid JC, Miller J, Gross AR. Knowledge translation tools are emerging to move neck pain research into practice. Open Orthopaed J. 2013; **7** Suppl 4:582-593.
23. The Cochrane Collaboration. Cochrane Effective Practice and Organisation of Care Group [Internet]. Ottawa ON; 2014; Available from http://epoc.cochrane.org/epoc-author-resources.
24. Ray WJ. Methods Toward a Science of Behavior and Experience, 5th Edition. Thousand Oaks CA: Brooks/Cole Publishing Company; 1997. Quasi-experimental, correlational and naturalistic observational designs; 257-288.
25. StataCorp. Stata Statistical Software: Release 13. College Station, TX: StataCorp LP; 2013.
26. Creswell JW. Qualitative Inquiry and Research Design: Choosing Among Five Approaches, 3rd Edition. Thousand Oaks: Sage Publications; 2013.
27. Grimshaw JM, Eccles MP, Lavis JN, Hill SJ, Squires JE. Knowledge translation of research findings. Implement Sci. 2012; 7:50.
28. National Institute for Health and Clinical Excellence; How to change practice [internet]. London UK: National Institute for Health and Clnical Excellence; 2007 Dec 12. Available from: http://www.nice.org.uk/media/AF1/73/HowToGuideChangePractice.pdf.
29. Boyko JA, Dobbins M, DeCorby K, Hanna S. Comparison of the use of self-report surveys and organizational documents in knowledge translation research. Cdn J Program Eval. 2013; 28(1):67–85.

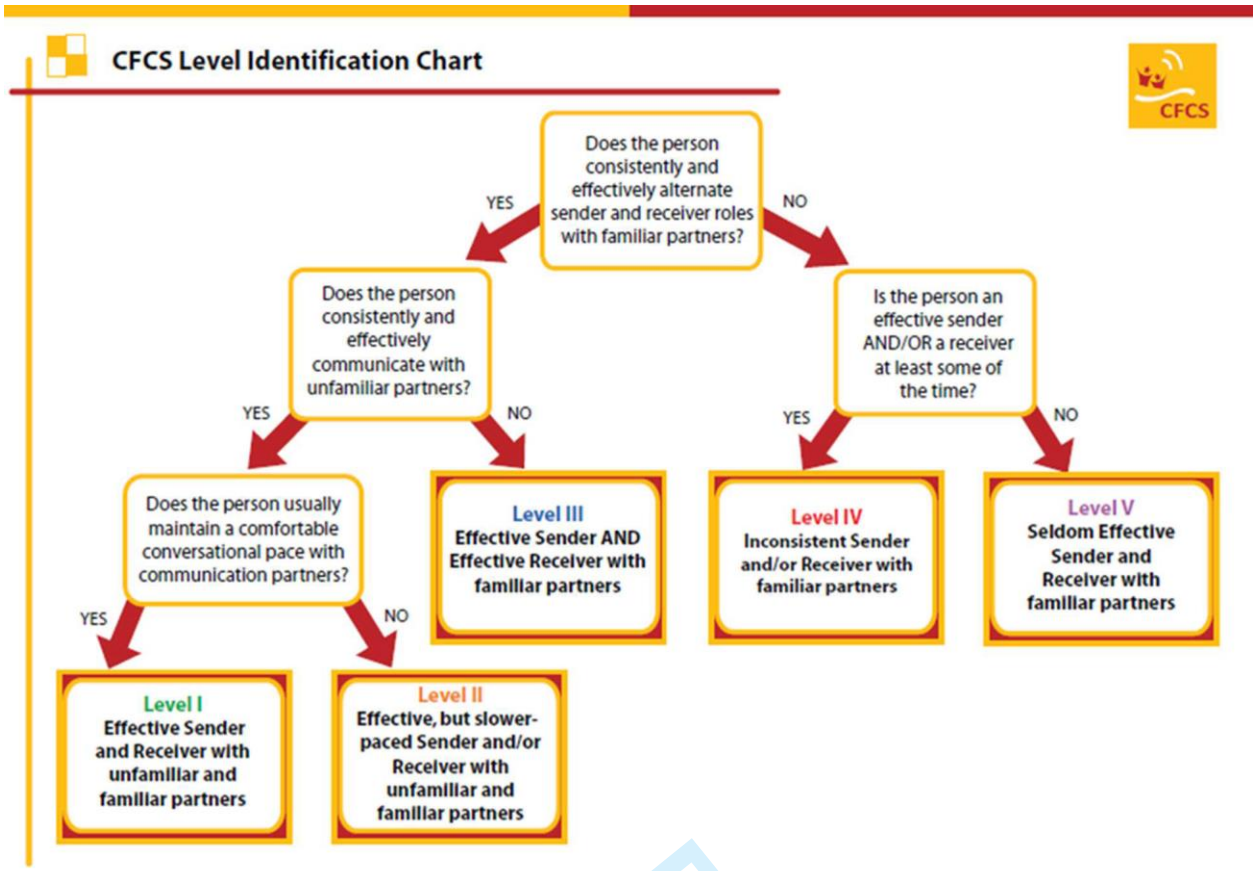

Figure 1. The five levels of function on the Communication Function Classification System [http://cfcs.us/].

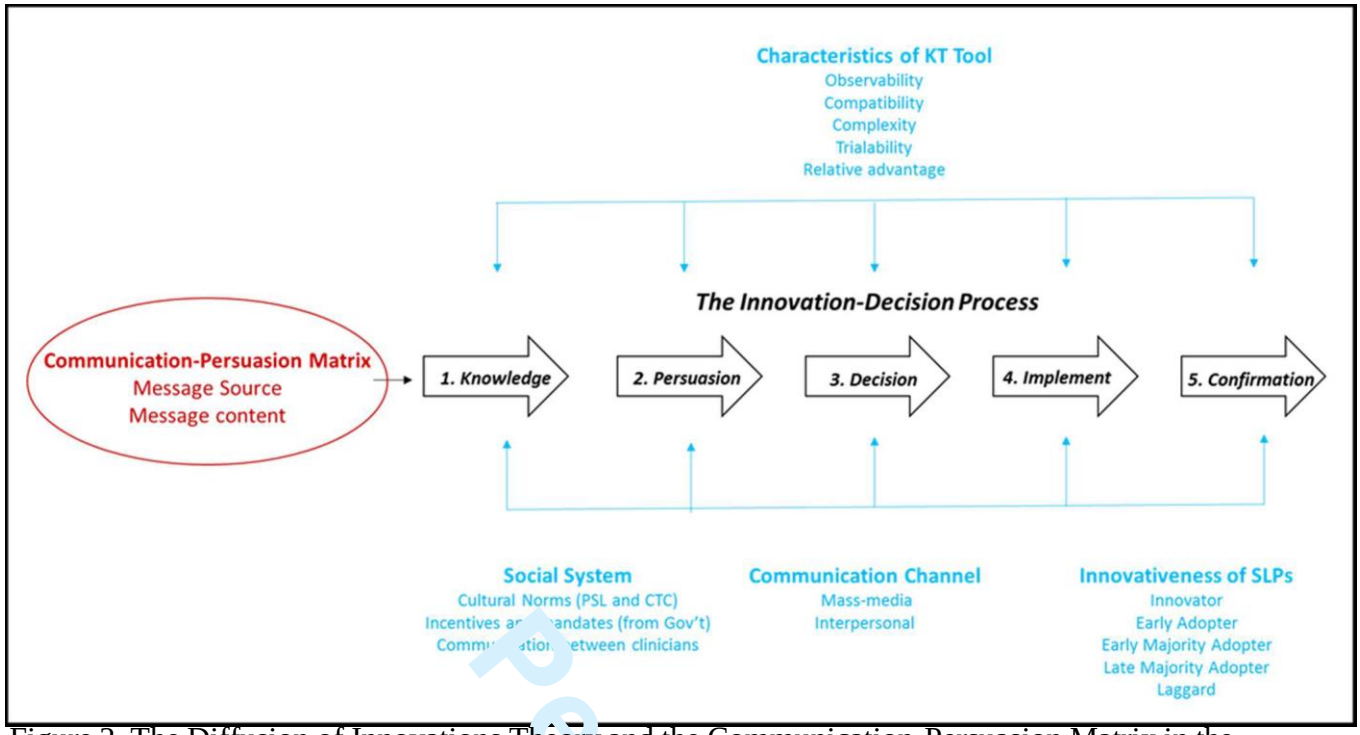

Figure 2. The Diffusion of Innovations Theory and the Communication-Persuasion Matrix in the context of standardizing use of the Communication Function Classification System (CFCS) within a group of SLPs in Ontario's Preschool Speech and Language Program.

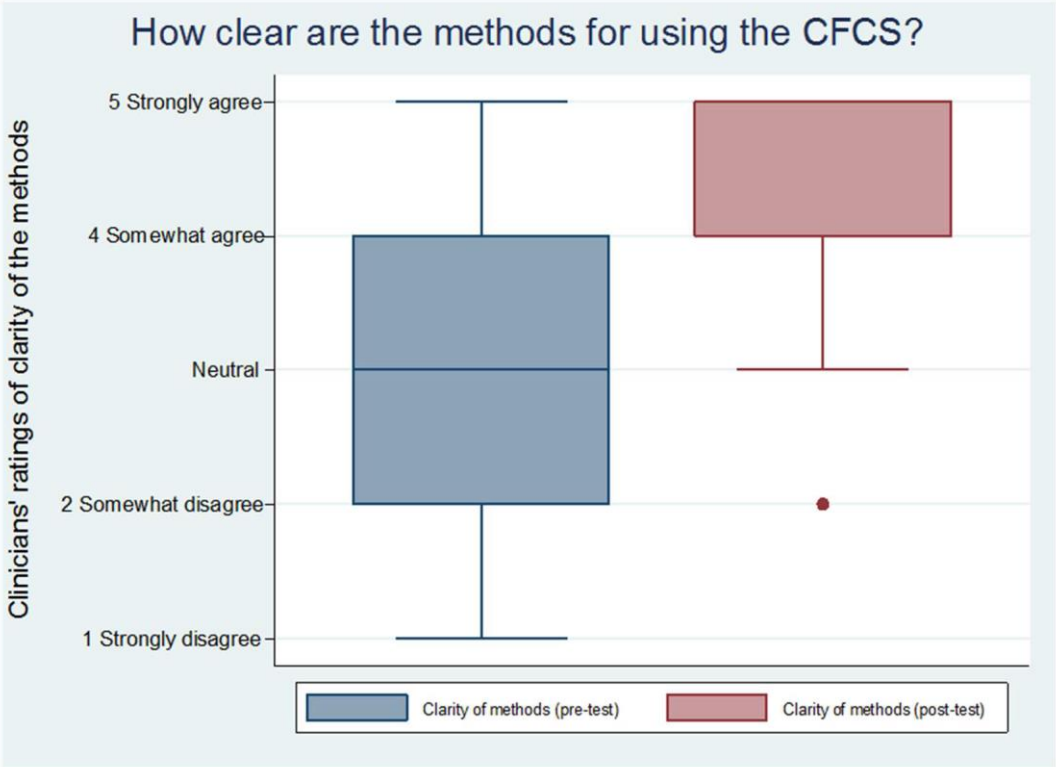

Figure 3. Clinicians' reported understanding of the methods for using the CFCS at pre-test versus at post-test.

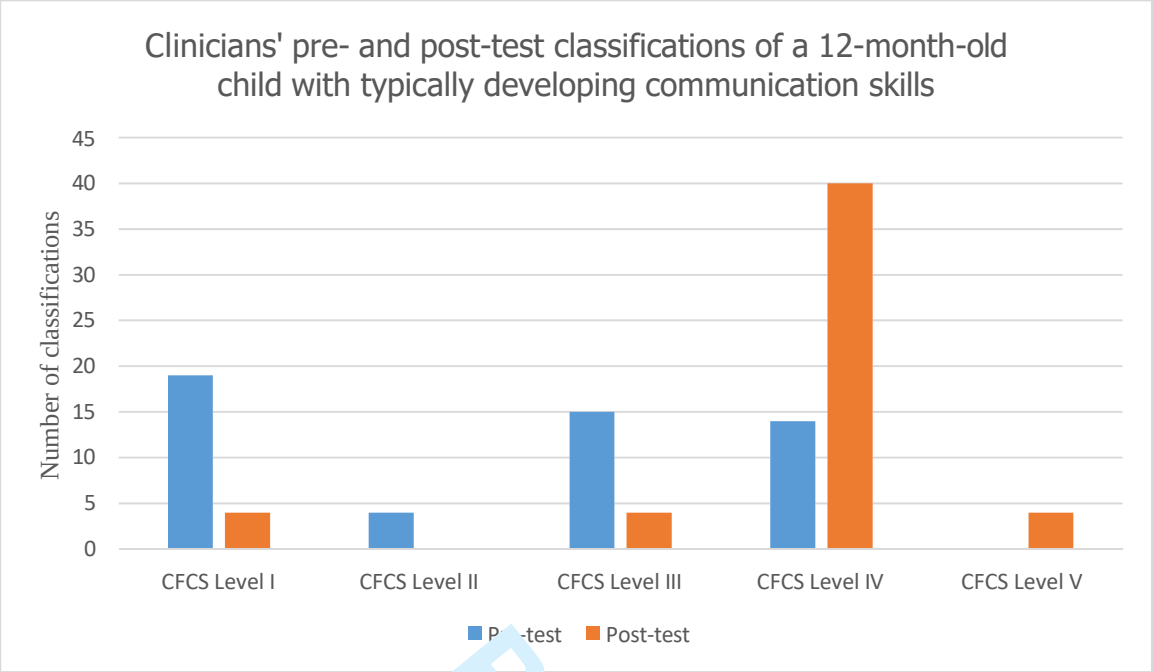

Figure 4. Frequency of Clinicians' classifications of the typically developing child in Scenario 1 at pre-test and post-test.

Table 1.

Characteristics of the innovation that are relevant to the content of the KT intervention to establish consistent use of the CFCS within the PSLP.

Characteristic *(all quotes from Rogers, 2003)*	**Considerations for the development of a knowledge translation intervention in the PSLP**
Relative advantage "*The degree to which an innovation is perceived as better than the idea it supersedes*"	The following information about the advantages of establishing standardized use of the CFCS were included in the intervention: 1) Establishing consistent use of the CFCS tool will allow for more accurate outcome measurements. With these, we will be better able to determine the effectiveness of our interventions. 2) Outcomes data can be reliably used to inform decisions about service delivery and resource allocation.
Compatibility "*The degree to which an innovation is consistent with existing values, experiences, and needs of potential adopters*"	Use of this tool has already been mandated by the PSLP. Clinicians are already familiar with the tool as it has been in use for approximately two years. All that is required is a minor shift in how the tool is used, keeping the innovation relatively consistent with current practices.
Complexity "*The degree to which an innovation is difficult to understand and use*"	The shift in use of the CFCS was relatively simple, however we took care to ensure information was conveyed as clearly and concisely as possible. Plain language was used to ensure messages were easy to understand.
Trialability "*The degree to which an innovation can be experimented with on a limited basis*"	Five sample clinical scenarios were included in the KT intervention to allow SLPs to practice matching scenarios with CFCS levels. This was included to provide clinicians with feedback on whether they were using the tool correctly.
Observability "*The degree to which results of an innovation are visible to others*"	Clinicians were told prior to participating in the KT intervention that their responses would be used to help establish consistent use of the tool across the province. Also included in the intervention was information about who was already using the CFCS and why they liked it.

Table 2.

Characteristics of Individuals at the five Levels of Innovation and Considerations for Working with them.

Characteristics of Individuals at 5 Levels of Innovation *(MacDermid, Miller & Gross, 2013)*	**Relevance for KT intervention development** *(Berwick, 2003; Robinson, 2013)*
Innovators: First adopters of new tools. *Daring, risky, cope well with uncertainty, understand complex technical information.*	Innovators can be identified and invited to participate as partners in the KT intervention, acting as local representatives for the project.
Early Adopters: Early users of new ideas. May influence uptake for the early majority. *Hold the greatest degree of opinion leadership, role models, respected by peers, successful.*	Early adopters will be those clinicians who already have a sound understanding of the CFCS and its use. They could be identified and promoted as local intervention leaders or peer educators.
Early Majority: Probable users of useful tools. Need rationale for the use of a new tool and evidence of utility. *Interact with peers, not opinion leaders, deliberate before adopting ideas. The largest group in a system.*	The early majority responds to endorsements from credible people. The intervention will be delivered by a respected leader in the field. Additionally, evidence of the tool's utility will be included in the content of the intervention.
Late Majority: Unlikely to use new tools without a targeted intervention. Follow the lead of the early majority. *Approx. 1/3 of a target audience, react to pressure from peers, motivated by necessity, skeptical, cautious.*	Social norms will be gathered (i.e., how others are using the tool, what others think of the tool) and used to increase this group's motivation to comply with the new standards.
Laggards: Unlikely tool users even with substantial investment in promoting uptake. *More isolated, suspicious of innovation, focus on the past, require long periods for making decisions.*	The intervention will be easily accessible and messages within the intervention will be clear and concise to maximize understandability and familiarity with the new standards. A visual reminder tool will be disseminated and may be particularly useful to this group which is known to struggle with change.

Table 3.

Participant Responses to Pre-test Questions about use of the CFCS

	Responses N (%)					Descriptive Statistics
	Strongly disagree (1)	Somewhat disagree (2)	Neutral (3)	Somewhat agree (4)	Strongly agree (5)	
I regularly use the CFCS tool	7 (13%)	1 (2%)	6 (12%)	16 (31%)	22 (42%)	*Median* = 4.0 *IQR* = 5.0 – 3.0
The methods for using the CFCS are clear to me	4 (8%)	16 (31%)	8 (15%)	18 (34%)	6 (12%)	*Median* = 3.0 *IQR* = 4.0 – 2.0
I complete the CFCS considering only level of function	7 (13.5%)	7 (13.5%)	4 (8%)	20 (38%)	14 (27%)	*Median* = 4.0 *IQR* = 5.0 – 2.0
I complete the CFCS in collaboration with families	23 (45%)	8 (15%)	9 (17%)	8 (15%)	4 (8%)	*Median* = 2.0 *IQR* = 3.0 – 1.0