The knowledge and perceptions of prospective teachers and speech language therapists in collaborative language and literacy instruction

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Abstract

Successful collaboration among speech and language therapists (SLTs) and teachers fosters the creation of communication friendly classrooms that maximize children's spoken and written language learning. However, these groups of professionals may have insufficient opportunity in their professional study to develop the shared knowledge, perceptions and attitudes required for effective collaboration. This study examined the knowledge and perceptions of student teachers and student SLTs in the areas of language concepts, junior school literacy curriculum, service delivery and professional collaboration. An online survey was completed by 58 student primary school teachers and 37 student SLTs in their final year of professional study. The results indicated that these groups possessed limited understanding of each other's expertise in literacy curriculum and spoken language concepts. Both groups demonstrated minimal knowledge of spoken–written language relationships and how SLTs can assist to develop children's orthographic knowledge. Participants demonstrated acceptance of indirect methods of classroom-based service delivery (e.g. SLT acting as a consultant) but were less accepting of direct methods of classroom-based service delivery (e.g. shared teaching). Both groups also reported minimal experience with SLT–teacher collaboration during their pre-service education. The data suggest pre-service inter-professional education (IPE) with a focus on children's early literacy learning is warranted to prepare prospective SLTs and teachers for collaborative instruction that enhances children's communication.

Keywords

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I Introduction

Collaboration among teachers and speech and language therapists (SLTs) is a critical element for the creation of communication friendly classrooms (ASHA, 2010; Squires et al., 2013). More specifically, the blending of SLTs' expertise of language structure and development with teachers' expertise of literacy curriculum and pedagogy can assist with the provision of explicit and differentiated oral and written language instruction in the first years of school (Kamhi et al., 2001; Squires et al., 2013). Intervention studies have demonstrated that classroom instruction that is collaboratively implemented by SLTs and teachers advances school-age children's oral vocabulary, phoneme awareness, decoding, reading comprehension and spelling (Carson et al., 2013; Throneburg et al., 2000). Moreover, positive language and literacy outcomes have extended to children with and without spoken language difficulties (Carson et al., 2013; Throneburg et al., 2000).

There are concerns, however, that collaborative classroom-based work is not being executed by SLTs and teachers effectively or frequently (Brandel and Loeb, 2011; Cirrin et al., 2010; Ehren, 2000; McCartney et al., 2011). McCartney et al. (2011) evaluated a consultative approach to service delivery where classroom teachers, learning support teachers and classroom assistants implemented language learning activities for school-age children (n = 38) with specific language impairment (SLI). Pre–post comparisons over four months revealed no significant improvement in the children's oral language or reading comprehension. The authors posited that the language activities were not implemented consistently or systematically enough to be effective for children with SLI. Similarly, Ehren (2000) suggested that service delivery approaches that involve the SLT directly in classroom instruction also often fail to provide sufficient individualization and frequency of speech and language learning activity. In addition, SLTs and teachers may not be taking full opportunity to collaboratively develop communication friendly classrooms. In a national American survey, school-based SLTs (n = 1897) reported the majority of their service delivery used a withdrawal rather than classroom-based model (Brandel and Loeb, 2011). Taken together, this evidence suggests that collaboration among SLTs and educational professionals must be further explored to understand what is limiting their ability to collaboratively design effective language and literacy instruction.

The lack of effective classroom-based collaboration among SLTs and teachers may be partly attributed to the adoption of service delivery methods that provide limited opportunity to blend their respective areas of expertise. For instance, when the primary role of SLTs in classroom-based service delivery is the provision of materials and learning activities for teachers to implement, as in McCartney et al. (2011), there is likely minimal focus on the sharing of knowledge between professionals (Hartas, 2004). The blending of knowledge, perspectives and experiences to create new knowledge has been highlighted as an essential part of true collaboration (WHO, 2010). Thus, it is crucial that this exchange of expertise is incorporated into methods of service delivery adopted by SLTs and teachers to create communication friendly classrooms.

The fields of health sciences and social care, however, have recognized that professionals from differing backgrounds require support and education to build the shared understandings that underpin collaboration. Programmes, referred to as inter-professional education (IPE), have been implemented to establish shared knowledge, attitudes and skills among complementary professions such as medicine, nursing, social work and physiotherapy (WHO, 2010). There is accumulating evidence from these applications that IPE enhances inter-professional collaboration that translates to improved outcomes for the individuals and families with whom these professionals work (Hammick et al., 2007; WHO, 2010).

Proponents of IPE state that such learning experiences should ideally begin at a pre-service level (Barr et al., 2005). Many examples exist of IPE programmes among students of health-related

professions, including speech and language therapy (e.g. Hammick et al., 2007; WHO, 2010). In contrast, examples of IPE among student SLTs and student teachers are rare although arguments for the implementation of such programmes are emerging (Goldberg, 2014). For instance, an exploratory study demonstrated that a three-hour inter-professional experience with student SLTs and student teachers improved their awareness of service delivery approaches that foster integration of services (Suleman et al., 2014). However, this IPE programme was based on a health-oriented framework, which may not be entirely appropriate for preparing students for collaboration within educational contexts. Customization of IPE for a particular group of participants and their professional backgrounds is essential for promoting inter-professional learning that translates to workplace collaboration (Hammick et al., 2007).

Determining to what extent current models of professional study build shared understandings among SLTs and teachers is necessary to develop an evidence base to guide the customization of future pre-service IPE. At present, only studies of in-service SLTs and teachers (i.e. experienced professionals) exist to illustrate professional similarities and differences. Hartas (2004) surveyed SLTs ($n = 17$) and teachers ($n = 25$) regarding barriers and facilitators to SLT–teacher collaboration. SLTs reported the need for teachers to better understand therapists' roles and the consequences of communication difficulties on children's academic learning and social development. In contrast, teachers suggested that SLTs needed to be more informed about curriculum and classroom management. SLTs and teachers also reported a lack of mutual understanding around the concept of collaboration (Hartas, 2004). In contrast, shared understandings were demonstrated by a study that surveyed teachers ($n = 51$) and SLTs ($n = 21$) about collaborative, classroom-based interventions (Beck and Dennis, 1997). Both groups had similar views regarding the advantages and disadvantages of classroom-based intervention and showed preference for the same types of classroom-based service delivery. These studies demonstrate the importance of investigating the extent of shared understandings across multiple areas (e.g. language–literacy, classroom curriculum, service delivery) to ensure that IPE programmes build cross-profession knowledge in a range of areas where mutual understandings do not already exist.

However, relying on only research of in-service teachers and SLTs to guide decisions about how to support growth of collaborative ability at a pre-service level is problematic given that the impact of work experience on these skills is unknown. Thus, it is essential to investigate shared understandings of student SLTs and student teachers to better inform implementation of IPE within university programmes. Furthermore, employing methodology that enables comparison of multiple students across different universities is required to increase confidence that findings are representative of student populations. Finally, investigating the extent of shared understandings in the areas that existing research has highlighted as important to SLT–teacher collaboration is crucial to determine what content should be prioritized for inclusion into pre-service IPE programmes.

At present there are no studies known to the authors that explore the inter-professional understandings of prospective SLTs and teachers. Thus, the current exploratory study employed a national survey of New Zealand student teachers and student SLTs in their final year of university study to examine what they know and think about language concepts, literacy curriculum, service delivery and professional collaboration. Such information is necessary for understanding how to support students' transitions to collaborative professional practices in a manner that will ultimately impact their ability to co-create communication friendly classrooms.

The specific research questions were:

1. To what extent do student SLTs and student teachers differ in their conceptual knowledge of spoken and written language and junior school literacy curriculum?

2. To what extent do student SLTs and student teachers differ in their perceptions of service delivery?
3. What are student SLTs' and student teachers' conceptualizations of SLT–teacher collaboration?

II Method

1 Participants

Student SLTs and student teachers in their final year of professional study in the three New Zealand universities that prepare both SLTs and teachers were invited by email to complete an online survey. Only student teachers completing a degree in primary school teacher education (school years 1–8) were invited to participate in the study.

University lecturing staff distributed an email invitation to students to complete the online survey. The invitation was sent to 125 student SLTs and 162 student teachers in their final year of study. Invitations were sent out near the end of the academic year to ensure that both groups of students had completed literacy coursework. Participants who had a previous qualification in teaching and/or speech and language therapy were excluded. Forty responses were received from student SLTs. One response was incomplete and two responses were discounted due to the participants not meeting inclusion criteria, leaving 37 usable forms (i.e. response rate of 29.6%). Sixty-eight responses were received from student teachers. Ten responses were incomplete leaving 58 usable forms (i.e. response rate of 35.8%). Within social science research, Fricker and Schonlau (2002) found that response rates varied from 8% to 44% for online surveys. Thus, the response rates obtained appear to be in line with the upper range gained in comparable research.

2 Survey instrument

The survey instrument was adapted from previous surveys that assessed teachers' linguistic knowledge (Bos et al., 2001; Brady et al., 2009). Additional questions were added to assess knowledge of classroom literacy curriculum and perceptions regarding service delivery and professional collaboration. The survey was piloted with two SLTs and three teachers to obtain feedback about its length, clarity of questions and terminology, and appropriateness of the items. Following piloting, one question was omitted due to having limited relevance to current literacy practices in New Zealand classrooms. Another question was omitted due to providing overlapping information with another item. The wording of 12 questions was simplified, and four questions were re-written to enhance their clarity.

The survey consisted of four sections (see Appendix 1). The first section (Background Information) consisted of six close-ended questions regarding educational and work experience. The second section (Language and Literacy Concepts) consisted of 24 multiple choice questions that sought participants' understanding of concepts relevant to children's oral language and early literacy learning. Content of the questions reflected three primary areas: (1) spoken language, (2) speech to print relationships and (3) junior classroom literacy curriculum. Eight questions sought understanding of SLT-oriented knowledge by focusing on spoken language concepts (e.g. phoneme, phonological disorder, voicing). Eight questions sought understanding of SLT- or teacher-oriented knowledge by focusing on the relationship between spoken and written language structure (e.g. decoding, grapheme, digraph). Finally, eight questions sought understanding of teacher-oriented knowledge by focusing on literacy-related concepts from the New Zealand Curriculum and/or from classroom literacy practices (e.g. Guided Reading, running records, chunking). Because

certain items were designed to include content that was more oriented either towards speech and language therapy or teaching, the question order was randomized to prevent participants experiencing testing fatigue. All multiple choice questions had five options including an option of 'not sure' to dissuade participants from guessing if they did not know the answer.

The third section of the survey (Professional Roles of Teachers and Speech and Language Therapists) consisted of four close-ended questions about different elements of service delivery. Two closed-ended questions asked participants to identify to what degree SLTs and teachers should participate in the assessment and teaching of various spoken and written language skills. Participants were asked to choose who should participate in assessing/teaching each skill (i.e. SLT Only, Mostly SLT, Both SLT and Teacher, Mostly Teacher, and Teacher Only). The remaining two close-ended questions sought participants' perceptions of appropriate service delivery methods for SLTs and how often SLTs should work in classrooms.

The final section of the survey (Inter-professional Experience) included a closed-ended question asking the participants to recall whether they had been provided with examples of collaboration between teachers and SLTs during their coursework and/or practicum experience. Participants who answered 'yes' were asked to briefly describe these experiences.

3 Reliability

Inter-rater reliability was calculated for the open-ended question regarding collaborative experiences. A theme-based analysis was conducted by creating categories present in the participants' responses and then classifying the responses according to these categories. An independent colleague also coded the responses using the identified categories. The raters agreed on the coding of 85% of the items. The remaining items were discussed and recoded until 100% agreement was achieved.

III Results

1 Background information

Nearly three-quarters of student SLTs (73%) reported practicum experience in educational settings. Over half of the student SLTs (59%) reported having direct experience working in a classroom setting with a child who had a speech and/or language impairment. Approximately half (52%) of student teachers reported having direct experience working with children with speech and/or language impairment.

2 Group knowledge of language and literacy

Table 1 illustrates average group performance on knowledge of spoken language, speech to print and literacy curriculum concepts. An independent samples *t*-test and effect size analysis was conducted to compare group means. Cohen's *d* was calculated and interpreted based on standards recommended by Cohen (1988) with 0.2, 0.5 and 0.8 as small, medium and large effect sizes, respectively.

Group performance was significantly different on all three sections of conceptual knowledge ($p < 0.05$). Student SLTs displayed greater understanding of spoken language and speech to print concepts. The effect size was large ($d = 1.91$) for spoken language concepts and medium ($d = 0.66$) for speech to print concepts. Student teachers demonstrated superior knowledge of literacy curriculum concepts ($d = 3.49$).

Table 1. Comparison of group performance on understanding of language and literacy concepts.

	Student SLTs		Student teachers		T	p	Cohen's d
	M	SD	M	SD			
Spoken language** (maximum = 8)	5.89	1.27	3.43	1.30	9.10	< 0.00	1.91
Speech to print* (maximum = 8)	4.32	1.27	3.34	1.68	3.03	0.003	0.66
Curriculum** (maximum = 8)	2.03	1.32	6.38	1.17	16.82	< 0.00	3.49

Notes. SLTs = speech and language therapists. *Significant at the 0.05 level. **Significant at the 0.001 level.

Of the spoken language items, at least 70% of both groups demonstrated understanding of expressive vocabulary, phoneme and oral language. However, less than 40% of both groups correctly identified the different levels of phonological awareness as syllable, onset–rime and phoneme awareness. Less than half of student teachers (43.1%) compared to 62.2% of student SLTs identified morphological awareness as an awareness of word parts that carry meaning. Student teachers also demonstrated limited familiarity with the articulatory features of vowels (25.9%) and voicing (3.4%).

Both groups demonstrated limited understanding of several speech to print concepts. For instance, the majority of both groups did not identify a digraph as two combined letters that represent a single speech sound or decoding as the translation of a printed word into sound. Student SLTs tended to identify phonological awareness (43.2%) as opposed to phonics (29.7%) as a reading method that focuses on teaching the application of speech sounds to letters. In addition, only 54.1% of student SLTs and 37.9% of student teachers correctly identified a grapheme as a written unit that represents a single speech sound.

Of the curricular items, student SLTs (64.9%) demonstrated the greatest understanding of Reading Recovery by identifying it as a reading intervention for six year old children. However, less than half of student SLTs correctly identified other common literacy instructional activities or terminology specific to the New Zealand curriculum. For instance, only 13.5% of student SLTs identified Guided Reading as a small group reading activity with levelled instructional materials and 18.9% of student SLTs identified running records as an assessment of reading behaviours. Student teachers demonstrated limited familiarity only with the concept of 'constrained reading skills' with less than 20% identifying it as referring to word decoding.

3 Group perceptions of service delivery

a   Professional responsibilities. The groups tended to identify some degree of shared role (i.e. Mostly Teacher, Both Teacher and SLT, or Mostly SLT) for the professional activities in both spoken and written language. Chi square tests of independence showed that each group was more likely to indicate a more prominent role for their own profession in the assessment and teaching of spoken language skills. Comparisons were made between the groups' responses regarding the appropriate degree of SLT and teacher participation for the eight different professional activities in spoken language. Results indicated statistically significant differences between seven of the eight comparisons ($p < 0.05$). Chi square results for the assessment of articulation, phonological awareness and vocabulary were $\chi^2(3) = 18.77$, $p < 0.001$; $\chi^2(2) = 8.87$, $p = 0.012$; $\chi^2(3) = 15.50$, $p = 0.001$, respectively. Chi square results for the teaching of articulation, phonological awareness, vocabulary and morphological awareness were $\chi^2(3) = 16.26$, $p = 0.001$; $\chi^2(2) = 15.13$, $p = 0.001$; $\chi^2(3) = 12.03$, $p = 0.007$; $\chi^2(3) = 11.01$, $p = 0.012$, respectively. The assessment of morphological awareness was the only
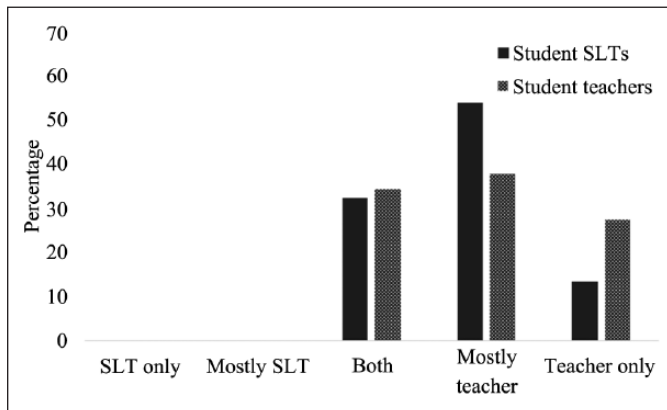
Figure 1. Group perceptions of the appropriate degree of professional involvement in reading instruction.
Note: SLT = speech and language therapist.

professional activity in spoken language skills for which there was no statistical difference between groups ($\chi^2(3) = 7.32$, $p = 0.062$). The majority of both groups identified the assessment of morphological awareness as a professional activity appropriate for both the teacher and SLT or for the teacher mostly.

Comparisons were also made between the groups' responses regarding the appropriate degree of SLT and teacher participation for the four different professional activities in written language (i.e. assessment and teaching of reading and spelling). Chi square tests of independence suggested that there was no relationship between group and perceptions of appropriate professional roles in written language. The majority of both groups tended to indicate that teachers should play the primary role (i.e. mostly teacher, teacher only) in assessment and teaching of reading and spelling. Figure 1 exemplifies this trend for reading instruction. Chi square results for assessment of reading and spelling were $\chi^2(2) = 3.76$, $p = 0.153$ and $\chi^2(2) = 2.74$, $p = 0.254$, respectively. Chi square results for the teaching of reading and spelling were $\chi^2(2) = 3.38$, $p = 0.185$ and $\chi^2(2) = 5.43$, $p = 0.066$, respectively.

b   Service delivery methods. At least 80% of both student groups identified four of the seven service delivery options as appropriate for a SLT supporting a child with speech and/or language impairment: these included work directly with a child in a quiet room outside the classroom, provide consultation on how the child's teacher could adapt classroom activities for the child, provide professional development to educators, and work with families to help them support their children. A lower proportion of both groups (i.e. 68% of student SLTs and 62% of student teachers) identified a SLT working directly with a child in the classroom as an appropriate intervention method. The two groups were more divided in their responses regarding the appropriateness of shared teaching and involving a teaching assistant in therapy. A little over half (54%) of student SLTs compared to 71% of student teachers selected having a SLT assist a child's teacher to teach a group lesson (i.e. shared teaching) as an appropriate role for a SLT. However, more student SLTs (95%) than student teachers (78%) identified a SLT providing activities for a teaching assistant to do with a child as an appropriate intervention method.

c   Frequency of classroom-based service delivery. A majority of both student groups (62% of student SLTs and 57% of student teachers) responded that SLTs should work often in a classroom setting

to optimize the learning of children who have speech and/or language impairment. Similar proportions of student SLTs (30%) and student teachers (21%) selected that SLTs should sometimes work in a classroom setting. The remaining 8% of student SLTs selected that SLTs should always work in a classroom setting where the remaining 22% of student teachers were divided in their answers (i.e. selecting 'always', 'rarely' or 'not sure').

4 Group perceptions of collaborative service delivery

Nearly half of student SLTs (46%) compared to 5% of student teachers provided their perceptions of collaboration given that the remainder of students reported they had no experience with SLT–teacher collaboration upon which to base their response. Therefore, only a summary of student SLTs' descriptions of collaboration will be presented given the limited response by student teachers (*n* = 3) for this item. The most common description was SLTs providing teachers with intervention goals and resources (41%). Other common responses were SLTs and teachers working together to provide intervention in the classroom (24%) and SLTs seeking assessment information from teachers (24%). Less frequent responses were SLTs educating teachers and/or teaching assistants (18%), SLTs and teachers communicating about their own work with a child (12%), teaching professionals educating SLTs (6%), shared goal setting between teachers and SLTs (6%), and SLTs and teachers participating in formal meetings regarding a child's communication and learning (6%).

IV Discussion

This study explored the knowledge and perceptions possessed by student teachers and student SLTs in language constructs, literacy curriculum, service delivery and professional collaboration. Investigating the shared understandings of these prospective professionals is an essential step in determining their readiness to collaborate to foster children's spoken and written language learning in the classroom environment. This is critical for understanding how to maximize student preparation for education-based careers where inter-professional collaboration is increasingly required to enhance the language and literacy outcomes of children with and without language learning difficulties (ASHA, 2010; Ministry of Education, 2013).

The first aim was to compare participants' conceptual knowledge of language and literacy. As expected, student SLTs possessed superior knowledge of spoken language concepts and student teachers possessed superior literacy curriculum knowledge. This reflects the traditional areas of expertise for SLTs and teachers (McCartney, 1999). While each profession must develop its own areas of expertise that are not shared by the other profession, it remains necessary for SLTs to become knowledgeable about curriculum and teachers to become knowledgeable about language concepts (Ehren, 2000). A shared understanding of basic language, literacy and curricular concepts facilitates communication and an understanding of each other's professional roles thereby preparing professionals for collaborative design of language and literacy instruction (Foorman et al., 2011).

The findings of the current study, however, suggest that student SLTs and teachers do not develop such knowledge during their university programmes. Previous research has indicated that initial teacher education provides insufficient opportunity to develop prospective teachers' knowledge of linguistic concepts that are critical to children's reading and spelling learning (e.g. Carroll et al., 2012; Joshi et al., 2009). The results of the current study align with these findings given that student teachers correctly identified less than half of the linguistic concepts. However, the current findings suggest that student SLTs also do not have adequate experience to develop an understanding of how orthography maps onto spoken language. Student SLTs also demonstrated limited familiarity with literacy curriculum content. They were largely unable to identify common

classroom literacy practices and curriculum documents. Overall, the results confirm previously reported concerns that SLTs and teachers are not well equipped with a body of shared knowledge of the linguistic features of language and of literacy curriculum (Foorman et al., 2011; Hartas, 2004; McCartney, 1999).

The second aim of the study was to explore what students SLTs and student teachers think about different aspects of service delivery. Both groups tended to agree that teachers should be the primary professional involved in the assessment and teaching of reading and spelling. Though these perceptions were shared among the groups, they are not positive for inter-professional collaboration to lift the literacy achievement of children, particularly those with SLI. SLTs' expertise in spoken language enables them to assume an active role in supporting children's orthography learning (Gillon, 2000). Student SLTs and teachers may not have understood how SLTs can assist with explicit instruction in orthography given that both groups appeared to have limited understanding of spoken–written language relationships. However, the fact that student teachers indicated they should assume a prominent role in spoken language skills such as phoneme awareness and morphological awareness bodes well for future teachers being receptive to collaborative, classroom-based work with SLTs to promote spoken language skills that underpin literacy development.

The majority of both groups reported that SLTs should work in classroom settings to optimize the learning of students with language learning difficulties. This indicates general acceptance of SLTs providing intervention that is relevant to the classroom environment. The majority of both groups tended to agree on most service delivery approaches where SLTs assume an indirect role by liaising with another professional (or family member) who works directly with a child. Overall, it is a positive indicator for inter-professional collaboration that both groups valued indirect methods of speech and language service delivery. As demonstrated by Carson et al. (2013), indirect methods adopted by a SLT can be effectively combined to enhance teachers' classroom language and literacy instruction. The lead researcher, a SLT, employed a combination of professional development sessions and coaching to assist teachers of 5- and 6-year-old children to deliver a classroom phonological awareness programme. Students receiving this instruction, including those diagnosed with spoken language impairment, demonstrated overall greater improvement in their reading and spelling compared to students in classrooms where teachers delivered the usual literacy curriculum. However, indirect speech and language service delivery has been traditionally based on a medical model which places the SLT in a role of providing expert advice to a teacher (Hartas, 2004). If student SLTs and student teachers conceptualize indirect service delivery with this traditional ideology, there would likely be minimal opportunity for sharing of expertise and skills (Hartas, 2004). Such an approach would likely have limited efficacy for collaboratively creating classroom structures and routines that provide sufficient intensity of support for children with language and literacy learning difficulties.

In contrast to the findings for indirect service delivery, both groups were less accepting of SLTs assuming a direct instructional role with teachers. Team-teaching constitutes a highly collaborative form of classroom-based service delivery as it requires equal responsibility for planning and presenting a lesson to students (Beck and Dennis, 1997). Such practices align with SLTs' professional responsibilities of assisting teachers to enhance the quality of general classroom instruction to lower the prevalence of language and literacy difficulties (Justice, 2006). Increasing opportunities for shared teaching during professional preparation for student SLTs and student teachers may support graduating professionals to engage in delivery models that demand a greater degree of communication, sharing of ideas and blending of professional roles.

The final aim of the study was to compare the perceptions of student SLTs and student teachers regarding what constitutes collaboration. Limited understanding of the features of collaboration have been reported by in-service SLTs and teachers as a barrier to effective co-working (Hartas,

2004). Therefore, students were asked to describe what they learned about SLT–teacher collaboration during their university programmes. The structure of this question revealed that student teachers have minimal inter-professional experience with speech and language therapists during their pre-service education; this is consistent with previous studies and suggests a continuing mismatch between university preparation and what is expected of teachers and SLTs working in primary education (Beck and Dennis, 1997; Brandel and Loeb, 2011; Hartas, 2004). However, asking students to describe collaboration based on experience specifically with the other profession prevented participants, whom did not have this experience, from sharing their perceptions of collaboration. Therefore, insights gained about students' perceptions of this topic were limited.

The student SLTs who reported having inter-professional experience tended to describe collaboration in terms of co-working models rather than key elements of collaboration (e.g. shared decision making, exchange of expertise) which can be applied to various co-working models (Friend and Cook, 2003). Student SLTs were most likely to perceive the method of providing materials and goals to the teacher as collaboration; however, this method of co-working offers minimal opportunity for blending of expertise and is likely ineffective on its own for advancing children's language and literacy learning (McCartney et al., 2011). Student SLTs also frequently referenced teachers and SLTs 'working together' in the classroom as collaboration. This suggests that the student SLTs perceived any type of classroom-based work as collaboration. However, one has to be careful not to assume that collaboration is simply the provision of classroom-based service by an outside specialist as highlighted by traditional consultation models that position SLTs in an expert role (Hartas, 2004). Even direct methods of in-class speech and language services can be executed with minimal sharing of ideas such as the case of a SLT delivering a classroom programme with limited input or participation from the classroom teacher (Friend and Cook, 2003). Overall, the results suggest that student SLTs have yet to develop an appreciation of the complexities of collaboration.

V Implications for professional education

Prospective teachers and SLTs in this study appeared to value co-working to support children's communication and learning in the classroom environment. The findings, however, suggest that although student teachers and student SLTs have expertise in their discipline specific knowledge, they have more limited shared understanding across disciplines and of collaborative co-working. Lack of shared knowledge could pose challenges to developing effective collaborative practices that will support children's communication development.

The findings suggest that new initiatives are warranted to increase opportunities for prospective SLTs and teachers to work together to develop shared knowledge of effective practices in developing children's spoken and written language. Such initiatives would be consistent with professional standards of practice in that speech and language services are increasingly expected to be delivered by SLTs in a collaborative manner with teachers (ASHA, 2010; Cirrin et al., 2010). For instance, the New Zealand Ministry of Education (2013) framework for SLTs emphasizes the need for SLTs to be informed about classroom curriculum to enable them to work effectively with teachers to support children's oral language and early literacy learning.

It can be argued that shared knowledge of the type discussed in this study can be achieved through curriculum modifications to traditional uni-professional models of professional study. However, inter-professional initiatives offer advantage by enabling interaction among students with complementary backgrounds (Barr et al., 2005). Such interactions can thus be guided to expose students to different knowledge and perspectives that challenge their own understandings. Supporting students to navigate these conflicts can extend their knowledge and skills while also providing practice for future inter-professional encounters where professional differences must be

negotiated to create a shared understanding of how to support children's communication development. Such educational opportunities likely cannot be replicated in uni-professional models of university education.

The current study highlights aims for pre-service IPE curricula including developing shared knowledge of basic linguistic and curricular concepts and of collaborative co-working. Nonetheless, further investigation of the knowledge and perspectives of prospective teachers and SLTs in various areas of children's communication is required to determine additional IPE curricular content given the limited scope of the current survey in addition to the small sample size and moderate response rate. Beyond that, however, research must also extend to evaluating the efficacy of pre-service inter-professional initiatives. Implementing evidence-based IPE for prospective teachers and SLTs is of utmost importance towards ensuring that more classrooms are communication friendly for all children.

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The authors declare that there is no conflict of interest.

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Appendix 1.

Survey instrument (Student speech and language therapist version).

Note. For sections 1 & 4, matching questions appropriate for student teachers were used in the student teacher form of the survey.

1. Background Information

    1-1.   Approximately how many weeks of professional practice have you had as a student SLT?

    1-2.   If you have had student professional practice, in what settings has your professional practice taken place (e.g. acute care, primary school, etc.)?

    1-3.   Have you had experience working in a classroom setting in a primary school with a child who has a speech and/or language impairment?

    1-4.   Have you been a student of teacher education in the past?

1-5. Do you have a teaching qualification?

1-6. Do you have any experience (unrelated to your current study) working or volunteering in educational settings?

2. Language and Literacy Concepts

Note. Correct answers are italicized. All items also included a fifth answer of 'not sure'.

2-1. Two combined letters that represent a single speech sound is a

   a. diphthong
   b. morpheme
   c. *digraph*
   d. consonant blend

2-2. The translation of a printed word into sound is called

   a. encoding
   b. *decoding*
   c. phonics
   d. phonological processing

2-3. A child that always says sounds made at the back of the mouth as sounds made at the front of the mouth (e.g. says cat as tat or goat as doat), most likely has a

   a. *phonological based difficulty*
   b. hearing based difficulty
   c. articulation based difficulty
   d. phonological awareness based difficulty

2-4. Running records is a method for assessing students'

   a. diversity of vocabulary use in a writing sample
   b. *reading behaviors by recording and analyzing the reading errors and self-corrections that students make during oral reading*
   c. spelling proficiency by analyzing the type of spelling errors that students make
   d. b & c

2-5. A combination of two or three consonant letters where each letter keeps its own speech sound is called a

   a. *consonant blend*
   b. diphthong
   c. orthographic sequence
   d. consonant digraph

2-6. Spelling of English words must obey the orthotactics of English. This means that English words must obey the

   a. *rules that govern were sequences of graphemes occur within a word (e.g. 'ck' can only occur at the end of a word)*
   b. rules of letter formation
   c. rules of how written morphemes are translated into sounds
   d. rules that govern word shapes

2-7. All the possible written units that represent a single speech sound are called

   a. graphomorphemes
   b. letters

    c.   morphemes
    d.   graphemes

2-8. A small group reading activity where children read instructional materials that are at an appropriate level of reading complexity for the children's abilities is called

    a.   Cooperative Literacy
    b.   Literacy Learning Progressions
    c.   Balanced Literacy
    d.   Guided Reading

2-9. 'Constrained reading skills' are the

    a.   Reading skills that a particular student is struggling to learn
    b.   Reading skills that can be assessed objectively
    c.   Reading skills that can be mastered within a relatively brief period of time such as word decoding
    d.   Reading skills that are generally more difficult for students to learn

2-10. Non-word reading tasks can be used to assess children's

    a.   ability to reflect on the meaning of words in order to identify nonsense words
    b.   vocabulary knowledge
    c.   use of phonological strategy to read
    d.   reading versatility

2-11. A child's expressive vocabulary is the

    a.   words that a child can produce by saying, writing or signing them
    b.   words used by the child that are vivid, lively or emotive
    c.   words used by the child to request something
    d.   a & b

2-12. Children's awareness of the parts of words that carry meaning is

    a.   morphological awareness
    b.   phonological awareness
    c.   syllabic awareness
    d.   graphophonemic awareness

2-13. The smallest segments of sounds in speech that distinguish one word from another are called

    a.   morphemes
    b.   phonemes
    c.   phonics
    d.   phonotactics

2-14. The oral reading of a word must obey the phonotactics of the language. This means that oral reading must obey the

    a.   rules that govern how speech sounds are pronounced
    b.   permissible sequences of sounds in the language
    c.   permissible sequences of syllables in the language
    d.   rules that govern how sounds correspond to letters

2-15. An example of a surface feature of writing is
    a.   story grammar
    b.   voice
    c.   spelling
    d.   vocabulary

2-16. The speech sounds that are formed when airflow from the throat passes unobstructed through the mouth are called
    a.   consonants
    b.   allophones
    c.   phonemes
    d.   vowels

2-17. A reading method that focuses on teaching the application of speech sounds to letters is called
    a.   phonological awareness
    b.   phoneme sequencing
    c.   phonics
    d.   phonemics

2-18. 'Using language, symbols and texts' is one of the
    a.   Key competencies from the New Zealand Curriculum
    b.   Literacy Learning Progressions
    c.   New Zealand Curriculum Exemplars
    d.   Core Literacy Objectives

2-19. Phonological awareness is the ability to reflect upon and manipulate
    a.   syllables, phonemes and letters
    b.   syllables, morphemes and phonemes
    c.   phonemes and morphemes
    d.   syllables, onset-rimes and phonemes

2-20. A teacher who is helping a child use a 'chunking' strategy is helping the child to
    a.   read words within compound words (e.g. butter-fly)
    b.   read a phrase or clause within a sentence and reflect on its meaning
    c.   group words into sight words and non-sight words
    d.   read any cluster of letters within a word such as prefixes, suffixes and syllables

2-21. Voicing refers to
    a.   differences between how vowel and consonant sounds are produced in the vocal folds
    b.   differences between how some of the consonant sounds are produced in the vocal folds
    c.   the personal characteristics used in speech or a piece of writing that are reflective of the speaker's or writer's character
    d.   how loud someone is speaking

2-22. Oral language is
    a.   the ability to express oneself in an appropriate and effective manner in the spoken medium
    b.   types of spoken communication (e.g. speeches, conversations, story telling)

      c.   *the understanding and use of a rule governed system of spoken symbols*
      d.   speech

2-23. A reading intervention program commonly used in New Zealand for 6-year-old children who show signs of early reading difficulty is

      a.   Guided Reading
      b.   Word Attack
      c.   Literacy Learning Progressions
      d.   *Reading Recovery*

2-24. The guidelines that describe the specific literacy skills, knowledge and attitudes that students need to learn in years 1 through 10 to meet the demands of the New Zealand curriculum are

      a.   The Key Competencies
      b.   The Literacy Core
      c.   *The Literacy Learning Progressions*
      d.   The English Exemplars

3.   Professional Roles of Teachers and Speech and Language Therapists

3-1. Who do you think should participate in the assessment of the following skills? (SLT Only, Mostly SLT, Both, Mostly Teacher, Teacher Only)

      i.   Children's pronunciation of sounds (i.e. how the parts of the mouth make speech sounds).
      ii. Children's awareness of sounds within words (e.g. identifying individual sounds within words, replacing one sound for another within a word)
      iii. Children's vocabulary knowledge
      iv. Children's awareness of how words can be divided into smaller units of meaning (e.g. teacher can be divided into teach and -er).
      v.   Children's reading
      vi. Children's spelling

3-2. Who do you think should participate in the teaching of the following skills? (SLT Only, Mostly SLT, Both, Mostly Teacher, Teacher Only)

Note. The same roles were provided as in 3-1.

3-3. Which of the following do you think are appropriate roles for a SLT who is supporting a child with speech and/or language impairment? You may select multiple answers.

      i.   work directly with the child in a quiet room outside the classroom
      ii. work directly with the child in the classroom
      iii. provided consultation on how the child's teacher could adapt classroom activities for the child
      iv. assist the child's teacher to teach a lesson or conduct an activity that will involve the child (i.e. shared teaching)
      v.   design activities for a teaching assistant to do with the child
      vi. provide professional development to educators
      vii. work with families to help them support the child

3-4. How often do you think a SLT should work in a classroom setting in order to optimize the learning of children who have speech and/or language impairments? (Never–Rarely–Sometimes–Often–Always–Not Sure)

4. Inter-professional Experience

    4-1. In your coursework and/or student professional practice, have you been provided with any examples or case studies on how to collaborate with a teacher? (Yes–No). If yes, please describe in 1 or 2 sentences.