ADVANCING COLLABORATION AMONG PROSPECTIVE TEACHERS AND SPEECH LANGUAGE THERAPISTS TO IMPROVE CHILDREN'S LANGUAGE AND EARLY LITERACY OUTCOMES

Leanne Wilson

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The material presented in this thesis is the original work of the candidate except as acknowledged in the text, and has not been previously submitted, either in part or in whole, for a degree at this or any other University.

The research reported in this thesis has been approved by the University of Canterbury Educational Research Human Ethics Committee.

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ABSTRACT

Ensuring teacher and speech and language therapists (SLTs) are prepared to work collaboratively together is an important goal towards meeting the diverse language and literacy learning needs of children. Inter-professional education (IPE) is a potentially effective approach for preparing prospective teachers and SLTs for this challenging task. Despite the potential benefits of IPE, investigation of applications for student SLTs and student teachers are scarce. The series of five studies in this thesis examined student SLTs' and student teachers' readiness for collaboration and investigated the effectiveness of novel IPE interventions designed to enhance these prospective professionals' shared competencies for collaborative language and literacy instruction.

The first study examined various aspects of student teachers' and student SLTs' collaborative competencies. An online survey was completed by 58 student primary school teachers and 37 student SLTs from multiple universities across New Zealand who were near completion of their professional study. The results indicated that these groups possessed limited understanding of each other's expertise areas in literacy curriculum and spoken language concepts. Both groups also demonstrated limited understanding of linguistic concepts denoting the relationship between spoken and written language. Participants demonstrated an emerging sense of inter-dependent co-working as evidenced by acceptance of classroom-based co-work among SLTs and teachers. They were, however, less accepting of co-working models which demand a greater degree of collaboration between SLTs and teachers. Both groups also reported minimal experience with SLT-teacher collaboration during their pre-service education. The data

suggested that IPE with a focus on children's early literacy learning was warranted for student teachers and student SLTs.

The second study investigated the efficacy of a 3-hour, course-based IPE initiative focused on explicit instruction in the language skills that underpin early reading and spelling acquisition. The combined programme incorporated student teachers and student SLTs working together on case-based instructional planning supplemented with structured opportunities for the groups to share their respective expertise in curriculum and linguistic knowledge. Student teachers (n=18) and student SLTs (n=27) were randomly assigned to this combined intervention or a comparison intervention that replaced the structured opportunities to share curriculum and linguistic knowledge with spending time together focused on non-language/literacy based activities. Before-and-after comparisons indicated that only the students in the combined condition increased their linguistic/curricular knowledge ($p<0.05$). However, neither of the interventions improved students' case-based instructional planning for children's literacy learning over and above what they could achieve working individually.

In the third study, ten student SLTs and nine student teachers who participated in the course-based IPE were interviewed to examine their perceptions of the IPE. An inductive thematic analysis of interview data revealed that IPE participants developed a preliminary understanding of each other's professional roles and gained an appreciation of the importance of inter-professional knowledge for collaborative co-working. Overall, participants valued the inter-professional interactions though some participants reported interactive learning was limited by students not yet developing adequate understanding of their own profession-specific expertise and by perceived differences in status. Interview analysis also revealed that students required more time to develop depth of understanding of each other's professional roles and that

embedding IPE into practical experience may enhance inter-professional learning. The results thus supported further investigation into the impact of IPE embedded within students' professional practice placements.

The fourth study employed a multiple case study design to examine the impact of placement-based IPE in which student SLTs (n=4) were paired with student teachers (n=4) to participate in shared professional practice placements in junior school classrooms. Student pairs co-worked to provide classroom-based instruction to foster children's speech and phonological awareness development over a 3-week period. An inductive thematic analysis of interviews conducted with participants after the IPE was employed to explore their development of competencies in collaborative practice. Change in inter-disciplinary knowledge and perceptions over the IPE was evaluated via survey to further explore development of collaborative competencies. Integration of qualitative and quantitative findings suggested that most participants began to develop four broad areas of collaborative competency: understanding of professional roles and expertise, communication skills to support shared decision making, inter-dependency in supporting children's learning, and flexibility to implement alternative instructional practices. Interview analysis also revealed factors related to the facilitators and learning contexts that supported and/or limited the collaboration between participants.

The fifth study examined the impact of the placement-based IPE on the speech, phonological awareness and early literacy skills of the children with whom each of the four student pairs instructed. A multiple single-subject design with repeated measures was employed to examine the impact of the IPE on children's development. Seven children who demonstrated difficulties with speech and/or phonological awareness participated in 3 weeks of classroom-based instruction, delivered by student SLT-teacher pairs, to target these areas of difficulty. Four

out of seven children (who were each instructed by a different student pair) improved on at least one of the two goal areas. More specifically, two out of six children improved their production of trained and untrained speech targets. Three out of seven children also improved on phoneme segmentation of trained and untrained words. Further, these children's improvement in phoneme awareness was also accompanied by improved letter-sound knowledge and spelling. Moreover, three out of the four children who demonstrated improved speech and/or phoneme awareness received a collaborative approach to instruction as suggested by student professionals' instructional logs and the results presented in Study 4. The findings further supported the effectiveness of the placement-based IPE in that most of the students could learn to establish classroom-based collaboration which positively impacted children's speech and early literacy outcomes.

The findings from this thesis suggest a need for coordinated reform of the professional study of SLTs and teachers to ensure these professional groups develop shared competencies for collaborative instruction in children's language and literacy learning. The potential benefits of IPE demonstrated in this thesis challenge the current practice of SLTs and teachers being educated in professional siloes which likely restrict the development of collaborative-ready practitioners. Given the novelty of IPE for prospective SLTs and teachers, improvements to the design of IPE models utilised in this thesis and directions for further research are also emphasised.

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3. Wilson, L., McNeill, B., & Gillon, G.T. (May, 2015). *The potential of inter-professional education to prepare prospective SLPs and teachers for collaborative language and literacy instruction.* Oral presentation at the Speech Pathology Australia (SPA) National Conference, Canberra, Australia.

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LITERATURE REVIEW

1.1 Introduction

Collaboration among teachers and speech and language therapists (SLTs) is considered a critical element for the creation of classroom instruction that supports the diverse language and literacy learning needs of children (ASHA, 2010; Squires, Gillam, & Reutzel, 2013). More specifically, the blending of SLTs' expertise of language structure and development with teachers' expertise of literacy curriculum and classroom management can assist with the provision of differentiated language instruction (Kamhi, Allen, & Catts, 2001; P. C. Snow et al., 2014). Intervention studies have demonstrated that classroom instruction that is collaboratively implemented by SLTs and teachers advances school-age children's language and literacy outcomes (Carson, Gillon, & Boustead, 2013; Farber & Klein, 1999; Throneburg, Calvert, Sturm, Paramboukas, & Paul, 2000). Moreover, positive effects 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 effectively by SLTs and teachers (Brandel & Loeb, 2011; Ehren, 2000; McCartney, Boyle, Ellis, Bannatyne, & Turnbull, 2011). This may be partly attributed to a lack of shared knowledge, attitudes and skills (competencies) required to be an effective collaborator. Inter-professional education (IPE) is a promising approach to building shared competencies for collaborative practice. IPE refers to programmes that encourage prospective or practicing professionals from complementary backgrounds to interact to "learn with, from and about each other" (Freeth, Hammick, Reeves, Koppel, & Barr, 2005, p. 11). The aim is to influence

individuals' attitudes, knowledge and skills to prepare professionals from different disciplines to collaborate with each other to improve the quality of their services (Reeves, Goldman, Burton, & Sawatzky-Girling, 2010). IPE has been implemented extensively among health professionals to improve their inter-professional collaboration (WHO, 2010). In contrast, IPE applications for SLTs and primary school teachers remain largely unexamined despite the critical importance of collaboration among these professional groups. Proponents of IPE state that such learning experiences should ideally begin at a pre-service level (i.e., during professional study) (Barr, Koppel, Reeves, Hammick, & Freeth, 2005). This thesis thus investigates student SLTs' and student teachers' readiness for inter-professional collaboration alongside the effectiveness of different IPE models for preparing these prospective professionals for classroom-based collaboration.

1.2 Inter-professional education definition

The concept of IPE was developed in the field of health sciences where well-functioning inter-professional teams are essential to patients' care and well-being (Thistlethwaite & Moran, 2010). A widely accepted definition of IPE is "occasions when two or more professions learn with, from and about each other to improve collaboration and the quality of care" (CAIPE, 1997, p. 19). This contrasts with a more traditional model, *uni-professional education*, in which students learn profession-specific competencies with minimal contact with other professional groups (Oandasan & Reeves, 2005a). Different terminology has been used synonymously with IPE including shared learning, joint learning, inter-disciplinary education and multi-professional education (Barr et al., 2005). This thesis adopts the recommendation of Barr et al. (2005) that the term *inter-professional education* be reserved for initiatives which employ interactive learning among members of complementary professions. Comparatively, *multi-professional education* is utilised for initiatives

where mixed-discipline groups learn a common curricula but with minimal interaction among participants.

IPE gained international attention as result of a 1988 World Health Organization (WHO) working group report (Barr et al., 2005). The report (WHO, 1988) drew upon examples of IPE to recommend that such initiatives should routinely complement traditional, or primarily uni-professional, educational models. The report further emphasised the importance of interactive learning to develop teamwork skills given the increasing application of team-based work in health-care contexts. In the years following the 1988 WHO report, research into the effectiveness of IPE became an international research agenda within health sciences (Barr et al., 2005). Another WHO report, released in 2010, concluded that there was sufficient evidence to support the effectiveness of IPE in promoting effective inter-professional collaboration (WHO, 2010). Systematic reviews of IPE for prospective professionals have demonstrated that IPE helps build specific attitudes, knowledge and skills required for collaborative practice including understanding of and respect for other professions and development of teamwork-related skills (e.g., communication skills) (Cooper, Carlisle, Gibbs, & Watkins, 2001; Olson & Bialocerkowski, 2014). There remains, however, a paucity of research examining the relative effectiveness of different approaches to IPE in addition to how IPE compares to other educational strategies (e.g., multi- or uni-professional education) in promoting effective collaboration (Payler, Meyer, & Humphris, 2008; Reeves, Perrier, Goldman, Freeth, & Zwarenstein, 2013; Thistlethwaite, Kumar, Moran, Saunders, & Carr, 2015).

1.2.1 A conceptual framework of IPE

Understanding a conceptual framework of IPE is useful to appreciate its application to SLT and teacher collaborative practice. D'Amour and Oandasan (2005) presented a framework designed to

illustrate the inter-related concepts of IPE and inter-professional collaboration. Their "Framework for Inter-professional Education for Collaborative Patient-Centred Practice" (IECPCP) utilises an ecological systems approach (Bronfenbrenner, 1992) to provide a conceptualization of the processes and outcomes of IPE and inter-professional collaboration (D'Amour & Oandasan, 2005). The first part of the framework outlines education-related factors which influence a learner's (i.e., student teachers' or student SLTs') development of competencies for collaborative practice during professional study. The second part of the framework outlines practice-related factors which influence the efficacy of inter-professional working related to client/patient outcomes. The framework acknowledges the inter-dependency between education to learn to be collaborative (i.e., first part of the model) and collaborative practice to advance quality of care provided (i.e., second part of the model). More specifically, the framework predicts that educational factors which foster collaborative-ready professionals will lead to more effective co-working in practice settings. Collaborative-ready professionals in turn create collaborative settings in which professionals can continue to develop competencies for collaboration. When applied to SLT and teacher collaboration, the framework predicts that IPE among student teachers and student SLTs will foster their ability as future practitioners to engage in collaborative co-working to advance children's learning outcomes. The IECPCP framework adapted to IPE and inter-professional collaboration of SLTs and teachers is presented in Figure 1 and will be discussed in the following paragraphs.

The education portion of the framework organises influential factors on a student professional's learning into micro, meso and macro level factors. The micro level denotes teaching-related factors which refer to how the IPE was taught. For student SLTs and student teachers, this would include the content of the IPE, teaching and learning strategies, learning environment (e.g., classroom versus practice setting) and competency of educators/facilitators.

The meso level denotes institutional factors including administrative support and resources (e.g., funding, time) available for educational initiatives. This is particularly relevant to IPE given logistical challenges are frequently encountered when bringing learners of different professional programmes together (Barr et al., 2005). In the New Zealand context, two out of the three programmes for speech and language therapy qualifications are in University science departments rather than in education departments. This poses the need for inter-department cooperation to schedule and resource IPE. Finally, the macro level denotes overall systemic factors related to the policies and/or philosophies of government systems (e.g., educational policy), professional regulatory systems (e.g., professional associations of SLTs and teachers) and societal values. Interaction among the various factors and the learner ultimately influences how the learner develops competencies for collaboration (i.e., the outcomes of professional study). Collaborative competencies are conceptualized as the attitudes, knowledge and skills which underpin collaborative co-working.

In the practice portion of the model, influential factors on collaborative practice are similarly divided into micro, meso and macro levels. The micro level denotes factors related to the interactions among co-working professionals (i.e., teachers and SLTs) which are affected by their competencies for collaborative practice. The meso level denotes organisational factors related to the structure and governance of practice settings. For teachers and SLTs, this would refer to the leadership, administrative processes, and protocols within schools and within the organisations in which SLTs are housed. The practice portion of the framework shares the same macro-level factors as the education portion. The practice portion also acknowledges that interactions among the various factors and the patient/client ultimately influence outcomes related to the well-being of the patient/client. In relation to SLT and teacher co-working, the framework demonstrates that

collaboratively competent SLTs and teachers alongside facilitative meso- and macro-level factors are likely required to achieve collaborative instruction that advances children learning outcomes.

Overall, the framework applied to SLT-teacher collaboration highlights the complexity of achieving effective collaborative practice among these professional groups. However, it also provides direction for specific areas of inquiry related to developing effective inter-professional collaboration through educational initiatives alongside organisational and systemic reforms to support collaboration of SLTs and teachers. This thesis adopts a focus on micro-level educational factors by examining how IPE initiatives can be designed to foster development of collaborative competence in a manner appropriate for student SLTs and student teachers. The literature review will also examine other factors related to the practice portion of the model (e.g., educational policy, collaborative competencies of practicing SLTs and teachers) to provide a rationale for investigation of the application of IPE for student SLTs and student teachers.

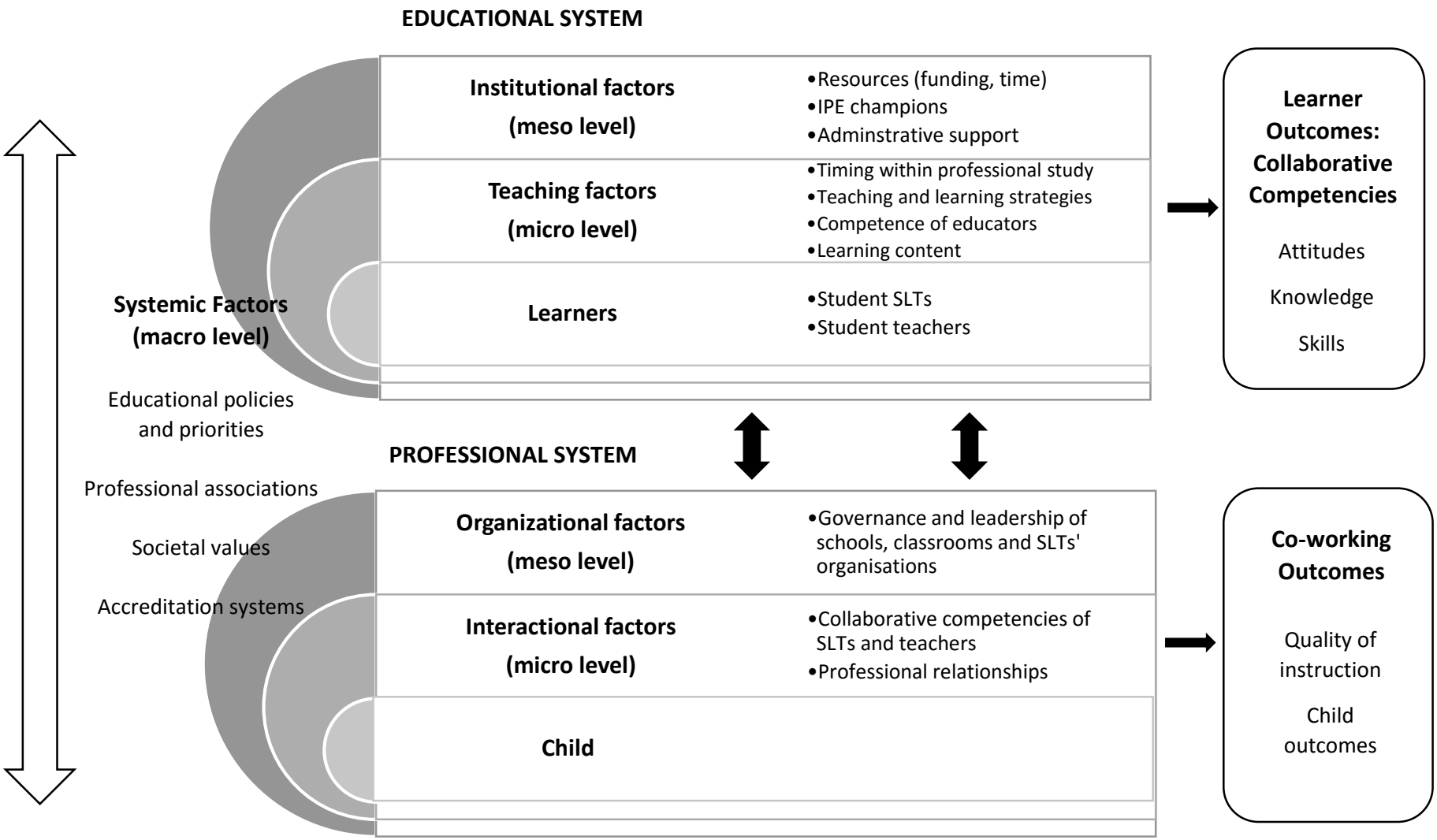


Figure 1. An illustration to depict D'Amour and Oandasan's (2005) Framework for Inter-professional Education for Collaborative Patient-Centred Practice (IECPCP) as applied to SLT-teacher IPE and inter-professional collaboration. *Note.* This figure represents an adaptation of D'Amour and Oandasan's (2005) original illustration from the Journal of Interprofessional Care (www.tandfonline.com).

1.2.2 A working definition of collaboration

Before examining practice-factors which influence SLT-teacher collaboration, it is first important to establish a working definition of collaboration that is appropriate to SLT and teacher co-working. Collaboration is often used to refer to any form of co-working (Friend & Cook, 2003). This, however, conceals the variability of co-working approaches which necessitates a more precise definition. Several authors have posited that co-working is best viewed along a continuum according to the degree of integration between co-workers (Hartas, 2004; Marvin, 1990; Thistlethwaite, Jackson, & Moran, 2013). For instance, Marvin (1990) described four stages of co-working among SLTs and teachers in which only the most integrated co-working is considered collaboration. These stages include:

- *co-activity* where professionals work alongside each other, but with little sharing of goals and ideas;
- *cooperation* where professionals share similar goals, but there remains minimal discussion and sharing of ideas and resources;
- *coordination* where professionals share similar goals accompanied by discussion and attempts to integrate each other's perspectives or advice into one's own work, and;
- *collaboration* where professional relationships are characterised by a high degree of trust and respect alongside shared responsibility for planning and achieving common goals.

McCartney (1999), however, critiqued this model of collaboration by arguing that the requirement for collaboration to include highly developed inter-personal relationships (i.e., that described in the highest stage of Marvin's model) is problematic. More specifically, such advanced forms of co-working may be unrealistic to achieve due to constraints within various practice settings and

may not always be necessary to achieve desirable outcomes (McCartney, 1999). There is consensus, however, that collaboration includes professionals who share decision making and planning about processes required to achieve common goals; this includes goal selection alongside design, implementation and evaluation of actions to achieve these goals (Bronstein, 2003; Caplan & Caplan, 1993; Friend & Cook, 2003; Marvin, 1990). Certainly, a certain degree of trust and respect is required among professionals, but this may be based on general respect for another's profession rather than for a particular professional (Thistlethwaite et al., 2013).

Exploring what is not collaboration can further help conceptualise the term. For instance, Friend and Cook (2003) argued that collaboration should be distinguished from educational delivery models (e.g., consultation, co-teaching) which can be executed with varying levels of collaboration among professionals. Even co-teaching, which involves professionals working in the same classroom, can be executed with minimal shared decision making if one professional plans and conducts the classroom activities with minimal input from another professional (Marvin, 1990). Shared decision making and planning for common goals, however, does not imply that co-working professionals must equally participate in all tasks required to achieve a common goal (Friend & Cook, 2003). Collaborative co-working can consist of one professional working primarily in an indirect (i.e., consultative) fashion, such as an SLT assisting a teacher to plan classroom activities which the teacher then implements. Such a co-working arrangement could be referred to as collaborative consultation which contrasts with a traditional, expert model of consultation in which consultant and consultee work on common goals albeit in the absence of shared decision making (Hartas, 2004; Marvin, 1990). Further, inter-professional co-working is often referred to in terms of multi-, inter-, or intra-disciplinary teams (Friend & Cook, 2003). Multi-disciplinary teams, which involve professionals working independently of each other, would

not be considered collaborative in contrast to inter- or intra-disciplinary teams which are characterised by shared decision making among team members and team goals (Giangreco, York and Rainforth, 1989; McGrath and Davis, 1992).

In conclusion, the working definition of collaboration assumed for this thesis is individuals who engage in shared decision making to select, implement and evaluate actions to achieve common goals. This is consistent with the definition of collaboration offered by the World Health Organization (2010) review of IPE which emphasised the process of developing shared understandings among co-workers. How the key parameters of collaboration highlighted in this thesis (i.e., shared decision making and achievement of common goals) relate to a variety of co-working models available to SLTs and teachers is summarised in Figure 2.

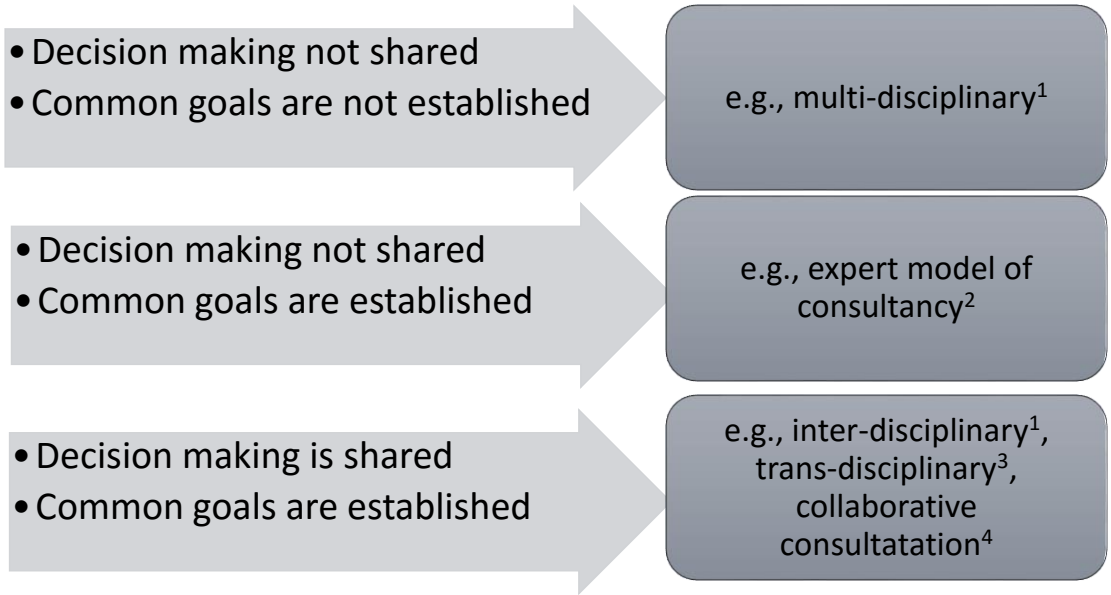


Figure 2. Summary of co-working models available to SLTs and teachers.

Notes. [1] McGrath and Davis (1992), [2] Hartas (2004), [3] Giangreco, York, and Rainforth (1989), [4] Marvin (1990). Co-teaching (Friend and Cook, 2003) was not added in this figure as it could be delivered in any of the three approaches.

1.2.3 Section summary

This section introduced the concept of IPE and its potential role in creating effective inter-professional collaboration among SLTs and teachers. Further, a working definition of collaboration as the process of professionals collectively sharing responsibility for accomplishing common goals was established. Collaboration has been posed as one solution for addressing the increasingly complex challenges encountered by professionals such as SLTs and teachers (ASHA, 1991; WHO, 2010). The next section examines practice-factors influencing SLT-teacher collaboration to provide a rationale for research into the application of IPE for prospective SLTs and teachers.

1.3 IPE applications for student teachers and student SLTs

1.3.1 Educational priority of advancing children's literacy outcomes

Teaching children to read and write well is a priority for education systems around the world. There remains, however, unacceptably high rates of poor literacy outcomes for school-age children even in developed countries (UNICEF, 2010). For instance, recent international studies of children's reading achievement revealed large inequities in reading outcomes between the highest and lowest achieving students (Mullis, Martin, Foy, & Drucker, 2012; OECD, 2010). This achievement gap was particularly marked for New Zealand students in an international comparative study of children's reading comprehension in their fifth year of school (Mullis et al., 2012). The distribution of reading scores of New Zealand children was amongst the largest of the 45 participating countries. Further, the most recent student achievement data from the New Zealand Ministry of Education (MoE) also suggested need for improvement (MoE, 2015). The data indicated that 35% of New Zealand children completing their first year of school did not develop the minimal level of reading proficiency as set by government benchmarks. Overall, these

are concerning findings given that poor literacy learning in the first years of school often sets the trajectory for continued reading difficulties, thus limiting children from achieving their full academic potential (Stanovich, 2008).

In English language contexts, it is well established that children who possess strong oral language skills (e.g., vocabulary and phonological awareness) are more likely to experience literacy success (Catts, Fey, Zhang, & Tomblin, 1999; Catts, Herrera, Nielsen, & Bridges, 2015; Clarke, Snowling, Truelove, & Hulme, 2010; NICHD Early Child Care Research Network, 2005; Storch & Whitehurst, 2002). Accumulating evidence also supports that classroom instruction that explicitly teaches the connection between oral and written language ameliorates children's reading problems (Carson et al., 2013; Ehri et al., 2001; Moats, 2000). Accordingly, researchers have examined how to better prepare classroom teachers to explicitly teach oral language and early literacy skills to ensure that more children experience reading and writing success (Al Otaiba, Lake, Greulich, Folsom, & Guidry, 2012; McCutchen, Green, Abbott, & Sanders, 2009; Moats, 2014). For instance, P. C. Snow et al. (2014) described a recent randomised controlled trial to examine the effectiveness of a professional development programme (PD) for classroom teachers of children in their first two years of school. Six days of PD activities (involving classroom teachers and principals) were spread across 18 months and focused on explicit instruction of multiple aspects of oral language (i.e., phonological awareness, vocabulary, narrative structure and sentence structure). Additionally, one staff member from each school in the intervention group completed a postgraduate course on language and early literacy development to further support the initiative. Comparisons before and after the PD revealed that children attending schools which received the PD (n=602) demonstrated improved oral language competency and reading ability compared to children who received standard instructional practice (n=652). These findings

illustrate the critical role classroom teachers play in fostering children's language and literacy learning.

SLTs are another group of educational practitioners who share responsibility with classroom teachers for advancing children's spoken and written language learning. SLTs frequently work with young children who experience spoken language impairment (SLI) (Brandel & Loeb, 2011). This refers to specific difficulties acquiring and using spoken language in the absence of neurological, emotional-behavioural, physical, sensory and/or cognitive disorders (Gillon, 2004). SLI is a common childhood delay/disorder; a systematic review of prevalence studies suggested that up to 12% of five year old children may possess a spoken language impairment that affects their speech and/or oral language (Law, Boyle, Harris, Harkness, & Nye, 2000). Children who have SLI are also at increased risk for literacy learning difficulties given the critical importance of oral language skills for literacy success (Anthony et al., 2011; Nation, Cocksey, Taylor, & Bishop, 2010; Stoeckel et al., 2013). Overall, research suggests that approximately 50% of young children with SLI will develop reading difficulties (Catts & Kamhi, 2005). SLTs also help to support the language and literacy skills of children with complex communication needs related to physical, sensory and/or intellectual impairments (i.e., conditions such as Down Syndrome, Autism Spectrum Disorder or Cerebral Palsy) (Clendon & Erickson, 2008; Sutherland, Gillon, & Yoder, 2005). Teachers and SLTs thus need to be prepared to co-work to prevent and/or ameliorate the spoken and written language difficulties of children with SLI alongside those with complex communication needs (ASHA, 2010; Ministry of Education, 2013a; ASHA, 1999). Finally, SLTs' expertise in oral language also positions them in a unique position to positively influence teachers' instruction of language skills which underpin spoken and written language competence (P. C. Snow, 2016). Effective SLT-teacher collaboration is thus critical to

ensure more children develop proficient literacy skills to guarantee them the best chance of successful and enjoyable participation in formal schooling.

1.3.2 Movement towards integrated and inclusive education in educational policy: International and New Zealand contexts

Preparing SLTs and teachers for collaborative co-working also aligns with current educational policy emphasising integrated and inclusive education. A series of educational policies and legal mandates have arisen throughout English speaking countries in the last 15 years stressing the importance of co-working among educational practitioners to integrate support for children into classroom instruction (Forbes & McCartney, 2010). These policies represent a continuing shift away from more traditional delivery paradigms in which educational practitioners tended to work in isolation. Specialists, such as SLTs, traditionally worked primarily within a medical model of service delivery; they assessed students in their respective area of expertise, diagnosed areas of difficulty, shared findings through written reports and if appropriate, developed an intervention programme that was generally independent of other on-going interventions or classroom programmes (Lacey & Ranson, 1994; McCartney, 1999). Further, SLTs or their assistants often withdrew individuals or small groups of children from the classroom for these interventions (McGinty & Justice, 2006). However, these approaches were criticized as fragmented forms of instruction that lead to reduplicated or conflicting services (Mellin & Winton, 2003). Additionally, therapy from outside specialists was criticised for lacking relevance to children's natural environments resulting in limited generalization of learning to contexts outside of the 'therapy room' (Harn, Bradshaw, & Ogletree, 1999; O'Toole & Kirkpatrick, 2007).

In the United States, Response to Intervention (RTI) initiatives in school districts highlight the increasing emphasis on inter-professional co-working (Forbes & McCartney, 2011). RTI

models use children's response to evidence-based classroom instruction to guide decisions about accessing additional support (Justice, 2006). Additional tiers of more individualised and intensive instruction are provided to children who do not respond adequately to general classroom instruction. As such, RTI demands a focus on improving the quality of general classroom instruction to ensure that all children are first receiving exemplary teaching. RTI has thus lead to new roles for SLTs to use their specialised knowledge of language structure and development to assist teachers to create classroom practices that maximise children's spoken and written language learning (Ehren, Montgomery, Redbusch, & Whitmire, 2006). A comparable graduated approach has also been emphasised in recent UK educational policy generating continued focus on co-working among educational practitioners to create "communication friendly" classrooms (Dockrell, Bakopoulou, Law, Spencer, & Lindsay, 2015; Dockrell, Lindsay, Roulstone, & Law, 2014).

In the New Zealand context, the Ministry of Education (MoE) has also promoted the idea of creating classroom instruction that gives all students equitable learning opportunities. More specifically, certain groups of students have not been well served by traditional education systems (MoE, 2014b). These groups include Maori and Pasifika students, students from disadvantaged backgrounds and students with special learning needs. As such, the MoE has developed a series of strategies to guide educational practitioners to support the diverse cultural, linguistic, cognitive and emotional profiles of all learners (e.g., MoE, 2010; MoE, 2013b). A similar orientation to enhancing classroom instruction is reflected in professional practice guidelines for New Zealand SLTs working in education (MoE, 2013a). A recent New Zealand MoE (2013a) framework stresses SLTs' responsibilities to work collaboratively with educational staff to embed enhanced speech and language learning opportunities within curricular activities. As such, shared decision

making with classroom teachers alongside provision of advice to classroom teachers through coaching and professional development workshops are among the recommended professional activities.

In summary, there are increasing requirements within the working contexts of SLTs and teachers to co-work to create classroom environments that are responsive to children's diverse learning needs. This adds further rationale for SLTs and teachers to be well prepared for this challenging task.

1.3.3 Effectiveness of collaborative, classroom-based instruction

Researchers have cautioned that endorsement of inter-professional co-working to achieve more integrated and inclusive education has proceeded without ample evidence that collaborative classroom instruction is effective in advancing school-aged children's speech, language and literacy outcomes (Cirrin et al., 2010). An increasing number of classroom-based intervention studies for school-age children have been conducted for different language and literacy skills including vocabulary, narrative ability, expressive grammar, phonological awareness and early literacy skills (Carson et al., 2013; Ellis, Schlaudecker, & Regimbal, 1995; Farber & Klein, 1999; Gillam, Olszewski, Fargo, & Gillam, 2014; Hadley, Simmerman, Long, & Luna, 2000; Justice, McGinty, Piasta, Kaderavek, & Fan, 2010; McCartney, Boyle, & Ellis, 2015; Ritter & Saxon, 2011; Smith-Lock, Leitao, Lambert, & Nickels, 2013; Throneburg et al., 2000). Some of these studies, however, did not employ a truly collaborative approach if applying the criteria (established earlier in this review) that shared decision making and planning by an SLT and teacher must be evident. In some cases, researchers and/or SLTs delivered the classroom instruction with minimal involvement from the classroom teachers evident in the description of the instructional programme (e.g., Ritter & Saxon, 2011). In other designs, the classroom teachers assisted in delivery but were

not involved in instructional planning (e.g., Gillam et al., 2014; Justice et al., 2010; Smith-Lock et al., 2013). Furthermore, a systematic review of classroom-based interventions revealed a paucity of studies comparing classroom-based delivery models to traditional, withdrawal models for school-age children with SLI (Cirrin et al., 2010). Thus, the relative effectiveness of collaborative, classroom-based delivery models remains largely inconclusive for school-age children with spoken language difficulties.

Nonetheless, the small number of studies that have examined collaborative, classroom-based instruction among SLTs and teachers supports the effectiveness of this approach. In these studies, participating teachers and SLTs shared responsibility for planning instruction which is a key feature of collaborative practice (Friend & Cook, 2003). For instance, Ellis et al. (1995) investigated the impact of 8 weeks of collaborative vocabulary instruction for children ages five to seven. The instruction was planned and delivered by two classroom teachers in consultation with an SLT and a university researcher. Twenty children received the collaborative instruction for 1 hour per week from the classroom teachers. Pre-post comparisons were conducted among the experimental group and a control classroom (n=20) who continued with the regular curriculum. The comparisons (with group differences in pre-test scores statistically controlled) demonstrated the children who received the collaborative instruction improved in their understanding of basic concepts to a greater extent than the control children. Only three participants, however, were identified as having SLI thus limiting understanding the impact of the collaborative instruction on children with spoken language difficulties.

Farber and Klein (1999) provided a larger-scale examination of collaborative-classroom based instruction among classroom teachers and SLTs for children in the first 2 years of school. Classes selected for the study were randomly assigned to receiving collaborative SLT-teacher

instruction (experimental group) or regular classroom instruction (control group). Sixteen SLTs and classroom teachers from the 12 intervention classes co-planned and co-taught oral language enrichment lessons three times per week throughout one academic year. SLTs and teachers were supported in their collaboration through participation in a 2-day workshop at the beginning of the project which focused on collaborative co-working and oral language facilitation techniques. Additionally, SLTs and teachers were allocated time for weekly planning meetings. At the end of the programme, the listening comprehension skills of children in the experimental group (n=273) were advanced relative to the control group of peers (n=253). An advantage for the experimental group, however, was not demonstrated on measures of expressive language, reading or writing. Similar to Ellis et al. (1995), this study did not examine the effect of the collaborative instruction on children with SLI. Further, pre-intervention scores were not collected thereby limiting understanding of the impact of the intervention given the possibility of pre-existing differences in control and experimental groups (despite the use of random assignment).

Hadley et al. (2000) also examined the effectiveness of classroom instruction which was jointly planned and delivered by an SLT and classroom teachers for children in their first and second year of school. Children in two experimental classrooms (n=46 children) received the collaborative instruction focused on oral vocabulary and phonological awareness goals. Children in two comparable classrooms (n=40) served as a control group which received standard instructional practice. Again, only a small number of participating children (n=5) were diagnosed with SLI. However, a larger number of children (n=35) were learning English as their second language and had not developed proficient spoken English. The participating children thus possessed a diverse range of language ability. The collaborative instruction spanned 23 weeks with the SLT working directly in each experimental classroom 9-10 hours per week. A teaching

assistant was also assigned to the control classrooms to maintain a similar adult-to-child ratio to limit this as a confounding factor. Before-and-after comparisons (with inter-group differences in pre-test scores and year level statistically controlled) indicated that children in the experimental classrooms demonstrated greater gains in vocabulary knowledge, phonological awareness and letter-sound knowledge relative to those in the control classrooms. Further, native and non-native English speaking children responded similarly to the collaborative instruction. This study therefore demonstrated that collaborative classroom instruction among SLTs and teachers can create more equitable learning opportunities for children who possess a diverse range of language learning needs.

Carson et al. (2013) demonstrated that collaborative approaches to classroom-based oral language instruction can also generalise to improved reading ability for young, school-age children. The lead researcher, an SLT, adopted a consultative, coaching model to assist classroom teachers to deliver a classroom-based phonological awareness programme for children aged 5-to-6 years. The researcher provided indirect support to teachers through 8 hours of professional development alongside modelling of lessons. Although a previously designed intervention programme was utilised, the classroom teachers provided input into adapting the programme to their classroom. The programme was delivered across 10 weeks in four, 30-minute lessons per week. Children who received this instruction (n=34) demonstrated overall greater growth in their phoneme awareness, reading and spelling compared to students (n=95) who did not participate in the classroom programme. Students with SLI (n=7) in the experimental group also demonstrated development in their literacy skills; at the completion of the programme, their phoneme awareness, reading and spelling ability were not significantly different from that of typically developing children who did not receive the phonological awareness instruction. Further, by the end of the

school year, only 6% of children who participated in the programme scored below age-expectations for reading accuracy compared to 26% of the control peers. Similar to the findings of Hadley et al. (2000), this study also supported the potential benefits of SLT and teacher collaboration in establishing more effective classroom instruction for a diverse group of children.

Finally, preliminary data also suggests that collaborative classroom instruction may be more effective than other delivery models for promoting some aspects of language development in children with SLI. Throneburg et al. (2000) compared the effects of vocabulary instruction delivered in three different models across a 12-week period to children in the first 4 years of school: SLT co-planning instruction and co-teaching with classroom teachers (collaborative model), SLT delivering classroom instruction without involvement of the classroom teachers (classroom independent model) and SLT-delivering instruction to children outside of the classroom (withdrawal model). The SLT applied similar instruction (e.g., intensity of instruction, vocabulary targets and activities) utilised in the collaborative model to her instruction in the classroom independent and withdrawal models. Pre-post comparisons of the vocabulary knowledge of the 32 children with SLI across the three groups suggested those who received the collaborative model developed enhanced vocabulary relative to the other children. While it was unclear why the collaborative model was more effective, teacher involvement in planning and delivery of instruction may have increased the relevance of learning activities to the children's classroom programme. It may have also encouraged teachers to reinforce children's learning of vocabulary outside of the dedicated vocabulary lessons (Throneburg et al., 2000).

Taken together, these studies support the potential benefits of collaborative, classroom-based approaches among SLTs and teachers to raise children's language and literacy achievement. However, these findings must be interpreted cautiously. First, there is a possibility of a publishing

bias given that null results are less likely to be published (Torgerson, 2006). Additionally, several features of the studies limit generalisation of findings. For instance, some studies reported additional support for the collaborating practitioners in the form of advising university faculty or programme evaluators (e.g., Ellis et al., 1995; Farber & Klein, 1999). This is likely not representative of typical collaborative endeavours among practicing SLTs and teachers. Second, the time demands of the collaborative instruction utilised in some of the studies (e.g., up to 9 hours per week for the SLT in the Hadley et al. (2000) study) would not be realistic for the workloads of most practitioners. Further, the small sample sizes of children with SLI and the small number of practitioners involved in the majority of studies limits generalisation of findings. For instance, it is possible that instructor-related characteristics also played a role in the success of the collaborative instruction in that participating practitioners may have already had a particular interest or set of skills related to collaborative practice. Nonetheless, this series of studies provides promising evidence regarding the impact of SLT-teacher collaboration. Further, the studies demonstrate how classroom-based collaboration between SLTs and teachers can boost the learning of a diverse range of children, thus aligning with educational policies that emphasise the need for inter-professional practice to achieve effective classroom instruction for all children.

1.3.4 Challenges in collaborative instruction among practicing SLTs and teachers

Despite the potential benefits of classroom-based collaboration, collaborative co-working is not widely utilised by practicing SLTs and teachers. For example, an extensive government-commissioned review of services for children with speech, language and communication needs in the UK (referred to as the Bercow Report) (DCSF, 2008) suggested that co-working between SLTs and educational staff was highly variable with most practitioners working independently. Similarly, in a national survey of school-based SLTs (n = 1897) in the United States, the majority

of respondents reported using a withdrawal rather than a classroom-based service delivery model (Brandel & Loeb, 2011). The findings suggested that withdrawal service delivery was applied regardless of type or severity of difficulty possessed by children. As suggested by the Throneburg et al. (2000) study reviewed above, some aspects of language learning (e.g., vocabulary) are likely better suited to the classroom environment. It is thus likely that children with SLI are not consistently receiving interventions appropriately individualised to their learning needs.

There are also concerns that commonly utilised co-working approaches among SLTs and educators to integrate speech and language services into classroom instruction are ineffective. McCartney et al. (2011) evaluated a consultancy approach in which SLTs guided educational staff on implementing explicit oral language instruction for children with SLI. This approach was of interest given it is commonly utilised by SLTs throughout the UK. Classroom teachers, learning support teachers and classroom assistants implemented language activities for school-age children (n=38) with SLI. The SLT provided indirect support through setting target goals for the children and providing advice to classroom staff on how to implement activities from a manualised language programme. Pre-post comparisons of children's language and literacy skills after receiving 4 months of the classroom-based intervention, however, revealed no significant improvement in their oral language or reading comprehension. A previous randomised control trial (RCT) had demonstrated that the language programme, delivered by SLTs or SLT-assistants, offered significant advantage for children's expressive language outcomes relative to 'usual' speech and language therapy practices (i.e., consultancy-based approaches with educational staff and/or families) (Boyle, McCartney, O'Hare, & Forbes, 2009). Further comparisons were thus made between the outcomes of the classroom-based language programme and those of the control group of children in the RCT who received usual therapy practices (i.e., a historical control). This

revealed no significant advantage for either group's oral language outcomes further indicating that the language programme applied through a consultancy approach was largely ineffective.

Further exploration suggested that the consultancy-based approach employed in the intervention study did not adequately support educational staff to sustain the language activities. Logs of teaching activity indicated that educational staff did not implement the programme as frequently as expected by the researchers, thereby limiting the amount of direct instruction received by the target children (McCartney et al., 2011). Follow-up interviews were conducted with a subset of the classroom teachers (n=4) who participated in the intervention study alongside other teachers (n=15) and SLTs (n=2) to evaluate the approach to co-working (McCartney, Ellis, Boyle, Turnbull, & Kerr, 2010). Interview participants reported that implementing key components of collaboration including more discussion, shared decision making and shared accountability for implementing the programme between the teachers and the consulting SLT may have helped the classroom staff to incorporate more language activities into the classroom programme.

A collaborative approach to consultancy aligns with recommended practice for New Zealand SLTs working in education. Practice guidelines created by the New Zealand Ministry of Education emphasise that SLTs should assist classroom teachers through shared planning of classroom instruction, provision of advice and guidance, coaching and professional development workshops (Ministry of Education, 2013a). This approach to co-working is exemplified in the recent Language and Learning Intervention (LLi) initiative from the Ministry of Education. Through this service, teachers attend workshops provided by SLTs who provide information on language and literacy development and assist teachers to plan language learning

activities/strategies to integrate into their classroom programme to support children with SLI (Ministry of Education, 2014a).

Co-teaching is another promising delivery approach which supports collaborative co-working (Friend & Cook, 2003). Survey studies suggest that school-based SLTs in the U.S. employ co-teaching although infrequently when compared to withdrawal models (Beck & Dennis, 1997; Brandel & Loeb, 2011). Unfortunately, there is no data on the application of co-teaching models by New Zealand SLTs and teachers. However, a co-teaching approach to service delivery is valid in the New Zealand context. For instance, practice guidelines for education-based SLTs in New Zealand support SLTs working directly within children's everyday environments as illustrated in the following quote.

> For speech-language therapists, this means, wherever possible, working in the classroom, early childhood centre and home environment, utilising the resources and context as much as possible, alongside the significant adults in the child's life so that all team members develop the necessary skills and knowledge to successfully implement the programme. (Ministry of Education, 2013a, p. 27).

Further, professional practice standards utilised for graduating SLTs in New Zealand list the delivery of a collaborative classroom programme with a teacher as a competency expected of beginning practitioners (New Zealand Speech-language Therapists' Association (NZSTA), 2015; Speech Pathology Australia, 2011). Finally, innovations in New Zealand classroom design to create "Flexible Learning Spaces" are intended to promote co-teaching and flexible arrangement of classroom spaces and activities to help meet children's diverse learning needs (Ministry of Education, 2014c, 2016).

The reasons for lack of effective collaboration among SLTs and teachers are likely varied and complex (McCartney, 1999). For instance, barriers related to the structure and organisation of the professionals' working contexts (i.e., meso-level factors) have been identified as including but not limited to: a) limited funding for speech and language services; b) SLTs not being housed in schools; and c) teachers and SLTs being governed by different management structures with different and sometimes conflicting philosophies, expectations and procedures (e.g., SLTs being managed by health departments rather than education departments) (Glover & McCormack, 2015; Hartas, 2004; McCartney, 1999; McCartney et al., 2010). Challenges at the level of the individual practitioners' attitudes, knowledge and skills for collaborative practice, however, have also been consistently identified as barriers to SLT and teacher collaboration. More specifically, recurring themes throughout the literature suggest that teachers and SLTs need to possess enhanced shared understandings of co-working approaches (including collaboration) and of each other's professional roles, expertise and perspectives (Forbes, 2008; Forbes & McCartney, 2011; Glover & McCormack, 2015; Hartas, 2004; Law et al., 2002; Marvin, 1990). Enhanced collaborative competencies may also help SLTs and teachers overcome organisation related (i.e., meso-level) barriers to their collaboration. For instance, in an interview study, Australian practitioners highlighted that SLTs being based out of schools and the limited number of SLTs restricted the time available for SLT-teacher collaboration (Glover & McCormack, 2015). Similar challenges are likely faced by New Zealand practitioners given that SLTs are based outside of schools and restricted funding is available for SLT services (Ministry of Education, 2013a). However, SLTs and teachers who have developed collaborative competencies may be likely to engage in more efficient shared decision making and planning thereby minimising the impact of limited time for collaboration.

In response to the identified gaps in inter-professional knowledge and skill, there is a growing consensus among scholars, policy makers and professional associations that professional preparation programmes carry the responsibility to prepare child practitioners (including teachers and SLTs) for collaborative practice (DCSF, 2008; Forbes & McCartney, 2011; Glover & McCormack, 2015; Goldberg, 2015). For instance, the Bercow Report included the recommendation that "professionals from across the children's and young people's workforce undertake pre-qualification training in collaborative and multidisciplinary working, alongside professionals from other backgrounds" (DCSF, 2008, p. 9). Similarly, Forbes and McCartney (2011) argued that inter-professional education should be routine in initial teacher education to help future teachers and child-practitioners (such as SLTs) build shared knowledge and skills underpinning effective co-working. In the New Zealand context, professional practice standards for graduating teachers and SLTs also recognise the importance of prospective practitioners developing competence in co-working with colleagues (New Zealand Educational Council, 2015; New Zealand Speech-language Therapists' Association (NZSTA), 2015; Speech Pathology Australia, 2011).

It is important to consider that IPE is only one of other potential approaches for preparing SLTs and teachers for collaboration. For instance, multi-professional education in which participants learn a common curricula but with minimal interactive learning is an alternative approach (Barr et al., 2005). Curricula changes to existing models of uni-professional education (in which students learn primarily within their profession-specific disciplines) is another potential avenue for building inter-professional competencies. Shared learning opportunities, such as IPE, among prospective SLTs and teachers have also received some criticism. For instance, Mroz (2012) highlighted that logistical barriers to IPE among student SLTs and student teachers (e.g.,

scheduling and funding) might make it an unrealistic venture. An ASHA Ad Hoc Committee report on IPE for student SLTs raised concerns that IPE might be viewed unfavourably by academic faculty (ASHA, 2013). More specifically, the report suggested that already large workloads and full course programmes may make faculty reticent to upskill to instruct IPE and redistribute discipline-specific course time to IPE. Given the validity of these concerns, the effectiveness of IPE among student teachers/SLTs needs to be evaluated to make evidence-informed decisions about the inclusion of IPE into professional preparation programmes. Further, IPE needs to provide added value that cannot be obtained through uni-professional models of learning (Thistlethwaite, 2012). The next section therefore reviews the theoretical basis of IPE to explain why this might be a particularly advantageous approach to professional preparation for collaborative practice.

1.3.5 Section summary

This section highlighted that collaboration among SLTs and teachers is critical to the establishment of classroom instruction that fosters children's spoken and written language development. Policy mandates related to inclusive education alongside preliminary evidence of the benefits of collaboratively developed instruction supports integrated co-working among SLTs and teachers. These professionals, however, may not have adequate opportunity to develop the competencies required to be effective collaborators and there are calls for professional preparation programmes to better foster collaborative-ready practitioners. These factors support the need to examine the effectiveness of new educational strategies, such as IPE, to address gaps in the professional study of SLTs and teachers.

1.4 Theoretical underpinnings of IPE

It is useful to consider the theoretical underpinnings of IPE to highlight why IPE might be a particularly advantageous approach to preparing student teachers and student SLTs for collaborative practice. The underlying assumption of IPE is that there is added value in bringing learners from different professional backgrounds to interactively develop competencies for collaborative practice (Thistlethwaite, 2012). Two key theoretical perspectives, Contact Theory and constructivist learning theory, have been utilised to explain how inter-professional learning offers advantage over uni-professional learning (Craddock, O'Halloran, Borthwick, & McPherson, 2006; Hean, Craddock, & O Halloran, 2009; Thistlethwaite, 2012). Both perspectives propound a similar approach to IPE though predict different mechanisms underpinning its effectiveness. This section will review these theories to highlight how IPE might offer advantage over uni-professional learning in relation to student SLTs' and student teacher's readiness for inter-professional collaboration.

IPE is frequently described as based on adult learning principles which are ultimately derived from a constructivist perspective of learning (Barr et al., 2005; Hean et al., 2009). Key tenets of a constructivist perspective are that optimal learning occurs when adults direct their own learning while engaged in problem-solving tasks which are relevant to real-life activities and challenges (Craddock et al., 2006). A further facet of constructivism posits that meaningful learning is mediated through one's social interactions. More specifically, learning is elaborated and deepened through drawing upon previous experience and knowledge to challenge and be challenged by others' beliefs and knowledge (Barr et al., 2005; Craddock et al., 2006). IPE that incorporates cooperative problem solving among individuals of different but complementary professional backgrounds thus offers meaningful learning experiences which could not be easily

replicated in uni-professional learning activities. Learning that is mediated through IPE is predicted to more likely to transfer to participants' inter-professional co-working (Craddock et al., 2006). Further, lecture-type activities (often referred to as "transmission" strategies) should be utilised minimally in IPE as they contradict with a constructivist approach to teaching and learning (Payler et al., 2008).

Another commonly utilised theory to explain the benefits of IPE is a psycho-social theory of group dynamics referred to as Contact Theory. The theoretical framework of Contact Theory has been applied to IPE given that negative stereotypes and tensions among members of different professional groups has been identified as a barrier to collaboration in health contexts (Carpenter & Hewstone, 1996). This theoretical framework proposes that certain conditions are required to foster development of improved relations when conflicting social groups come into contact. These conditions include members of different groups having opportunity to work as equals and to work cooperatively on common goals. Further facilitating conditions have been proposed, such as ensuring participants enter the contact with positive expectations, experience successful joint work and have opportunity to learn about inter-group similarities and differences (Hewstone & Brown, 1986). Similar to a constructivist perspective, IPE designed on the basis of Contact Theory emphasises the importance of cooperative problem solving amongst individuals of different professional backgrounds. However, the predicted benefit is related to enhancement of inter-professional attitudes and relationships which in-turn promotes inter-professional collaboration.

Systematic reviews of pre-service IPE in health-care contexts have established that IPE which incorporates cooperative problem-solving improves students' perceptions of other professional groups (Cooper et al., 2001; Olson & Bialocerkowski, 2014). Preliminary research suggests, however, that positive influence on inter-professional attitudes may be more likely

when IPE is implemented in the later stages of professional study. Mandy, Milton, and Mandy (2004) implemented IPE for physiotherapy (n=85) and podiatry (n=45) students who were in their first year of professional study. Consistent with Contact Theory, the intervention employed cooperative problem solving activities among mixed-discipline groups throughout a semester long IPE course. Students' stereotypes of each other's professions were assessed via questionnaire. Before and after comparisons within the intervention group suggested that negative stereotypes were reinforced rather than minimised, thus contradicting Contact Theory. The researchers postulated that student professionals may have required additional study to become secure in their own professional identify before being able to meaningfully engage in cooperative work with students from other professional groups. Consequently, IPE which utilises cooperative problem solving may need to be introduced in the latter portion of students' professional study.

The potential of Contact Theory to explain the added value of IPE has been criticized based on the view that change in inter-professional attitudes alone is unlikely to improve collaborative practice (Oandasan & Reeves, 2005b). Studies have also highlighted that student professionals often enter IPE possessing positive perspectives of each other's professions (Thistlethwaite et al., 2015). Further, lack of equity and respect among SLTs and teachers may not be a primary barrier to their collaboration. Wright (1996) interviewed 20 teachers and 20 SLTs and employed Contact Theory as a theoretical framework to examine their perceptions of each other's professions and of collaborative co-working. Overall, interview analysis revealed little evidence of inter-professional conflict with the majority of participants reporting positive attitudes towards each other's professions. The goal of enhancing inter-professional attitudes alone thus provides insufficient justification to incorporate IPE into the professional study of

student SLTs and student teachers. Alternatively, a constructivist orientation provides a more comprehensive rationale for IPE given the opportunities to acquire collaborative competencies through cooperative problem-solving among individuals with diverse roles, beliefs, knowledge and skills (Thistlethwaite, 2012). Nonetheless, the effects of IPE on inter-professional attitudes should be monitored to ensure there are not unwanted effects related to negative stereotyping. Further, when feasible, experimental intervention studies of IPE should delineate the impact of enhanced relationships from knowledge/skill growth on the development of students' collaborative practice.

There is a paucity of studies examining the effectiveness of IPE for student teachers and student SLTs to enhance inter-professional attitudes, knowledge and/or skills. It is thus unknown whether student SLTs and student teachers can learn from each to develop shared collaborative competencies and whether this learning transfers to co-working ability. An initial examination of IPE explored the impact of a 3-hour IPE workshop for student teachers (n=52) and student SLTs (n=55) (Suleman, MacFarlane, Pollock, Schneider, & Leroy, 2013; Suleman et al., 2014). Mixed-discipline pairs of students participated in interactive lectures aimed at enhancing their awareness of differences in profession-specific terminology and models of service delivery. Mixed-discipline groups also worked together to develop instructional plans for children who possessed behavioural and/or speech and language difficulties. Quantitative analysis of pre- and post-questionnaires suggested that the intervention was successful. More specifically, participants possessed increased awareness of their use of profession-specific jargon and of co-working models that foster inter-professional practice.

While this study was an important initial examination of the feasibility of IPE for student teachers and student SLTs, there were several limitations that necessitate further research. For

instance, a complicating factor in the design of the IPE was incorporation of explicit instruction by a lecturer regarding specific aspects of the targeted competency areas. Consequently, improvement in students' collaborative competencies could be attributed to the lecture-based teaching strategy rather than through student interactions (i.e., the unique feature of IPE). Use of a comparison control intervention utilising only lecture-based teaching would help ascertain the contribution of interactive learning to students' improvement in collaborative competencies. Furthermore, the inter-professional experience encouraged students to avoid use of linguistic and curricular terms, as they were considered to impede inter-professional communication. The counter-argument is that IPE initiatives should encourage shared understanding and use of such terminology given the importance for teachers and SLTs to possess this knowledge to enhance their individual and co-working practice (Foorman, Arndt, & Crawford, 2011; Forbes, 2008; McCartney & Ellis, 2013). Finally, the impact of the intervention on students' co-practice (e.g., ability to co-plan evidence-based language and/or literacy instruction) was not examined. Continued research is thus required to examine how interactive learning among student SLTs and student teachers prepares them for future inter-professional collaboration.

1.4.1 Section summary

Review of learning and psycho-social theories utilised to inform IPE design suggests that IPE may offer added value over uni- and multi-professional learning models related to opportunities for interactive learning and developing positive inter-professional attitudes. Review of these theoretical perspectives suggests that effective IPE should possess the following features:

- IPE should primarily incorporate mixed-discipline pairs and/or groups working together on activities oriented towards problem-solving to achieve common goals.

- Learning activities should be situated within authentic learning contexts (e.g., creating a management plan for a case study or addressing a problem likely to be encountered in practice settings).
- Participants should have opportunity to develop their own profession-specific identity and confidence before being introduced to IPE which employs cooperative problem solving.

Further, a constructivist theoretical framework which emphasises the importance of interactive learning during cooperative problem solving may provide the most comprehensive explanation of how IPE provides added value over traditional, uni-professional learning. There is, however, a paucity of research to establish the effectiveness of interactive learning among student SLTs and student teachers in preparing them for collaborative practice. The next section therefore develops potential IPE intervention models for student SLTs and student teachers within a constructivist framework.

1.5 Design and evaluation of IPE for student teachers and student SLTs

1.5.1 Collaborative competencies for student SLTs and student teachers

A diverse array of potential competencies have been proposed for effective collaborative practice (Thistlethwaite & Moran, 2010). Researchers have begun to identify the specific attitudes, knowledge and skills that underpin SLT-teacher collaboration though additional research is required to determine which are most critical to collaboration (Forbes, 2008). Three broad areas of collaborative competency which have been proposed as critical to SLT-teacher collaboration are described below.

Knowledge related to professional roles and expertise (i.e., role understanding). It has been argued that SLTs and classroom teachers should be knowledgeable in each other's areas of

expertise to facilitate meaningful communication (Ehren, 2000; Forbes, 2008). SLTs are expected to possess strong language knowledge given their in-depth instruction in linguistics and children's speech and oral language development (Fleming, Miller, & Wright, 1997; McCartney & Ellis, 2013). For example, SLTs usually possess more advanced phoneme awareness than teachers and literacy specialists (Carroll, Gillon, & McNeill, 2012; Spencer, Schuele, Guillot, & Lee, 2008). Comparatively, teachers are expected to possess expertise in curriculum and classroom management (Fleming et al., 1997; McCartney, 1999). SLTs tend to use their in-depth knowledge of language structure and development to guide decisions about their approaches to instruction/intervention. In contrast, teachers use curricular frameworks and programmes to guide their instruction. Differences in approaches may lead to tensions and miscommunications among SLTs and teachers given that curricular structures typically do not conceptualise language in the same way as SLTs (e.g., curricular models do not necessarily follow a developmental approach to language learning) (McCartney, 1999). Indeed, both SLTs and teachers have reported that each professional group requires a better understanding of each other's professional expertise to enhance their inter-professional collaboration (Glover & McCormack, 2015; Hartas, 2004; Law et al., 2002). Enhanced familiarity with each other's professional roles and expertise may facilitate SLTs and teachers to blend their respective expertise to incorporate developmentally appropriate language instruction within curricular aims.

This perspective aligns with a large body of evidence, in English learning contexts, indicating that classroom teachers require opportunities to develop understanding of linguistic structures and concepts underpinning children's language and literacy acquisition (Brady et al., 2009; Joshi et al., 2009; Washburn, Joshi, & Binks-Cantrell, 2011). Moats (1994) originally drew attention to teachers' language/literacy knowledge through a survey study of teachers' knowledge

of linguistic concepts and meta-linguistic skills related to reading and writing instruction. Results suggested that teacher participants (n=89) possessed limited knowledge of linguistic terminology and meta-linguistic skills (e.g., phoneme awareness) related to word-level reading. Several subsequent studies further emphasised that teachers required additional understanding of linguistic concepts related to oral language and speech-to-print (i.e., orthographic) relationships (Bos, Mather, Dickson, Podhajski, & Chard, 2001; Brady et al., 2009; Mather, Bos, & Babur, 2001; Washburn et al., 2011). For instance, Bos et al. (2001) demonstrated that pre-service teachers (n=252) and in-service teachers (n=286) had difficulty correctly defining speech-to-print concepts, such as phonics and types of graphemes including consonant blends and digraphs. More recently, in a survey study of 185 primary school teachers, less than half of the participants were able to correctly identify oral language concepts such as phonological awareness and phoneme awareness (Washburn et al., 2011). Enhancing teachers' conceptual linguistic knowledge may enhance SLT-teacher co-working alongside teachers' individual practice given the accumulating evidence associating teachers' language structure knowledge to effective literacy instruction (e.g., McCutchen et al., 2009).

Lack of shared inter-professional knowledge related to language and literacy content may be partially attributed to the professional study of teachers. Assessment of the linguistic knowledge of 78 teacher educators (i.e., those responsible for teaching pre-service teachers) suggested that they did not possess the requisite understandings of language structure to develop such knowledge in their student teachers (Joshi et al., 2009). Textbooks and course content related to reading instruction have also been found to provide erroneous information about linguistic concepts or fail to address the range of language skills underpinning literacy acquisition (Hayward, Phillips, & Sych, 2014; Walsh, Glaser, & Wilcox, 2006). However, student teachers' linguistic knowledge

has shown to improve after relevant course and fieldwork focused on the language-basis of literacy acquisition, thus supporting the argument for incorporation of explicit instruction of this content into teacher education curricula (Al Otaiba et al., 2012; Purvis, McNeill, & Everatt, 2015). IPE may provide another avenue for student teachers, beyond their regular course and fieldwork, to develop enhanced linguistic knowledge through their interactions with student SLTs.

Similarly, professional study programmes may not provide adequate opportunity to build prospective SLTs' understanding of curriculum and classroom instruction. SLTs have reported gaining minimal experience with classroom-based models of instruction/intervention during their professional study (Beck & Dennis, 1997; Brandel & Loeb, 2011). For instance, in the previously introduced survey of 1897 school-based SLTs in the US, only 24.2% reported co-teaching experience with a primary school teacher during their professional study (Brandel & Loeb, 2011). Moreover, those who reported having co-teaching experience during their professional study were 6 times more likely to utilise classroom-based work as a practising SLT. Providing student SLTs opportunity to interact with student teachers and learn from their developing classroom-based expertise may therefore help prospective SLTs feel more prepared to work alongside teachers in the classroom.

Inter-dependency in professional roles and responsibilities. Beyond having the appropriate knowledge of each other's professional roles and expertise, SLTs and teachers must also value integrated and inter-dependent co-working to achieve common goals for a child (Beck & Dennis, 1997; Bronstein, 2003). This had lead researchers to explore SLTs' and teachers' perceptions of the appropriateness of classroom-based delivery models in which SLTs and teachers must engage in some degree of collaboration (Beck & Dennis, 1997; Elksnin & Capilouto, 1994). For instance, Beck and Dennis (1997) hypothesised that SLTs and teachers might be resistant to

service delivery models which demand greater integration of knowledge and skills given that they have traditionally worked largely independent of each other. In contrast, their survey of practising teachers (n=51) and SLTs (n=21) indicated that both groups favoured a co-teaching model (i.e., team teaching) which required the greatest degree of collaboration. SLTs and teachers also perceived classroom-based co-work as largely advantageous for children's learning.

Although this study suggested that teachers and SLTs possess largely positive attitudes towards integrated co-working, the small sample size limited the generalisation of the findings. Furthermore, an earlier study found that SLTs who had not yet attempted classroom-based delivery models were less accepting of a team teaching model compared to SLTs who had engaged in classroom-based work (Elksnin & Capilouto, 1994). Examination of the participants in the Beck and Dennis (1997) study indicated that nearly 70% had previously employed classroom-based co-working. Consequently, the views of practitioners who had not adopted classroom-based co-work were under-represented, likely resulting in an over-estimation of the degree to which SLTs and teachers value integrated co-working. Further, Beck and Dennis (1997) did not examine whether teachers' and SLTs' acceptance of integrated co-working was influenced by the content of instruction (e.g., articulation, vocabulary, phonological awareness, reading, spelling, etc.). More recent studies examining the perceptions of teachers and SLTs in relation to integrated co-working have suggested practitioners are accepting of collaboration; however, the studies did not systematically examine how their perceptions are influenced by co-working experience or by content area (Glover & McCormack, 2015; Hartas, 2004). Consequently, further research is required to understand to what degree inexperienced versus experienced SLTs and teachers value being inter-dependent practitioners in various elements of

speech, language and literacy instruction. Such information will inform whether attitudes towards integrated co-working would be an appropriate competency area to address through pre-service IPE.

Knowledge of co-working models. SLTs and teachers who possess a shared understanding of what constitutes collaboration are also more likely to experience successful co-working (Marvin, 1990). However, both teachers and SLTs have expressed confusion over the concept of collaboration (Hartas, 2004). As discussed earlier in this review, collaboration is often used colloquially to refer to several different co-working approaches ranging from loosely coordinated to highly integrated co-working. This can lead to miscommunication if one professional conceptualises collaboration differently from another (Marvin, 1990).

Further confusion may exist over service delivery models. In a UK-based study, Law et al. (2002) highlighted the various understandings of consultation that arose during interviews with SLTs, teachers, parents and managers of speech and language services. Some viewed consultation as the SLT directing para-professional staff (e.g., a teaching assistant) on how to support children with speech, language and/or communication difficulties. In contrast, others viewed consultation as the SLT providing guidance to a third party (e.g., teacher, assistant, parents) as well as providing direct instruction/intervention (e.g., modelling instructional strategies in the classroom). Confusion may partially arise from traditional consultation roles which were based on a medical model. In this model of consultancy, the SLT provides expert advice and guidance to a third party who then works directly with a child (Hartas, 2004). Without shared decision making, however, such an approach cannot be considered collaborative. Teachers and/or SLTs who conceptualise consultancy with a medical orientation versus a collaborative orientation may thus encounter difficulties in establishing effective co-working.

Continued research comparing how prospective SLTs and teachers conceptualise collaboration alongside delivery models might thus provide insight into whether establishing mutual understandings of these concepts would be an appropriate goal for pre-service IPE.

Other potential competency areas relevant to SLT-teacher collaboration. It is important to consider other competencies that have been highlighted as critical to effective collaboration, but have received less attention in empirical studies of SLT-teacher collaboration. Other potential collaborative competencies to consider when designing and evaluating IPE for student SLTs and student teachers are as follows.

Respect for the other profession. Collaboration requires that co-workers view each other as possessing equal status and power in decision making (Friend & Cook, 2003; Thistlethwaite & Moran, 2010). Collaboration is thus unlikely to develop if at least one co-worker views the other co-worker as lacking expertise to make a meaningful contribution to joint decision making (Friend & Cook, 2003). Frequently utilised consultancy models which position SLTs in an expert role raises issues of unequal power relationships among teachers and SLTs (Hartas, 2004). It is possible, however, that this pattern of co-working is related to limited understanding of other co-working approaches rather than to perceptions of unequal professional status. As previously discussed, there is little evidence to suggest that negative perceptions or disrespect of each other's professions is a primary barrier to SLT-teacher collaboration. However, understanding of SLTs' and teachers' perceptions of each other is limited given that few studies have directly examined SLT-teacher inter-professional relationships. Therefore, even if inter-professional relationships are not directly targeted by IPE, negative effects due to limited respect and unequal power relationships across professional groups should be monitored closely when evaluating IPE.

Inter-personal communication. SLTs and teachers have described lack of time to maintain communication as a barrier to their collaboration (Glover & McCormack, 2015). It is possible, however, that communication challenges could be partially attributed to limited communication skills. For instance, collaboration requires that co-workers possess negotiation skills, ability to adjust one's language to an audience (e.g., avoiding jargon use), knowledge of communication technology (e.g., video conferencing) and active listening skills (Canadian Interprofessional Health Collaborative, 2010; Suter et al., 2009).

Role flexibility. Several conceptualizations of collaboration include that co-workers must be willing to adopt roles and responsibilities which may not be part of one's typical practice (Bronstein, 2003). This is often referred to as 'role release' or 'role blurring' (Bronstein, 2003). Classroom-based SLT-teacher collaboration necessitates some degree of role flexibility, such as the SLT participating in classroom instruction and working within a curricular framework (Suleman et al., 2014; Wright & Kersner, 2004). Limited classroom-based collaboration among SLTs and teachers may be partially related to lack of openness to assume responsibilities that are not associated with their traditional roles. Some have cautioned, however, that role flexibility requires further examination as it may lead to professional conflict and burnout due to practitioners assuming a growing set of responsibilities (Hall, 2005).

1.5.2 Designing a model of IPE

Contexts for learning. IPE for prospective professionals is delivered in classroom-based and in placement-based applications (Freeth et al., 2005). Classroom-based applications refer to programmes delivered within university contexts, generally in the form of workshops or courses. Placement-based applications refer to instances when inter-professional learning is incorporated into professional practice placements in which student professionals gain experience in work

settings under the supervision of qualified professionals. As introduced earlier, only course-based applications for prospective SLTs and teachers have begun to be explored in the form of one-off workshops (Suleman et al., 2013; Suleman et al., 2014). There are no studies, however, of IPE applications embedded within professional practice placements.

It is important to examine the impact of both course- and placement-based models of IPE on students' readiness for collaborative practice. Course-based applications of IPE are favourable from a logistical perspective, as they can be conducted with fewer facilitators and do not require finding suitable practice settings in which to situate inter-professional activities (Davidson, Smith, Dodd, Smith, & O'Loughlan, 2008). Course-based applications might thus provide a more sustainable and wide-reaching form of IPE, thus warranting further research into their effectiveness. Some researchers suggest, however, that IPE might be more successful when situated in practice settings because learning experiences align more closely with constructivist learning theory (e.g., increased motivation to learn due to real-life problems) (Baxter, 2004). Further, it cannot be assumed that inter-professional learning will be a routine part of traditional placements (Cook, 2005). In the New Zealand context, funding for SLT services is limited to 1% of children whose primary difficulty is related to a developmental speech and/or language disorder/delay (MoE, 2013a). Consequently, it is unlikely that traditional practice placements will provide student teachers opportunity to gain inter-professional knowledge through interactions with practising SLTs. Thus, shared placement experiences among student SLTs and student teachers might provide a valuable method for optimising their inter-professional experience during their professional study. Research into the impact of both course- and placement-based models is thus warranted to determine how the different approaches to IPE contribute to developing collaborative-ready graduates.

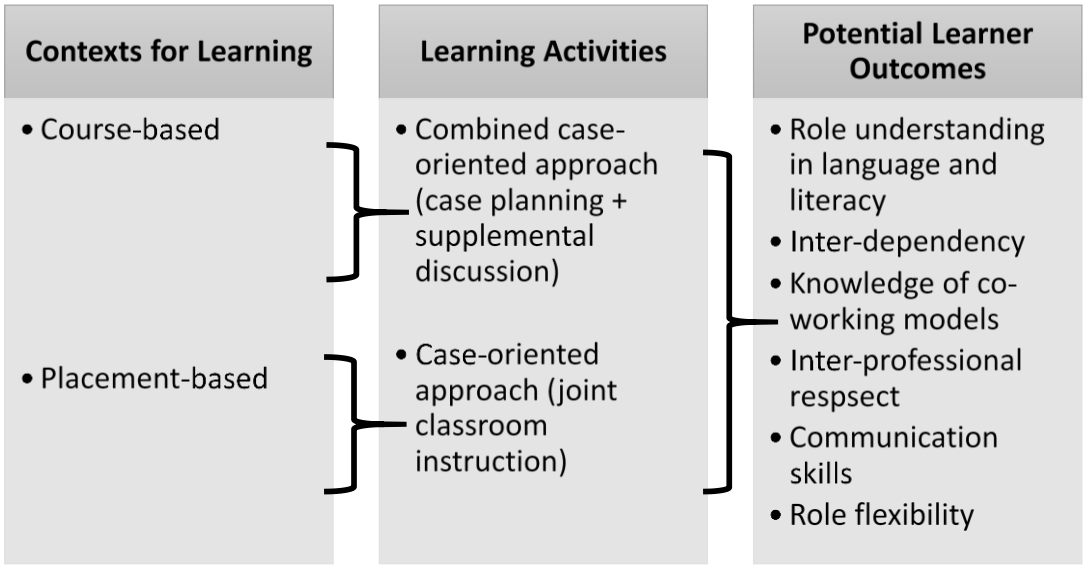
Learning activities. A diverse array of learning activities are utilised in IPE which makes it difficult to determine the relative efficacy of different IPE models (Davidson et al., 2008; Thistlethwaite, 2012). Learning activities include: observations, role play, case-based problem solving, lectures, facilitated discussions, social interactions and on-line discussion forums (Barr et al., 2005; Olson & Bialocerkowski, 2014). IPE oriented around a case-format, however, is a recommended learning activity (D'Eon, 2004; Payler et al., 2008). This refers to IPE which emphasises mixed-discipline groups of students working collectively to decide how to manage a particular case. This approach is consistent with a constructivist orientation to IPE which emphasises the importance of inter-professional groups working cooperatively to solve a problem. Further, a case-oriented approach is appropriate for student SLTs and student teachers as this resembles their co-working responsibilities in practice.

Case-oriented work in course-based applications may need to be supplemented with additional interactive activities to deepen students' learning. For instance, Carpenter and Hewstone (1996) utilised a combination of learning activities in a one-off IPE programme for prospective doctors (n=41) and social workers (n=44). Mixed-discipline pairs participated in case-based planning combined with structured opportunities to discuss their respective professional roles. Students' self-assessments suggested they had greater understanding of the skills and roles of the other profession at the end of the intervention. They also reported developing more positive attitudes towards each other's professions. A similar approach for course-based IPE may thus provide a promising model for developing student SLTs' and student teachers' collaborative competencies. Further, comparing the effects of case-based planning supplemented with different types of supplemental activities can provide further insight into the relative efficacy of different combination of learning activities.

In contrast, there may be less need for supplemental activities in case-oriented, placement-based IPE given the variety of learning opportunities offered within the environment. Potential learning opportunities include observing each other's practice, engaging in informal discussion (e.g., during lunch breaks) and implementing cooperatively developed instructional plans. Case-oriented approaches, in which students are primarily self-directed in their inter-professional learning, may be a more sustainable model of IPE given the limited additional input by placement supervisors. Reeves and Freeth (2002) employed a case-oriented, placement-based model in which health-care students (n=36) from medicine, nursing, occupational therapy and physiotherapy co-worked to provide care for patients on a hospital ward. Interview analysis suggested that students felt this approach encouraged inter-professional interaction and opportunity to learn more about teamwork processes. Supervisors, however, reported that facilitating both the profession-specific and inter-professional activities of students was overwhelming and unrealistic to maintain. Exploratory research is thus required to examine whether it is feasible for student SLTs and student teachers to develop collaborative competencies during a case-oriented placement model in which they primarily direct their own inter-professional learning.

Figure 3 presents a summary of the two proposed IPE models for student SLTs/teachers and the collaborative competencies which could be potentially influenced by IPE.

Figure 3. Proposed Inter-Professional Education (IPE) models for student teachers and student SLTs.



1.5.3 Methodological considerations for evaluating IPE

Evaluating impact of IPE on collaborative competencies. Evaluating whether student teachers/SLTs develop competencies for collaboration through IPE is challenging. First, there are few validated measures of collaborative competencies beyond self-report questionnaires focused on attitudes towards collaboration and inter-professional learning (Thistlethwaite et al., 2015). The majority of IPE efficacy studies have thus focused on change in these factors (Payler et al., 2008). To explore the range of other potential competencies that could be developed through IPE, researchers must either develop their own measures and/or utilise qualitative methodologies (Payler et al., 2008; Thistlethwaite et al., 2015).

Moreover, it is has been recommended that quantitative investigations be routinely complemented with qualitative investigations to explore the impact of IPE (Payler et al., 2008; Reeves et al., 2010; Reeves et al., 2013). For instance, in the previously introduced study of pre-service IPE for student SLTs/teachers, Suleman and colleagues (2013, 2014) employed

experimenter-developed measurements to examine change in students' use of profession-specific jargon and knowledge of co-working approaches. It was feasible, however, that students were developing other competencies through their interactions which were not easily assessed using quantitative measurement and analysis. Complementing quantitative with qualitative investigation of students' experiences could examine the broader scope of student professionals' learning and their needs for further development following IPE. Such an approach to evaluation will help determine what IPE approaches result in what types of learning outcomes and for what professional groups (Thistlethwaite et al., 2015).

Qualitative understanding of students' experiences in IPE may also provide direction on how such experiences can be better structured or facilitated to enhance participants' learning. Again, such information was not explored in the Suleman et al. (2013, 2014) initial examination of IPE among student SLTs and student teachers despite it being critical for informing the design of future IPE. Evaluations need to consider the range of teaching related (i.e., micro-level) factors that could influence the success of an IPE intervention (D'Amour & Oandasan, 2005). As described earlier in this review, these factors include timing of the IPE within professional preparation programmes, teaching and learning strategies, and skills of facilitators/educators (Freeth et al., 2005; Thistlethwaite et al., 2015).

Evaluating impact of IPE beyond collaborative competencies. The ultimate goal of IPE is to develop participants who are better able to engage in effective collaborative practice (Reeves et al., 2013). When feasible, IPE evaluations should thus aim to examine development of collaborative competencies alongside effectiveness of collaborative practice. Again, this task is challenging as collaboration involves both a process (i.e., quality of inter-professional interaction) and a product (i.e., benefits to the child) (Lindsay & Dockrell, 2002). Examination of

only the product may miss improvements in the process. Nonetheless, development of methods to evaluate products of students' co-working (e.g., quality of cooperatively created lesson plans) is a starting point for examining the development of students' collaborative practice. Examining both proximal effects of IPE (e.g., development of specific competencies) and distal effects (e.g., co-working products) will provide more robust evidence as to whether student professionals are becoming collaborative-ready practitioners.

Currently, studies of pre-service IPE have predominantly examined impact on participants' collaborative competencies (Olson & Bialocerkowski, 2014; Suleman et al., 2013; Suleman et al., 2014). Future applications of course-based IPE should seek to examine whether IPE results in improved co-working among student professionals. A case-oriented approach to course-based IPE offers opportunity to examine whether students' collaborative instructional plans improve throughout an IPE experience, thus providing insight into the development of their collaborative practice. Case-oriented, placement-based IPE also offers opportunity to examine how children's language and literacy learning is influenced by student professionals' joint work. Comparisons could be made between children's learning outcomes in shared placements (i.e., student SLTs and student teachers providing joint instruction) and non-shared placements (i.e., student SLT and student teacher working separately in a classroom). This could help delineate whether shared placement experiences enable development of competencies that allow students to engage in collaborative practice that is more effective than separate practice. Exploratory research is first required, however, to establish the feasibility of such an approach to inter-professional learning for student SLTs and student teachers.

It is important to acknowledge that these proposed approaches to IPE evaluation do not address whether student professionals who undertake IPE can effectively engage in collaborative

practices as a professional. Longitudinal research is required to evaluate students' post graduation use of collaborative practices. Such an undertaking would be costly and fraught with difficulties given the variety of micro (collaborative competencies of other practitioners), meso (organisational) and macro (systemic) factors which may impede inter-professional collaboration despite IPE-trained practitioners having adequate competency for collaborative practice (D'Amour & Oandasan, 2005). Initial stages of pre-service IPE research first needs to establish the short-term effects (e.g., development of collaborative competencies alongside co-working efficacy) before the difficult and costly task of examining long-term effects can be justified.

1.5.4 Section summary

This section highlighted specific knowledge and attitudes that SLTs and teachers may require additional opportunity to learn to better support their collaboration. This includes knowledge and/or perceptions related to role understanding (e.g., knowledge of linguistic and curricular concepts), inter-dependency in roles (e.g., acceptance of integrated service delivery models) and knowledge of co-working models (e.g., conceptualisations of collaboration). Case-oriented IPE applied in course- and placement-based experiences may provide opportunity for student SLTs and student teachers to develop these competencies. Evaluating the impact of case-oriented IPE models on collaborative competencies alongside students' co-working is critical towards understanding whether IPE could play a valuable role in preparing prospective SLTs and teachers for collaborative language and literacy instruction.

1.6 Summary and thesis aims

The importance of ensuring that classroom teachers and SLTs are well prepared to collaboratively support the diverse language and literacy learning needs of children is well established. It has been

recognised, however, that SLTs and teachers require additional opportunity in their professional study to develop the attitudes, knowledge and/or skills (i.e., competencies) required to collaborate effectively (DCSF, 2008; Forbes & McCartney, 2011). In-depth investigation of student SLTs' and student teachers' competencies for collaborative practice, however, has yet to be conducted. Such information is critical to inform curriculum design for professional study of prospective SLTs and teachers.

Part of an overall strategy for enhancing teacher and SLT preparation in relation to effective language and literacy instruction may be the inclusion of inter-professional education (IPE) among student teachers and student SLTs. Evaluations of pre-service IPE in health-based applications have demonstrated that student professionals develop attitudes, knowledge and skills considered important for collaborative practice (Cooper et al., 2001; Olson & Bialocerkowski, 2014; Thistlethwaite et al., 2015). In contrast, how IPE can be applied in a relevant and effective manner for student SLTs and student teachers is under-explored. Research is required to examine the effectiveness of IPE models to determine whether inter-professional learning should become a routine part of the professional preparation of teachers and SLTs. Case-oriented IPE may be a particularly important model to examine given its consistency with learning and psycho-social theories predicting the benefits of IPE over other educational models. Further, case-oriented approaches offer opportunity to examine student professionals' development of specific collaborative competencies alongside their ability to collaboratively support the learning of children with spoken language impairment.

The primary aims of this thesis are to:

1. Describe the current state of student teachers' and student SLTs' competencies for collaborative practice related to their knowledge and perceptions of each other's professional

roles/expertise, acceptance of inter-dependent co-working and understanding of co-working models in collaborative language and literacy instruction.

2. Evaluate the effectiveness of case-oriented IPE models developed to enhance shared competencies among student SLTs and student teachers for collaborative language and literacy instruction.

The following questions are addressed to accomplish these aims:

1. To what extent do student SLTs and student teachers differ in their
   a) content knowledge of linguistic concepts and classroom literacy curriculum,
   b) perceptions of appropriate co-working models, and
   c) conceptualisations of SLT-teacher collaboration?

2. What are the effects of a case-oriented, course-based model on student SLTs' and student teachers'

   a) competencies in collaborative practice, including their shared content knowledge of linguistic concepts and classroom literacy curriculum; and

   b) instructional co-planning for children with speech and literacy difficulties?

3. What are the effects of a case-oriented, placement-based model of IPE on student SLTs' and student teachers' competencies in collaborative practice, including their

   a) shared content knowledge of linguistic concepts and classroom literacy curriculum, and

   b) perceptions of appropriate co-working models?

4. What are the effects of a case-oriented, placement-based model of IPE on the speech, phonological awareness and early literacy skills of children whom student SLTs and student teachers jointly instruct?

The series of studies, presented in Chapters 2 to 6 of the thesis, answer the research questions outlined above. Chapter 2 will present a survey study comparing student SLTs' and student teachers' knowledge of linguistic and literacy concepts related to each other's expertise, perceptions of appropriate co-working models, and conceptualisations of collaboration. Chapter 3 will examine the efficacy of a case-oriented, course-based model of IPE utilising a randomized-controlled group design. Development of collaborative competency related to understanding of professional expertise alongside development of collaborative practice will be examined. Chapter 4 will further examine the effects of the course-based model through analysis of post-intervention interviews provided by participating students. Development of collaborative competencies alongside how the instructional design of the IPE affected students' learning will be presented. Chapter 5 will examine the efficacy of a case-oriented, placement-based IPE model utilising a case study approach combining interview analysis and pre-post questionnaires. Again, development of collaborative competencies alongside how the instructional design affected students' learning will be presented. Finally, Chapter 6 will further examine the effects of the placement-based model by utilising a single-subject intervention design to examine how children's speech and early literacy skills were impacted by student professionals' joint instruction.

CHAPTER 2

THE KNOWLEDGE AND PERCEPTIONS OF PROSPECTIVE TEACHERS AND SPEECH LANGUAGE THERAPISTS IN COLLABORATIVE LANGUAGE AND LITERACY INSTRUCTION

2.1 Introduction

The literature reviewed in Chapter 1 showed the aim of IPE initiatives is to build shared attitudes, knowledge and skills among professionals from different backgrounds to prepare them for effective inter-professional collaboration. Customisation 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, Freeth, Koppel, Reeves, & Barr, 2007). Consequently, determining how current models of professional study build shared collaborative competencies among SLTs and teachers is necessary to guide the development of pre-service IPE for these groups.

In review of Scottish policy regarding school-based SLT services, Forbes (2008) highlighted the areas of shared knowledge that SLTs and teachers may need to utilise in their co-working. These included knowledge about language structure and development, curricular frameworks and activities and inter-professional working. Empirical studies of SLTs and teachers, however, suggest that the two professional groups possess limited shared understandings of areas relevant to their collaboration. Hartas (2004) surveyed SLTs (n=17) and teachers (n=25) from the United Kingdom (UK) regarding barriers and facilitators to SLT-teacher collaboration. SLTs reported the need for teachers to better understand therapists' role 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.

Similar perspectives were echoed in a more recent study which surveyed Australian classroom teachers (n=14) and SLTs (n=6) followed by interviews of a subset of the respondents (n=4) (Glover & McCormack, 2015). Teachers and SLTs highlighted the need for better understanding of each other's professional roles and expertise to enhance their co-practice. More specifically, respondents indicated that classroom teachers required better understanding of SLTs' expertise in language development, while SLTs required better understanding of teachers' expertise in curriculum. Limited understanding of classroom-based delivery models may also exist among SLTs and teachers as suggested by a government-funded review of SLT services in the UK (Law et al., 2002). In particular, application of a consultative SLT delivery model was not well understood by SLTs or educational staff.

Taken together, these studies suggest that IPE should build shared understandings across multiple aspects of collaborative competency. However, relying on research involving in-service teachers and SLTs to guide decisions about how to develop collaborative ability at a pre-service level is problematic given the likely impact of work experience. It is thus essential to investigate shared collaborative competencies of student SLTs and student teachers to better inform implementation of IPE within university programmes. At present there are no studies known to the researcher that have examined the inter-professional understandings of prospective SLTs and teachers. 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 competencies in the areas that existing research has highlighted as important to SLT-teacher collaboration is crucial to determine what content should be prioritised for inclusion into pre-service IPE. As described in the literature review in Chapter 1, further development of competencies related to understanding of each other's professional expertise in language and literacy, acceptance of inter-dependent co-working and understanding of collaboration may be particularly important for advancing SLT-teacher collaboration. The current exploratory study thus 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 each other's professional expertise in language and literacy, co-working models and professional collaboration. The study addresses the first research question within the thesis as identified in Chapter 1, including the sub-questions which are listed below.

The specific research questions were:

a) To what extent do student SLTs and student teachers differ in their understanding of linguistic concepts and classroom literacy curriculum?
b) To what extent do student SLTs and student teachers differ in their perceptions of appropriate co-working models?
c) What are student SLTs' and student teachers' conceptualisations of SLT-teacher collaboration?

2.2 Method

2.2.1 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.

2.2.2 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 co-working models 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 A). The first section consisted of six close-ended questions regarding educational and work experience. The second section 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:

a) spoken language,

b) speech to print relationships and,

c) 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 concepts denoting the relationship between spoken and written language structure (e.g., decoding, grapheme, digraph). It was unknown whether this category of linguistic concepts could be considered SLT-oriented knowledge as SLTs' knowledge of the connection between spoken and written language has not been previously examined. These eight questions were thus analysed separately from the spoken language concepts. 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 randomised 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 consisted of three close-ended questions about different elements of SLT and teacher co-working. One closed-ended question asked participants to identify to what degree SLTs and teachers should participate in instruction of various spoken and written language skills. Participants were asked to choose who should participate in instruction of 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 approaches for SLTs and how often SLTs should work in classrooms.

The final section of the survey 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.

2.2.3 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.

2.3 Results

2.3.1 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.

2.3.2 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				
	M	*SD*	M	*SD*	*T*	*p*	Cohen's *d*
Spoken language** (max=8)	5.89	1.27	3.43	1.30	9.10	<0.00	1.91
Speech to print* (max = 8)	4.32	1.27	3.34	1.68	3.03	0.003	0.66
Curriculum** (max = 8)	2.03	1.32	6.38	1.17	16.82	<0.00	3.49

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

Table 2 further illustrates the groups' performance on individual items. 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 represents 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.

Table 2. Group performance on individual language and literacy concepts.

	Student SLT (n=37) % correct	Student Teacher (n=58) % correct
Spoken language		
Phonological disorder	48.6	10.3
Expressive vocabulary	100	74.1
Morphological awareness	62.2	43.1
Phoneme	78.4	74.1
Phonological awareness	35.1	25.9
Vowels	91.9	25.9
Voicing	83.8	3.4
Oral language	89.2	86.2
Speech to print		
Digraph	27.0	43.1
Decoding	27.0	39.7
Consonant blend	83.8	46.6
Orthotactics	64.9	48.3
Grapheme	54.1	37.9
Non-word reading	86.5	41.4
Phonotactics	59.5	15.5
Phonics	29.7	62.1
Literacy curriculum		
Running records	18.9	93.1
Guided reading	13.5	87.9
Constrained reading skills	2.7	17.2
Surface features of writing	27.0	89.7
Key competencies*	48.6	98.3
Reading Recovery	64.9	94.8
Literacy Learning Progressions*	8.1	93.1
Chunking	18.9	63.8

Note: *refers to components of the New Zealand curriculum and supporting documents.

2.3.3 Group perceptions of co-working models

Shared roles in language and literacy instruction. Students' responses regarding the extent to which SLTs and teachers should share roles in instruction of various spoken and written language skills are illustrated in Figures 4 and 5, respectively. The majority of both student groups identified

a shared role for phonological awareness instruction. The groups, however, were more divided in their responses for the remainder of spoken language skills. The majority of student SLTs reported SLTs should possess primary responsibility for supporting children's speech sound development. Comparatively, the majority of student teachers reported teachers should assume a shared role with SLTs. The opposite pattern was demonstrated for vocabulary instruction and morphological awareness instruction. The majority of student teachers reported teachers should assume a primary role in instruction of these skills compared to the majority of student SLTs who reported SLTs should share assume an equal role. Chi square tests of independence confirmed that each group was more likely to indicate a more prominent role for their own profession in instruction of the various spoken language skills. Comparisons were made between the groups' responses regarding the appropriate degree of SLT and teacher participation in instruction of the four different domains of spoken language. Results indicated statistically significant differences between all comparisons ($p<0.05$). 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. In contrast, the majority of both groups tended to indicate that teachers should play the primary role (i.e., teacher mostly, teacher only) in reading and spelling instruction. Chi square tests of independence confirmed that there was no relationship between group and perceptions of appropriate professional roles in written language. 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.

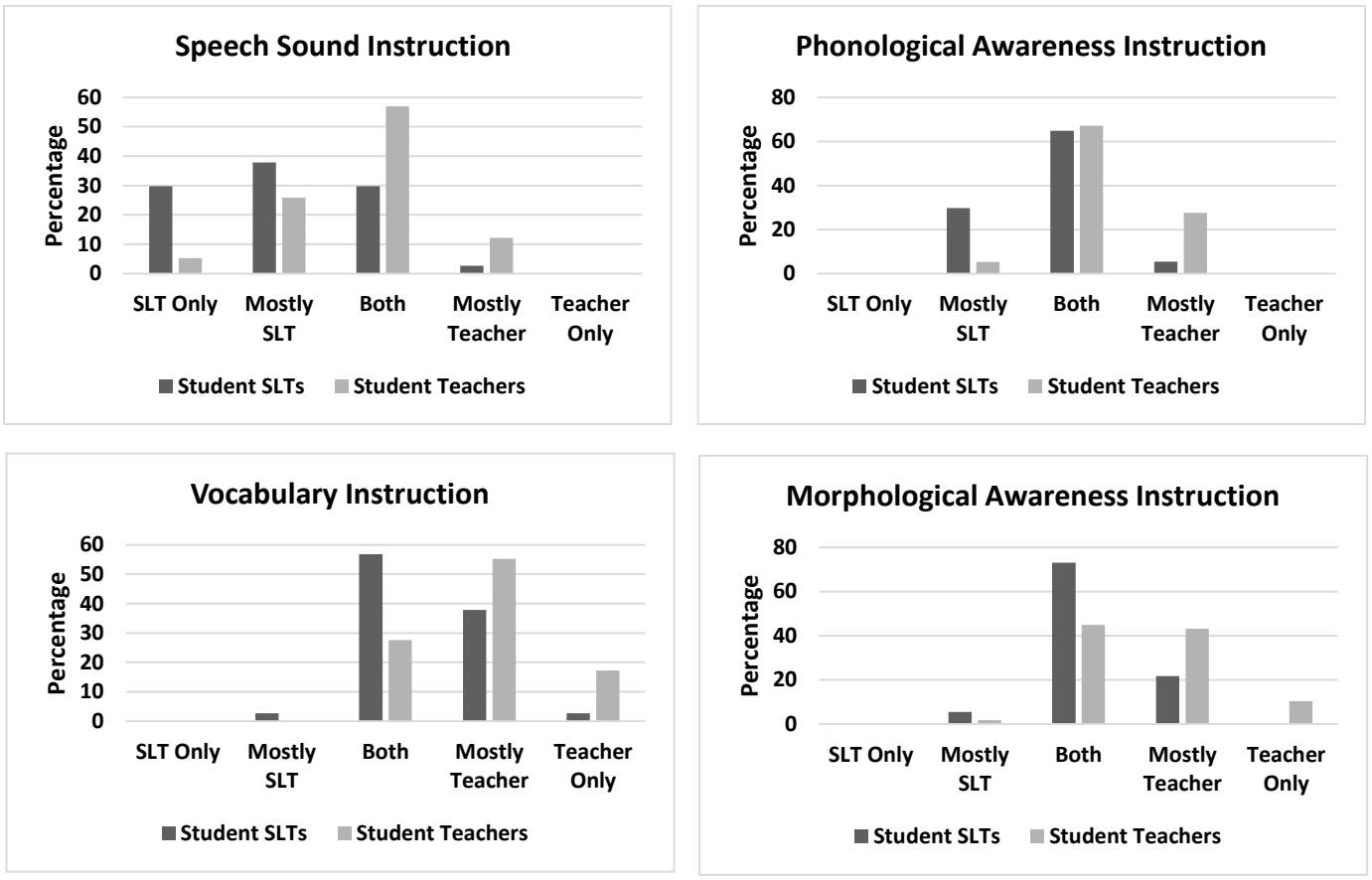


Figure 4. Group perceptions of the appropriate degree of professional involvement in instruction of spoken language skills. *Note.* SLT = speech and language therapist.

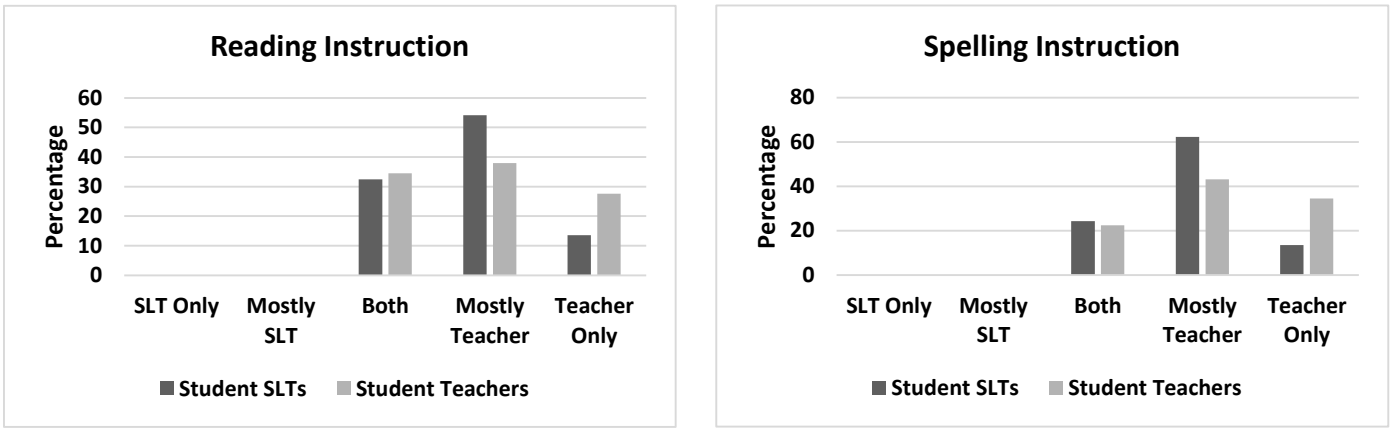


Figure 5. Group perceptions of the appropriate degree of professional involvement in instruction of written language skills. *Note.* SLT = speech and language therapist.

Delivery models. 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.

Frequency of classroom-based co-working. 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 optimise 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').

2.3.4 Group understanding of collaborative co-working

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%).

2.4 Discussion

This study explored the knowledge and perceptions possessed by student teachers and student SLTs in language and literacy concepts related to each other's professional expertise, co-working models 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 maximise 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 (American Speech-Language-Hearing Association, 2010; Ministry of Education, 2013a).

The first research question sought 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 likely 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, suggested 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; Glover & McCormack, 2015; Hartas, 2004; McCartney, 1999).

The second research question sought to compare student SLTs' and student teachers' perceptions of appropriate co-working models to examine their acceptance of inter-dependent co-working. Most notably, both groups tended to agree that teachers should be the primary

professional involved in reading and spelling instruction. Though these perceptions were shared among the groups, they are not positive for inter-professional collaboration to lift the literacy achievement of children. SLTs' expertise in spoken language enables them to assume an active role in supporting children's orthography learning (Gillon, 2000). Students' lack of inter-dependence in written language instruction may have been partially related to their limited understanding of spoken-written language relationships. Alternatively, students' limited acceptance of shared roles in some aspects of children's language learning could be reflective of the limited availability of SLT services in New Zealand related to funding restrictions (Ministry of Education, 2013a). Consequently, some students may have identified teachers as possessing a primary instructional role given the limited time SLTs can dedicate to any particular child. Continued investigation is thus required to better understand why students demonstrated limited inter-dependency in the various aspects of children's language and literacy development.

The majority of both groups reported that SLTs should work in classroom settings to optimise the learning of students with language learning difficulties. This indicates general acceptance of SLTs working alongside teachers in 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 children. Overall, it is a positive indicator for inter-professional collaboration that both groups valued indirect methods of speech and language service delivery. As previously described in Chapter 1, Carson et al. (2013) demonstrated that 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 SLI, 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 conceptualise indirect service delivery with this traditional ideology, there would likely be minimal opportunity for sharing of expertise and skills (Hartas, 2004). Such an approach likely has limited efficacy for collaboratively creating classroom structures and routines that provide sufficient intensity of support for children with language and literacy learning difficulties (McCartney et al., 2011; McCartney et al., 2010).

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 & Dennis, 1997). Such practices align with SLTs' professional responsibilities of assisting teachers to enhance the quality of 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 research question sought to compare the perceptions of student SLTs and student teachers regarding what constitutes collaboration. Limited understanding of the features of collaboration has 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 had minimal inter-professional experience with SLTs 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 & Dennis, 1997; Brandel & 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 & 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., 2010). 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 & Cook, 2003).

Overall, the results suggest that student SLTs have yet to develop an appreciation of the complexities of collaboration.

2.4.1 Implications and future directions

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, suggested that although student teachers and student SLTs have expertise in their discipline specific knowledge, they have more limited shared understandings 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 acquire 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 (American Speech-Language-Hearing Association, 2010; Cirrin et al., 2010). As discussed in the literature review, the New Zealand Ministry of Education (2013a) framework for SLTs also emphasises 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. IPE for prospective SLTs and teachers is also aligned with professional standards of practice within education. The New Zealand graduating teacher standards require teachers to have the "knowledge and dispositions to work effectively with colleagues" (New Zealand Educational Council, 2015, p. 1).

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 may offer advantage by enabling interaction among students with complementary backgrounds (Barr et al., 2005). Such interactions can be guided to expose students to different knowledge and perspectives that extend their own understandings in a manner that optimally prepares them for future collaboration. The current study highlights aims for pre-service IPE curricula including developing shared knowledge of basic linguistic and curricular concepts and acceptance of inter-dependent co-working in children's literacy development. Nonetheless, further investigation of the knowledge and perspectives of prospective teachers and SLTs in various areas of children's communication is required 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. The following chapters thus begin to examine the impact of different forms of IPE on student SLTs' and student teachers' knowledge, skills and attitudes for collaborative practice.

CHAPTER 3

COMPARISON OF COURSE-BASED APPROACHES TO INTER-PROFESSIONAL EDUCATION IN COLLABORATIVE LANGUAGE-LITERACY INSTRUCTION

3.1 Introduction

The results presented in Chapter 2 demonstrated that graduating SLTs and primary school teachers possess minimal shared knowledge of areas considered relevant for effective collaboration. These results align with previous studies comparing the knowledge and perspectives of in-service SLTs and classroom teachers, thereby confirming that these professional groups have limited opportunity to develop inter-professional knowledge (Glover & McCormack, 2015; Hartas, 2004; Law et al., 2002). The study described in this chapter explores whether shared knowledge can be advanced by a single exposure to course-based IPE. As highlighted in the literature review, examples of IPE among student teachers and SLTs are rare. Exploratory research is therefore required before exploring more extensive and resource-intensive initiatives, such as longer-term courses or field experiences.

The results presented in Chapter 2 suggested that student SLTs possess superior understanding of linguistic concepts while student teachers possess superior understanding of literacy curriculum concepts. Students could therefore be encouraged to learn from each other's developing expertise alongside building shared knowledge of each other's professional roles/expertise to prepare them for future collaboration. Such practice would be consistent within a constructivist framework of IPE which aims to encourage learning through interaction among participants (Hean et al., 2009). It can be argued, however, that enhanced linguistic and curricular

knowledge for prospective teachers and SLTs could be achieved through curricula modifications to existing models of university education. Accordingly, efficacy studies of IPE need to demonstrate that such initiatives can extend to enhancing co-working among participants and that their co-working represents better practice than what students can accomplish on their own. Previous examinations of course-based IPE applications have not yet examined how IPE affects students professionals' collaborative co-working (Reeves et al., 2013; Suleman et al., 2013; Suleman et al., 2014; Thistlethwaite et al., 2015).

Designing IPE to examine both change in students' language-literacy knowledge and application to instruction is consistent with previous studies examining methods of teacher preparation (Al Otaiba & Lake, 2007; Al Otaiba et al., 2012). Al Otaiba et al. (2012) compared two tutoring programmes that differed in whether scripted activities for word-reading skills were provided to student teachers. Student teachers (n=28) were randomly assigned to one of the two tutoring programs which required them to develop one-to-one instruction in components critical to children's reading development. Pre-post questionnaires of the student teachers' linguistic knowledge indicated that both groups' knowledge improved similarly over the 8 weeks of tutoring. However, analysis of student teachers' lesson plans indicated that student teachers who were provided with scripted activities developed more in depth instruction of word-reading skills. Children who received tutoring in the scripted activities condition also demonstrated greater gains in decoding. Similar methods of evaluation can also be applied to IPE programmes to examine their utility in preparing student teachers and student SLTs for explicit language and literacy instruction.

Course-based IPE initiatives often employ a combination of learning approaches designed to encourage interaction among participants (Carpenter & Hewstone, 1996; Freeth et al., 2005).

As described in Chapter 1, having mixed-discipline groups plan interventions for realistic cases is a recommended method to encourage interactive learning (D'Eon, 2004). Supplementing this with activities to facilitate discussion of each other's expertise may further help students build shared language-literacy knowledge and to co-plan instruction during case-based work. Examining how students' knowledge and instructional co-planning change over the course of the inter-professional experience can provide insight into the efficacy of this particular combination of interactive learning methods.

The study aimed to examine the effects of a combined case-oriented IPE model focused on discussion and application of language and literacy content. It was taken into account that spending time together during supplemental discussion activities may also enhance students' inter-professional attitudes/relationships as predicted by Contact Theory (Bridges & Tomkowiak, 2010). Change in inter-professional attitudes may thus play a role in supporting students' co-working in case planning. This necessitated the use of a comparison control intervention which supplemented case planning with spending time together discussing non-language/literacy content. Comparisons between the two interventions were used to address the second research question within the thesis as identified in Chapter 1, including the sub-questions which are listed below.

The specific research questions were:

a) To what extent does the combined course-based IPE for student teachers and student SLTs improve their shared content knowledge of linguistic concepts and classroom literacy curriculum?
b) To what extent does supplemental discussion of language and literacy content improve the instructional co-planning of student teachers and student SLTs?

c) How does students' instructional co-planning before and after supplemental discussion of language and literacy content compare to what they can achieve when planning instruction individually?

3.2 Method

3.2.1 Participants

Eighteen student teachers and 27 student SLTs participated in the study (n=45). All participants attended the University of Canterbury in New Zealand and were drawn from separate undergraduate programmes of either primary teacher education or speech and language therapy. Both undergraduate programmes enable students to graduate into their respective profession. Participating student SLTs and student teachers were in their third year of a 4 year and 3 year programme, respectively. Both student groups were participating in their final course work relating to child language and literacy. The timing of the interventions was selected to complement this course work and allow students to develop their own areas of expertise. Student SLTs had completed previous course work related to English language structure, typical and disordered speech/language development, and management of speech/language disorders. Student teachers had completed previous coursework related to child development (including language development), instruction of oral language and early literacy skills, and implementation of curricular literacy programmes.

All student SLTs were expected to participate in the interventions as part of their compulsory academic course in child language. Twenty-eight out of 29 third year student SLTs participated in the interventions. In contrast, student teachers were asked to volunteer to participate as a learning experience additional to their regular course work given they were a much larger cohort (i.e., a cohort of over 120 students). Student teachers were invited to participate through

electronic messages (e.g., email, online noticeboard) as well as verbally during a third year language and literacy course. Eighteen student teachers volunteered. All consenting participants met the inclusion criteria of having no previous qualifications in either teacher education or speech and language therapy. A total of 44 of the 45 consenting participants across the student teacher and SLT groups were female. Participation in the interventions did not contribute towards the students' course grades.

3.2.2 Research design

A quasi-experimental design was employed to compare the efficacy of the contrasting IPE programmes. Participants were randomly assigned to either the:

1. Experimental group (Group 1): The combined intervention which included case-based instructional planning supplemented with guided discussion of literacy curriculum and linguistic knowledge.

2. Comparison control group (Group 2): An intervention which involved the same opportunity for case-based instructional planning but supplemented with guided discussion of non-language/literacy content.

Figure 6 displays the allocation of the student participants to the contrasting intervention groups. Random allocation to the intervention groups was utilised to try to balance the profile of participants within each condition (e.g., academic level, engagement during the programme, etc.). Case-based instructional planning was common to both interventions to compare how supplementing case planning with knowledge sharing versus time to build inter-professional relationships impacted participants' learning.

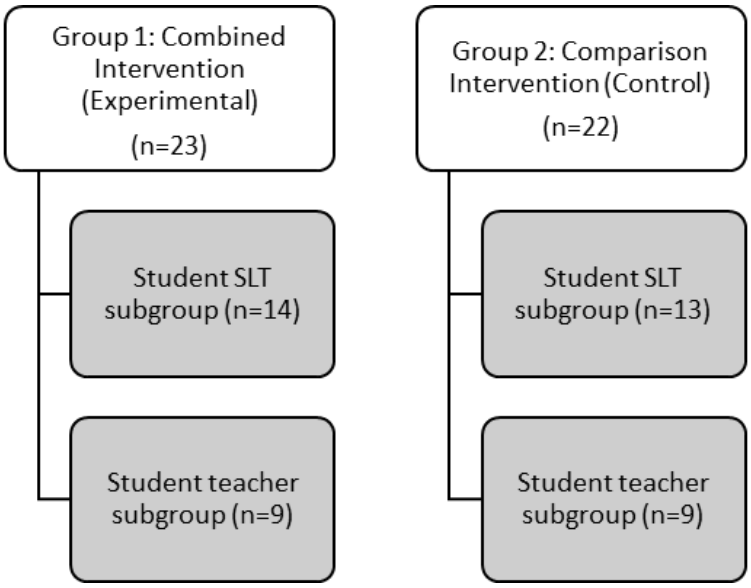


Figure 6. Structure of student subgroups assigned to each intervention group.

Note: Combined intervention consisted of case-based planning combined with activities to promote linguistic and curricular content knowledge. Comparison intervention consisted of case-based planning and discussion of professional issues.

3.2.3 Intervention groups

Descriptive characteristics of the combined intervention group (i.e., Group 1) and the comparison intervention group (i.e., Group 2) are described in Table 3. There was no significant difference in participants' ages between Group 1 (*Md* = 20.0) and Group 2 (*Md* = 21.0), *U* =190, *z* = -1.07, *p* = .29. In addition, the number of participants who had completed some practical learning experience working with school-age children was similar among the intervention groups (*p* = .70, Fisher's exact test). All student teachers had successfully completed practical placement periods in primary schools (e.g., completed 15 weeks working alongside an experienced teacher in a primary school); however, five student SLTs from Group 1 and three from Group 2 had not yet completed a placement working with school-age children. These student SLTs were not excluded from the IPE as it was part of their compulsory academic coursework and exclusion may have disadvantaged their performance in the latter portion of the course.

Table 3. Characteristics of student subgroups within each intervention group.

		Age		*N* having experience with children in years[a]		*N* with no school-age experience[a]
	N	M(SD)	Range	1-4	5-8	
Group 1						
Student teacher	9	22.3(5.0)	20-35	9	9	0
Student SLT	14	22.4(4.5)	20-34	7	3	5
Group 2						
Student teacher	9	23.8(7.7)	20-44	9	9	0
Student SLT	13	21.1(1.1)	20-23	8	3	3

Note. Data from two participants from each intervention group is not available. [a]refers to practical experience in schools as part of the students' professional study.

3.2.4 IPE interventions

The researcher (an experienced, school-based SLT) developed the intervention programmes based on the survey study (see Chapter 2) which found that student teachers and student SLTs possess limited understanding of each other's areas of expertise despite nearing completion of their professional study. The two forms of intervention ran concurrently in two different rooms and the student participants were unaware of the differences in content. The total length of each intervention was 3 hours. Two hours were dedicated to interactive learning activities (i.e., case-based instructional planning, supplemental guided discussion). One hour was dedicated to a brief introduction, breaks and completion of pre and post knowledge measures. The researcher facilitated the combined intervention and a colleague with a similar professional background (i.e.,

paediatric speech and language therapist) facilitated the comparison intervention. The components of each intervention were as follows.

Case study instructional planning. During both the combined intervention and the comparison intervention, the student participants were required to create lesson plans for a series of case studies related to young children with speech, language and literacy learning difficulties. The participants were provided with a teacher report and a speech and language therapy report for each case which detailed the children's current levels of speech, language and literacy skills. The planning involved the following steps.

Case 1: The students worked independently to create a lesson plan for the child in case study 1.

Case 2: Students worked in mixed-discipline pairs or trios to complete a lesson plan for the child in case study 2.

Case 3: Students worked in new mixed-discipline pairs/trios to complete a lesson plan for the child in case study 3.

Participants were given 25 minutes to complete each case, including review of reports and creating a lesson plan for how they would support the learning of the case child. The length of this activity was partly chosen due to time constraints. This was judged, however, to be a realistic amount of time in which SLTs and teachers would have to co-plan instruction in real practice settings and would thus provide an authentic co-working experience. In the independent case study, students were asked to review the reports and write a lesson plan on their own. In the mixed-discipline case studies, students were instructed to review the reports together and discuss ideas for the lesson plans. However, each student was responsible for writing her/his own lesson plan of how she/he would support the child's communication and learning.

Cases were based on three children who participated in a research project previously conducted by another researcher (McNeill & Gillon, November 2014). All three cases were selected to have similar language and literacy profiles. This was done to limit differences in case content acting as an extraneous variable impacting participants' instructional planning. The speech, language and literacy skills of children selected for the case studies were assessed via a set of standardised, norm-referenced measures as well as informal measures. These children were assessed at approximately five-and-a half years of age as having significant speech impairment in addition to being at risk for progressing slowly in literacy acquisition due to language-based difficulties, particularly in phoneme awareness. Receptive language skills were within normal limits for the children described in Case 1 and 2 and just below age-expectations for the child described in Case 3. The children's word recognition, decoding and reading comprehension were within a typical range according to a normative sample; however, they all performed below age-expectations on phoneme awareness tasks and their spelling samples suggested limited ability to use a phonological approach to spell unfamiliar words.

Based on the children's speech and language profiles, the researcher devised hypothetical teacher reports coinciding with completion of the children's first year of school (i.e., at age six given that New Zealand children start school when they turn five). All case study children were described as reading levelled texts that were below age-expectation for the first year of school. This was done to highlight that the children who were identified at risk for literacy learning difficulties at five-and-a half went on to fall behind in their reading development by age six. To align with the speech and language report, use of grapho-phonemic knowledge to decode and spell unfamiliar words was described to be an area of difficulty for all three children. Development of

sight word reading vocabulary and use of text-based cues (e.g., picture cues) for word recognition were described as relative strengths in their reading.

Supplemental guided discussion. Both intervention groups engaged in supplemental discussion between the mixed-discipline cases (i.e., Case 2 and 3). Supplemental discussion activities were conducted over a 45 minute period for both interventions. Content of the supplemental discussion varied as follows between the two intervention groups.

1. Combined Intervention (Group 1)

Mixed-discipline groups of four to five students engaged in three sets of approximately fifteen minute activities designed to guide students through discussion of spoken language structure, speech to print relationships and literacy curriculum. The activities are summarised as follows.

Activity 1: Spoken language concepts. Student SLTs were asked to explain the articulation of vowel and consonant sounds to their student teacher counterparts. The second part of the activity required student participants to discuss their understanding of the term "language".

Activity 2: Speech to print concepts. This began with a 13 minute lecture by the researcher to discuss the relationship between sound structure of words and their orthography. A lecture format was selected for this component based on the findings presented in Chapter 2 which suggested that student teachers and student SLTs possessed limited orthographic knowledge. The lecture focused on linguistic concepts related to word decoding (e.g., phoneme awareness, phonics, types of graphemes, orthographic patterns). The Simple View of Reading (Gough & Tunmer, 1986) was used as a framework to introduce these concepts and how they relate to reading comprehension. This activity concluded with the mixed-discipline groups completing word-analysis activities

including identification of phonemes, graphemes (e.g., digraphs, trigraphs, vowel teams) and morphemes.

Activity 3: Classroom literacy curriculum concepts. Student teachers were asked to describe common literacy instructional materials and activities that are used in New Zealand primary school classrooms. Students were also provided with English literacy curriculum documents and were asked to review them to determine which may be most useful for collaborative goal setting among teachers and SLTs.

2. Comparison intervention (Group 2)

Mixed-discipline groups of four to five students engaged in three sets of approximately fifteen minute activities engaging students in guided discussion of factors affecting speech and language therapy services for school-age children. These activities sought to provide similar opportunity for interaction as supplemental discussion in the combined intervention but without an explicit focus on language and literacy knowledge. Activity 1 asked the students to discuss potential barriers to SLT-teacher collaboration and ways to overcome such barriers. Activity 2 asked students to discuss ways that educational professionals, families and communities could advocate for increased access to speech and language therapy services for children who experience communication difficulties. Activity 3 asked students to develop an appropriate name, slogan and mission statement for an advocacy group formed to promote increased accessibility to speech and language therapy services.

Materials provided to prompt supplemental discussion can be viewed in Appendix B for both Group 1 (combined intervention) and Group 2 (comparison intervention).

3.2.5 Procedure

All evaluation instruments employed for the current study were developed by the researcher because currently available validated instruments employed for IPE evaluation were not suitable for the aims of the study. The methods of evaluation and their implementation are described in the following sections.

Linguistic and literacy curriculum knowledge. All students completed a questionnaire before and after the 2-hour interactive learning activities (i.e., instructional planning and supplemental discussion) to assess their linguistic and literacy curriculum knowledge. The questionnaire employed the 24 multiple choice questions from the survey described in Chapter 2 (see Appendix A). The questions asked students to identify the definition of various primary school English literacy curriculum and English linguistic concepts relevant to children's spoken and written language learning.

Instructional planning. The student professionals were asked to submit their lesson plans from the three case studies. For each lesson plan, participants were asked to describe areas for extra instruction for the child and how they would address these areas. No further template was given for the lesson planning. Lesson plans were coded and used as a measure of instructional planning. Comparison between lesson plans from mixed-discipline case studies (i.e., Case 2 and 3) were conducted to evaluate the development of co-working among student teachers/SLTs. Comparison between lesson plans from the individual (i.e., Case 1) and mixed-discipline case studies were conducted to examine whether students' co-working represented better practice than what students could achieve working individually. A summary of the intervention structure and outcome measures is presented visually in Figure 7.

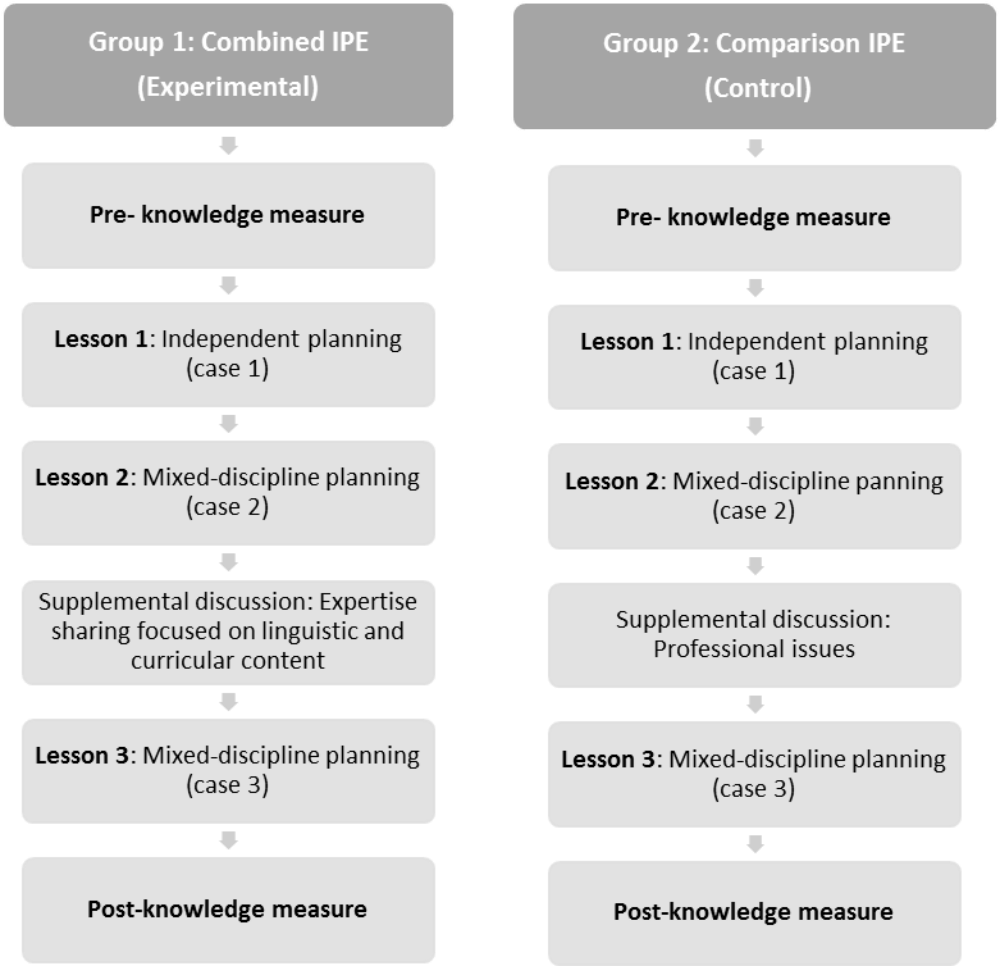


Figure 7. Summary of outcome measures utilised throughout the IPE interventions. *Note.* Outcome measures are highlighted by bold print.

A coding system for the lesson plans was developed by the researcher (an experienced school-based SLT) and an independent colleague (an experienced primary school teacher). The coding system was created to evaluate the depth of five components developed in each of the lesson plans. First, a co-working component was evaluated to examine the degree to which students acknowledged the role of the other-profession. Secondly, four linguistic categories were evaluated including expressive phonology/articulation, phonological awareness, orthographic knowledge and language comprehension. These were selected due to them being appropriate areas

for targeted instruction for all the case study children to improve their speech, oral and/or written language.

A three-step coding process was adopted for the co-working component. A score of zero was allocated if the writer of the lesson plan did not reference the other-profession. Comparatively, a score of 1 was allocated if the writer of the lesson plan made a general reference to the other-profession (e.g., "ensure involvement from home to support in class/SLT work"). A score of 2 was allocated if the other-profession's role was described as addressing goal areas different than those targeted by the writer of the lesson plan. A score of 3 was allocated if the other-profession's role was described as targeting goal areas shared by the writer of the lesson plan. This coding system was adopted so that higher scores were reflective of co-working that more closely aligns with collaborative co-working given that adoption of mutual goals is key feature of collaboration (Bronstein, 2003).

A four-step coding process, adapted from Al Otaiba et al. (2012), was adopted for each of the linguistic components. A score of zero was allocated for a language component if it was not referenced. A score of 1 was allocated for a language component if a minimum of a general reference to the component was made (e.g., phonological awareness). An additional point was allocated for each of the following: 1) reference to a targeted aspect of the language component (e.g., segmenting phonemes) 2) description of instructional activities which included detail on at least two different aspects of instruction (e.g., explicit acts of instruction such as modelling, detailing progression from less to more challenging tasks, and/or materials used) and 3) an accurate rationale for working on the language component. Consequently, the maximum score for each language component was 4 (see Appendix C for examples of coding).

A protocol was developed for common areas of confusion around phonological awareness and phonics instruction. Participants often stated phonological awareness as an objective but then described instruction of phoneme-grapheme relationships. In these cases, credit was given for only a general reference to phonological awareness (score of 1) but a targeted reference (score of 2) for orthographic knowledge. Additionally, lesson plans which described only instruction in rhyme awareness could not receive credit for a rationale given the research evidence that phoneme rather than rhyme awareness should be the focus of explicit instruction for school-age children (Gillon, 2000). An additional protocol was developed to deal with inter-relatedness between expressive phonology/articulation and phoneme awareness instruction. Phoneme awareness intervention supports improved reading ability as well as speech production for children with spoken language impairment (Gillon, 2000; McNeill, Gillon, & Dodd, 2009). Therefore, student participants were credited points for both phoneme awareness and expressive phonology/articulation if they explicitly linked phoneme awareness activities to children's literacy and speech development.

A total of 134 lesson plans were included in the analysis. Student SLTs and student teachers participating in the combined intervention submitted 41 and 27 lesson plans, respectively. Student SLTs and student teachers participating in the comparison intervention submitted 39 and 27 lesson plans, respectively. Coding was done by both developers of the coding system who were blinded to case study and intervention conditions.

3.2.6 Reliability

Inter-rater reliability was calculated for lesson plan coding. The two coders began by both coding a subset of 11 randomly selected plans to establish reliability and to finalise coding procedures. These plans were then re-coded along with the remaining plans by either of the two coders. Twenty-seven lesson plans (i.e., 20% of the total number of plans) were randomly selected for

both coders to complete to calculate inter-rater reliability. The percent agreement was 86% which was deemed acceptable based on previous studies which set 80% agreement as a minimal level of acceptable inter-rater reliability (e.g., Suleman et al., 2014). Differences in coding were resolved through discussion until 100% agreement was reached.

3.2.7 Intervention fidelity

A script was written for both interventions to help ensure that each group received the same intervention components except for the supplemental guided discussion activities. The facilitators were also directed to not assist students during the case studies or guided discussion (with the exception of the lecture component) to encourage further consistency between the two forms of the intervention.

3.3 Results

3.3.1 Language-literacy content knowledge

Pre-intervention knowledge. Comparisons were conducted for three categories of language and literacy concepts including those related to spoken language, the relationship between spoken and written language (i.e., speech to print), and literacy curriculum. Comparisons for each knowledge category were conducted across the four student subgroups (see Figure 5) using a one-factor between-group ANOVA. The purpose of this analysis was to:

a) confirm equivalence between the intervention groups by investigating whether there were statistical differences between student SLT subgroups from Group 1 and Group 2 and likewise for student teacher subgroups, and

b) confirm that student SLTs and student teachers within each intervention group had differing strengths in their knowledge of tested concepts.

The analyses revealed a significant group effect for spoken language concepts [F (3,41)=6.62, p=0.001] and curriculum concepts [F (3,41)=68.83, p<0.001]. There was no significant group effect for speech to print concepts [F (3.41)=0.57, p=0.639]. Effect size was calculated using Eta squared and was interpreted according to Cohen (1988) with 0.01 as small, 0.06 as medium and 0.14 as large effect sizes. Effect size calculations for spoken language, speech to print and curriculum concepts were 0.33, 0.04 and 0.83, respectively. Post-hoc comparisons (Tukey HSD test) indicated that the two student SLT subgroups (from Group 1 and 2) scored significantly higher than the two student teacher subgroups (from Group 1 and 2) on spoken language concepts ($p<0.05$). In contrast, the two student teacher subgroups had significantly higher mean scores than the two student SLT subgroups on curriculum concepts. In summary, the analyses confirmed that intervention groups were similar as there were no differences in knowledge of tested concepts between student SLTs from Group 1 and Group 2 or between student teachers from Group 1 and Group 2. In addition, it confirmed that the student SLTs and student teachers within each intervention group had differing areas of strength in their knowledge.

Change in knowledge. Before-and-after comparisons for each category of language-literacy concepts were made for each of the four student subgroups (Table 4). This was done to examine how students from the differing professions responded to the interventions given that student SLTs and teachers entered the interventions with different levels of knowledge. Independent samples t-tests were employed as mislabeling of tests prevented matching participants' pre-and-post questionnaires which would be required for paired samples t-tests or ANOVA analyses. Effect size was calculated using Cohen's d and was interpreted according to recommendations of 0.2=small effect, 0.5=medium effect and 0.8=large effect (Cohen, 1988).

Statistically significant increases in conceptual knowledge were obtained only for subgroups from Group 1 (Table 4). Both student SLTs and student teachers from Group 1 demonstrated significantly greater understanding of speech to print concepts. Student SLTs from Group 1 also demonstrated enhanced understanding of literacy curriculum concepts. All the statistically significant gains in conceptual knowledge were accompanied by large effect sizes ($d > 0.8$). Student subgroups from either intervention group did not demonstrate statistically significant improvement in their understanding of spoken language concepts.

Examination of the percentage of each subgroup which correctly answered each of the tested concepts before-and-after the interventions, however, suggested that student teachers from Group 1 were more likely to correctly identify some spoken language concepts at post intervention. The concepts for which student subgroups from Group 1 demonstrated the greatest improvement in terms of percentage of subgroup correct are displayed in Figure 8 (for student teachers) and Figure 9 (for student SLTs). This suggested that student teachers from Group 1 were more likely to identify a phoneme as the smallest unit of sound and vowels as sounds produced with unobstructed airflow through the vocal tract at post intervention as compared to pre-intervention. Similar gains for these items were not seen for student teachers from Group 2.

Table 4. Conceptual knowledge of student subgroups before and after the interventions.

Variables	Group 1					Group 2				
	Pre[a] *M(SD)*	Post[a] *M(SD)*	*t*	*p*	Cohen's *d*	Pre[a] *M(SD)*	Post[a] *M(SD)*	*t*	*p*	Cohen's *d*
Spoken Language										
Student teacher	2.1(0.8)	3.1(1.8)	1.56	0.148	0.73	2.3(0.7)	2.0(1.8)	-0.52	0.616	-0.24
Student SLT	3.8(1.4)	4.6(1.1)	1.67	0.107	0.65	3.7(1.2)	3.5(1.4)	-0.30	0.764	-0.12
Speech to Print										
Student teacher	2.7(1.4)	4.4(1.7)	2.38	0.030*	1.12	2.7(0.9)	3.7(1.7)	1.60	0.135	0.76
Student SLT	3.1(1.5)	5.3(1.1)	4.21	0.000**	1.64	3.4(2.0)	4.1(1.9)	0.89	0.381	0.35
Literacy Curriculum										
Student teacher	6.3(1.0)	6.1(0.9)	-0.49	0.632	-0.23	5.8(0.7)	5.9(0.8)	0.32	0.750	0.15
Student SLT	1.4(1.1)	2.8(1.1)	3.19	0.004*	1.23	1.9(1.1)	2.5(1.4)	1.24	0.225	0.49

Note. [a]Maximum individual scores were 8.0. *p<0.05, **p<0.001.

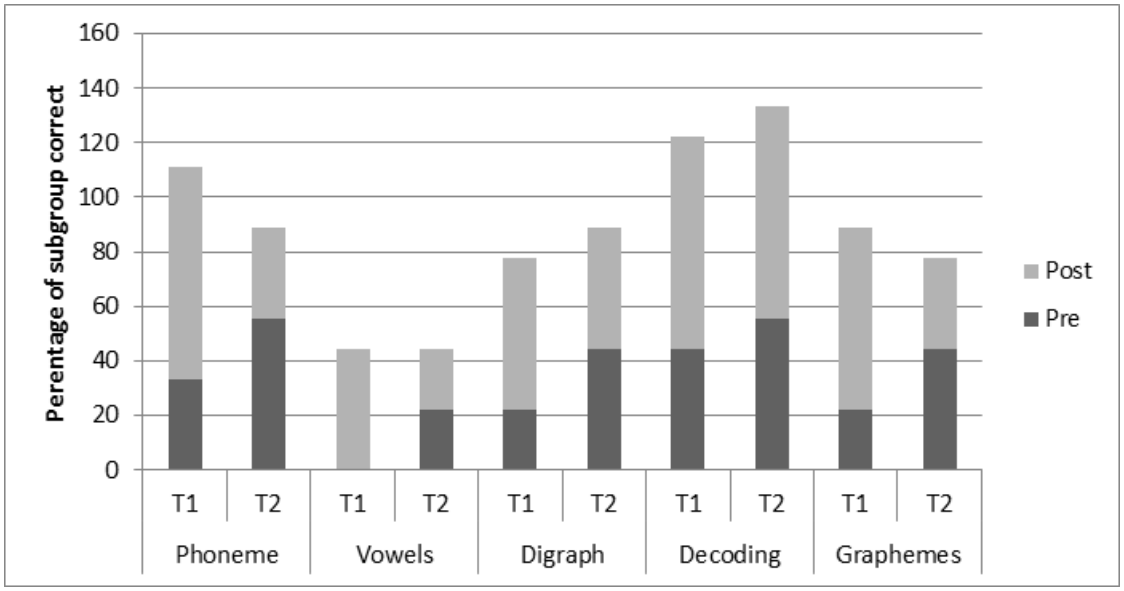


Figure 8. Comparison between student teacher subgroup performance on concepts which student teachers from the experimental intervention group showed the greatest improvement.

Note. T1= student teachers from Group 1 (experimental). T2=student teachers from Group 2 (comparison control).

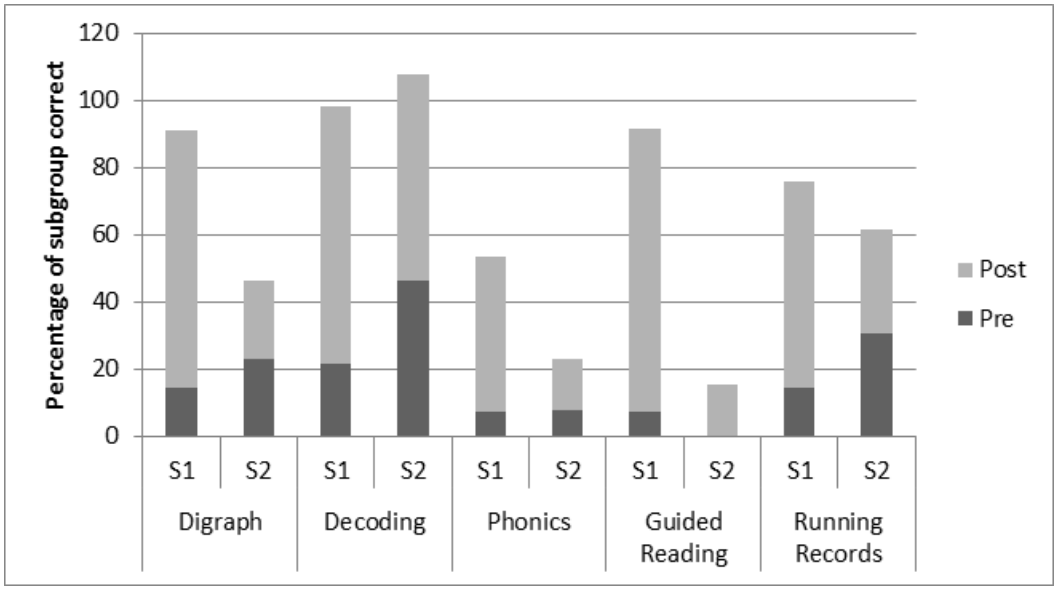


Figure 9. Comparison between student SLT subgroup performance on concepts which student SLTs from the experimental intervention group showed the greatest improvement.

Note. S1= student SLTs from Group 1 (experimental). S2=student SLTs from Group 2 (comparison control).

3.3.2 Case study instructional planning

Individual instructional planning. Comparisons of instructional planning were first made for Case 1 (i.e., individual planning) between the four subgroups of students. The aim was to explore if pre-existing differences in instructional planning between the intervention groups may have been an additional variable affecting subsequent instructional planning in the mixed-discipline cases. Visual inspection of subgroups' mean scores suggested that phonological awareness scores differed with both student SLT subgroups gaining higher scores than both student teacher subgroups (Table 5). A nonparametric analysis (i.e., Kruskall–Wallis Test) was employed to compare the student subgroups as parametric analysis was inappropriate due to subgroups scoring zero on some language components (i.e., variance of zero). This confirmed that statistically significant differences across the four student subgroups existed only for the phonological awareness component ($\chi^2(3,\ n=44)=22.80,\ p<0.001$). This again suggested equivalence between the intervention groups as student SLTs in Group 1 performed similarly to their student SLT counterparts in Group 2 and likewise for student teacher subgroups. Student SLTs' and student teachers' data from each intervention group were collapsed for further analysis given the overall similarity of instructional planning between subgroups of students.

Table 5. Student subgroup performance on individual instructional planning during Case 1.

	Group 1		Group 2	
	Student teacher	Student SLT	Student teacher	Student SLT
Co-working[a]	0 (0)	0.3 (0.86)	0 (0)	0.5 (0.97)
Expressive Phonology/ Articulation[b]	0.3 (0.7)	0.7 (0.95)	0 (0)	0.9 (1.1)
Phonological Awareness[b]	0.4 (0.73)	2.5 (1.05)	0.8 (0.83)	2.3 (0.86)
Orthographic Knowledge[b]	2.7 (1.12)	2.2 (1.07)	2.5 (0.73)	1.9 (1.26)
Language Comprehension[b]	1.3 (1.3)	0.1(0.28)	0.7(1.12)	0.7 (0.95)

Note. Means for each component are presented with standard deviation in parentheses. [a]maximum score was 3. [b]maximum score was 4.

Change in instructional planning across cases. Two-factor ANOVA with a repeated measures factor was used to evaluate the presence of statistically significant change in instructional planning between and within the two intervention groups across time (i.e., across the three different cases). This analysis was carried out for mean scores on each of the five lesson plan components (Table 6).

Statistical analysis for the co-working component revealed no significant main or interaction effects. Comparatively, statistical analysis for the phonological awareness component revealed a significant time by group effect [Wilks' Lambda=0.0.84, $F(2,41)=3.78$, $p=0.031$, partial eta squared=0.16] along with significant main effects for time [Wilks' Lambda=0.82, $F(2,41)=4.60$, $p=0.016$, partial eta squared=0.18] and group [$F(1,42)=4.13$, $p=0.049$, partial eta squared=0.09]. This suggested that Group 2's decline in phonological

awareness scores across time was significantly different from Group 1's scores across time which remained similar across all three case studies.

Table 6. Intervention group performance on lesson plan components across the three cases.

	Group 1			Group 2		
Components	Case 1	Case 2	Case 3	Case 1	Case 2	Case 3
Co-working[a]	0.2 (0.6)	0.3 (0.7)	0.2 (0.6)	0.3 (0.8)	0.6 (1.1)	0.5 (0.9)
Expressive Phonology/ Articulation[b]	0.6 (0.9)	1.1 (1.2)	0.9 (0.9)	0.5 (0.9)	1.6 (1.1)	1.3 (1.0)
Phonological Awareness[b]	1.6 (1.4)	1.6 (0.9)	1.6 (0.9)	1.7 (1.1)	1.2 (0.9)	0.6 (0.7)
Orthographic Knowledge[b]	2.4 (1.1)	1.1 (1.1)	1.4 (1.2)	2.1 (1.1)	1.5 (0.9)	0.9 (1.0)
Language Comprehension[b]	0.6 (1.1)	0.1 (0.3)	1.3 (1.0)	0.7 (1.0)	0.3 (0.8)	0.9 (1.1)

Note. Means for each component are presented with standard deviation in parentheses. [a]maximum score was 3. [b]maximum score was 4.

Further analysis revealed only significant main time effects for the three remaining components including expressive phonology/articulation [Wilks' Lambda=0.68, $F(2,41)=9.60$, $p<0.001$, partial eta squared=0.32], orthographic knowledge [Wilks' Lambda=0.54, $F(2,41)=17.68$, $p<0.001$, partial eta squared=0.46] and language comprehension (Wilks' Lambda=0.58, $F(2,41)=14.62$, $p<0.001$, partial eta squared=0.42]. Post hoc pairwise comparisons using Bonferroni tests was completed for each component to evaluate where statistically significant changes occurred between the three time points, representing the three different cases. This analysis revealed the intervention groups increased in expressive/articulation scores between Case 1 and 2 ($p<0.05$) and decreased in orthographic knowledge scores between Case 1 and 2 ($p<0.001$). Post hoc analysis for the language

comprehension component demonstrated a decrease in scores between Case 1 and 2 ($p<0.05$) and an increase in scores between Case 2 and 3 ($p<0.001$) for both intervention groups.

In summary, the two intervention groups did not appear to perform differently from each other on the various instructional components with the exception of phonological awareness where the performance of group 2 appeared to decline across the three cases. Both intervention groups improved in their expressive phonology/articulation scores between the individual and first mixed-discipline case (i.e., Case 1 and 2) as well as in their language comprehension scores between the two mixed-discipline cases (i.e., Case 2 and 3).

3.4 Discussion

Preparing educational professionals to provide language-literacy instruction is critical for advancing children's learning outcomes (Moats, 2014). A large body of research has focused on the knowledge and practice of prospective teachers; however, increased focus on preparing teachers alongside other child practitioners, such as SLTs, for collaboratively supporting children's learning is also required (Forbes & McCartney, 2015). Thus, the present study examined the impact of course-based IPE interventions on the shared linguistic and literacy curricular knowledge of student teachers and student SLTs alongside their co-planning of language and literacy instruction. Contrasting interventions were implemented to determine to what extent supplementing case-based instructional planning with expertise sharing (i.e., the combined intervention) offered additional benefit over supplementing case-based work with only spending time together (i.e., the comparison control intervention).

The first research question sought to compare how students' linguistic and curricular knowledge improved over the course of the contrasting interventions. Such knowledge has been highlighted as important for both students' individual and co-working practice to support children's literacy learning (Forbes, 2008; McCartney & Ellis, 2013). It was expected that

supplementing case-activities with language-literacy expertise sharing would enhance students' linguistic and curricular knowledge to a greater extent than supplementing case-activities with only spending time together. Students from the combined intervention demonstrated gains in some aspects of their linguistic and curricular knowledge while students from the comparison intervention did not show any statistically significant gains in conceptual knowledge. More specifically, in the combined intervention, the literacy curricular knowledge of student SLTs improved as evidenced by increased ability to identify definitions of common classroom literacy activities such as Guided Reading and running records. Both subgroups of students from the combined intervention also demonstrated improved knowledge of linguistic concepts pertaining to the relationship between speech and print (e.g., decoding, digraph, and grapheme). Improvement in this category of concepts, however, was supported by explicit instruction provided by the researcher through a lecture-based activity.

There was less evidence to suggest that participation in the combined intervention benefitted student teachers' knowledge of spoken language concepts. The pre-post comparison of students' spoken language knowledge from the combined intervention was not statistically significant. There was a trend, however, towards improved knowledge for these student teachers according to effect size analysis and examination of their responses to individual items (e.g., definitions of phoneme and vowels). One explanation for limited change may be that the student SLTs did not have sufficiently strong knowledge of the spoken language concepts examined to be able to positively influence the student teachers' knowledge. Timing of delivery has been highlighted as a key consideration for IPE. In previous IPE studies, health care students reported that lack of knowledge of their own professional roles limited the utility of inter-professional interactions (Olson & Bialocerkowski, 2014). The student SLTs in the present study were in their third of a 4 year programme and thus may have required further study to strengthen their linguistic knowledge. They identified an average of only half of the

spoken language concepts before the intervention; this contrasts with results from the previous survey study (see Chapter 2) where student SLTs who were in their fourth and final year of professional study correctly identified an average of 75% of these concepts. Furthermore, a portion of the student SLTs reported having no formal practicum experience with school-age children. This likely limited their development of spoken language expertise given that relevant field experiences builds students' conceptual linguistic knowledge as evidenced in studies of pre-service teachers' field experiences (e.g., Al Otaiba et al., 2012).

The second research question sought to examine the impact of the contrasting interventions on students' ability to co-plan language and literacy instruction. Comparison of students' lesson plans from mixed-discipline cases before and after the contrasting forms of supplemental discussion revealed only improvement in students' planning for language comprehension. This improvement was evident for both intervention groups. However, examination of the total scores achieved in the final round of mixed-discipline planning indicated that students were not developing language comprehension beyond general references. Overall, the combination of case-based planning and expertise sharing had little impact on influencing students' ability to co-plan instruction across multiple linguistic components. Furthermore, students were also no more likely to plan for coordinating their instruction with the other-profession. Overall, the planning outcomes of student SLTs and student teachers working together did not appear to be improved by either intervention.

The short duration of the inter-professional experience likely was a factor limiting the students' ability to develop depth of linguistic and curricular knowledge required for application to their co-planning. However, longer periods of time to develop and apply knowledge to practice are not necessarily sufficient as demonstrated by Al Otaiba et al. (2012) in their study of tutoring experiences. Student teachers required additional support in the form of examples of scripted activities to plan more comprehensive language and literacy

instruction. Thus, it is likely that additional forms of facilitation are required to help students develop adequate linguistic and curricular knowledge that can be applied to their co-practice. The importance of seeing the relevance of practice on children whom student professionals are actually working with has also been highlighted as a factor supporting student teachers' learning in tutoring experiences (Al Otaiba & Lake, 2007). Thus, application of knowledge to practice may be more likely in field-based experiences where students have opportunity to co-instruct real children.

The final research question sought to compare students' co-planning to their independent instructional planning. Even with limited improvement evident in students' co-working, it was possible that simply putting students in co-working scenarios without supplemental discussion could improve the quality of language and literacy instruction they devised. Comparisons of students' independent and mixed-discipline planning, however, revealed only enhanced planning for the component of expressive phonology/articulation. Thus, during mixed-discipline planning, students appeared to focus more on traditional forms of expressive phonology/articulation such as providing intensive practice articulating sounds in increasingly difficult contexts (Bernthal, Bankson, & Flipsen, 2013). However, this approach may have limited effect on promoting children's reading and spelling development (Gillon, 2000, 2002). In contrast, integrating phonological awareness and orthographic knowledge into instruction has been shown to support children's reading and spelling alongside their speech production (Gillon, 2000, 2002, 2005; McNeill et al., 2009).

Speech sound production has traditionally been considered an SLT's area of expertise and therefore this finding may indicate that student SLTs were assuming the role of an expert delivering information to the student teachers (Hartas, 2004). However, this may have limited their exploration of areas of shared responsibility such as language-based literacy instruction. Thus, as conducted in the study of IPE by Suleman et al. (2014), students may also require

facilitated discussion of co-working approaches including constructs of collaborative co-working. Helping students understand that collaboration requires reciprocal sharing of knowledge, perspectives and responsibilities may have supported students to more extensively share roles in supporting both children's speech and language-literacy development.

3.4.1 Limitations and future directions

Despite the mixed findings, the current study highlights the need to consider the preparation of educationally relevant specialists, such as SLTs, alongside the preparation of teachers to provide explicit language and literacy instruction. The results of this exploratory study suggest that student SLTs and student teachers benefitted from being actively guided to engage with the other profession. Supplementing case activities with guided discussion of language and literacy content did not appear sufficient to support enhanced co-working outcomes among student SLTs and student teachers. The small sample size, particularly for the student teachers, was a limitation which may have restricted detection of statistically significant changes. Furthermore, tracking student discussion during interactive learning activities may have provided further insight into why some aspects of knowledge and/or co-planning were not enhanced.

Further, this study adopted a narrow focus by evaluating only changes in linguistic and curricular knowledge and lesson planning outcomes. During their various interactions, it is possible that student professionals were gaining competency for collaboration which were not part of the planned IPE curriculum. Consequently, the next chapter examines student professionals' perceptions of their experiences during the course-based IPE to gain further insight into the impact of the inter-professional experience. Investigation of participants' perceptions may also provide additional insight into how the instructional design of future course-based IPE could be enhanced. Subsequent chapters also examine the effectiveness of a

case-oriented, placement-based model of IPE. The opportunity for a longer period of co-working among student SLTs and student teachers to support children with speech, language and literacy needs may provide enhanced opportunity to develop understanding of each other's professional expertise amongst other collaborative competencies.

CHAPTER 4

PARTICIPANTS' PERCEPTIONS OF COURSE-BASED APPROACHES TO INTER-PROFESSIONAL EDUCATION IN COLLABORATIVE LANGUAGE-LITERACY INSTRUCTION

4.1 Introduction

Outcome-focused evaluation, such as the study described in Chapter 3, is a commonly used approach in IPE research (Thistlethwaite et al., 2015). These evaluations employ a deductive approach; learning outcomes are stated prior to the IPE and evaluation seeks to determine whether the intervention brings about change in the desired learning areas. While this a critical component of evaluation research for IPE, it fails to address important questions related to the effectiveness of IPE. For instance, what else might have participants learned about collaboration through their interactions? Were there any unexpected or unwanted effects? What aspects of the instructional design (e.g., learning activities, timing of the IPE, classroom versus practice settings) enhanced and/or limited participants' learning? Answers to these questions are critical for understanding the broader impact of IPE and are required to inform design and implementation of future initiatives (Olson & Bialocerkowski, 2014; Thistlethwaite et al., 2015).

Qualitative research approaches are well suited to exploring the broader impact of IPE beyond change in measurable learning outcomes (Payler et al., 2008). Qualitative approaches to IPE evaluation are also necessary given the paucity of validated measures related to readiness for collaborative practice. This paucity of measures has resulted in an over-reliance on existing validated instruments which only measure change in participants' self-reported

attitudes towards inter-professional learning and collaboration (Payler et al., 2008; Thistlethwaite et al., 2015). Unfortunately, understanding of the impact of IPE has been limited by the reliance on such measures. Qualitative investigations, however, have been successfully utilised to understand the effects of IPE. For instance, in an investigation of IPE for students of health-care disciplines, Cooper, Spencer-Dawe, and Mclean (2005) demonstrated that complementing quantitative data (i.e., pre-post questionnaires regarding collaborative attitudes) with qualitative data (i.e., post-IPE participant interviews) revealed development of competencies beyond positive attitude changes. After the IPE, student participants (n=21) described possessing enhanced confidence in their own professional knowledge alongside enhanced understanding of other professions' role and responsibilities.

Qualitative investigations of health-based applications have also revealed factors which limit the success of IPE. Baker, Egan-Lee, Martimianakis, and Reeves (2011) interviewed student participants (n=25) from multiple health-disciplines about their participation in an IPE intervention. Interview analysis revealed that tensions related to perceived differences in status hampered interactions among students from different professional backgrounds. Consequently, the utility of interactive learning activities was limited. Barnes, Carpenter, and Dickinson (2000) also utilised post-IPE interviews as part of an evaluation of IPE for mental health practitioners. Participants (n=20) reported that additional opportunities to interact with members of complementary professions was required to advance their understanding of effective co-working. Interview analysis of IPE participants has also revealed facilitating factors, such as students confirming that the timing of the IPE, content and instructional activities were facilitative of their learning about collaborative practice (Cooper et al., 2005; O'Neill & Wyness, 2005). These studies demonstrate that qualitative investigation of participants' experiences can provide useful insights into why or why not IPE initiatives achieve the desired learning outcomes.

Qualitative investigation was thus utilised to further understand the impact of the IPE interventions described in Chapter 3. More specifically, the current study sought to explore student participants' perceptions of their experiences in the two forms of course-based IPE. This study further addresses the second research question within the thesis as identified in Chapter 1, including the sub-questions which are listed below.

The specific research questions were:

a) In what ways did student teachers and student SLTs perceive that collaborative competencies were developed during the course-based IPE?

b) In what ways did student teachers and student SLTs perceive the instructional design of the course-based IPE to influence development of collaborative competencies?

4.2 Method

4.2.1 Research design

This study employed individual interviews with a portion of student SLTs and student teachers who had completed the course-based IPE interventions described in Chapter 3. All interviews were conducted within 4 weeks after the completion of the IPE.

4.2.2 Participants

Individual interviews were conducted with ten student SLTs and nine student teachers who participated in the course-based IPE intervention study presented in Chapter 3 (i.e., 37% and 50% of each professional group respectively). Five of the student SLTs and four of the student teachers had participated in the combined intervention (i.e., Group 1, experimental group). The remainder of the participating student SLTs (n=5) and student teachers (n=5) had participated in the comparison intervention (i.e., Group 2, comparison control group). Figure 10 demonstrates interview participants' participation in the IPE interventions.

Participants were recruited according to their professional group (i.e., SLT versus teacher) and their participation in the two forms of IPE. Participants were then randomly selected from each of these four subgroups and were invited by email to participate in an interview with the researcher. Invitations were sent until five participants from each subgroup were recruited (with the exception of student teachers from the combined intervention in which only four interviews were able to be obtained). Of those invited to participate, four student teachers either declined or did not respond to the invitation. All invited student SLTs agreed to participate in the interview. Interview participants were female and were 20-24 years of age with the exception of one student teacher who was 35 years of age. All student teachers interviewees had completed practical placement periods in junior schools. All student SLT interviewees, with the exception of two student SLTs from the experimental group (i.e., S4, S5), had completed practical placement periods in junior schools.

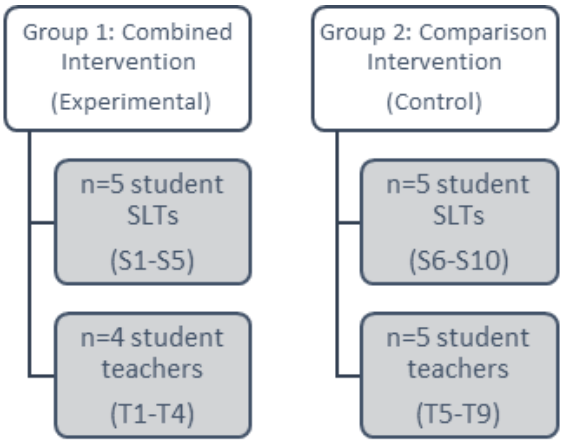


Figure 10. Interview participants' participation in the IPE interventions. *Note*: S=student SLT, T=student teacher.

4.2.3 Interview procedure

Participants were interviewed individually by the researcher using a semi-structured interview approach. All participants were aware that the researcher had been involved in the design and implementation of the IPE. Student teachers completed their interviews in person at their

university campus. Student SLTs completed phone interviews given that many students were completing practical placement periods in various locations across the country. All interviews were audio recorded and field notes were also kept by the interviewer. Interviews were transcribed by an independent agency. The researcher checked the accuracy of the transcriptions using the audio files and field notes and corrected any errors in transcription. The interview questions sought students' perspectives on what they learned, how they interacted with the students from the other profession, and strengths and weaknesses of the IPE (see Appendix D for the interview questions). Interviews ranged from 7 to 18 minutes in length.

4.2.4 Data analysis

An inductive thematic analysis of the interview data was adopted which progressed through three stages including open, axial and selective coding (Neuman, 2006; Strauss & Corbin, 1990). To enhance the trustworthiness of the data analysis, peer debriefing was employed throughout the coding process by obtaining feedback about coding from an independent colleague (Creswell, 2013). A colleague with teaching experience was selected for peer debriefing to balance the views of the researcher who has a background in paediatric speech and language therapy. The analysis involved the following steps:

Step 1. Initially, the researcher and teaching colleague independently employed open coding by assigning preliminary labels to excerpts of data in all interview transcripts to begin to capture ideas expressed at sentence or paragraph levels.

Step 2. The researcher then categorised related labels into preliminary categories based on discussion of similarities and differences in coding and review of literature on inter-professional collaboration.

Step 3. The two colleagues then progressed to axial coding by independently applying these new codes to interviews followed by comparison and discussion to refine coding into categories

and subcategories of related data. This process was conducted for 50% of the interview data and resulted in a final coding system of twelve main parent codes with two of these containing five more precise codes.

Step 4. The researcher then finalized coding of all the interview data.

Step 5. In the final stage of analysis, the researcher employed selective coding by reviewing the interviews a final time to group related categories into overarching themes and select data that exemplified these themes. Again, peer debriefing was utilised to obtain feedback about theme development.

Step 6. To further establish the trustworthiness of the data analysis, quotes which were representative of each theme were selected from the participants' interview transcripts to include in the final reporting of results (Elo et al., 2014). Portions of the quotes were paraphrased (as indicated by text in brackets) to enhance clarity.

4.3 Results

4.3.1 Development of collaborative competencies

Derived themes were interpreted within the collaborative competency framework, described in the literature review (Chapter 1), which highlighted collaborative competencies that are potentially critical for SLT-teacher collaboration. One main theme emerged from this analysis: participants' understanding of each other's professional roles and expertise. The theme is discussed in further detail as follows.

Theme 1: Understanding of professional roles and expertise

Subtheme: Realising the complementary roles of teachers and SLTs. Student teachers and student SLTs from both intervention groups discussed gaining a greater understanding of the

roles of the other profession. Prior to the IPE, several student teachers commented on not appreciating SLTs' role in educational contexts.

I hadn't really thought of [SLTs] being part of education. (Group 2, T7).

I had no idea what [SLTs] even did and how they could be helpful. (Group 1, T3)

Student teachers realised that SLTs could be a useful resource to support them in advancing children's communication development. For instance, they described learning that SLTs could help them develop classroom instructional strategies for children with communication difficulties. They also described being more likely to access support from an SLT.

If I have a child in my class that needs speech therapy, I'll be able to have some form of an idea of what's happening and what they're doing and maybe send a few emails to get an awareness of what I can do in the classroom. (Group 1, T4)

I didn't have a clue what [SLTs] did. Now I have a better idea. Now I feel more confident [saying], "Well, I think this is someone we need to talk to." (Group 2, T8)

Student SLTs also described gaining an awareness of the scope of teachers' practice and how SLTs' responsibilities overlap with those of teachers.

I also didn't realise how relevant so much of what we learn is [to early childhood and what student teachers] are learning and that they're participating in all the time. (Group 2, S7)

I really had no idea [teachers] had so much involvement in reading… I [thought] that if kids are struggling with reading that it's up to [SLTs] to fix it. So, that was really helpful to talk to them and see that they actually have lots of ideas and ways they could work on reading in the classroom. (Group 1, S3)

Subtheme: Realising the importance of possessing knowledge of each other's professional roles. A common thread running through students' experiences was their realisation of how little they knew of each other's professional roles including profession-specific terminology.

> *They [student SLTs] had no idea about the literacy programmes and all the programmes that we have in place in class, or the ministry of education documents, and we didn't have any idea about what they did. (Group 2, T6)*

Several students identified this as a problem for co-working and the need for students to develop better understanding of each other's roles, responsibilities and profession-specific terminology.

> *The thing that I remember the most was that if [the Ministry of Education] want [SLTs and teachers] to interact so much more then we need to know more about what each other does. (Group 2, T8)*

> *There was a lot of lack of understanding of what was going through the [speech and language] reports. Because there's a lot that we didn't understand... How you would put this into your classroom plan if you don't actually understand what the issues are. (Group 1, T3)*

> *I did learn a lot from the workshop, but it made me realise that I also need to find out more for myself. I need to find out a lot more about the teaching curriculum. (Group 1, S1)*

4.3.2 Influence of the instructional design

Derived themes were interpreted within D'amour and Oandasan's conceptual framework of IPE (described in Chapter 1) which identifies various aspects of instructional design (i.e., teaching-related factors) which could impact the effectiveness of IPE (D'Amour & Oandasan, 2005). Four main themes emerged from this analysis highlighting teaching-related factors that were influential on participants' learning. These factors included the interactive approach to learning, the length of the IPE, the structure of the group activities and timing of the IPE. These various themes are discussed in further detail as follows.

Theme 1: Interactive approach to learning

Subtheme: Engagement in interactive learning activities. Overall, participants were favourable regarding the opportunity to interact with students of the other profession. Participants tended to describe each other as friendly and engaged in learning about each other. Several participants also appeared to value the inter-professional interactions as an approach to learning. In particular, participants across the intervention groups described these interactions as useful for learning about the professional roles and expertise of the other profession.

> *It was good to see [the student SLTs'] point of view. They are really willing to help. (Group 1, T2)*

> *That was probably the thing I most enjoyed about the session was talking to [the student SLTs] and seeing their views on the classroom and the kids. (Group 2, T9)*

> *I just found talking to [the student teachers], [sic] I learned so much from that interaction. (Group 1, S3)*

> *I found it useful being with other people and learning about what they do. (Group 2, S10)*

In some cases, however, participants described instances when opportunities to interact were not as beneficial. In particular, these participants struggled to maintain effective communication to support exchange of information between the professional groups. One student teacher (Group 2, T7) described a situation in which she did not engage with student SLTs in her group who were discussing content she did not understand. In contrast, other participants appeared more forward in questioning their colleagues to clarify discussion.

> *I found that I was getting very, very confused with all those long terms that [the student SLTs] were using. I would have to keep asking them questions, going, "What does this mean? What does that mean?" (Group 1, T3)*

There was evidence to suggest that discord may also have impeded some interactions. For instance, one student teacher (Group 1, T1) felt that student SLT group members were not

interested in her explanation of teachers' professional roles during the supplemental discussion activities. A student SLT (Group 2, S7) also felt that there was tension amongst group members based on each viewing their profession as superior.

Students from both intervention groups were generally positive in their evaluations of the various forms of interactive activities. Students tended to describe the case studies and both forms of supplemental discussion as interesting and appropriate for learning about similarities and differences in professional roles and perspectives. Some students, however, suggested that utilising more dissimilar cases when doing case-based activities would be more engaging and thus might have encouraged better lesson planning (Group 2, T9; Group 1, T1; Group 1, S3). In contrast, some student SLTs suggested that their mixed-discipline groups become more engaged in discussing the case studies by the end of IPE (Group 1, S4; Group 1, S1).

Subtheme: Requirements for participants' expertise of their own profession-specific knowledge. Overall, students tended to describe each other as knowledgeable about their own professions. Two student teachers, however, suggested that some student SLTs, in particular, had difficulty explaining concepts related to SLTs' area of expertise. One student teacher attributed this to difficulty explaining implicit knowledge while the other attributed this to participants not possessing adequate knowledge.

> *When I came across words [I didn't understand] in the case studies, we could ask [the student SLTs] and go, "What is this?" Then they had trouble trying to explain it to us, because it's so natural for them to just know what it is… A lot of the technical words they struggled to explain to us. (Group 2, T6)*

> *[The student SLTs] couldn't really tell me a lot of the basics [of what they were instructed to do]. I felt like I didn't get much from that part of it. Then, the second two [SLTs] that I was with were very knowledgeable and I wish I'd been with them for the first part. (Group 1, T1)*

Furthermore, student participants suggested that interactive learning may have been enhanced if individuals had time to prepare prior to the workshop (Group 2, S9; Group 1, T2).

Theme 2: Length of the IPE

Student participants from both intervention groups suggested that there was insufficient time to gain an adequate understanding of each other's professional roles and expertise. For instance, some participants described using the allocated case planning time to discuss each other's professions rather than co-planning instruction. Students from both intervention groups suggested the workshop would be improved by having more opportunity to discuss professional roles as well as their own experiences including previous course work and professional practice placements.

> *I found a lot of my time that I was talking to [the SLTs] wasn't necessarily all about the case studies. It was, "Oh wow! So that's what you do?" It was just getting to know [them]. (Group 2, T8)*

> *I found that when we were given the opportunity to talk over the case studies, we spent more time discussing what it was that each other actually did. Because that's what I really wanted to know... (Group 1, T3)*

> *I think I would have liked [to spend] more time talking with the student teachers about what they do in their role, and what they're learning… (Group 1, S2)*

Students from both intervention groups also suggested that there was insufficient time allocated to case planning. One student SLT (Group 1, S1) felt she was rushed to get adequate information from her student teacher partners. Students also described having in-depth discussions about cases but then running out of time to write down their ideas for instruction.

> *I think maybe by the last [case study] people were just talking about it more, [rather] than actually writing it down. Because I know with our group we'd talk about it and then we'd go to write it down and then the time was up… (Group 1, S4)*

I really liked doing the three case studies but we kept running out of time. I felt like we'd spent so much time talking. We had so much to talk about, that we didn't get to write down everything that we thought. (Group 2, S9)

Theme 3: Grouping of students

Several students from both intervention groups suggested that group dynamics impacted the effectiveness of the interactive learning activities. For instance, some students were in favour of having the same-profession peers within group activities as this provided peer support to help explain profession-specific knowledge. In contrast, some students suggested having two student SLTs combined with one student teacher may have been detrimental to collaborative planning. They attributed this to student SLTs being more likely to talk amongst themselves rather than including the student teacher. Finally, students also suggested that keeping the same student SLT and teacher paired throughout the IPE activities might have facilitated better lesson planning in the final case study due to increased comfort with each other.

Theme 4: Timing of the IPE to enable transfer of learning to practice

Several students made suggestions related to aligning IPE with opportunities for gaining experience in real practice settings. One student teacher (Group 1, T2) indicated that the IPE could motivate students to explore the role of SLTs during practical placement periods. She pointed out, however, that it was unfortunate that student teachers had completed the majority of their practical placements prior to the IPE, thus limiting opportunity to gain inter-professional knowledge during their professional study. Similarly, others felt that the IPE would be valuable when they were working or completing practice placement periods. They suggested that having practical experience while participating in IPE would enhance interactive learning as student participants would have recent experiences to draw upon. There would also be opportunity to immediately transfer learning from the IPE to their practice.

When you're actually out in the real world and [working with children with communication difficulties], I think you probably have more to talk about so it would probably be valuable… (Group 2, S8).

We actually went out into classrooms and taught kids that were low progress learners. Kids had problems with phonological awareness and it was like, "Oh, it would have been really good to have a better understanding of what a speech language therapist would do." (Group 2, T8)

4.4 Discussion

This study explored student participants' perceptions of their experiences in course-based IPE interventions focused on explicit instruction in the language skills that underpin early reading and spelling acquisition. Interviews were conducted with 19 student participants who had participated in either the combined or comparison control IPE interventions (as described in Chapter 3). Thematic analysis of interview data was utilised to understand how participants may have developed readiness for collaboration during the interventions.

The first research question asked in what ways participants developed competency for collaborative practice. Interview analysis suggested that students from both intervention groups gained a cursory understanding of each other's professional roles and expertise. More specifically, students learned about the complementary nature of their two professions. Student teachers, in particular, appeared to enter the IPE possessing limited knowledge of speech and language therapy with some reporting not being aware that SLTs work in education settings. Consequently, building knowledge such as shared understanding of professional terminology related to linguistic concepts might have been an unrealistic goal to achieve in a one-off intervention. Students also appeared to gain an understanding of the importance of shared knowledge of professional roles to co-working, suggesting they possessed an enhanced appreciation of the processes underlying effective collaboration. The IPE might thus motivate

some students to take up further learning opportunities that would advance their inter-professional knowledge.

Building understanding of professional roles is a common learning outcome for health-based IPE (Thistlethwaite & Moran, 2010). For instance, two prevalent IPE competency frameworks developed for health-based initiatives include understanding of professional roles as a critical competency for inter-professional collaboration (Canadian Interprofessional Health Collaborative, 2010; Interprofessional Education Collaborative Expert Panel, 2011). Similarly, a study which utilised interview analysis with health-care workers (n=60) also revealed that role understanding was one of the competencies which they considered most relevant to effective co-working (Suter et al., 2009). More specifically, role understanding has been described as necessary for meaningful inter-professional communication (Suter et al., 2009). Further, role understanding facilitates appropriate use of practitioners' services by helping them understand which professional has the knowledge and skills best suited to address a particular problem (Canadian Interprofessional Health Collaborative, 2010). This was evidenced in the current study by student teachers' comments of possessing a better understanding of when to access SLT services. Similarly, the IPE prompted some student SLTs to consider how classroom teachers' skills can be utilised to support children who experience speech, language and/or literacy difficulties. Without this IPE experience, many participants may not have opportunity to develop even these cursory understandings of professional roles, given that current models of professional study offer limited inter-professional learning opportunities (as supported by the survey study in Chapter 2). The current findings thus suggest that the IPE was a valuable experience that made a unique contribution towards preparing participants for collaborative practice.

The second research question sought understanding of how aspects of the instructional design of the IPE influenced students' development of collaborative competence. Generally,

the interactive approach to learning was well received by most participants, although there was some evidence that this approach was not appropriate for all participants. More specifically, some participants' learning may have been limited by decreased engagement in some of the IPE activities, difficulty maintaining interactions with student colleagues, and/or professional tensions. Further, some student SLTs had difficulty explaining profession-specific knowledge to their student teacher counterparts. These challenges should be taken seriously as placing students in group tasks where they are unable or unwilling to make meaningful contributions could reinforce or instill negative perceptions of other professions and impede the goals of IPE (Oandasan & Reeves, 2005a).

Students' suggestions related to allowing preparation time before the workshop and utilising a variety of cases offer valuable ideas on how to avoid possible unwanted effects. Another possibility is altering the timing of the IPE within the students' course programmes. For instance, providing the IPE later in their professional study would likely allow students to develop further knowledge, skill and confidence in their own professional roles through accumulation of additional relevant practical experience. This may improve expertise sharing among the student groups. Further, the risk of participants feeling threatened by other professional groups due to not being adequately secure in their own roles may also be reduced (Mandy et al., 2004). However, as highlighted in the interview analysis, the IPE may motivate students to continue accumulating inter-professional knowledge throughout their professional study, particularly during practical placement periods. Thus, offering IPE too late may limit opportunity for students to continue developing readiness for collaborative practice. Overall, difficulties with expertise sharing and professional tensions appeared to be limited to only a portion of participants. Thus, perhaps the best solution would be assisting students to prepare for their role in IPE activities through guided self-study prior to their participation. Further, incorporating a more active role for facilitators than that offered in the examined IPE

interventions (Chapter 3) may be advisable. For example, inclusion of additional lecture-based activities or facilitator-lead discussion in which students are learning in parallel might help offset challenges related to the emerging nature of students' professional knowledge and confidence (Charles, Bainbridge, & Gilbert, 2010)

Issues related to the structure of the intervention also appeared to limit participants' learning about collaborative practice. First, the IPE did not provide sufficient opportunity for some students to develop adequate role understanding required for collaborative lesson planning. They consequently reported using the case-based instructional planning activity to continue discussing each other's professional roles. This confirms the importance of role understanding to collaborative practice and suggests that dedicated time to discuss each other's responsibilities and emerging areas of expertise, as done in the combined intervention (Chapter 3), may be critical to the success of IPE. However, additional development of role understanding beyond that offered in the combined intervention may be required before benefits are obtained in students' co-working. In contrast, other participants suggested that they engaged in co-planning but did not have sufficient time to write down their plans. Only measuring co-working through lesson plan analysis may have thus limited insight into whether interactions during the case planning were enhanced in the interventions. Development of methods appropriate for exploring change in students' interactions is thus required in future studies, as it may provide a more sensitive measure of co-working.

The grouping of students during learning activities also emerged as an influential factor on students' inter-professional learning. Students' recommendations for achieving better group dynamics align with those made by Oandasan and Reeves (2005a) in their review of IPE programmes. Similarly, they recommended establishing equal representation of members from different professional groups (when possible) to avoid one professional group dominating group interactions. Further, the review recommended maintaining the same grouping of

participants throughout an IPE initiative to enhance interaction. The current study thus confirms the findings of previous IPE research in that careful consideration must be given to group structure in order to achieve optimal conditions for interactive learning among participants (Freeth et al., 2005; Oandasan & Reeves, 2005a).

4.4.1 Limitations and future directions

The current study suggested that the course-based IPE interventions, initially examined in Chapter 3, challenged students to consider how other professionals may complement their own work to advance children's learning outcomes. The findings also support that the effectiveness of the IPE, in relation to learning outcomes examined in Chapter 3, could be enhanced by additional opportunity to build shared understandings of professional roles and expertise, more active facilitation, and modifications to the grouping structure. However, these findings must be considered within the limitations of the current methodology. Although recruitment for the interviews was partially random, a number of participants declined to be included. A sampling bias may have thus occurred, as those who had positive experiences with the IPE may have been more inclined to participate. Further, social desirability bias may have existed; interview participants may have been inclined to provide positive rather than negative feedback given their knowledge of the researcher's relation to the IPE. Nonetheless, interview participants provided both positive and negative critiques of the interventions, thus suggesting the current study captured a representative range of instructional factors which influenced the effectiveness of the IPE.

To conclude, interview participants' overall positive evaluations of the interactive and case-based style of learning warrant further investigation into IPE. In particular, students valued the time talking to students from the other profession and learning about their role and training. Moreover, students voiced a need for longer inter-professional experiences alongside

making IPE immediately relevant to practical experience to optimise learning. Thus, the next chapter examines whether a placement-based approach to IPE could foster development of a broader range of competencies for collaborative practice.

CHAPTER 5

IMPACT OF A PLACEMENT-BASED APPROACH TO INTER-PROFESSIONAL EDUCATION: STUDENT PROFESSIONAL OUTCOMES

5.1 Introduction

IPE for prospective professionals is often delivered in placement-based applications (Freeth et al., 2005). These applications refer to instances when inter-professional learning is incorporated into professional practice placements in which students gain experience in work settings under the supervision of qualified professionals. As highlighted in the literature review in Chapter 1, classroom-based applications for prospective SLTs and teachers have begun to be explored in the form of one-off workshops (e.g., Suleman et al., 2013; Suleman et al., 2014). There are no studies, however, of IPE applications embedded within professional practice placements.

The examination of the one-off IPE workshop, described in Chapters 3 and 4, suggested that the inter-professional knowledge and practice of student teachers and student SLTs can be impacted in positive, but relatively limited, ways. According to a constructivist perspective of IPE, placement-based applications offer enhanced opportunity for student professionals to develop collaborative competencies (Oandasan & Reeves, 2005b). More specifically, setting up shared placement experiences among student SLTs and student teachers enable longer periods of interaction across multiple days and may provide more motivation to explore collaborative practice given opportunities to co-instruct children in classrooms. Research also suggests that SLTs who gain collaborative experience working with teachers in their professional practice placements are more likely to employ collaborative service delivery as professionals (Brandel & Loeb, 2011). The study in this

chapter thus examines the impact of a placement-based approach to IPE on student SLTs' and student teachers' collaborative competencies.

The value of preparing prospective professionals for collaborative practice through student placements has been recognised for student SLTs and student teachers in contexts outside of SLT-teacher collaboration. For instance, Baxter (2004) described an initiative in a hospital setting for student SLTs (n=26) and other student health professionals (n=10). Mixed-discipline groups worked together during a seminar to devise a management plan for clients whose communication abilities were assessed by the student SLTs. Questionnaires alongside focus group discussion conducted after the programme suggested that participants viewed the experience as valuable for learning about teamwork and collaboration. Providing students with opportunity to implement their care plans, however, may have further elucidated how placement experiences can encourage students to learn about specific aspects of collaborative practice.

Collaboration within professional practice placements for student teachers has been explored in the context of preparing them for co-working with other teachers. Santagata and Guarino (2012) reported on the development of collaboration between pairs of student teachers who were placed in primary school classrooms for a 10-week period. Interview analysis with 15 participants revealed that discussion and problem-solving between student pairs helped understanding of their pupils' learning needs alongside ways to improve instruction. It was not clear from the analysis, however, how specific skills or knowledge related to collaborative practice were developed by the experience. Nonetheless, the study demonstrated that teacher educators are also concerned with preparing entry-level teachers to engage in effective collaborative practice.

Several logistical challenges are involved in organising shared learning experiences among students from different professional backgrounds (Baxter, 2004). One model that avoids these challenges is to support student SLTs or student teachers to gain inter-professional experience in traditional placements wherever a student has opportunity to interact with other professionals. Within this model, the inter-professional interaction typically occurs between the student and a trained professional from another discipline. For instance, Peña and Quinn (2003) used case study methodology to investigate the development of classroom-based collaboration among two teams comprising a student SLT, classroom teacher and teaching assistant in a pre-school setting. Several barriers to collaboration within the teams were identified and intervention from university supervisors and/or school administrators was required to resolve them. Differences in status between the students and the qualified professionals were an on-going barrier to their collaboration. In contrast, shared placement experiences among student SLTs and student teachers may overcome such challenges. Nonetheless, empirical studies comparing different approaches to inter-professional learning in professional practice placements are required.

The aim of the current study was to explore the impact of IPE situated within professional practice placements in which pairs of student SLTs and student teachers were placed in the same junior school classroom. As outlined in the literature review (Chapter 1), a case-oriented approach was adopted in which student pairs were asked to co-work to support a child or group of children who demonstrated speech and/or early literacy difficulties. Given the novelty of this approach and the potentially rich learning experiences offered by a placement experience, qualitative investigation was employed to examine the broad scope of student professionals' learning and their needs for further development following the IPE. Such information is critical for informing the design and evaluation of future IPE programmes. To complement the qualitative investigation, quantitative research methods

were also utilised to examine the influence of the IPE on specific aspects of student participants' inter-professional knowledge and perceptions related to understanding of each other's professional roles/expertise and of acceptance of inter-dependent co-working.

This study addresses the third research question within the thesis as identified in Chapter 1, including the sub-questions which are listed below.

The specific research questions were:

a) In what ways did student teachers and student SLTs perceive that collaborative competencies were developed during the placement-based IPE?

b) To what extent does the placement-based IPE develop student teachers' and student SLTs' shared content knowledge of linguistic concepts and classroom literacy curriculum?

c) To what extent does the placement-based IPE develop student teachers' and student SLTs' perceptions of appropriate co-working models?

d) In what ways did student teachers and student SLTs perceive the instructional design of the placement-based IPE to influence development of collaborative competencies?

5.2 Method

5.2.1 Research design

This research project used a multiple case study design. The in-depth investigation allowed by case studies make them appropriate for exploratory phases of intervention research to identify positive or negative effects and factors that may influence the effects of an intervention (Robey & Schultz, 1998).

5.2.2 Participants

Four student teachers and four student SLTs participated in the study. Student participants attended the University of Canterbury in New Zealand and were in the final year of their professional programme. Both programmes were at the undergraduate level and allowed students to enter into their respective professions. Inclusion criteria required that student participants did not have previous qualifications in either teacher education or speech and language therapy. Student teachers were recruited by email invitation as well as verbally during a language and literacy course. Student SLTs were selected for participation by their programme's coordinator of placement experiences. At the time of the study, student SLTs were participating in a part-time placement with mornings dedicated to practical experience. Student SLTs had completed all relevant coursework in child language and literacy. Student teachers were participating in full-time placements in primary schools. Student teachers had partially completed their final academic course work in child literacy at the time of the study. They had completed relevant courses in literacy and child development from their previous 2 years of study.

The shared placements occurred in the four primary schools to which participating student teachers were assigned. Each student SLT was then randomly assigned to one of these four schools creating four student SLT/teacher dyads. Table 7 provides further information regarding the characteristics of the students. Classroom teachers were responsible for supervision of the student teachers who were placed in their classrooms. The researcher, a qualified SLT, maintained supervisory responsibility of the student SLTs.

Table 7. Background information on student participants.

	Age	Gender	Previous Relevant Placement Experiences
Dyad 1			
S1	23	M	Assessing children and adults for AAC devices (included consultation with teachers and/or parents).
T1	20	M	Placements in years 3 and higher. No previous direct experience working with children with SLI.
Dyad 2			
S2	21	F	Providing articulation therapy to a child client in a clinic setting. Provision of AAC including direct work with children and consultation with teachers and teacher aides.
T2	40	F	Placements in years 2 and higher. Teacher aide experience including provision of speech sound therapy under the guidance of an SLT.
Dyad 3			
S3	21	F	Providing articulation and phonological awareness therapy in children's homes and/or in clinic setting.
T3	21	F	Placement in years 2 and higher. No previous direct experience working with children with SLI.
Dyad 4			
S4	21	F	Provision of AAC focused on consultation with teachers.
T4	40	F	Placement in years 3 and higher. No previous direct experience working with children with SLI.

Note. S= student SLT. T=student teacher. AAC=alternative and augmentative communication. SLI=spoken language impairment.

5.2.3 Approach to IPE

IPE was embedded within students' placement experiences by asking each student SLT/teacher dyad to work together to support the learning of a child or group of children who demonstrated speech, language or literacy learning difficulties. Inter-professional learning was facilitated by the researcher who coordinated with the supervising classroom teacher(s) to select children whom the SLT/teacher dyad would support. Criteria for selection of children were:

a) the classroom teacher was concerned about the child's speech, language or literacy development;

b) the child did not possess any visual, hearing or neurological disorders; and

c) the child was not receiving formal speech and language services through private or public agencies.

The shared placement experiences spanned a 5 week period which corresponded with the entire duration of the student teachers' placements and the first half of the student SLTs' placements. All student dyads were placed in classrooms in which children were in their first year of primary school.

The project proceeded in three main stages:

Stage 1. Assessment of the speech, language and literacy skills of children selected for the project. This was conducted by the student SLTs under the supervision of the researcher over the first 2 weeks of the shared placement. The assessment battery included norm-referenced measures of children's expressive phonology, phonological awareness, sound-letter knowledge, and expressive/receptive oral language. Informal assessment of children's word-reading and spelling was also conducted. The researcher then assisted the student SLTs to select speech sound and/or phonological awareness goals for the placement period as all children demonstrated difficulty with at least one of these areas. Moreover, similar goal areas were selected to facilitate comparison among the collaborative experiences of the student dyads.

Stage 2. Joint planning meeting. The researcher facilitated meetings between each of the student SLT/teacher dyads and the supervising classroom teachers. The aim of the meetings was to discuss potential speech sound and phonological awareness goals for each child based on their initial assessment. Student SLTs and student teachers were first encouraged to share what they learned about each child from their assessment and classroom observations, respectively. The researcher then guided group discussion until consensus was reached about

goal areas for the student dyads to jointly target. Table 8 provides descriptive information about each classroom, targeted children and their instructional goals.

Table 8. Description of classrooms, targeted children and proposed goals areas for shared instruction by the student dyads.

	Classroom Characteristics			Child Characteristics		
	Class size[a]	No. of CTs	Decile[b]	Age	Gender	Instructional goals
Dyad 1	7-12 children	1	10	5;1	M	Reduce palatal fronting Final phoneme identification Segmenting phonemes
Dyad 2	10 children	1	10	5;2	F	Final phoneme identification Segmenting phonemes Blending phonemes
Dyad 3	38 children	2	10	5;1	F	Reduce velar fronting Final phoneme identification Segmenting phonemes Blending phonemes
Dyad 4	26 children	2	3	5;9 5;9 5;8 5;6	M M M M	Reduce cluster reduction/ simplification[c] Final phoneme identification[c] Segmenting phonemes[c]

Note. [a]Class size changed due to children entering school when they turn age five. [b]New Zealand schools receive a decile ranking according to the socioeconomic status of the schools' community with decile 1 indicating schools with the highest proportion of children drawn from a low socio-economic community. [c] Instructional goal applied to all four children instructed by Dyad 4. CTs= classroom teacher.

Stage 3. Classroom-based targeted instruction. During the final 3 weeks of the shared placement, student dyads worked together to provide targeted instruction of the shared goals. All instruction was required to take place in the classroom and student SLTs, in particular, were asked to only take children out of the classroom when conducting assessment probes to track progress.

During this period, the researcher provided supervisory support only to the student SLTs which was primarily focused on their direct instruction. Written and verbal feedback was provided on student SLTs' lesson plans and execution of their plans. Feedback focused on therapy techniques including:

a) activity design to facilitate ample practice opportunities at an appropriate level of difficulty,
b) providing specific feedback to children regarding their performance,
c) integrating speech and phonological awareness instruction, and
d) documenting children's performance during learning activities.

In their lesson planning, students were also encouraged to utilise developmental milestones alongside language/literacy curriculum when developing rationale for goal areas.

To align with a constructivist approach to learning, no specific guidance about co-working was provided so that participants' learning was primarily self-directed and oriented around problem-solving (Barr et al., 2005). Feedback relevant to student SLTs' co-working was limited to:

a) discussing conceptual knowledge of language, literacy and curriculum on an ad hoc basis;
b) general praise of co-working activities that were occurring (e.g., team teaching); and
c) general encouragement to continue communication with their dyad partners.

During the final 3 weeks of the inter-professional placement, students were asked to document their communication with their student partner alongside instructional activities for shared goals. Student logs confirmed that students provided classroom-based instruction on targeted goal areas, as 50 out of the 52 reported instructional activities occurred in the

classroom. Student logs further confirmed that dyad partners maintained contact to plan instruction with an average of 9.5 contacts per dyad (range = 6-17).

5.2.4 Data collection

Qualitative data (interviews) and quantitative data (pre-post questionnaires) were used to explore the potential learning outcomes and factors affecting students' learning. A mixed method approach was adopted as it was judged that neither form of data was sufficient on its own to explore the impact of the shared placement experiences. Consequently, the mixing of methods offered a form of triangulation (Bronstein & Kovacs, 2013).

Interviews. Semi-structured interviews were conducted by the researcher with all student participants. Students were interviewed once within a 2 week period following completion of their shared placement experiences (see Appendix E for interview questions). All interviews were audio-taped and then transcribed by an external agency. The researcher listened to the interview audio files and corrected any transcription errors.

Pre-post questionnaire. Students completed a questionnaire before and after the shared placement which examined their content knowledge of language/literacy and perceptions of appropriate co-working models among teachers and SLTs. The questions were adapted from the survey study that was reported in Chapter 2. The questionnaire consisted of three sections which are described as follows.

1. Section 1 asked about participants' previous educational and work experience.
2. Section 2 assessed participants' understanding of various concepts in English literacy curriculum and English language structure related to each other's areas of professional expertise. This section utilised the same 24 multiple choice questions of the survey instrument reported in Chapter 2 with the exception of one literacy curriculum question. The question assessing understanding of the term "constrained

reading skills" was replaced with a question assessing understanding of the term "Colour Wheel" (i.e., a tool used in all New Zealand schools to describe children's reading levels). This modification was undertaken due to the vast majority of student teachers failing to identify the term "constrained reading skills" in previous studies described in Chapter 2 and 3. This pattern contradicted the pattern of student teachers' responses on the other curricular items suggesting that the term might not be widely used amongst educational practitioners. The item was therefore removed from the survey.

3. Section 3 examined participants' perceptions about different elements of teacher and SLT co-working. One close-ended question (taken from the original survey) asked participants to identify to what degree SLTs and teachers should participate in instruction of various spoken and written language skills. A second close-ended question was added asking participants to rate how frequently two different co-teaching models should be employed by SLTs and teachers. The examined co-teaching models included team teaching and alternative teaching based on models described by Friend and Cook (2003).

5.2.5 Data analysis

An inductive thematic analysis was adopted utilising three stages of coding including open, axial and selective coding (Strauss & Corbin, 1990). A detailed description of this approach to coding is provided in Chapter 4. Initially, the researcher and an independent colleague employed open coding by assigning preliminary labels to data excerpts in interview transcripts. The researcher then categorised related labels into preliminary categories/codes. The two colleagues then progressed to axial coding by independently applying these new codes to the interview data. Comparison and discussion of coding was conducted for 50% of the interview data which resulted in a refined coding system of 15 main parent codes with

nine of these containing two-to-four more precise codes. The researcher then finalised coding of all the interview data. Finally, selective coding was employed by the researcher by grouping related codes into overarching themes and selecting data excerpts that were representative of each theme. Again, the independent colleague provided feedback about theme development. Quotes from the data set were included in the reporting of results to enhance trustworthiness of the data analysis (Elo et al., 2014). Portions of the quotes were paraphrased (as indicated by text in brackets) to enhance clarity.

5.3 Results

5.3.1 Development of collaborative competencies

Interview analysis was utilised to explore students' perceptions of their development in collaborative competence. Derived themes were interpreted within the collaborative competency framework, described in the literature review (Chapter 1), which highlighted collaborative competencies that are potentially critical for SLT-teacher collaboration. Four main themes emerged from this analysis: understanding of each other's professional roles and expertise, inter-dependency to achieve common goals, role flexibility and communication skills. Each theme is discussed in further detail as follows.

Theme 1: Understanding of each other's professional roles and expertise

All student SLTs reported learning about the professional responsibilities, perspectives and working contexts of classroom teachers. For instance, they described learning about classroom teachers' approaches to literacy instruction. They also reported gaining an awareness of how children are organised into different reading groups and how teacher(s) manage instruction of those groups. Student SLTs also learned how the classroom structure could provide opportunities for additional or targeted instruction to a group of children.

Observations within the classroom and discussion with their student teacher partner and/or the classroom teacher were the main sources of this learning for the student SLTs.

Student SLTs also discussed the expectations that are placed on teachers and the pressures they face, such as lifting student achievement and managing a busy classroom schedule. S2 described learning how teachers are expected to have their pupils achieve certain levels of reading proficiency by the end of the school year. S1 described that working with his student teacher partner helped him appreciate the structured and busy nature of classrooms and the need for SLTs to be aware of how their actions could impact a classroom teacher:

> *It's given me a real appreciation for the school programme and the amount of work that goes into actually producing that programme for kids… Everything has had to be juggled so that [an SLT] can pull a kid out [of the classroom]. That's something for me to be cognizant of going forward. (S1)*

Student SLTs also appeared to learn about the similarities and the differences between the roles and perspectives of teachers and SLTs. Student SLTs remarked on similarities in assessment practices and instructional content utilised by teachers and SLTs:

> *I didn't even realise that [classroom teachers] did phonics programmes. [I have more of an] understanding that it is getting applied at school also. It's not just all what you're doing [as an SLT]. (S3)*

Student SLTs, however, also commented on the different perspectives and understandings of SLTs and teachers. These reflections primarily focused on the different understandings SLTs and teachers possess of phonics and phonological awareness instruction. For instance, a participant remarked:

[*The classroom phonics programme] blurs the definition between phonics and phonological awareness whereas [SLTs] see a distinction between [phonics] and phonological awareness. When we suggest work on phonological awareness, [teachers] think, "We're already doing it." (S1)*

Student teachers, on the other hand, were less likely to describe learning about the professional responsibilities, perspectives or working contexts of SLTs in relation to school-based work. T1 was the only student teacher who remarked on learning more about SLTs' professional practice in educational contexts. For instance, he reflected on how limited opportunities for students SLTs to gain experience with classroom instruction would make it challenging for an SLT to step into the role of working collaboratively with teachers.

Theme 2: Inter-dependency to achieve common goals

Subtheme: Inter-changeability in learning from each other. Dyads 1, 2, and 3 described supporting children's learning indirectly through providing advice and guidance to each other regarding instruction of the shared goal areas. The students' descriptions of learning from each other suggest interchangeability between being the learner and teacher in their professional co-working. Being both the teacher and learner has been characterised as an important aspect of more advanced forms of professional collaboration (Hartas, 2004). This contrasts with traditional consultation models in which SLTs assume an expert role and provide advice for classroom teachers to incorporate into their instruction. These descriptions of learning also relate to traditional Māori learning models within the New Zealand context. The Tuakana-Teina model demonstrates that both the 'tuakana' (i.e., person with greater experience) and 'teina' (i.e., person with less experience) benefit from learning interactions (Winitana, 2012). Within the current study, students also moved readily between being the 'tuakana' and the 'teina' which benefited their learning further.

S1, S2 and S3 supported their student teacher partners by providing guidance and feedback on phonological awareness instruction. Additionally, student SLTs and student teachers reported asking questions of each other to help in their respective instructional planning. One student teacher reflected on the benefits of the student SLTs' support:

> *I think this has helped me because it's given me more skills to understand how children learn in this area. Working with [the student SLT], she's given me ideas. If something didn't work out, if I didn't know, I could ask her. It's great to have someone [to say to], "I don't understand." (T3)*

Less frequently described was the student SLT modelling instruction with the student teacher observing. Only Dyad 1 described the student SLT modelling phonological awareness instruction which was achieved through the two student professionals team teaching a whole class lesson in the final week of the shared placement.

Student teachers supported their SLT partners by providing advice related to child behaviour. For instance, S2 described how her student teacher colleague gave her ideas on what to say to a child who was distracting others. Dyad 3 described the student teacher providing advice on how to encourage participation of children beyond the target child into the student SLTs' classroom activities. Although Dyad 4 described the student teacher providing advice on behaviour management to her partner, there was limited evidence to suggest that the student SLT was actively providing feedback regarding her partner's direct instruction of the shared goal areas.

Subtheme: Acceptance of co-working in the classroom. Participants commented on observing the benefits of classroom-based collaboration for the children selected for co-instruction. Participants highlighted that co-teaching in the classroom increased opportunity for children to practice target skills, supported better behaviour in the children during SLTs' direct

instruction, increased children's motivation due to the child being able to work with peers, and minimised the chance of the children feeling different from others due to being withdrawn for extra instruction. These attitudes suggested that, in at least some ways, participants believed that they accomplished more through their co-working compared to working independently.

Some students, however, expressed reservations about classroom-based co-working in which the SLT provides direct instruction to children. Dyad 4, in particular, commented on the drawbacks of the SLT providing direct instruction in the classroom; these included increased noise levels and scheduling difficulties limiting the amount of time the student SLT could spend providing direct instruction. T2 and S1 commented that student SLTs' provision of direct instruction in the classroom would be inappropriate for the working contexts of practicing SLTs and teachers. For instance, one participant remarked:

> *Would that happen in the classroom? Probably not because the SLTs are not going to sit with kids at reading time. The school won't pay for it. It's not going to happen. (T2)*

Theme 3: Role flexibility to create shared learning environments

Participants from Dyads 1, 2 and 3 described creating learning activities that other children in the classroom could join alongside the target child. To achieve this, these student dyads adopted responsibilities outside their conventional practice. For instance, student SLTs included multiple children of mixed abilities into their instruction. S2 and S3 did this by working with their target child's reading group (i.e., 4-5 children) before or after the group participated in Guided Reading with the student teacher/classroom teacher. S1 co-taught a class lesson on phoneme segmentation (segmenting words into individual sounds) with T1. In contrast, S4 only focused her instruction on the target children though did reflect in the interview on how other children could benefit from SLTs' classroom-based instruction.

The student teachers demonstrated flexibility by altering some aspect of the whole class or group instructional programme to create shared learning experiences for the target child despite these goals not aligning with the regular classroom programme. T2 and T3 added whole class or small group lessons that worked on these children's speech and/or phoneme awareness goals. T1 modified the progression of the classroom programme (i.e., order in which the sounds/graphemes were taught) and the materials (e.g., book selection for shared reading) to provide exposure and opportunities for practice of the speech goal selected for the target child.

> *I would work through the book during their independent reading time with [the target child]. Then all the children would do a classroom activity where they'd read the same book. [It would] have the 'sh' sound so the [target child] was getting plenty of practice [saying and hearing the 'sh' sound]. (S1)*

In comparison, T4 reported working on goals for only one of the four target children when the target goals came up incidentally within small group instructional activities that were part of the regular classroom programme.

Theme 4: Communication skills to support shared decision making

Dyads 1, 2, and 4 reported challenges and limitations in collaboratively making shared decisions regarding planning and selecting approaches to co-working. S1, T1, and T2 discussed how they could have improved the process of making shared decisions with their student colleagues. Specifically, they suggested creating more opportunities for communication (e.g., scheduling formal meeting times, online planning documents that both student professionals could access) or how to provide their colleague with more meaningful rationales for why they should work on particular goal areas.

Participants from these dyads also talked about instances when their colleague was not acting in a way that aligned with their expectations for effective co-working. For instance, T2 reported wishing her student SLT partner was more directive in her feedback as she felt this would have led to more discussion on instructional approaches. S4 described uncertainty in how to approach her colleague when their co-working approach was not successful. These challenges described by students presented the need for discussion and negotiation to come to an agreement on alternatives to their co-working styles or approaches. Only one participant, however, reported approaching his student colleague to discuss other options for co-working when he felt their current approach was relegating him to the role of teaching assistant.

> *I expressed [my concerns] and said, "Look, can we go back and have another look?" I think once we aired those concerns and actually spoke, we were able to overcome [our difficulties]. (S1)*

5.3.2 Change in content knowledge of language and literacy

Table 9 demonstrates students' performance on the questionnaire assessing understanding of linguistic and curricular concepts related to SLTs' and teachers' areas of expertise, respectively. All student SLTs' scores improved from pre to post on curricular concepts. Analysis of individual items suggested that after the IPE, more student SLTs correctly identify terminology related to curricular reading programmes (i.e., Guided Reading, Colour Wheel and Reading Recovery) (Figure 11). S2 and S3 also improved in their knowledge of spoken language concepts while little improvement was evident for student teachers. It was also notable that the majority of the student SLTs did not correctly identify several of the spoken language concepts either prior to or after the IPE (Figure 12). S2, S3 and T1 made the most evident improvement in their understanding of speech to print concepts. Analysis of

individual items suggested that more student SLTs correctly identified digraph and phonics at the end of the IPE (Figure 13).

Table 9. Participants' performance on test of conceptual language-literacy knowledge before and after the shared placement.

	Spoken Language[a]		Speech to Print[a]		Literacy Curriculum[a]	
	Pre	Post	Pre	Post	Pre	Post
Student SLT						
S1	5	4	5	5	4	6
S2	4	6	2	4	2	5
S3	3	6	3	5	1	4
S4	3	3	4	4	2	7
Student teacher						
T1	3	4	3	7	7	8
T2	3	5	3	3	8	7
T3	6	4	4	5	7	6
T4	4	4	6	7	7	7

Note. [a]Maximum score = 8

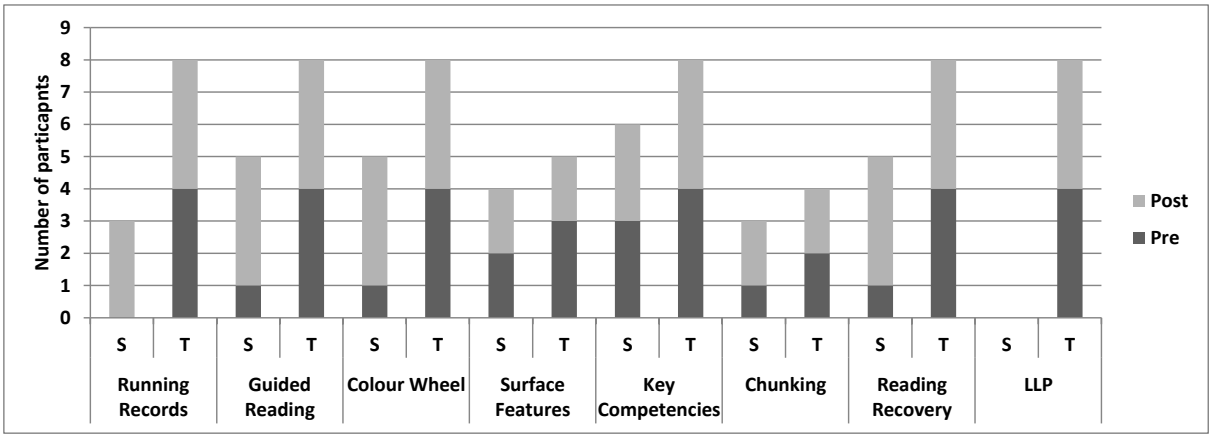


Figure 11. Number of participants who correctly answered literacy curricular concepts before and after the placements. *Note.* S=student SLTs; T=student teachers; LLP=Literacy Learning Progressions referring to a New Zealand curriculum document that describes the language and literacy skills children are expected to learn at each school year.

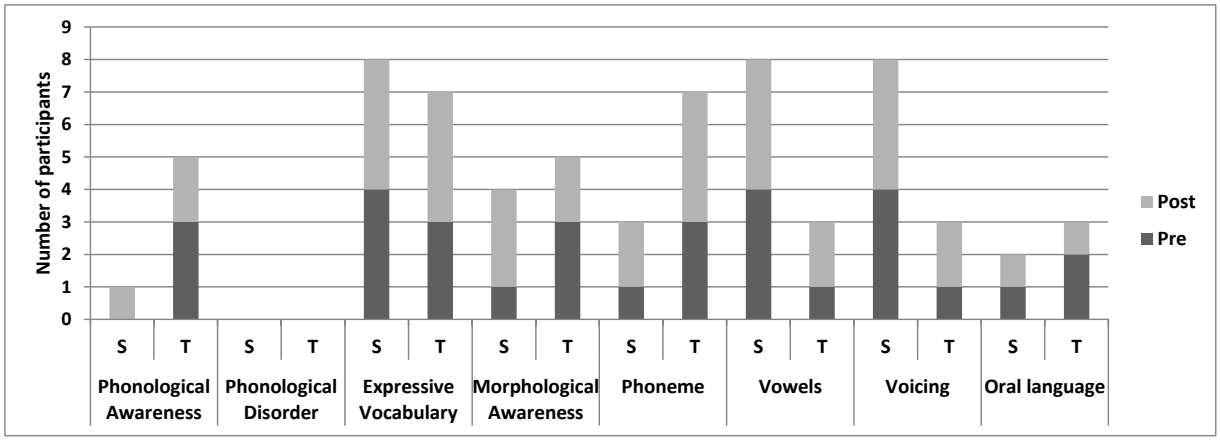


Figure 12. Number of participants who correctly answered spoken language concepts before and after the placements. *Note.* S= student SLTs. T=student teachers.

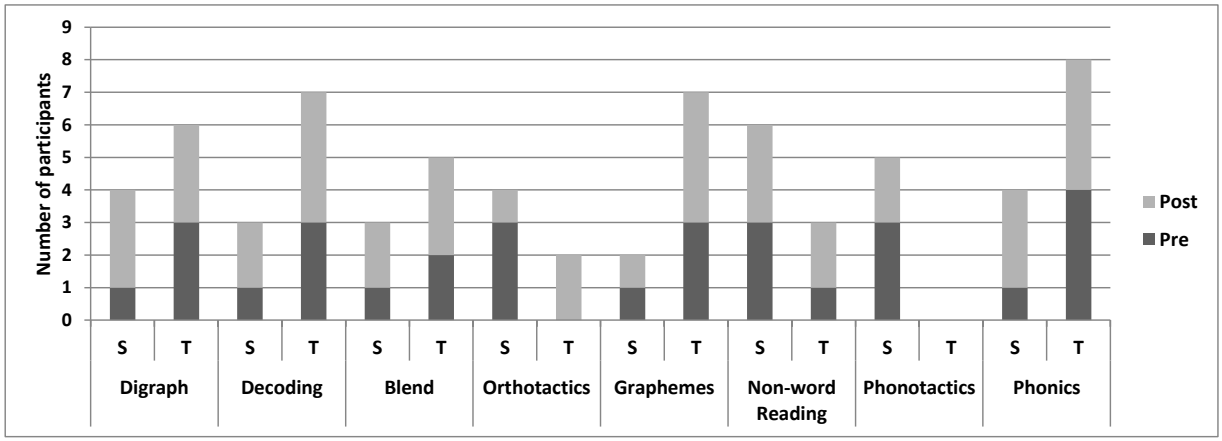


Figure 13. Number of participants who correctly answered speech to print concepts before and after the placements. *Note.* S= student SLTs. T=student teachers.

5.3.3 Change in perceptions of appropriate co-working models

Shared roles in language and literacy instruction. Responses on questionnaires indicated that more student SLTs and student teachers at post placement selected a shared role between teachers and SLTs in supporting children's speech production. Most student SLTs saw an equally shared role in phonological awareness instruction before and after the placement. In contrast, most student teachers saw the teacher as having the primary responsibility in

phonological awareness instruction. Following the IPE, most participants did not change in their view that teachers are primarily responsible for reading and spelling instruction.

Classroom-based service delivery options. Student participants rated the appropriateness of two methods of direct classroom-based work by the SLT including team teaching (i.e., SLT and teacher teaching a lesson together) or alternative teaching (i.e., one professional provides instruction which the other professional later adapts for a group of students who require extra assistance.) At the end of the placement, six out of the eight student participants chose a higher frequency for team teaching or alternative teaching (Table 10).

Table 10. Perceptions about appropriate frequency of usage for co-teaching approaches among teachers and SLTs.

	Student SLTs				Student teachers			
	S1	S2	S3	S4	T1	T2	T3	T4
Alternative Teaching								
Always								t1
Often	t1, t2	t2	t2	t2	t2			t2
Sometimes				t1	t1	t2	t1, t2	
Rarely		t1	t1			t1		
Never								
Team Teaching								
Always								
Often	t1, t2			t2	t2		t2	t1
Sometimes		t1, t2		t1	t1		t1	t2
Rarely			t2			t1, t2		
Never			t1					

Note. t1=before the placement. t2=after the placement.

5.3.4 Influence of the instructional design

Interview analysis was again utilised to explore students' perceptions of how the instructional design of the IPE influenced their learning. Derived themes were interpreted within D'amour and Oandasan's conceptual framework of IPE (described in Chapter 1) which identifies various aspects of instructional design (i.e., teaching-related factors) which could influence

the effectiveness of IPE (D'Amour & Oandasan, 2005). Three main themes emerged from this analysis highlighting teaching-related factors that were influential on participants' learning. These factors included the classroom structure and programme (i.e., the learning environment), the supervising classroom teacher and the placement workload and expectations. These various themes are discussed in further detail as follows.

Theme 1: Classroom programme (i.e., the learning environment)

Several of the challenges students reported in their co-working related to the classroom programme. For instance, Dyad 1 and 4 spoke about the challenge of scheduling time for co-instruction in their classroom which had a full programme that often included events that took children out of the classroom. Participants also talked about challenges posed by the number of children and teachers in the classroom and how those children were allocated to teachers for small group instruction. In particular, students who were placed in classrooms in which there were two co-teachers and large class sizes (i.e., Dyad 3 and 4) reported logistical challenges related to having several other professionals to co-work with including other student teachers and multiple classroom teachers.

Theme 2: Supervising classroom teacher(s)

T1, T2 and T4 spoke about their awareness that they were temporary visitors in their supervising teacher's classroom; they therefore felt they had limited scope to change the classroom programme or structure while they were on full management. For instance, one participant commented:

> *I made some changes but I'm aware this is not my classroom and that I'm here for a very limited time. You don't want to make it hard for your [supervising teacher] when they [resume instruction]. (T2)*

T2 and T3 spoke about receiving support from their classroom teacher to alter some aspect of the classroom programme to accommodate instruction on the shared goal areas. T4, however, did not attempt to alter any aspect of the classroom programme or structure as she was concerned that her supervising teacher would not support changes to accommodate goal work for the target children.

Theme 3: Placement workload and expectations

Student teachers often referred to the pressures of managing instruction for a whole class and how this limited the amount of time they could allocate to collaborating with the student SLT and/or providing direct instruction to the targeted children. This may have affected how student SLTs interacted with their student teacher partners. For example, S4 spoke about not wanting to request too much of her student colleague given her concern about meeting the requirements of the teaching placement.

Student SLTs reported less concerns about the workload demands of the placement. The main concern over the student SLTs' workload arose from Dyad 4 who were assigned four children to co-instruct. They described that the time spent by S4 on assessment delayed the implementation of instruction of the shared goals. Furthermore, S1 and S4 reported that lack of previous practical experience with speech or phonological awareness limited their collaboration as they were not yet secure enough in their own knowledge and skill.

5.4 Discussion

The study described in this chapter evaluated placement-based IPE in which student SLTs and student teachers planned and delivered classroom instruction to support children's speech and phonological awareness development. The aim of the study was to understand how participants developed readiness for collaboration throughout the inter-professional experience.

The first three research questions sought to gain an understanding of what aspects of collaborative competence was gained by the participants. Overall, there was evidence to suggest that student SLTs gained competency in their understanding of the roles and expertise of classroom teachers. Student SLTs described learning about teachers' instructional responsibilities and pre-post questionnaire results suggested improved understanding of terminology related to classroom instruction. Additionally, student SLTs and student teachers appeared to develop communication skills to support shared decision making. They described lessons learned for future practice based on the challenges they encountered in maintaining effective communication and negotiating differences in practice. They, however, may have required additional support to overcome these challenges during their co-instruction.

In health-based applications, it has been recommended that knowledge of inter-professional roles alongside inter-professional communication skills should be the primary learning outcomes targeted by IPE (Suter et al., 2009). The current approach to IPE thus appeared effective for student SLTs but may require modification to more fully benefit student teachers. Interview and questionnaire analyses suggested student teachers were less likely to develop enhanced understandings of roles or terminology related to SLTs' expertise. The narrow focus on co-instructing a small set of goals likely limited the students' exploration of topics beyond the goal areas. Incorporating opportunities for student teachers to observe student SLTs in other roles (e.g., conducting language-literacy assessments) may have facilitated further shared understandings of professional roles and expertise. Student SLTs also appeared to be developing their own expertise as suggested by their pre-questionnaire scores on examined linguistic concepts and reported feelings of insecurity in their own knowledge. This may have limited the exchange of knowledge to their student teacher counterparts. It was notable that the two student SLTs who commented on their

limited relevant experience did not improve in their understanding of the tested concepts. This raises the concern that a placement focused on collaborative practice may distract from the development of student professionals' own expertise. An inter-professional placement may be most suitable for students who possess previous practical experience working with children with speech and language difficulties.

Participants from both professions also appeared to be developing inter-dependency. This refers to a reliance on working closely with other professionals to accomplish goals and is an essential element underpinning collaboration (Bronstein, 2003). This was evidenced by students' increased acceptance of classroom-based co-working, observations of the benefits of classroom-based co-work, and engagement in coaching each other to improve instruction. These positive experiences with classroom-based co-working may increase the chances of these students employing such approaches in their future work (Brandel & Loeb, 2011). There was some indication, however, that students' previous knowledge of existing practices of SLTs and teachers may already be limiting their readiness to attempt innovative co-working practices as new graduates. Addressing these concerns through reflection with a facilitator may help participants further appreciate the relevance of their placement experiences to real practice contexts.

Unfortunately, the shared placement experiences were insufficient to develop students' inter-dependency in reading and spelling instruction. After the placement experience, participants still viewed SLTs as playing a limited role in literacy instruction. Interestingly, students appeared to become more inter-dependent in their roles in speech production despite dyads being asked to work on speech and literacy-related goals. Previous research in IPE has highlighted the need to be aware of unplanned or covert learning, particularly when it may contradict the desired learning outcomes (Freeth et al., 2005). Perhaps directing the participants to work on speech goals reinforced the stereotype that

SLTs primarily work on articulation. This could undermine their appreciation of SLTs' role in supporting the language skills which underpin literacy acquisition.

Interview analysis also revealed role flexibility as evidenced though participants' integration of their shared instruction into the classroom programme by including children beyond those identified as having specific difficulties. This aligns with inclusive practice as it prevents children from being singled out as different. Furthermore, this provides opportunity for peer modelling as an instructional strategy (Ehren, 2000). The benefits of such co-working could also be extended to other children as typically developing children also benefit from explicit instruction of language skills which underpin literacy acquisition (Carson et al., 2013). Thus, preparing teacher and SLT graduates to demonstrate flexibility in instructional roles should be considered as a potential learning objective for future placement-based IPE.

The fourth research question asked what instructional factors influenced the participants' development of collaborative competencies. Participants identified classroom teachers as influential on their ability to explore collaborative practice. This suggests that supervising classroom teachers should have been included as more active facilitators of the IPE to maximise participants' inter-professional learning. Furthermore, it is recommended that IPE facilitators have previous experience and knowledge of inter-professional working (Freeth et al., 2005). Thus, SLT and teacher supervisors should receive inter-professional education to ensure they are both providing role-modelling and/or feedback that is aligned with effective collaborative practice. Students also described how classroom settings and workload demands posed challenges to their co-working. Dyad 4, in particular, encountered several challenges which likely contributed to their engagement in fewer aspects of collaborative practice (e.g., coaching each other, role flexibility) relative to the other dyads. Consequently, facilitators should carefully consider the classroom structure and workload

demands (e.g., number of children assigned for co-instruction) when designing shared placement experiences to ensure that students are not overwhelmed by the complexity of task.

5.4.1 Limitations and future directions

This exploratory study highlighted the potential competencies that could be fostered in shared placement experiences among prospective SLTs and teachers. These included understanding of professional roles and expertise, communication skills to support shared decision making, inter-dependency to achieve goals and flexibility to explore alternative instructional practices. While the case study design and sampling methods limit the generalisability of the results, this study is an important initial step in understanding the constructs of collaborative practice that could be developed in a case-oriented approach to placement-based IPE. The findings can also inform the development of comprehensive and objective forms of evaluation required for more rigorous forms of intervention research. Long term evaluations would also be valuable to explore whether participants demonstrate advantages in future professional practice placements or in initial years of work. Finally, investigation into how children's learning is influenced by student professionals' co-working is required to advance understanding of the impact of placement-based IPE on all stakeholders. The next chapter thus explores the effects of the IPE on target children's speech and phonological awareness.

CHAPTER 6

IMPACT OF A PLACEMENT-BASED APPROACH TO INTER-PROFESSIONAL EDUCATION: CHILD OUTCOMES

6.1 Introduction

Little is known about the impact of placement-based IPE on client/child outcomes. As highlighted in the literature review (Chapter 1), placement IPE for student teachers and student SLTs has not been previously examined. Further, two recent systematic reviews of health-based IPE revealed only one study of placement IPE that included outcomes related to the clients or patients who are involved in IPE (Olson & Bialocerkowski, 2014; Reeves et al., 2013). Consequently, researchers should seek to investigate whether IPE promotes collaborative practice that positively influences child/client outcomes.

For instance, Janson et al. (2009) employed a controlled research design to provide preliminary evidence that mixed-discipline teams of student health professionals can learn to co-work to advance some aspects of health-care provision. Inter-professional teams of student professionals were given responsibility to collaboratively provide care for clients with chronic illness. They were supported in their co-work through participation in additional shared training sessions related to management of chronic illness. Measurements of the frequency of care provided by the students and medical status of the students' clients were conducted before and after the IPE. Comparisons were made to a control group which received the 'usual care' provided by only medical students. Overall, clients from the experimental group received more frequent care; however, the overall health of the clients from the experimental group did not

improve beyond those in the control group. While the results demonstrated patient care was not compromised by the IPE, it remains unknown whether student professionals can learn to work effectively to advance client outcomes. Continued examination of the influence of placement IPE on client outcomes is required to provide robust evidence that these initiatives foster prospective practitioners' ability to engage in effective collaborative practice (Reeves et al., 2013).

This study investigated whether child outcomes could be advanced though an IPE approach in which student SLTs and student teachers were given responsibility to plan and implement classroom-based speech and phonological awareness instruction. A combined speech and phonological awareness focus is consistent with previous studies that have demonstrated the efficacy of integrated phonological awareness approaches in stimulating the early literacy skills and speech of children with SLI (Gillon, 2000, 2002, 2005). For instance, Gillon (2005) examined the impact of an integrated phonological awareness approach for 3- and 4-year old children (n=12) with moderate or severe speech impairment. The intervention consisted of activities designed to facilitate children's phoneme awareness and letter-sound knowledge. Children also participated in activities to practice articulating words containing specific speech targets. An integrated approach was adopted by incorporating speech production target words into phoneme awareness and letter-sound activities. Children participated in an average of 25.5 sessions before school entry which were delivered in 4-6 week blocks of therapy with one individual and one group session provided per week. Examination of speech ability within the first 2 years of school revealed that children who received the integrated intervention possessed similar speech production skills as a matched control group of children with a similar history of speech impairment but who received pre-school intervention focused solely on speech production. Improvement in speech production thus did not appear to be compromised by the

inclusion of a phonological awareness component into therapy sessions. The children who received the integrated intervention, however, demonstrated advantage in phonological awareness and early reading and spelling ability relative to the control children. Other studies have also demonstrated the positive influence of integrated phonological awareness interventions on the speech and early literacy skills of children who experience spoken and written language difficulties related to Childhood Apraxia of Speech (McNeill et al., 2009) and Down Syndrome (van Bysterveldt, Gillon, & Foster-Cohen, 2010). Integrated phonological awareness instruction thus offers an appropriate instructional approach in which to encourage student SLTs and student teachers to adopt into their co-instruction during placement IPE.

The findings presented in Chapter 5 suggested that most student dyads developed several aspects of competency related to collaborative provision of classroom-based language and literacy instruction. The current study aimed to extend these findings by examining whether students' engagement in elements of collaborative co-working (as described in Chapter 5) was also accompanied by positive gains in children's speech and literacy outcomes. Investigation of students' instructional logs was first undertaken to further establish which student dyads engaged in collaborative practice. Examination of children's speech, phoneme and early literacy outcomes were then examined to determine whether collaborative co-working was also associated with advancing children's speech and early literacy outcomes.

This study addresses the fourth research question within the thesis as identified in Chapter 1, including the sub-questions which are listed below:

a) How did each student partner contribute to the direct instruction portion of their classroom-based co-working for each target child?

b) Did the student professionals' co-instruction improve targeted children's speech error patterns in trained and untrained words?
c) Did the student professionals' co-instruction increase the targeted children's phonological awareness of trained and untrained words?
d) Did the targeted children's spontaneous single word speech production, letter-sound knowledge, non-word reading and spelling ability improve over the course of the student professionals' co-instruction?

6.2 Method

6.2.1 Research design

This study adopted a multiple single-subject design with repeated measures to examine the impact of the classroom-based intervention on children's speech and early literacy skills. An A-B design (baseline phase followed by an instructional phase) was employed for each child's instructional goals. Given the small sample size of children (n=7), single subject design with repeated measures was utilised to allow each participant to serve as their own control. Single subject design is a robust form of intervention research particularly suitable for classroom-based research in which large, controlled group studies are often not feasible (Vance & Clegg, 2012).

6.2.2 Participants

Seven New Zealand children between the ages of 5;1 and 5;9 participated in the study. All children were in their first year of formal education. All children had received a minimum of 4 weeks of schooling at the beginning of the study given that New Zealand children begin formal education on their fifth birthday. These children were selected from the four junior school classrooms in which pairs of student SLTs (n=4) and student teachers (n=4) were assigned for

their professional practice placements as described in Chapter 5 (referred to as Dyad 1 through 4). Recruitment procedures for student professionals and characteristics of these participants are detailed in Chapter 5. Child participants were selected for participation based on nominations by their classroom teachers. Criteria for nomination included:

a) the classroom teacher was concerned about the child's speech, language or literacy development;

b) the child did not possess any visual, hearing or neurological disorders; and

c) the child was not receiving any formal speech and language services through any other agency.

Classroom teachers distributed consent forms to parents of these children to receive permission for the children to participate in the study. Seven of the nine children nominated for the study received parental consent. These children then participated in a comprehensive assessment of their speech, language and literacy skills. All assessments were conducted and audio-recorded by the participating student SLTs who would be later co-working with their student teacher partners to provide classroom-based instruction to support the target children. Assessments were conducted under the supervision of the researcher who is a qualified SLT. The researcher also reviewed all record forms and audio files to ensure correct documentation, transcription and scoring of assessment data. The battery included the following assessments:

- Peabody Picture Vocabulary Test – 4 (PPVT-4; Dunn & Dunn, 2007) was used to measure children's receptive vocabulary. Children were presented with four pictures and asked to point to the item named by the examiner. A standard score was calculated from

this assessment. A standard score of 85 or greater represents age-appropriate performance.

- Subtests of the Clinical Evaluation of Language Fundamentals – Fourth Edition - Australian (CELF-4, Semel, Wiig, & Secord, 2006) were used to measure children's receptive and expressive language skills. Children completed the Sentence Structure subtest to measure their understanding of sentence structures. Children also completed the Word Structure and Recalling Sentences subtests to measure their expressive morpho-syntactic skills. Standard scores for each subtest were calculated. A standard score of 7 or greater represents age-appropriate performance.
- The New Zealand Articulation Test (NZAT; Moyle, 2004) was used as a measure of children's speech production. Spontaneous production of 111 single words were elicited by asking children to name pictures of objects. The test measures production of single consonants, initial consonant blends, vowels and multi-syllabic words. All responses were recording using broad transcription. Percent phonemes correct (PPC) was obtained by analyzing data with Profile of Phonology (PROPH) software (Long & Fey, 2005). A PPC score of 90% or greater was considered age-appropriate performance (Shriberg, Austin, Lewis, McSweeny, & Wilson, 1997).
- The Preschool and Primary Inventory of Phonological Awareness (PIPA; Dodd, Crosbie, MacIntosh, Teitzel, & Ozanne, 2000) was used to measure children's phonological awareness and sound-letter knowledge. Children completed the rhyme awareness, alliteration awareness, phoneme identity, phoneme segmentation and letter-sound knowledge subtests. A standard score was calculated for each subtest. A standard score of 7 or greater is considered age-appropriate performance. Raw scores were also reported

for the letter-sound knowledge subtest to indicate how many of the 32 items (including letters, digraphs, blends and vowels) children could associate with correct sounds.

- Burt Word Reading Task – New Zealand Revision (Gilmore, Croft, & Reid, 1981) was used to measure children's word recognition skills. Children were asked to read aloud increasingly difficult real words until they made 10 consecutive errors. Raw scores were reported given that normative data is only available for children 6-to-13 years of age.
- An informal non-word reading task (adapted from Calder, 1992) was used to measure children's decoding skills. This test requires children to read aloud sets of 10 non-words with each set possessing different orthographic patterns. Given that children were in early stages of reading development, they were asked to read only one set of non-words with simple orthography (i.e., CVC words with short vowels). Children's responses were recorded using broad transcription. Percentage of phonemes correctly read was calculated. For example, a score of 1 out of 3 would allocated if a child read 'sep' as 'sat'.
- An informal real-word spelling task (Gillon, 2002) was used to measure children's spelling skills. Children were asked to spell 10 words (ranging from one-to-three syllables) to assess their ability to use phonological information when spelling words. Accordingly, percentage of phonemes that were spelled in a phonetically plausible manner was calculated. For example, alternative spellings of a phoneme (e.g., c versus s) or use of single vowel letters to spell a long vowel sound (e.g., 'cak' for 'cake') were scored as correct. Phonemes had to be spelled in the correct sequence to be scored as correct (e.g., 'fsht' for 'fish' would only receive credit for spelling of the first phoneme).

Uppercase letters and obvious printing reversals (e.g., for letters such as f, g, s, h, c and q) were accepted as correct.

Table 11 describes the speech, language and literacy skills of the participating children. All children demonstrated difficulty in at least one domains so their participation in the study was continued.

Table 11. Speech, language and literacy skills of child participants before joint instruction.

	C1	C2	C3	C4	C5	C6	C7
Age	5;1	5;2	5;1	5;9	5;9	5;8	5;6
Sex	male	female	female	male	male	male	male
Dyad	1	2	3	4	4	4	4
Rec Lang:							
PPVT -4	109	104	112	99	105	84*	77*
CELF-4: SS	8	10	9	6*	10	4*	na
Exp Lang:							
CELF-4:WS	4*	9	10	5*	6*	6*	5*
CELF-4: RS	4*	10	13	na	10	3*	na
NZAT (PPC)	72.2*	92.2	75.1*	60.8*	59.9*	82.6*	87.8*
PIPA:							
RA	9	9	6*	6*	9	7	6*
AA	6*	6*	10	8	7	5*	5*
PI	7	10	12	9	<5*	<5*	9
PS	7	7	7	7	7	7	7
LK	5*	4*	4*	<5*	5*	<5*	<5*
LK(Raw/32)	5	0	2	7	13	6	10
Burt (Raw)	1	0	1	5	6	3	4
NWR (PPC)	0 %	3.3%	0%	na	13.3%	0%	0%
Spelling**	0%	5.1%	18.0%	na	18.2%	0%	0%

Notes. All test scores are standard scores unless otherwise specified. C=child. Rec Lang= Receptive language. SS=Sentence Structure subtest. Exp Lang=Expressive Language. WS= Word Structure subtest. RS= Recalling Sentences subtest. RA=Rhyme Awareness subtest. AA=Alliteration Awareness Subtest. PI=Phoneme Isolation subtest. PS=Phoneme Segmentation subtest. LK=Letter-sound knowledge subtest. Raw=raw score. Burt=Burt Word Reading task. NWR=non-word reading task. PPC=percent phonemes correct. na= not available due to child refusing to participate. * Indicates that the child's score was below the expected range on normed measures (i.e., PPVT, CELF, NZAT, PIPA), **Scores reported as percent phonemes spelled in a phonetically plausible manner.

6.2.3 Procedure

Selection of instructional goals. The researcher selected phonological awareness as an area for targeted instruction for all participating children as all evidenced some degree of difficulty with phonological awareness tasks and/or sound-letter knowledge based on results of the initial assessment battery. All participants scored below the expected range on at least one phonological awareness subtest of the PIPA. Furthermore, all participants appeared to have limited sound-letter knowledge as evidenced by standard scores of five or lower on the sound-letter knowledge subtest of the PIPA. Student dyads were encouraged by the lead researcher to work on multiple phoneme level skills including phoneme identity, segmenting and blending based on research which suggests working on a range of phoneme levels tasks is an effective and efficient approach to phonological awareness instruction (Carson et al., 2013; Gillon, 2000; McNeill et al., 2009; Torgesen, Morgan, & Davis, 1992).

Speech production goals were also selected by the researcher for the children who also demonstrated difficulty with speech production. All children with the exception of C2 evidenced speech difficulty according to criterion of a PPC score equal to or greater than 90% as age-appropriate performance. Further, the frequency of phonological process occurrence was calculated as part of the PROPH analysis. A phonological process occurrence of 40% or greater was considered an appropriate target for intervention (Hodson, 2006). Children were also required to be stimulable for the target sound(s) and the target sound(s) had to be developmentally appropriate. A summary of the speech production goals for each child is presented in Table 12. C6 and C7 did not demonstrate any phonological processes over 40% therefore their most frequent speech error pattern was chosen as a target. Only one speech goal was set per child given the short duration of the instructional period (i.e., three weeks). Both

speech production and phoneme awareness goals were selected for these children based on research which suggests that integrated instruction of these skills supports both speech and word reading/spelling development (Gillon, 2000, 2002, 2005; McNeill et al., 2009).

Although five of the children (C1, C4, C5, C6 and C7) also demonstrated language difficulties based on norm-referenced language testing, phonological awareness and/or speech production goals were selected for all children to make measurement of treatment goals and supervision of student SLTs more feasible. Further, the short intervention period necessitated focus on a limited number of instructional goals. Similarity in treatment goals also facilitated comparison among the experiences of student SLT/teacher dyads and the learning outcomes of the children they jointly instructed.

Table 12. Target speech error patterns proposed for joint instruction to the target children.

Participant		Speech target	%usage
Dyad 1:	C1	palatal fronting	50
Dyad 2:	C2	na	na
Dyad 3:	C3	velar fronting	67
Dyad 4:	C4	s-cluster reduction	50
	C5	s-cluster reduction	74
	C6	l-cluster simplification	30
	C7	l-cluster reduction	28

Notes. na=not applicable as child demonstrated age-appropriate speech production.

Probes for repeated measures. Repeated administration of probes for phonological awareness and speech production were conducted before the joint instruction phase to establish a stable baseline of the children's performance on their instructional goals. Baseline probes were administered three times for each child during the week prior to joint instruction. Probes were then re-administered three times over the course of the joint instructional period (i.e., 3 weeks)

and then an additional two times post-instruction. Post-instruction probes were administered after a 2-week school holiday.

Probes were developed based on protocols described by McNeill et al. (2009). The phonological awareness probe required children to segment 15 words into phonemes. Words were two-to-four phonemes in length and had CV, CVC or CCVC phonological structures. The same set of 15 words was employed with all seven participants. Ten of these words were selected to be included in instructional activities for all children (i.e., trained items) and five were selected to be avoided during instruction (i.e., untrained items). Speech production probes required children to name 10 pictures of items which contained the children's speech target. Five words were selected as trained words and five as untrained words. For all probes, untrained items were selected to have similar phonological structure to trained items to provide a measure of generalisation. For example, C1's trained speech items contained five CVC words with the target sound in the initial and final positions for three and two of the words, respectively (e.g., ship, shirt, shark, fish, wish). Accordingly, the child's untrained items consisted of five different CVC words with the target sound in the initial and final positions for three and two of the words, respectively (e.g., sheet, shop, shed, push, dish). Appendix F provides further examples of speech and phoneme awareness probe items.

Speech and phoneme segmentation probes were administered and scored by the student SLTs under the supervision of the researcher. Children's responses were recorded using broad transcription. Again, all record forms and audio files were reviewed by the researcher to ensure correct transcription and scoring of probe data. The percentage of phonemes correctly segmented (PPC) was calculated for trained and untrained items on the phoneme segmentation probes. For example, a score of 1 out of 3 would be awarded if a child segmented 'sun' as /s/ /t/. This metric

was chosen as it provided a more sensitive measure of phoneme segmentation ability compared to marking responses as correct versus incorrect. The percentage of phonemes correctly produced (i.e., PPC) was also calculated for trained and untrained items on speech probes.

Additional post-instructional measures. Several of the measures administered prior to the joint instruction were re-administered post-instruction to examine generalisation to decoding/spelling skills and speech production of both treated and untreated sounds. Re-administered measures included the letter-sound subtest of the PIPA (Dodd et al., 2000), the non-word reading task, the real-word spelling task and the NZAT (Moyle, 2004). All measures were administered and scored by the student SLTs under the supervision of the researcher. Recording and scoring of all data was reviewed and corrected by the researcher using audio files recorded by the student SLTs. A summary of the pre-post assessments, probe assessments and timing of the IPE intervention is illustrated in Figure 14.

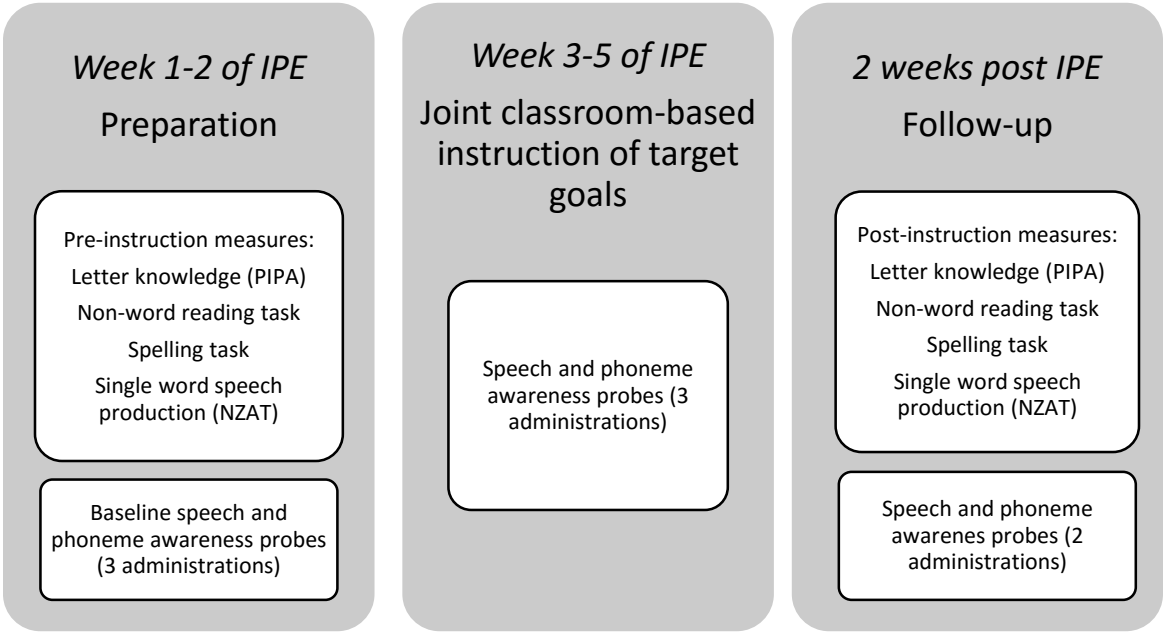


Figure 14. Summary of procedure including timing of pre-post measures and probe administration.

Joint Classroom-Based Instruction. Student SLTs and student teacher dyads engaged in joint instruction of the goal areas for the target children as part of the 5-week placement IPE (as described in detail in Chapter 5). The following information provides a review of the IPE structure. Student SLTs conducted the speech, language and literacy battery assessments over the first 2 weeks of the IPE and were introduced to their student teacher partners and the supervising classroom teachers. During this period, student teachers prepared for assuming full responsibility of classroom instruction. Upon completion and analysis of the assessment batteries, each student dyad along with the supervising classroom teacher and the researcher met to discuss the assessment results and the proposed speech and phonological awareness goals for the target children. Student professionals were then asked to work together to provide classroom-based instruction to the target children on the speech and phonological awareness goals during the final 3 weeks of the inter-professional placement. During this period, student teachers worked in the classroom for the whole day and student SLTs joined the classroom in the mornings to conduct their classroom-based activities. The only specific guidance provided to the student partners about their co-working was that all instruction on the target goal areas had to be situated within the classroom. The researcher provided supervisory support only to the student SLTs while the classroom teachers maintained a supervisory role for the student teachers. The researcher provided feedback on the student SLTs' direct instruction through written feedback on lesson plans alongside written and verbal feedback after observation of student SLTs' instruction. Feedback focused on activity design to facilitate ample practice opportunities at an appropriate level of difficulty, provision of specific feedback to children, integrating speech and phonological awareness instruction, and documenting children's performance.

Student SLTs and student teachers were asked to provide lesson plans as well as log details of their direct instruction to the target children including what goals were worked on, the length of instruction and a brief description of their approach to instruction. Additionally, student SLTs were asked to provide all clinic notes kept as per their placement requirements. All four student SLTs returned their logs, lessons plans and clinic notes. All student teachers returned their logs; however, only one student teacher (from dyad 3) returned lesson plans.

Data analysis for repeated measures. The repeated measures results were analysed using the celeration line method as well as the two standard deviation (2SD) band method (Portney & Watkins, 2008). Both methods have been used previously to examine the impact of an integrated speech and phonological awareness intervention for school-age children (Moriarty & Gillon, 2006). A celeration line is a calculation of the linear trend in a series of continuous data. The celeration line of baseline data was calculated and graphed across baseline, instruction and post-instruction phases to determine whether post-instruction scores were greater than those predicted by the linear trend of baseline data. The 2SD band method refers to use of variability in the data of the baseline phase to calculate the degree of change required to be statistically significant in the instruction phase. This involves graphing two standard deviations of the baseline data above and below the mean of the baseline data. Any change in the instruction phase is considered significant if at least two consecutive data points fall outside the band of area denoted by the 2SD values (Portney & Watkins, 2008). Finally, effect size analyses have been recommended for generalisation data collected in single-subject designs for treatment of children with phonological disorders (Gierut, Morrisette, & Dickinson, 2015). An effect size analysis using a standard mean difference calculation based on that described by Apel and Masterson (2001) was

thus employed to determine the magnitude of children's improvement on repeated measures of 'untrained' items after the joint instruction.

6.2.4 Reliability

Assessment data. Pre- and post-instruction speech data was re-transcribed by an independent SLT colleague on two participants' data (i.e., nearly 30% of the participants). Reliability was calculated based on the percentage of phonemes that were transcribed identically. Mean inter-rater agreement was 90.9% with a range of 86.9% to 95.9%.

Repeated measures probes. Approximately 20% of the data was randomly selected to be re-transcribed by an independent SLT colleague. Reliability for phoneme segmentation probes was based on percent agreement on whether each phoneme of a word was correctly or incorrectly segmented. Mean inter-rater agreement of phoneme awareness probes was 92.2% for the baseline phase, 93.8% for the instruction phase and 91.9% for the post-instruction phase. Reliability for speech probes was calculated based on the percentage of phonemes transcribed identically. Mean inter-rater agreement of speech probes was 85.7% for the baseline phase, 92.3% for the instruction phase and 90.8% for the post-instruction phase.

Non-word reading task. An independent SLT colleague re-transcribed two participants' oral reading of the set of 10 non-words (nearly 30% of participants). Reliability was calculated based on the percentage of phonemes transcribed identically. Mean inter-rater agreement was 90.0% with a range of 79.3% to 100%.

Real-word spelling task. An independent SLT colleague scored the responses of three children (i.e., approximately 40% of the participants). Reliability was based on percent agreement on

whether each phoneme of the 10 words were spelled in a phonetically plausible manner. Mean inter-rater agreement was 95.3% with a range of 89.7% to 100%.

6.2.5 Instructional fidelity

Student professionals' logs of their direct instruction alongside their lesson plans and student SLTs' clinic notes were reviewed by the lead researcher to ensure that student professionals:

a) incorporated the selected speech target and multiple phoneme awareness skills (i.e., phoneme identity, segmenting, blending) into their joint instruction;

b) worked on words selected for training and excluded words selected to be 'untrained'; and

c) worked on goal areas for targeted children in the classroom environment.

All student dyads reported working on the appropriate speech target alongside multiple phoneme awareness tasks. Dyad 3 only incorporated three of the 10 words selected for training in phonological awareness instruction. This student dyad appeared to focus only on words which had their child's target speech error pattern for phonological awareness instruction. Consequently, only analysis of the untrained words (12 in total) was undertaken for repeated measures of phonological awareness for their target child (i.e., C3). All student dyads also reported incorporating words outside of those given by the researcher. This was noted in particular by student teachers (from Dyads 1, 2 and 4) who reported reinforcing goals areas on an ad hoc basis as they came up in regular classroom activities throughout the school day. Consequently, it is possible that some 'untrained' words may have been employed as student professionals did not document all words used during all direct acts of instruction. Review of documentation also revealed that adherence to classroom-based instruction was 90.6% for

student SLTs' total reported activities and 100% for student teachers' total reported activities on targeted goal areas.

6.3 Results

6.3.1 Student professionals' contributions to direct instruction

Table 13 describes each student professionals' reported roles in direct instruction of targeted goal areas including the mode of instruction (e.g., class versus group versus individual), the approximate length of instructional activities and the frequency of instruction. The total amount of time spent on instruction of target goal areas could not be accurately calculated due to student professionals inconsistently indicating what portion of their instruction was allocated to speech production versus phonological awareness. Further, student teachers did not consistently report the amount of instructional time dedicated to project goals (see Table 13). Student teachers from Dyad 1, 2 and 4 also noted reinforcing the speech and phonological awareness goals in an informal basis throughout the school day. Therefore, children may have received more learning activity on target goal areas than that captured by student teachers' logs as summarised in Table 13.

Table 13. Documented instructional activities by student teacher and student SLT dyads on children's targeted goal areas.

	Mode(s) and approximate length of instruction		Total number of instructional activities completed
C1 (Dyad 1)	T1:	Leading class activities (one PA lesson co-taught with student SLT).[a]	10
	S1:	Supporting child during class and individual activities to integrate target goals into these activities. (30-45 minutes) One PA class lesson co-taught with the student teacher. [a] One withdrawal session. (35 minutes)	
C2 (Dyad 2)	T2:	Leading class lessons. (10-15 minutes each)	Min: 12[b]
	S2:	Leading small group lessons. (15-20 minutes each)	
C3 (Dyad 3)	T3:	Leading small group lessons. (10-30 minutes each)	10
	S3:	Leading small group lessons. (40-50 minutes each)	
C4 (Dyad 4)	T4:	Supporting child during reading or writing groups to integrate target goals into these activities. [a]	14
	S4:	Leading group lessons with only targeted children. (15 minutes each) One group withdrawal session. (15 minutes)	
C5 (Dyad 4)	T4:	Did not provide direct instruction.	8
	S4:	Leading group lessons with only targeted children. (15 minutes each) One group withdrawal session. (15 minutes)	
C6 (Dyad 4)	T4:	Did not provide direct instruction.	6
	S4:	Leading group lessons with only targeted children. (15 minutes each) One group withdrawal session. (15 minutes)	
C7 (Dyad 4)	T4:	Did not provide direct instruction.	6
	S4:	Leading group lessons with only targeted children. (15 minutes each) One group withdrawal session. (15 minutes)	

Notes. C=child. T=student teacher. S=student SLT. [a] Length of instruction not documented. [b]Incomplete documentation by student teacher made it difficult to ascertain the exact number of lessons she instructed.

6.3.2 Children's performance on repeated measures: speech production

Two of the six participating children who received speech production instruction improved on probes of their targeted speech error pattern (see Table 14). C3 (from dyad 3) and C4 (from dyad 4) improved on their trained and untrained speech probes. The graphs used to analyse C3's and C4's speech production of trained items are presented in Figures 15 and 16, respectively. The PPC and celeration line were plotted for each graph. The 2SD band was also plotted where applicable when variability in the baseline probes was greater than zero. C3 and C4's performances on untrained items demonstrated a similar pattern to their performance on trained items (see Table 14). The remaining four children who had speech production goals did not demonstrate significant improvement on trained or untrained speech targets. The graphs used to analyse the remainder of the children's speech production are presented in Appendix G.

Table 14. Summary of speech production results (PPC) for trained and untrained probes.

Participant		Baseline	Est 2SD	Est Cel	Post	Effect Size
C1:	Trained	75.6 (7.7)	60.2-91.0	>100	76.7 (4.7)	
	Untrained	66.7(8.3)	50.0-83.3	41.7-45.8	66.7(23.6)	0
C3:	Trained	66.7 (0)	na	66.7	100 (0)*	
	Untrained	66.7 (0)	na	66.7	100 (0)*	na
C4:	Trained	66.3 (5.8)	51.8-74.9	88.3-93.3	100 (0)*	
	Untrained	60.0 (0)	na	60.0	85.0 (7.1)*	na
C5:	Trained	78.3 (7.6)	63.1-93.6	33.3-40.8	77.7 (17.7)	
	Untrained	68.3(5.8)	56.8-79.9	68.3	75.0 (7.1)	1.15
C6:	Trained	70.0 (5.0)	60.0-80.0	40.0-45.0	75.0 (0)	
	Untrained	58.3 (2.9)	52.6-64.1	58.3	57.5 (3.5)	-0.29
C7:	Trained	93.3 (7.6)	78.1-100	>100	95.0 (0)	
	Untrained	86.7 (5.8)	75.1-98.2	86.7	92.5 (9.7)	1.01

Notes. Baseline and post scores represent the mean and standard deviation (in brackets) of the three baseline phase and two post-instruction phase measurements. Est 2SD = range estimated by the two standard deviation band method. Est cel = range estimated by the celeration line method. na= not able to be calculated due to the standard deviation of baseline phase being equal to zero. *Significant change (must be above both estimated ranges to be considered significant).

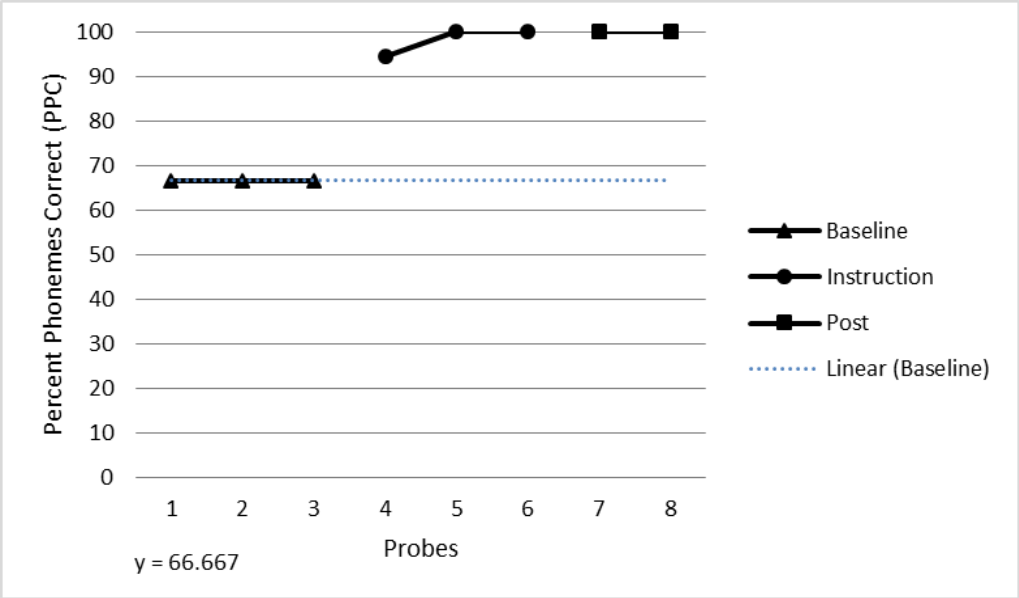


Figure 15. C3: Speech production probes of trained items before, during and after instruction. The celeration line is represented by the dashed line and its formula is presented in the bottom left portion of the graph.

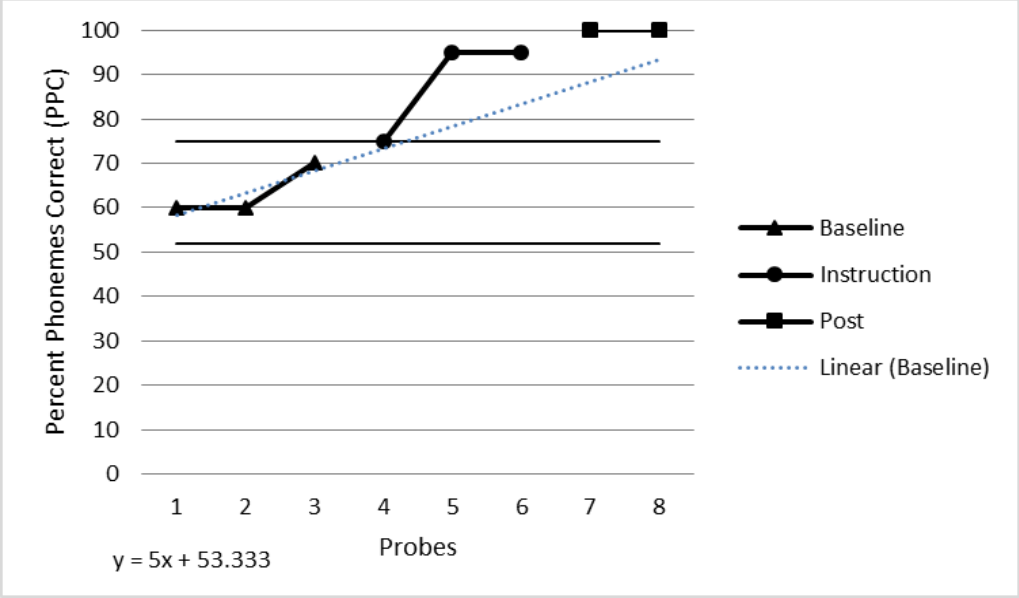


Figure 16. C4: Speech production probes of trained items before, during and after joint instruction. The horizontal lines represent 2SD above and below the mean of the baseline measures.

6.3.3 Children's performance on repeated measures: phonological awareness

Three (C1, C2, and C3) of the seven children who received direct instruction in phonological awareness demonstrated significantly improved performance on trained and/or untrained probes (see Table 15). C1 demonstrated an interesting pattern with improvement only evident in the post-instructional phase for both trained and untrained probes (see Figure 17 for example of this pattern). C2 improved on trained and untrained items as demonstrated in Figures 18 and 19, respectively. C3 improved on untrained probes of phoneme segmentation as illustrated in Figure 20 (trained probes were not included in the analysis given the limited number of words that were trained from the phonological awareness probe). The graphs used to analyse the remainder of the children's phonological awareness are presented in Appendix G.

Table 15. Summary of phoneme segmentation results (PPC) for trained and untrained probes.

Participant		Baseline	Est 2SD	Est Cel	Post	Effect Size
C1:	Trained	14.4 (3.8)	6.75-22.1	14.4	30.0 (9.4)*	
	Untrained	8.9 (10.1)	0-29.26	< 0	43.3 (14.1)*	3.38
C2:	Trained	28.9 (1.9)	25.0-32.7	28.9	90.0 (4.7)*	
	Untrained	35.6 (7.7)	20.2-51.0	35.6	86.7 (0)*	6.64
C3:	Trained	na	na	na	na	
	Untrained	42.3 (1.6)	39.2-45.5	42.3	62.2 (0)*	12.70
C4:	Trained	28.3 (2.4)	23.6-33.0	10.0-13.3	31.7 (2.4)	
	Untrained	30.0 (4.7)	20.6-39.4	60.0-66.7	36.7 (4.7)	1.41
C5:	Trained	25.6 (5.1)	15.4-35.7	42.2-45.6	36.7 (14.1)	
	Untrained	28.9 (10.2)	8.5-49.3	78.9-88.9	36.7 (14.1)	0.76
C6:	Trained	17.8 (8.4)	1.0-34.6	59.4-67.8	18.3 (11.8)	
	Untrained	22.2 (3.8)	14.5-29.9	38.9-42.2	33.3 (18.9)	2.89
C7:	Trained	16.7 (8.8)	0-34.31	23.3-25.0	13.3 (0)	
	Untrained	20.0 (6.7)	6.7-33.3	33.3-36.7	23.3 (4.7)	0.50

Notes. Baseline and post scores represent the mean and standard deviation (in brackets) of the three baseline phase and two post-instruction phase measurements. Est 2SD = range estimated by the two standard deviation band method. Est cel = range estimated by the celeration line method. na=data not available. *Significant change (must be above both estimated ranges to be considered significant).

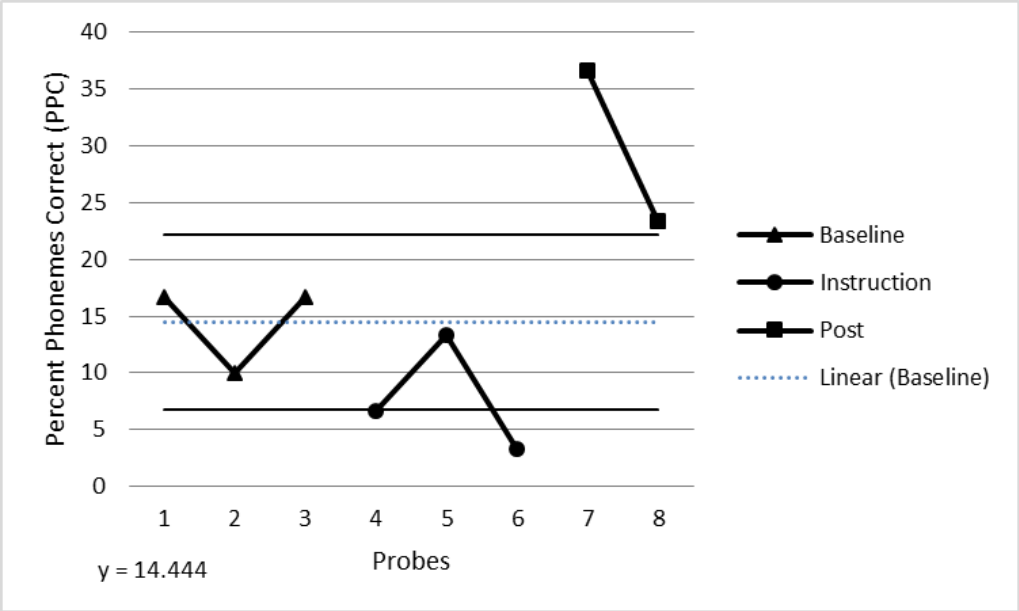


Figure 17. C1: Phoneme segmentation probes of trained items before, during and after joint instruction.

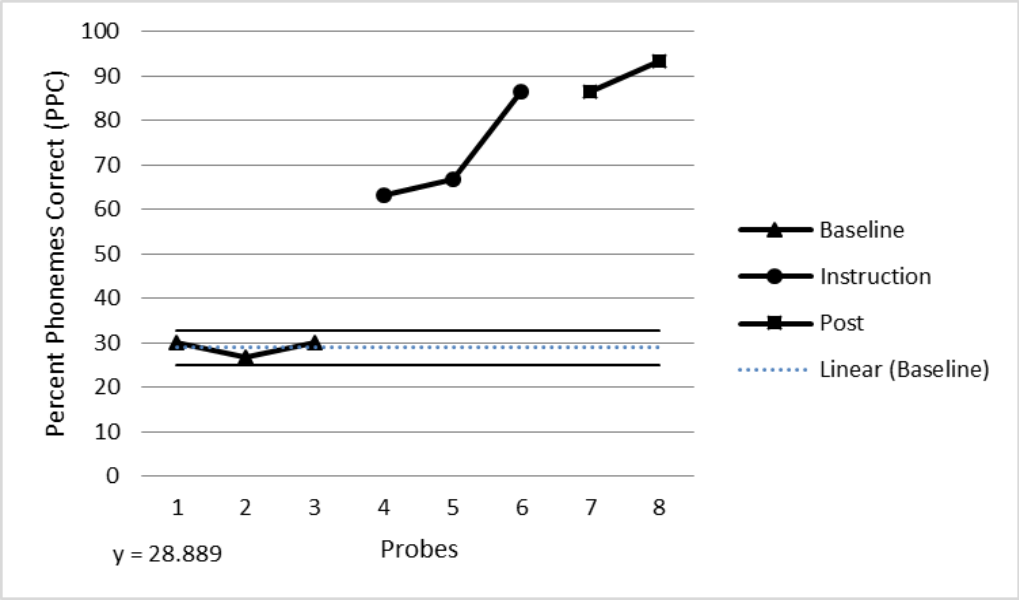


Figure 18. C2: Phoneme segmentation probes of trained items before, during and after joint instruction.

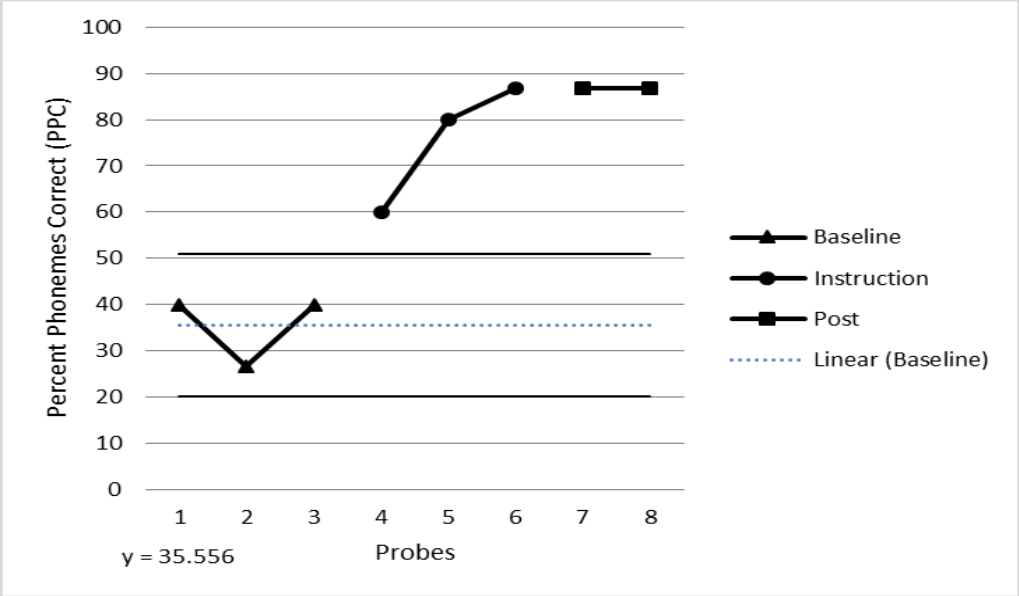


Figure 19. C2: Phoneme segmentation probes of untrained items before, during and after joint instruction.

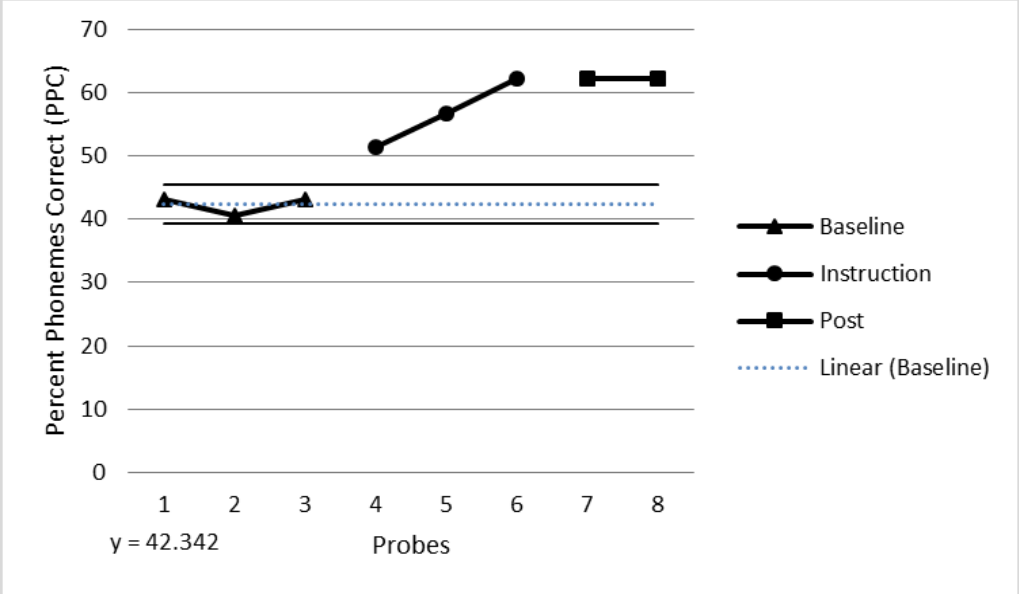


Figure 20. C3: Phoneme segmentation probes of untrained items before, during and after joint instruction.

6.3.4 Children's performance on pre-post speech and literacy measures

Figures 21-24 display the children's pre- and post-instruction performance on spontaneous single word speech production, letter-sound knowledge, non-word reading and spelling, respectively. Two children (i.e., C3 and C4) demonstrated improvement on their PPC scores. These were the only two children who also improved on speech probe items. The three children (i.e., C1, C2 and C3) who demonstrated improved phonological awareness also showed improved sound-letter knowledge and ability to spell words phonetically after joint instruction. C3 was the only child to also show marked growth on non-word reading. Improvement on select literacy measures was also noted for two of the four children (i.e., C4 and C5) who did not demonstrate significant improvement on their phonological awareness probes.

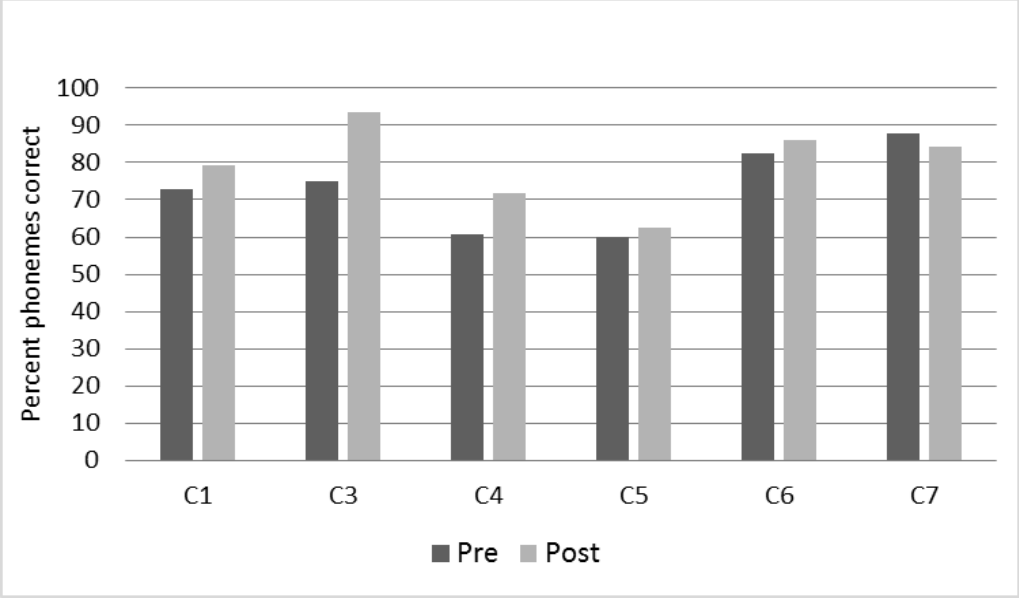


Figure 21. Individual children's improvement on single word speech production. *Note.* Measured as percent phonemes correct (PPC). No data is available for C2 as this child demonstrated age-appropriate speech ability.

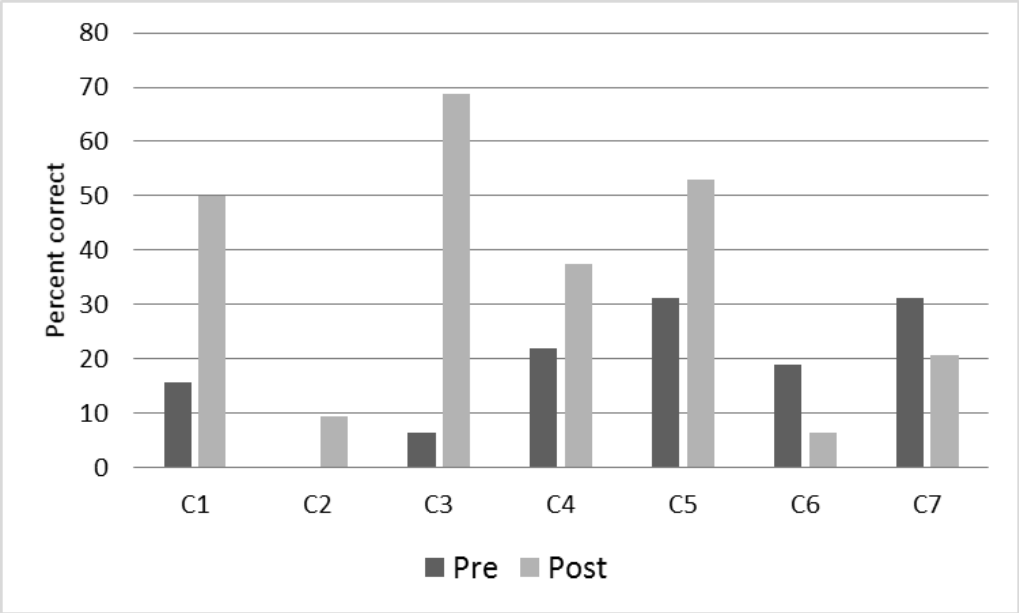


Figure 22. Individual children's improvement on letter-sound knowledge. *Note.* Measured as percent of letters with which children associated correct phonemes.

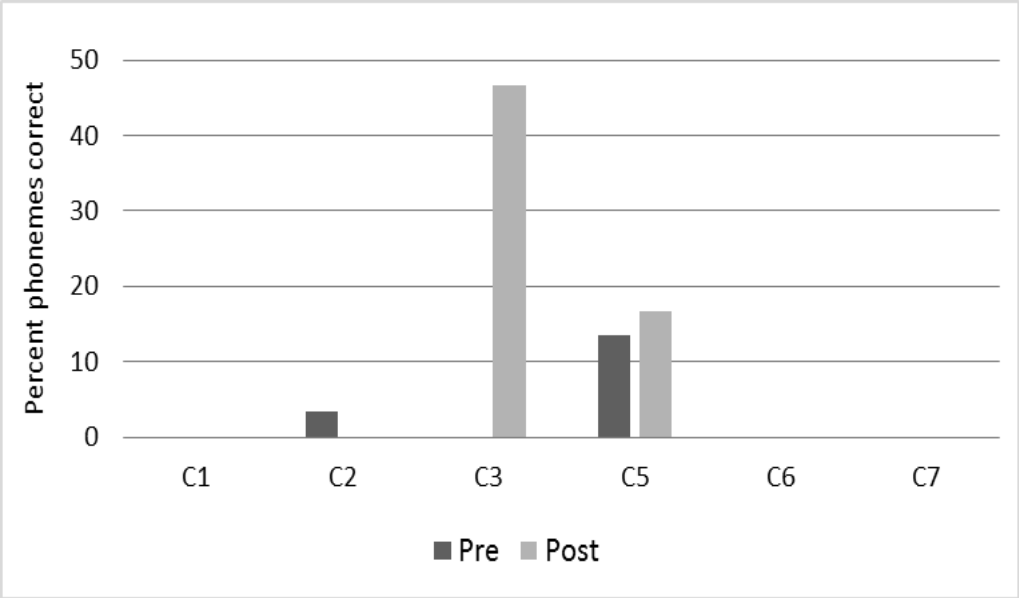


Figure 23. Individual children's improvement on non-word reading task. *Note.* Measured as percent phonemes decoded correctly. No data is available for C4 due to child refusing to participate in the task.

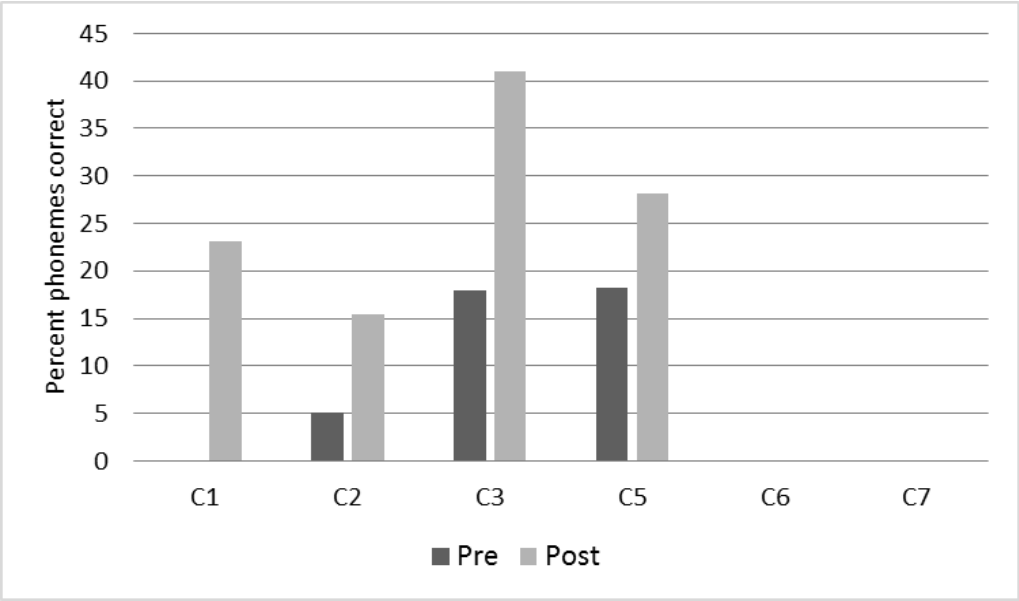


Figure 24. Individual children's improvement on the spelling task. *Note.* Measured as percent of phonemes spelled phonetically. No data is available for C4 due to child refusing to participate in the task.

6.4 Discussion

This study used a multiple single subject design to investigate whether pairs of student teachers and student SLTs could learn to work together to provide effective classroom-based collaboration. Four mixed-discipline pairs of student participants were asked to plan and deliver classroom-based instruction to a child or group of children. The instruction aimed to improve children's speech and/or phonological awareness. Seven children with speech and/or literacy difficulties received the co-instruction. Repeated measures of children's performance on speech and phonological awareness goals were conducted before, during and after the joint instruction. Children's spontaneous single word speech production, reading and spelling were also examined before and after the co-instruction.

The first research question asked how student professionals contributed to direct instruction of children's speech and phoneme awareness goals. Examination of instructional logs revealed that students delivered instructional activities with an intensity ranging from two-to-four contacts per week. Students thus appeared to have established sufficient instructional activity that could feasibly impact children's learning outcomes. Examination of students' instructional activities further suggested that C1-C3 received instruction (delivered by Dyads 1-3) that aligned with a co-teaching model. True co-teaching involves multiple professionals delivering direct instruction in a manner that enables specialised or differentiated instruction to be integrated into the classroom programme (Friend & Cook, 2003). Evidence of a co-teaching approach for C1-C3 included reports of both student professionals assuming an active role in delivering instruction and that instruction of targeted goal areas was integrated into the classroom programme to include peers beyond those with specific difficulties in speech and/or phoneme awareness. In contrast, only the student SLT (from Dyad 4) provided direct instruction to C5-C7. Both student professionals from Dyad 4 provided direct instruction for C4; however, there was little evidence to suggest that the instruction was integrated into the classroom programme by involving peers of mixed abilities into the instructional activities.

The findings of variation in instructional approaches is consistent with the results presented in Chapter 5 which indicated that Dyad 4 had particular difficulty engaging in various elements of collaborative practice. In Chapter 5, Dyad 4 reported several challenges to their collaboration including having numerous children to co-instruct, perceptions of limited support from the classroom teacher and negotiating collaborative practice within a complex classroom structure (i.e., large class sizes and multiple classroom teachers). This in turn may have limited their exploration of classroom-based co-teaching models that demand some degree of shared

decision making and communication to implement (Beck & Dennis, 1997; Friend & Cook, 2003). Overall, it would thus appear that C1-C3 (i.e., instructed by Dyad 1-3) received more collaborative instruction relative to C4-C7 (i.e., instructed by Dyad 4). Evidence that C1-C3 also improved on targeted goal areas would support that the current approach to IPE was effective in fostering these students' ability to collaboratively advance children's outcomes.

The second research question asked whether the joint instruction improved children's targeted speech error patterns in words that were and were not trained during the joint instruction. One of the two children (C3) who received the collaborative speech instruction demonstrated improved accuracy of both trained and untrained speech targets. One of the four children (i.e., C4) who received the less collaborative instruction, however, also improved on both trained and untrained speech targets. C4's improvement was likely related to the student teacher and student SLT providing direct instruction with greater intensity relative to the other children (i.e., 14 sessions across three weeks) albeit with limited evidence of collaboration in their co-working. Lack of improvement for C5-C7 was likely related to these children receiving less frequent instruction on target goal areas relative to the other children. Limited frequency of instruction for these children may have been reflective of Dyad 4's difficulties in establishing collaborative co-working; however, a direct relationship between degree of collaboration and frequency of instructional activity cannot be assumed.

Child-related factors must also be considered when exploring the variation in outcomes across children. C7's performance on baseline speech probes was near ceiling so there was little opportunity for improvement. Differences in the underlying nature of the children's speech difficulties, though not directly examined in the current study, may have also influenced their response to instruction (Crosbie, Holm, & Dodd, 2005). For instance, C6 demonstrated

numerous speech errors which did not fit within any phonological process patterns which may be characteristic of children with inconsistent speech disorder (Dodd & Bradford, 2000). Previous intervention studies have suggested that a core vocabulary therapy approach may be more effective than phonological approaches for children with inconsistent speech disorder (e.g., Crosbie et al., 2005; McIntosh & Dodd, 2009). Future research into the efficacy of placement IPE should thus examine the underlying nature of children's speech disorder to ensure an appropriate match between the instructional approach and the child's difficulties. In summary, lack of progress for C5-C7 cannot be attributed to the less collaborative nature of Dyad 4's co-working given the potential impact of differences in intensity of instructional activities and differences in the underlying nature and/or severity of children's speech difficulties.

The third research question asked whether joint instruction improved children's phonological awareness in trained and untrained words. Only children who received the collaborative instruction (i.e., C1, C2 and C3) improved on their phoneme segmentation probes. C2 and C3 demonstrated improvement with generalisation to untrained items evident for both children. These children, however, possessed relatively mild difficulties as suggested by their typical language development compared to the rest of the children. C1 showed a delayed response with improvement on trained and untrained phonological awareness items only evident in the post-instruction phase. This child's improvement could be attributed to environmental factors such as additional instruction after the IPE; however, this seems unlikely given that children began a 2-week school break when the IPE ended and post measures were conducted the week they returned to school. Student dyad's co-instruction could then have feasibly contributed to the child's improved performance. This would be particularly remarkable given that the child possessed both speech and language difficulties which is associated with more

severe and persistent phonological processing deficits (Leitão, Hogben, & Fletcher, 1997; Lewis, Freebairn, & Taylor, 2000; Nathan, Stackhouse, Goulandris, & Snowling, 2004). Those children who received the less collaborative instruction (i.e., C4, C5, C6 and C7) did not improve on any of their phonological awareness probes. However, these children possessed concomitant language difficulties which may have limited their response to instruction. Again, limited evidence of improvement for these children cannot be wholly attributed to the less collaborative nature of the students' co-working.

The final research question asked whether the children's spontaneous single word speech production, letter-sound knowledge, reading and spelling ability would improve over the course of the IPE. The two children (i.e., C3 and C4) who improved on their speech probes also demonstrated improved single word speech production suggesting generalisation of intervention effects. Further, the improvement in phonological awareness demonstrated by C1-3 was accompanied by improved letter-sound knowledge and spelling. This raises the possibility that the joint instruction contributed to children's improved early literacy skills. In contrast, these children were less likely to improve on non-word reading. Early reading instruction in New Zealand has not traditionally focused on the use of grapho-phonemic information to decode words (Tunmer, Chapman, Greaney, Prochnow, & Arrow, 2013). Thus, the regular classroom context may have provided insufficient support to help children apply their improved phonological awareness to word level reading.

The improved literacy skills of C1-3 must be interpreted cautiously, as the impact of the joint instruction cannot be elucidated from other variables without a control group. For instance, C4 and C5 also improved on select literacy measures despite not improving on phonological awareness during the IPE. This highlights that maturation and/or regular classroom instruction

likely contributed to children's improved early literacy skills. Nonetheless, the current study provides encouraging evidence that student professionals can learn to establish effective collaboration even within a restricted period of time (i.e., 3 weeks). Further investigation is warranted into the impact of placement-based IPE on children's learning outcomes utilising control groups (i.e., no supplemental instruction) or comparison controls (e.g., student SLTs and student teachers working non-collaboratively) to further elucidate the impact of placement IPE.

6.4.1 Implications and future directions

The results of the current study align with the emerging evidence that supplemental classroom instruction advances the oral and written language skills of children who experience spoken language difficulties (Carson et al., 2013; Ritter & Saxon, 2011; Throneburg et al., 2000). The novel aspect of this study was the finding that student professionals could learn to collaboratively provide effective supplemental instruction. This provides further evidence, alongside the findings of Chapter 5, that incorporating opportunities for co-instruction into placement-based IPE is a feasible and effective educational approach for preparing student SLTs and student teachers for effective collaborative practice. More specifically, students can learn about collaborative practice while also positively impacting children's speech and literacy development.

Given the exploratory nature of the study, there are further limitations that require discussion and are important to consider for future research conducted in this area. The short period of intervention, which was dictated by the length of the student teachers' placement, does not align with evidence regarding effective classroom-based phonological awareness teaching. Carson et al. (2013) showed significant gains in children's phonological awareness, including children with spoken language difficulties following 10 weeks of classroom based instruction. It is likely that the short duration of the current intervention impacted its effectiveness. The

importance of intervention intensity has also been highlighted by studies that have explored the effectiveness of integrated phonological awareness interventions outside of the classroom. Denne, Langdown, Pring, and Roy (2005) examined the effectiveness of integrated phonological awareness intervention (as described in Gillon (2000)), but included 12 hours of intervention rather than the 20 hours included in the original study. Participants showed some improvement in their phonological awareness knowledge, but gains in speech and/or literacy measures were not evident. Future studies will need to balance the logistical realities of joint placement experiences with best practice for enhancing children's communication and literacy outcomes carefully.

The lack of collaborative planning between the supervisors of student SLTs and student teachers may have also influenced outcomes. As highlighted in interview analysis in Chapter 5, student participants identified this as a limitation to the instructional design of the placement-based IPE. Enhanced collaboration between the supervisors may have helped students establish more effective or efficient collaboration thereby encouraging greater intensity and/or quality of shared instruction within the restricted time frame. Establishing collaboration among the supervisors would have necessitated professional development prior to the IPE thus requiring additional resources and time which were not available within the context of the current study. In future IPE, careful consideration should be given to the role that teacher and SLT supervisors play in supporting the inter-professional component of shared placements.

It is important to acknowledge that not all of the children benefitted from the IPE. Three of the four children assigned to Dyad 4 did not demonstrate improvement in any of their goal areas. This finding can likely be attributed to a combination of the student dyad having difficulty establishing collaborative instruction, the short duration of the shared placement, and the children possessing speech and literacy difficulties which may have been more difficult to

remediate. It was possible that establishing collaborative instruction for children with more extensive difficulties was another factor (beyond those reported in Chapter 5) making the IPE too challenging for these student professionals. Selecting children for IPE who possess mild to moderate difficulties and/or fewer co-morbidities may be less likely to overwhelm student professionals who are still developing knowledge and skills related to their own profession and to inter-professional working. Thus, the current study highlights further design considerations to help ensure that student professionals and the children they co-instruct enjoy successful outcomes in placement-based IPE.

CHAPTER 7

GENERAL DISCUSSION

7.1 Introduction

The role of collaborative co-working among speech and language therapists (SLTs) and teachers has received much attention due to the increasing policy emphasis on integrated co-working to provide classroom instruction that meets children's diverse learning needs (Ehren et al., 2006; Mroz, 2012). It is well-established, however, that inter-professional collaboration is a challenging form of co-working (Barr et al., 2005; Friend & Cook, 2003). In line with this, SLTs and teachers have reported being inadequately prepared to effectively collaborate with each other (Glover & McCormack, 2015; Hartas, 2004). Despite these concerns, there has been no direct investigation into the attitudes, knowledge and skills (i.e., competencies) that entry-level SLTs and teachers possess for inter-professional collaboration. Information of this type is critical to guide curricular reform of the initial education of SLTs and teachers. Further, incorporating inter-professional education (IPE) into the professional study of SLTs and teachers is a promising approach for building competencies to prepare these prospective practitioners for inter-professional collaboration (Forbes & McCartney, 2011; Goldberg, 2015). There is a paucity of research, however, examining the application of IPE for student teachers and student SLTs. In response to these areas of need, this thesis examined the collaborative competencies of student SLTs and student teachers preparing to become primary school teachers. The thesis also investigated the effectiveness of novel IPE models designed to facilitate student teachers' and student SLTs' readiness for collaboration. Two IPE models were evaluated including a course-based approach and a placement-based approach. Both approaches adopted activities which required mixed-

discipline pairs or groups of students to collectively decide how to support children's learning (i.e., a case-oriented approach). A focus on preparation for collaborative language and literacy instruction was adopted given that SLTs and teachers possess critical expertise to support children's language and early literacy development (P. C. Snow, 2016).

7.2 Summary of findings

This section will revisit each of the research questions posed in Chapter 1 and examine how these questions were addressed through the series of five studies included in this thesis. The remainder of the chapter will then discuss the broader implications of the findings, limitations and directions for further research.

Question 1: To what extent do student SLTs and student teachers differ in their

a) content knowledge of linguistic concepts and classroom literacy curriculum,

b) perceptions of appropriate co-working models, and

c) conceptualisations of SLT-teacher collaboration?

The first study, a survey of student SLTs (n=37) and student teachers (n=58) across New Zealand, suggested that students had yet to develop several aspects of collaborative competence despite being in the final months of their professional study. Survey results indicated that student SLTs and student teachers demonstrated understanding of language and literacy concepts related to their own profession's traditional areas of expertise in spoken language structure/development and literacy curriculum, respectively. They, however, possessed limited understanding of the concepts associated with each other's professional expertise. This aligns with studies of practicing SLTs and teachers who describe limited understanding of each other's expertise in language and curriculum as a barrier to collaboration (Glover & McCormack, 2015; Hartas, 2004). Limited shared understanding of terminology and concepts related to each other's professional expertise

likely leads to misunderstandings and more laborious communication making collaborative activities time consuming and frustrating (McCartney & Ellis, 2013). Without some prior established shared knowledge, collaboration can then become an unrealistic venture given that time for planning and discussion is often restricted in the practice contexts of SLTs and teachers (Friend & Cook, 2003; Marvin, 1990).

Students had an emerging appreciation of inter-dependent co-working as suggested by their acceptance of SLTs providing classroom-based service. Students, however, were less accepting of delivery models in which SLTs work directly in the classroom as compared to indirectly (i.e., through consultation with a teacher). Further, the majority of students from both professional groups did not perceive SLTs and teachers as sharing equal responsibility for supporting children's literacy development. Collaborative-ready practitioners believe that more can be achieved through working closely with another professional (Bronstein, 2003). These findings suggest, however, that prospective SLTs and teachers did not view themselves as inter-dependent professionals particularly in relation to children's literacy acquisition. This may limit their engagement in integrated co-working to the detriment of children's academic and social development given that each professional group possesses critical expertise required to foster children's language and literacy skills (P. C. Snow, 2016).

Finally, the survey investigated students' conceptualisations of collaboration based on experience gained during their professional study. The vast majority of student teachers did not answer this question, as only 5% of the student teachers reported having any inter-professional experience with SLTs. Further, analysis of student SLTs' descriptions of collaboration suggested that they tended to mistakenly equate collaboration with traditional, consultation models in which the SLT provides expert advice to a classroom teacher. Consistent with previous research,

these findings suggest that SLTs and teachers require additional opportunity during their professional study to learn about collaboration and how this can be applied to different delivery models (Beck & Dennis, 1997; Brandel & Loeb, 2011).

Question 2: What are the effects of a case-oriented, course-based model of IPE on student SLTs' and student teachers'

a) competencies in collaborative practice including their shared content knowledge of linguistic concepts and classroom literacy curriculum; and

b) instructional co-planning for children with speech and literacy difficulties?

The subsequent study (Study 2) investigated the impact of a course-based IPE model on the development of student SLTs' and student teachers' collaborative competencies alongside their collaborative planning. This controlled group study provided evidence of the potential benefits of course-based IPE which combined case-based instructional planning with content-based activities focused on linguistic and curricular knowledge. The results indicated that this intervention improved student SLTs' understanding of concepts related to teachers' expertise in primary school literacy curriculum. These gains were not demonstrated in the control intervention which included case-based activities but with time spent discussing general professional issues rather than specific content-based activities. Both interventions, however, had limited impact on student teachers' understanding of concepts related to SLTs' expertise in linguistic concepts. Greater collaboration between professional groups in supporting a child's speech development was evidenced in planning following both interventions. There was limited impact, however, on building collaborative plans in language/literacy instruction or enhancing planning for co-working in the classroom.

Follow-up investigation was undertaken in Study 3 to further examine the impact of the course-based IPE. Post-intervention interviews suggested that students gained a cursory understanding of the complementary nature of the two professions and the importance of shared understanding of professional roles/expertise to support collaboration. Overall, the findings of Study 2 and 3 were consistent with previous health-based IPE studies demonstrating that students develop inter-professional role understanding through a combined case-planning and supplemental discussion model (Carpenter & Hewstone, 1996). This evaluation of a course-based model was unique, however, given that impact on students' collaborative practice was also examined. This investigation suggested that a single exposure to course-based IPE was insufficient to build the depth of inter-professional knowledge required to influence students' collaborative planning in language and literacy instruction. Further investigation is thus required to determine whether a more extensive course-based IPE model can positively impact students' co-working.

The interview analysis conducted in Study 3 also examined how the instructional design of the IPE model influenced participants' learning. Overall, student SLTs and student teachers who participated in the course IPE were enthusiastic about the use of interactive learning; they desired additional opportunity to interactively develop understanding about each other's professional roles and educational study. There was little evidence to suggest that the interactions fostered unwanted effects related to negative stereotyping or inter-group conflict as found in previous studies of health-based IPE (Mandy et al., 2004). Some student SLTs reported not feeling adequately secure in their own profession-specific roles to participate meaningfully in the interactive learning. This may be related to the breadth of subjects covered in SLTs' initial education to prepare them for working with both child and adult clients and therefore limiting

their ability to specialise in any particular area (Harn et al., 1999). Introducing preparation time prior to course-based IPE was suggested by interview participants as a way to improve the IPE design.

Question 3: What are the effects of a case-oriented, placement-based model of IPE on student SLTs' and student teachers' competencies in collaborative practice including their

a) shared content knowledge of linguistic concepts and classroom literacy curriculum, and

b) perceptions of appropriate co-working models?

Study 4 provided evidence of the potential benefits of a placement-based IPE model in which pairs of student SLTs and student teachers co-worked in classroom environments to support children's speech and phonological awareness development. This study represented the first of its kind to examine the impact of IPE embedded with the professional practice placements of student teachers and student SLTs. Interview analysis alongside pre-post questionnaires suggested that student pairs developed competency in multiple aspects of collaborative practice. Similar to the course-based approach, student SLTs developed enhanced understanding of classroom teachers' professional roles and profession-specific terminology. Student teachers' development of language/literacy knowledge related to SLTs' expertise in spoken language, however, was limited. Development of additional competencies over and above role understanding were evident for both student groups including enhanced acceptance of integrated co-working models, role flexibility to explore alternative instructional practices and communication skills to support shared decision making. The placement-based IPE approach thus provided an initial model for advanced inter-professional learning among student SLTs and student teachers. Similarly, in health-based contexts, favourable outcomes are most likely to be associated with IPE models which are based within professional practice (Oandasan & Reeves,

2005a). Continued investigation is required, however, to determine how to shift aspects of students' inter-professional attitudes and knowledge which were more resistant to change such as acceptance of shared roles in children's literacy-related skills (e.g., phonological awareness, reading, and spelling) and student teachers' linguistic knowledge.

Student interviews in Study 4 also highlighted that shared placements are more likely to be successful when the supervising classroom teacher actively supported students' co-working and when students were responsible for co-planning instruction for one as opposed to multiple children. Further, students highlighted the need for IPE participants to have relevant practical experience in children's language/literacy prior to placement-based IPE to enhance security in their own profession-specific knowledge. Consistent with the IECPCP model of D'amour and Oandasaan (2005) introduced in Chapter 1, careful consideration of the instructional design of IPE (i.e., teaching-related factors) is critical towards ensuring task complexity does not overwhelm students' emerging collaborative competencies.

Question 4: What are the effects of a case-oriented, placement-based model of IPE on the speech, phonological awareness and early literacy skills of children whom student SLTs and student teachers jointly instruct?

Further evidence supporting the effectiveness of the placement-based IPE model was presented in Study 5 which examined the effects of the students' joint, classroom-based instruction on children's speech and phonological awareness development. Analysis of repeated measures of speech and phonological awareness items revealed that four out of seven target children improved in their accuracy of trained and untrained targets in at least one of the two goal areas. Examination of students' instructional logs alongside the findings of Study 4 further indicated that three of the four children who improved on target goals were instructed by the three student

dyads who were most successful in establishing various aspects of collaborative co-working. More specifically, one child (out of the two children who had speech difficulties) demonstrated improved speech performance on both trained and untrained probe items. Further, all three children demonstrated improved ability to segment words into phonemes for both trained and untrained probes. Preliminary evidence also suggested generalisation to these children's early literacy skills (i.e., letter-sound knowledge and spelling). These findings provided further evidence that the placement IPE was effective in fostering most students' ability to engage in effective collaborative practice. It is important to note, however, that the small sample size and variety of instructional approaches prevented making any conclusions about how variation in the extent of students' collaboration was related to child outcomes.

Study 5 is one of few controlled studies examining the impact of shared IPE placements on client outcomes and extends previous findings that students' co-working is not at the detriment of client/child outcomes (Janson et al., 2009). Improvements to the IPE design (e.g., greater engagement of the supervising classroom teacher in the IPE; increasing intervention intensity) may further assist students to establish collaborative co-working that advances children's speech, language and literacy outcomes.

7.3 Theoretical implications

The results from this thesis support the growing evidence base that student professionals develop readiness for collaboration when they work cooperatively to solve real-life problems with members of other professional groups (Barr et al., 2005). IPE participants interactively developed attitudes, knowledge and skills which underpin collaborative co-working thus supporting a social constructivist theory of IPE described in Chapter 1. However, the findings that student teachers were less likely to develop understanding of content knowledge related to

SLTs' areas of expertise in language/literacy raises the possibility that other teaching and learning methods may be required for certain competencies. For instance, traditional didactic methods may need to be adopted in which an instructor with advanced expertise provides explicit instruction (Barr et al., 2005). This was shown to improve student SLTs' and student teachers' understanding of concepts related to English orthography in Study 2. Alternatively, innovative ways to strengthen the Tuakana-Teina model (described in Chapter 5, p. 128) where student SLTs and student teachers take on the role of teacher and learner to develop each others' professional knowledge may prove effective. Further research into how student SLTs acquire linguistic knowledge would likely provide insights into how they can be supported to facilitate the development of such knowledge of their student teacher counterparts.

A further theoretical consideration is whether primarily inter-professional learning approaches offer advantage over multi- or uni-professional approaches in preparing new graduates for inter-professional collaboration. Comparison studies of various learning approaches are required to answer this question and have yet to be undertaken for pre-service IPE (Reeves et al., 2013). Social constructivist learning theory predicts advantage for IPE related to opportunity to engage in social-mediated learning with individuals who possess diverse perspectives, knowledge and skills (Hean et al., 2009). Accordingly, the findings of the placement IPE, in particular, illustrated the diversity of potential learning outcomes which an inter-professional approach fosters. It is difficult to envision how a placement among same-profession peers could foster all the competencies developed in the placement IPE including general teamwork skills (e.g., communication skills) alongside competencies related to co-working across professional groups (e.g., role understanding, inter-dependency). Case-oriented

placement IPE might thus provide a particularly efficient means of preparing students for collaboration within and across professional groups.

A final theoretical consideration is whether classroom-based collaboration among teachers and SLTs is an effective approach for supporting children's diverse language and literacy needs. The benefits of collaborative co-working among teachers and SLTs has remained largely a theoretical and philosophical argument with limited evidence examining the effects of this co-working approach for children with spoken language difficulties (Cirrin et al., 2010; Lindsay & Dockrell, 2002). Study 5, however, demonstrated that student SLT-teacher dyads who established collaborative instruction positively impacted the speech and phonological awareness outcomes of children with difficulties in these areas. These findings warrant further examination into whether student SLTs and student teachers working collaboratively in shared placements can have a greater impact on children's development than students working independently while on placement.

7.4 Practical implications

The findings of this thesis provide new evidence that the professional study of SLTs and teachers should be re-configured to better foster their readiness for inter-professional practice in children's language and literacy development. The gaps in inter-professional attitudes, knowledge and skills identified in this thesis can be utilised by those working in professional regulatory bodies, government agencies and/or university departments (i.e., macro and meso level systems) who are ultimately responsible for influencing the curricula of professional study programmes (D'Amour & Oandasan, 2005; Oandasan & Reeves, 2005b).

Professional practice standards utilised for graduating SLTs and teachers in New Zealand require graduates to possess the knowledge and attitudes to work effectively with other

colleagues (New Zealand Educational Council, 2015; New Zealand Speech-language Therapists' Association (NZSTA), 2015; Speech Pathology Australia, 2011). The potential positive effects of IPE towards achieving this standard supports incorporation of IPE into the professional study of SLTs and teachers. Further, the competencies developed in the placement-based IPE align with student SLTs' professional practice standards which recognise the importance of preparing students to work on inter-disciplinary teams (e.g., Speech Pathology Australia, 2011). This approach to teamwork involves collective decision making and exploration of role flexibility thus aligning with collaborative co-working (Speech Pathology Australia, 2009). In contrast, the New Zealand graduating teacher standards make a more conservative statement that graduates should be prepared to work cooperatively with other colleagues. The evaluation of placement-based IPE in this thesis suggests, however, that with appropriate support, student teachers can progress beyond cooperative work to more advanced forms of co-working. These findings thus argue for modification of the graduating teacher standards to raise the expectations for students' co-working ability within and across professions. Enhanced expectations for teachers' collaborative practice may help prompt curricular reform in teacher education.

To ensure maximal learning during IPE, inter-department cooperation is required to support the development of university faculty and placement supervisors who can effectively support inter-professional learning (D'Amour & Oandasan, 2005). Participants in the placement IPE study (Study 4) reported that supervising classroom teachers' support of inter-professional learning was critical to the success of the placement IPE. This undoubtedly presents a considerable challenge as the contrasting ideologies and knowledges that limit SLT-teacher collaboration are also likely at play among university educators. Securing support of academic leaders to provide resources for professional development of academic and clinical/practice

educators is likely key to developing effective and sustainable inter-professional learning programmes (Oandasan & Reeves, 2005b). Inter-department support will also be critical in optimising other facets of placement-based IPE. As highlighted in Study 5, the intensity of therapy support over the 3-week placement was lower than the optimal level according to the evidence base for integrated phonological awareness therapy (Carson et al., 2013; Gillon, 2000; McNeill et al., 2009).

IPE initiatives would also be supported by development of competency frameworks which delineate the specific attitudes, knowledge and skills which students require to be collaborative within educational contexts. Such frameworks have been developed for health-based IPE applications with these aims:

a) to guide curricular development of IPE,

b) to facilitate dialogue of how inter-professional content aligns with accreditation standards, and

c) to prompt evaluation of collaborative competencies as part of the accreditation/licensing process (Interprofessional Education Collaborative Expert Panel, 2011).

The findings of this thesis highlight several areas that would be useful to include in a competency framework for SLTs and teachers (e.g., role understanding, inter-dependency in professional roles, role flexibility). Such a tool could then be refined through further research of IPE and inter-professional practice. It will be challenging, however, to ensure that the competency framework is specific enough to support SLT-teacher collaboration but can also be applied to other educational professionals with whom SLTs and teachers collaborate (e.g., psychologists, literacy specialists).

Further, the importance of student SLTs' and student teachers' reported enjoyment of learning about and from each other should not be underestimated. Student engagement is increasingly recognised as critical to the success of tertiary education given its association with enhanced academic achievement and student retention (Kahn, 2014). Further, the placement-based IPE model examined in this thesis demonstrated potential for depth of learning that may be appealing for student teachers wishing to specialise in children's language/literacy development and student SLTs particularly interested in education. If further research confirms IPE is an engaging form of learning that offers opportunity for specialisation, teacher education and speech and language therapy programmes which adopt IPE could develop this as a point of difference for their programmes.

Despite the focus on IPE in this thesis, it is important to acknowledge that the findings could also be applied to developing uni-professional education curricula that foster student SLTs' and student teachers' readiness for collaboration. Developing collaborative-ready practitioners will likely require a coordinated combination of uni- and inter-professional approaches. For instance, joint academic posts between SLT and teacher education departments may facilitate opportunities for students to develop inter-professional knowledge from experts in each respective field (Forbes & McCartney, 2015). For example, Purvis et al. (2015) demonstrated that student teachers' language structure knowledge improved after 7 hours of dedicated course work provided by a tertiary educator with expertise in speech and language therapy. Shared placements among same-profession students may also provide opportunity to develop general collaborative skills (e.g., communication skills) which are likely relevant to collaboration within and across professions (Santagata & Guarino, 2012). Continued research examining the effects of uni- and inter-professional education will provide insight into what

aspects of collaborative competency are best targeted by a single educational approach or an integrated (i.e., uni- and inter-professional) approach.

Organisations in which SLTs and teachers work also carry responsibility to foster the collaborative competencies of entry-level practitioners (Barr et al., 2005; Friend & Cook, 2003; Wright, Stackhouse, & Wood, 2008). The findings of this thesis thus are relevant to those working within meso- and macro-level systems who influence the structure and organisation of practice settings of SLTs and teachers. For instance, those in leadership and administrator roles could adapt the placement-based model examined in this thesis to formalise inter-professional learning as part of SLT and teacher co-work. More specifically, the relevant competency areas identified in the IPE placement model could be used to guide SLTs and teachers in setting learning objectives for their own development as inter-professional practitioners. Further, the results of Study 5 (Chapter 6) suggest that this 'learning by doing' approach is not at the detriment of advancing children's language and literacy outcomes.

7.5 Limitations of the current research

Several limitations related to the sample of participants utilised across the studies limits the generalisation of findings to the broader population of student SLTs and student teachers. These limitations include small sample sizes and inclusion of participants from the same university for the intervention studies. Furthermore, a sampling bias must be considered for the intervention studies. Student teachers volunteered to participate in the IPE interventions raising the possibility that those with a particular interest in inter-professional collaboration were over-represented in the samples. In addition, student SLTs were purposefully selected for the placement-based IPE intervention by their placement coordinator suggesting they may have possessed characteristics pre-disposing them to a more successful experience. Future intervention studies should utilise

random sampling techniques alongside larger sample sizes to ensure that participants are more representative of the broader population.

Limitations of the survey instrument utilised across the studies must also be considered. In particular, the limited number of items related to language/literacy knowledge may have restricted the ability to detect change in students' inter-professional knowledge during the intervention studies. The researcher's background in speech and language therapy may have also created a bias in the degree of difficulty of the linguistic versus curricular questions. Consequently, the survey tool may have had greater sensitivity for change in curricular as opposed to linguistic knowledge. This highlights the importance of inter-professional teams of researchers creating measurement tools for IPE. Further, validation of the survey is also required to establish psychometric properties related to reliability and validity.

The survey study (Chapter 2) suggested that students' understanding of collaboration was a competency area of which they possessed limited knowledge. There was, however, no attempt to analyse how students' understanding of collaboration was impacted by IPE. This was related to the absence of measures to assess collaborative competencies. It would be important, however, to investigate whether students who are actively engaged in aspects of collaborative practice are also able to explicitly recognize these as elements of collaboration. Possessing explicit knowledge may help students apply their learning to future practice. In-depth qualitative investigations (e.g., ethnographic or grounded theory research) may provide key insights into how students' conceptualisation of collaboration develops throughout IPE experiences. Such research would likely provide critical information needed for the development of quantitative measures assessing change in this aspect of collaborative competency.

Finally, limitations of the competency-based approach utilised in this thesis requires consideration. The research adopted a focus on shared competencies required for collaborative practice. It is important to acknowledge, however, that unshared knowledge and skills that are specific to each profession are required to derive benefit from the involvement of multiple professionals (Ehren, 2000). How SLTs and teachers apply their specialist knowledge and skills to their co-working should be examined in future IPE research to further elucidate what unshared knowledge and skills are particularly relevant to SLT-teacher collaboration. The competency approach utilised in this thesis was further limited in scope as it did not attempt to examine competencies related to including families as collaborators to support children's learning. Partnerships between educational practitioners and children's families are a critical part of both evidence-based and culturally responsive practice (A. H. Macfarlane, 2013; S. Macfarlane, 2009). The New Zealand Ministry of Education has recognised the importance of family involvement by setting a goal of achieving enhanced partnerships among families and educational practitioners (MoE, 2014b). Future research should thus consider the shared competencies that SLTs and teachers require to actively engage families as part of their collaboration.

7.6 Future directions

The research undertaken in this thesis highlights several areas for continued investigation. First, the findings of Study 1 (Chapter 2) suggested that graduating SLTs may possess limited understanding of linguistic knowledge pertaining to the relationship between spoken and written language structure. It is possible that SLTs develop this knowledge as practitioners in education contexts; however, this is unknown as there remains limited investigation into SLTs' linguistic knowledge. A small number of studies have demonstrated that SLTs possess more advanced phoneme awareness than teachers and literacy specialists (Carroll et al., 2012; Spencer et al.,

2008). SLTs, however, also require knowledge of written language constructs to adequately assist teachers to foster children's literacy acquisition (Foorman et al., 2011; C. E. Snow et al., 1999). Continued investigation is thus required regarding the development of SLTs' understanding of constructs related to written language structure.

Continued research is required into how student SLTs and student teachers could achieve improved co-working through a course-based IPE model. The development of an effective course model is critical for ensuring more student participation in IPE given the difficulty in including larger numbers of students in shared placement experiences. Longer interventions than that examined in Study 2 that target multiple collaborative competencies are likely required to impact students' ability to collaboratively plan explicit language and literacy instruction. For instance, courses could be divided into multiple units with each unit targeting different competency areas through the combined approach utilised in Study 2 (i.e., guided discussion alongside a co-planning activity). Alternating intervention designs (with each competency unit considered as a separate intervention) could be used to examine the cumulative effects of the units as well as the impact of individual units on students' co-planning ability. This would, however, necessitate the development of additional measures assessing different aspects of collaborative competence.

Continued investigation into the impact of placement-based IPE is also required. Further qualitative investigation could provide insight into students' learning needs. The findings of such research could be used to assist students establish collaborative work in a timely and efficient manner that positively impacts children's learning. Comparison of shared placement experiences and non-shared placement experiences (e.g., student SLT providing a classroom-based service) may help elucidate whether a case-oriented, placement-based IPE model offers advantage over

more traditional placement models. Finally, a combined approach (i.e., case-based work plus guided discussions) for placement-based IPE should also be examined. The extra assistance provided through guided discussions may better foster students' collaborative competencies and the quality/intensity of instruction they provide. Addition of guided discussions into a placement-based model, however, will necessitate additional responsibilities for placement supervisors. Consequently, the impact of a combined, placement-based model on supervisors also needs to be examined to determine the sustainability of such a model.

Continued investigation of a case-oriented, placement-based IPE model also offers opportunity to investigate the efficacy of collaborative, classroom-based instruction. Investigation of the placement-based IPE model (Studies 4 and 5) suggested variability in the degree to which students were able to establish collaborative co-working. Consequently, comparing child outcomes for those who received collaborative co-working to those who received less collaborative co-working will help to establish whether the degree of collaboration is associated with the efficacy of instruction. If differences in child outcomes do exist, examination of students' co-instruction could help develop hypotheses of how collaboration leads to effective instruction. This line of research would necessitate the development of an instrument or metric to facilitate identification of collaborative from non-collaborative co-working.

Finally, examination of the longer term effects of IPE is also required (Thistlethwaite et al., 2015). Follow-up studies of IPE participants can help elucidate whether they maintain any gains in inter-professional knowledge and attitudes. Follow-up investigation should also examine whether IPE offers any advantage to participants' future course or placement work. Comparing long-term effects of IPE versus uni-professional approaches may be particularly important in

distinguishing the relative efficacy of each approach. Perhaps IPE may prove more effective for some collaborative competencies related to opportunity for socially-mediated learning that fosters deeper and more usable forms of knowledge and skill.

7.7 Conclusion

Becoming a highly collaborative practitioner likely requires career-long learning (Friend & Cook, 2003). However, ensuring that SLT and primary school teacher graduates possess basic collaborative competencies will likely engender early successful collaborative experiences that benefit children's learning and development. The findings of this thesis provide new evidence that advances our knowledge regarding the collaborative competencies in which student SLTs and student teachers require further development to promote their transition to collaborative-ready practitioners. Further, this thesis provides the first in-depth investigation of IPE educational models in preparing SLTs and teachers for collaborative language and literary instruction. Despite the exploratory nature of the research, the benefits of IPE were evident and outcomes will only improve with continued research into optimal IPE instructional design and methods of evaluation. With continued research alongside institutional support, IPE has the potential to transform SLT-teacher co-work to ensure more children experience the benefits of their combined expertise.

The strength of this thesis lies in its commitment to innovative practice in teacher and SLT education to ultimately improve children's literacy learning. Though exploring unchartered territory is a difficult endeavour, it is necessary to ensure the evolution and advancement of higher education. Tertiary education in New Zealand is under-going an exciting transformation in which learning is increasingly viewed as a collaborative partnership between educator and student as well as between students (Winitana, 2012). In line with this movement, this thesis

challenges SLT and teacher education programmes to adopt interactive learning across professional boundaries to ensure prospective professionals are learning in the way they will be expected to work together. Such a challenge can no longer be ignored given the critical importance of SLT-teacher collaboration in helping at risk children reach their full potential.

REFERENCES

Al Otaiba, S., & Lake, V. E. (2007). Preparing special educators to teach reading and use curriculum-based assessments. *Reading and Writing: An Interdisciplinary Journal, 20*(6), 591-617.

Al Otaiba, S., Lake, V. E., Greulich, L., Folsom, J. S., & Guidry, L. (2012). Preparing beginning reading teachers: An experimental comparison of initial early literacy field experiences. *Reading and Writing: An Interdisciplinary Journal, 25*(1), 109-129.

American Speech-Language-Hearing Association. (1991). *A model for collaborative service delivery for students with language-learning disorders in public schools* [Relevant Paper]. Available from www.asha.org/policy.

American Speech-Language-Hearing Association. (2010). *Roles and responsiblities of speech-language pathologists in schools*. [Professional Issues Statement]. Available from www.asha.org/policy.

Anthony, J. L., Aghara, R. G., Dunkelberger, M. J., Anthony, T. I., Williams, J. M., & Zhang, Z. (2011). What factors place children with speech sound disorders at risk for reading problems? *American Journal of Speech-Language Pathology, 20*(2), 146-160.

Apel, K., & Masterson, J. J. (2001). Theory-guided spelling assessment and intervention: A case study. *Language, Speech, and Hearing Services in Schools, 32*(3), 182-195.

ASHA. (2013). *Ad Hoc Committee on Interprofessional Education*. Retrieved from http://www.asha.org/uploadedFiles/Report-Ad-Hoc-Committee-on-Interprofessional-Education.pdf (accessed 12 December 2015).

Baker, L., Egan-Lee, E., Martimianakis, M. A., & Reeves, S. (2011). Relationships of power: Implications for interprofessional education. *Journal of Interprofessional Care, 25*(2), 98-104.

Barnes, D., Carpenter, J., & Dickinson, C. (2000). Interprofessional education for community mental health: Attitudes to community care and professional stereotypes. *Social Work Education, 19*(6), 565-583.

Barr, H., Koppel, I., Reeves, S., Hammick, M., & Freeth, D. (2005). *Effective interprofessional education: Argument, assumption, and evidence*. Oxford: Blackwell Publishing.

Baxter, S. K. (2004). Perspectives and practice: Speech and language therapy student views of an interprofessional learning experience. *Learning in Health and Social Care, 3*(2), 102-110.

Beck, A. R., & Dennis, M. (1997). Speech-language pathologists' and teachers' perceptions of classroom-based interventions. *Language, Speech, and Hearing Services in Schools, 28*(2), 146-153.

Bernthal, J. E., Bankson, N. W., & Flipsen, P. Jr. (2013). *Articulation and phonological disorders: Speech sound disorders in children*. Boston: Pearson.

Bos, C., Mather, N., Dickson, S., Podhajski, B., & Chard, D. (2001). Perceptions and knowledge of preservice and inservice educators about early reading instruction. *Annals of Dyslexia, 51*(1), 97-120.

Boyle, J. M., McCartney, E., O'Hare, A., & Forbes, J. (2009). Direct versus indirect and individual versus group modes of language therapy for children with primary language impairment: Principal outcomes from a randomized controlled trial and economic evaluation. *International Journal of Language & Communication Disorders 44*(6), 826-846.

Brady, S., Gillis, M., Smith, T., Lavalette, M., Liss-Bronstein, L., Lowe, E., . . . Wilder, T. D. (2009). First grade teachers' knowledge of phonological awareness and code concepts: Examining gains from an intensive form of professional development and corresponding teacher attitudes. *Reading and Writing, 22*(4), 425-455.

Brandel, J., & Loeb, D. F. (2011). Program intensity and service delivery models in the schools: SLP survey results. *Language, Speech & Hearing Services in Schools, 42*(4), 461-490.

Bridges, D. R., & Tomkowiak, J. (2010). Allport's Intergroup Contact Theory as a theoretical base for impacting student attitudes in interprofessional education. *Journal of Allied Health, 39*(1), 29E-33E.

Bronfenbrenner, U. (1992). *Ecological systems theory*. London, England: Jessica Kingsley Publishers.

Bronstein, L. R. (2003). A model for interdisciplinary collaboration. *Social Work, 48*(3), 297-306.

Bronstein, L. R., & Kovacs, P. J. (2013). Writing a mixed methods report in social work research. *Research on Social Work Practice, 23*(3), 354-360.

CAIPE. (1997). *Interprofessional education: A definition*. London: Centre for Advancement of Interprofessional Education.

Calder, H. (1992). *Reading Freedom Teacher's Manual* New South Wales, Australia: Pascal Press.

Canadian Interprofessional Health Collaborative. (2010). *A national interprofessional competency framework*. Vancouver, Canada: CIHC.

Caplan, G., & Caplan, R. B. (1993). *Mental health consultation and collaboration*. San Francisco: Jossey-Bass Publishers.

Carpenter, J., & Hewstone, M. (1996). Shared learning for doctors and social workers: Evaluation of a programme. *The British Journal of Social Work, 26*(2), 239-257.

Carroll, J., Gillon, G., & McNeill, B. (2012). Explicit phonological knowledge of educational professionals. *Asia Pacific Journal of Speech, Language and Hearing, 15*(4), 231-244.

Carson, K. L., Gillon, G. T., & Boustead, T. M. (2013). Classroom phonological awareness instruction and literacy outcomes in the first year of school. *Language, Speech, and Hearing Services in Schools, 44*(2), 147-160.

Catts, H. W., Fey, M.E., Zhang, X., & Tomblin, J. B. (1999). Language basis of reading and reading disabilities: Evidence from a longitudinal investigation. *Scientific Studies of Reading, 3*(4), 331-361.

Catts, H. W., Herrera, S., Nielsen, D.C., & Bridges, M.S. (2015). Early prediction of reading comprehension within the simple view framework. *Reading and Writing, 28*(9), 1407-1425.

Catts, H. W., & Kamhi, A. G. (2005). *Language and reading disabilities* Boston, MA: Pearson Education Inc.

Charles, G., Bainbridge, L., & Gilbert, J. (2010). The University of British Columbia model of interprofessional education. *Journal of Interprofessional Care, 24*(1), 9-18.

Cirrin, F. M., Schooling, T. L., Nelson, N. W., Diehl, S. F., Flynn, P. F., Staskowski, M., . . . Adamczyk, D. F. (2010). Evidence-based systematic review: Effects of different service delivery models on communication outcomes for elementary school-age children. *Language, Speech, and Hearing Services in Schools, 41*(3), 233-264.

Clarke, P. J., Snowling, M. J., Truelove, E., & Hulme, C. (2010). Ameliorating children's reading comprehension difficulties: A randomized controlled trial. *Psychological Science, 21*(8), 1106-1116.

Clendon, S. A., & Erickson, K. A. (2008). The vocabulary of beginning writers: Implications for children with complex communication needs. *Augmentative and Alternative Communication, 24*(4), 281-293.

Cohen, J. (1988). *Statistical Power Analysis for the Behavioral Sciences*. Hillsdale, N.J: L. Erlbaum Associates.

Cook, D. A. (2005). Models of interprofessional learning in Canada. *Journal of Interprofessional Care, 19*(S1), 107-115. doi: 10.1080/13561820500082354

Cooper, H., Carlisle, C., Gibbs, T., & Watkins, C. (2001). Developing an evidence base for interdisciplinary learning: A systematic review. *Journal of Advanced Nursing, 35*(2), 228-237.

Cooper, H., Spencer-Dawe, E., & Mclean, E. (2005). Beginning the process of teamwork: Design, implementation and evaluation of an inter-professional education intervention for first year undergraduate students. *Journal of Interprofessional Care, 19*(5), 492-508.

Craddock, D., O'Halloran, C., Borthwick, A., & McPherson, K. (2006). Interprofessional education in health and social care: Fashion or informed practice? *Learning in Health and Social Care, 5*(4), 220-242.

Creswell, J. W. (2013). *Qualitative inquiry & research design: Choosing among five approaches* (Vol. 3rd). Los Angeles: SAGE Publications.

Crosbie, S., Holm, A., & Dodd, B. (2005). Intervention for children with severe speech disorder: A comparison of two approaches. *International Journal of Language & Communication Disorders, 40*(4), 467-491.

D'Amour, D., & Oandasan, I. (2005). Interprofessionality as the field of interprofessional practice and interprofessional education: An emerging concept. *Journal of Interprofessional Care, 19*, 8-20.

D'Eon, M. (2004). A blueprint for interprofessional learning. *Medical Teacher, 26*(7), 604-609.

Davidson, M., Smith, R. A., Dodd, K. J., Smith, J. S., & O'Loughlan, M. J. (2008). Interprofessional pre-qualification clinical education: A systematic review. *Australian Health Review, 32*(1), 111-120.

Denne, M., Langdown, N., Pring, T., & Roy, P. (2005). Treating children with expressive phonological disorders: Does phonological awareness therapy work in the clinic? *Journal of Language and Communication Disorders, 40*, 493-504.

Department for Children, Schools and Families (DCSF). (2008). *The Bercow Report: A review of services for children and young people (0-19) with speech, language and communication needs.* London: DCSF.

Dockrell, J. E., Bakopoulou, I., Law, J., Spencer, S., & Lindsay, G. (2015). Capturing communication supporting classrooms: The development of a tool and feasibility study. *Child Language Teaching and Therapy, 31*(3), 271-286.

Dockrell, J. E., Lindsay, G., Roulstone, S., & Law, J. (2014). Supporting children with speech, language and communication needs: An overview of the results of the Better Communication Research Programme. *International Journal of Language & Communication Disorders, 49*(5), 543-557.

Dodd, B., & Bradford, A. (2000). A comparison of three therapy methods for children with different types of developmental phonological disorder. *International Journal of Language & Communication Disorders, 35*(2), 189-209.

Dodd, B., Crosbie, S., MacIntosh, B., Teitzel, T., & Ozanne, A. (2000). *Preschool and Primary Inventory of Phonological Awareness (PIPA).* London, UK: The Psychological Corporation.

Dunn, L. M. , & Dunn, D. M. . (2007). *Peabody Picture Vocabulary Test - 4* (4th ed.). San Antonio, TX: Pearson.

Ehren, B. J. (2000). Maintaining a therapeutic focus and sharing responsibility for student success: Keys to in-classroom speech-language services. *Language, Speech, and Hearing Services in Schools, 31*(3), 219-229.

Ehren, B. J., Montgomery, J., Redbusch, J., & Whitmire, K. (2006). *Responsiveness to intervention: New roles for speech-language pathologists*. Retreived from http://www.asha.org/SLP/schools/prof-consult/NewRolesSLP/

Ehri, L. C., Nunes, S. R., Willows, D. M., Schuster, B., Yaghoub-Zadeh, Z., & Shanahan, T. (2001). Phonemic awareness instruction helps children learn to read: Evidence from the national reading panel's meta-analysis. *Reading Research Quarterly, 36*(3), 250-287.

Elksnin, L.K., & Capilouto, G.J. (1994). Speech-language pathologists' perceptions of integrated service delivery in school settings. *Language, Speech, and Hearing Services in Schools, 25*(4), 258-267.

Ellis, L., Schlaudecker, C., & Regimbal, C. (1995). Effectiveness of a collaborative consultation approach to basic concept instruction with kindergarten children. *Language, Speech, and Hearing Services in Schools, 26*(1), 69-74.

Elo, S, Kääriäinen, M, Kanste, O, Pölkki, T, Utriainen, K, & Kyngäs, H. (2014). Qualitative content analysis: A focus on trustworthiness *SAGE Open* 1-10. Retrieved from www.sgo.sagepub.com.

Farber, J. G., & Klein, E. R. (1999). Classroom-based assessment of a collaborative intervention program with kindergarten and first-grade students. *Language, Speech, and Hearing Services in Schools, 30*(1), 83-91.

Fleming, P., Miller, C., & Wright, J. A. (1997). *Speech & language difficulties in education: Approaches to collaborative practice for teachers and speech & language therapists*. Bicester, England: Winslow.

Foorman, B., Arndt, E., & Crawford, E. (2011). Important constructs in literacy learning across disciplines. *Topics in Language Disorders, 31*(1), 73-83.

Forbes, J. (2008). Knowledge transformations: Examining the knowledge needed in teacher and speech and language therapist co-work. *Educational Review, 60*(2), 141-154.

Forbes, J., & McCartney, E. (2010). Social capital theory: A cross-cutting analytic for teacher/therapist work in integrating children's services? *Child Language Teaching and Therapy, 26*(3), 321-334.

Forbes, J., & McCartney, E. (2011). Educating scotland's future together? Inter/professional preparation for schools and children's services. *Scottish Educational Review, 43*(2), 39-54.

Forbes, J., & McCartney, E. (2015). Educating child practitioners: A (re)turn to the university disciplines. *Discourse: Studies in the Cultural Politics of Education, 36*(1), 144-159.

Freeth, D., Hammick, M., Reeves, S., Koppel, I., & Barr, H. (2005). *Effective Interprofessional Education: Development, Delivery, and Evaluation*. Oxford: Blackwell Publishing.

Fricker, R.D., & Schonlau, M. (2002). Advantages and disadvantages of internet research surveys: Evidence from the literature. *Field Methods, 14*(4), 347-367.

Friend, M. P., & Cook, L. (2003). *Interactions: Collaboration skills for school professionals* (4th Ed.). Boston: Allyn and Bacon.

Giangreco, M. F., York, J., & Rainforth, B. (1989). Providing related services to learners with severe handicaps in educational settings: Pursuing the least restrictive option *Pediatric Physical Therapy, 1*(2), 55-63.

Gierut, J. A., Morrisette, M. L., & Dickinson, S. L. (2015). Effect size for single-subject design in phonological treatment. *Journal of Speech, Language, and Hearing Research, 58*(5), 1464-1481.

Gillam, S. L., Olszewski, A., Fargo, J., & Gillam, R. B. (2014). Classroom-based narrative and vocabulary instruction: Results of an early-stage, nonrandomized comparison study. *Language, Speech, and Hearing Services in Schools, 45*(3), 204-219.

Gillon, G. T. (2000). The efficacy of phonological awareness intervention for children with spoken language impairment. *Language, Speech, and Hearing Services in Schools, 31*(2), 126-141.

Gillon, G. T. (2002). Follow-up study investigating the benefits of phonological awareness intervention for children with spoken language impairment. *International Journal of Language & Communication Disorders 37*(4), 381-400.

Gillon, G. T. (2004). *Phonological awareness: From research to practice*. New York: Guilford Press.

Gillon, G. T. (2005). Facilitating phoneme awareness development in 3- and 4-year-old children with speech impairment. *Language, Speech & Hearing Services in Schools, 36*(4), 308-324.

Gilmore, A., Croft, C., & Reid, N. (1981). *The Burt Word Reading Test - New Zealand Revision*. Wellington, New Zealand: NZCER Press.

Glover, A., & McCormack, J. (2015). Collaboration between teachers and speech and language therapists: Services for primary school children with speech, language and communication needs. *Child Language Teaching & Therapy, 31*(3), 363-382.

Goldberg, L. R. (2015). The importance of interprofessional education for students in communication sciences and disorders. *Communication Disorders Quarterly, 36*(2), 121-125.

Gough, P.B., & Tunmer, W.E. (1986). Decoding, reading, and reading disability. *Remedial and Special Education, 7*(1), 6-10.

Hadley, P. A., Simmerman, A., Long, M., & Luna, M. (2000). Facilitating language development for inner-city children: Experimental evaluation of a collaborative, classroom-based intervention. *Language, Speech, and Hearing Services in Schools, 31*(3), 280-295.

Hall, P. (2005). Interprofessional teamwork: Professional cultures as barriers. *Journal of Interprofessional Care, 19*, 188-196.

Hammick, M., Freeth, D., Koppel, I., Reeves, S., & Barr, H. (2007). A best evidence systematic review of interprofessional education: BEME Guide no. 9. *Medical Teacher, 29*(8), 735-751.

Harn, W.E., Bradshaw, M.L., & Ogletree, B.T. (1999). The speech-language pathologist in the schools: Changing roles. *Intervention in School and Clinic, 34*(3), 163-169.

Hartas, D. (2004). Teacher and speech-language therapist collaboration: Being equal and achieving a common goal? *Child Language Teaching and Therapy, 20*(1), 33-54.

Hayward, D. V., Phillips, L. M., & Sych, J. E. (2014). Analysis of phonological awareness content in pre-service textbooks on the teaching of reading. *Canadian Journal of Speech-Language Pathology and Audiology, 38*(1), 6-24.

Hean, S., Craddock, D., & O Halloran, C. (2009). Learning theories and interprofessional education: A user's guide. *Learning in Health and Social Care, 8*(4), 250-262.

Hewstone, M., & Brown, R. (1986). Contact is not enough: An intergroup perspective on the "contact hypothesis". In M. Hewstone & R. Brown (Eds.), *Contact and conflict in integroup encounters*. Oxford: Blackwell.

Hodson, B. W. (2006). Identifying phonological patterns and projecting remediation cycles: Expediting intelligibility gains of a 7 year old australian child. *Advances in Speech-Language Pathology, 8*(3), 257-264.

Interprofessional Education Collaborative Expert Panel. (2011). *Core competencies for interprofessional collaborative practice: Report of an expert panel*. Washington, DC: Interprofessional Education Collaborative.

Janson, S. L., Cooke, M., McGrath, K. W., Kroon, L. A., Robinson, S., & Baron, R. B. (2009). Improving chronic care of type 2 diabetes using teams of interprofessional learners. *Academic Medicine 84*(11), 1540-1548.

Joshi, R. M., Binks, E., Hougen, M., Dahlgren, M. E., Ocker-Dean, E., & Smith, D. L. (2009). Why elementary teachers might be inadequately prepared to teach reading. *Journal of Learning Disabilities, 42*(5), 392-402.

Justice, L. M. (2006). Evidence-based practice, response to intervention, and the prevention of reading difficulties. *Language, Speech, and Hearing Services in Schools 37*(4), 284.

Justice, L. M., McGinty, A. S., Piasta, S. B., Kaderavek, J. N., & Fan, X. (2010). Print-focused read-alouds in preschool classrooms: Intervention effectiveness and moderators of child outcomes. *Language, Speech, and Hearing Services in Schools, 41*(4), 504-520.

Kahn, P. E. (2014). Theorising student engagement in higher education. *British Educational Research Journal, 40*(6), 1005-1018.

Kamhi, A. G., Allen, M. M., & Catts, H. W. (2001). The role of the speech-language pathologist in improving decoding skills. *Seminars in Speech and Language, 22*(3), 175-184.

Lacey, P., & Ranson, S. (1994). Partnership for learning. *Support for Learning, 9*(2), 79-82.

Law, J., Boyle, J., Harris, F., Harkness, A., & Nye, C. (2000). Prevalence and natural history of primary speech and language delay: Findings from a systematic review of the literature. *International Journal of Language & Communication Disorders, 35*(2), 165-188.

Law, J., Lindsay, G., Peacey, N., Gascoigne, M., Soloff, N., Radford, J., & Band, S. (2002). Consultation as a model for providing speech and language therapy in schools: A panacea or one step too far? *Child Language Teaching and Therapy, 18*(2), 145-163.

Leitão, S., Hogben, J., & Fletcher, J. (1997). Phonological processing skills in speech and language impaired children. *European Journal of Disorders of Communication, 32*(2 Spec No), 91-111.

Lewis, B. A., Freebairn, L. A., & Taylor, H. G. (2000). Follow-up of children with early expressive phonology disorders. *Journal of Learning Disabilities, 33*(5), 433-444.

Lindsay, G., & Dockrell, J. (2002). Meeting the needs of children with speech language and communication needs: A critical perspective on inclusion and collaboration. *Child Language Teaching and Therapy, 18*(2), 91-101.

Long, S., & Fey, M. E. (2005). *Computerized profiling (version 9.7.0)*. Cleveland, OH: Case Western Reserve University.

Macfarlane, A. H. (2013). *Cultural markers in disability studies in education*. Paper presented at the Keynote presentation at the Disability Studies in Education Conferences, Christchurch New Zealand.

Macfarlane, S. (2009). Te pikinga ki runga: Raising possibilities. *Set: Research Information for Teachers*(2), 42-50.

Mandy, A., Milton, C., & Mandy, P. (2004). Professional stereotyping and interprofessional education. *Learning in Health and Social Care, 3*(3), 154-170.

Marvin, C. (1990). Problems in school-based speech-language consultation and collaboration services: Defining the terms and improving the process. *Best Practices in School Speech-Language Pathology, 1*, 37-47.

Mather, N., Bos, C., & Babur, N. (2001). Perceptions and knowledge of preservice and inservice teachers about early literacy instruction. *Journal of Learning Disabilities, 34*(5), 472-482.

McCartney, E. (1999). *Speech/language therapists and teachers working together: A systems approach to collaboration*. London: Whurr.

McCartney, E., Boyle, J., & Ellis, S. (2015). Developing a universal reading comprehension intervention for mainstream primary schools within areas of social deprivation for children with and without language-learning impairment: A feasibility study. *International Journal of Language & Communication Disorders, 50*(1), 129-135.

McCartney, E., Boyle, J., Ellis, S., Bannatyne, S., & Turnbull, M. (2011). Indirect language therapy for children with persistent language impairment in mainstream primary schools: Outcomes from a cohort intervention. *International Journal of Language & Communication Disorders 46*(1), 74-82.

McCartney, E., & Ellis, S. (2013). The linguistically aware teacher and the teacher-aware linguist. *Clinical Linguistics & Phonetics, 27*(6-7), 419-427.

McCartney, E., Ellis, S., Boyle, J., Turnbull, M., & Kerr, J. (2010). Developing a language support model for mainstream primary school teachers. *Child Language Teaching and Therapy, 26*(3), 359-374.

McCutchen, D., Green, L., Abbott, R. D., & Sanders, E. A. (2009). Further evidence for teacher knowledge: Supporting struggling readers in grades three through five. *Reading and Writing, 22*(4), 401-423.

McGinty, A., & Justice, L. (2006). Classroom-based versus pullout interventions: A review of the experimental evidence. *EBP Briefs, 1*(1), 3-25.

McGrath, J. R., & Davis, A. M. (1992). Rehabilitation: Where are we going and how do we get there? *Clinical Rehabilitation, 6*(3), 225-235.

McIntosh, B., & Dodd, B. (2009). Evaluation of Core Vocabulary intervention for treatment of inconsistent phonological disorder: Three treatment case studies. *Child Language Teaching and Therapy, 25*(1), 09-29.

McNeill, B. C., Gillon, G. T., & Dodd, B. (2009). Effectiveness of an integrated phonological awareness approach for children with childhood apraxia of speech (CAS). *Child Language Teaching and Therapy, 25*(3), 341-366.

McNeill, B. C., & Gillon, G.T. (November 2014). *Longitudinal evaluation of the speech and literacy profile of children with inconsistent speech errors*. Paper presented at the American Speech-Language-Hearing Association (ASHA) Annual Convention Orlando, USA.

Mellin, A. E., & Winton, P. J. (2003). Interdisciplinary collaboration among early intervention faculty members. *Journal of Early Intervention, 25*(3), 173-188.

Ministry of Education. (2010). *Success for All-Every School, Every Child*. Wellington, NZ: Ministry of Education.

Ministry of Education. (2013a). *Communication practice framework*. Wellington, NZ: Ministry of Education.

Ministry of Education. (2013b). *Hi Hikitia-Accelerating Success: The Maori Education Strategy 2013-2017*. Wellington, NZ: Ministry of Education.

Ministry of Education. (2014a). *Language and learning intervention (LLi)*. Retrieved from http://nzcurriculum.tki.org.nz/System-of-support-incl.-PLD/Learner-initiated-supports/Language-and-Learning-intervention-LLi (accessed 19 May 2016).

Ministry of Education. (2014b). *Statement of Intent 2014-2018*. Wellington, NZ: Ministry of Education.

Ministry of Education. (2014c). *Woolston School Modern Learning Environment Case Study*. Retrieved from http://www.education.govt.nz/assets/Documents/Primary-Secondary/Property/School-property-design/Flexible-learning-spaces/WoolstonSchoolMLECaseStudy-June2014.pdf (accessed 15 February 2016).

Ministry of Education. (2015). *National Standards Results, 2014*. Retrieved from http://www.educationcounts.govt.nz/__data/assets/pdf_file/0009/148851/National-Standards-Achievements-Results-2014.pdf (accessed 7 February 2016).

Ministry of Education. (2016). *Flexible learning spaces in schools*. Retrieved from http://www.education.govt.nz/school/property/state-schools/design-standards/flexible-learning-spaces/ (accessed 15 February 2016).

Moats, L. C. (1994). The missing foundation in teacher education: Knowledge of the structure of spoken and written language. *Annals of dyslexia, 44*(1), 81-104.

Moats, L. C. (2000). *Speech to print: Language essentials for teachers (2nd Ed)*. Baltimore, USA: Paul Brooks Publishing Co.

Moats, L. C. (2014). What teachers don't know and why they aren't learning it: Addressing the need for content and pedagogy in teacher education. *Australian Journal of Learning Difficulties, 19*(2), 75-91.

Moriarty, B. C., & Gillon, G. T. (2006). Phonological awareness intervention for children with childhood apraxia of speech. *International Journal of Language & Communication Disorders, 41*(6), 713-734.

Moyle, J. (2004). *The New Zealand Articulation Test (NZAT)*. Wellington, New Zealand: Ministry of Education.

Mroz, M. (2012). Meeting the recommendations of the Bercow Report: The challenges and the potential within initial teacher education. *Child Language Teaching and Therapy, 28*(3), 309-324.

Mullis, I., Martin, M.O., Foy, P., & Drucker, K.T. (2012). *PIRLS 2011 International Results in Reading*. Chestnut Hill, MA: TIMSS & PIRLS International Study Centre, Boston College.

Nathan, L., Stackhouse, J., Goulandris, N., & Snowling, M. J. (2004). The development of early literacy skills among children with speech difficulties: A test of the "Critical Age Hypothesis". *Journal of Speech, Language, and Hearing Research, 47*(2), 377-391.

Nation, K., Cocksey, J., Taylor, J. S. H., & Bishop, D. V. M. (2010). A longitudinal investigation of early reading and language skills in children with poor reading comprehension. *Journal of Child Psychology and Psychiatry, and Allied Disciplines, 51*(9), 1031-1039.

Neuman, W. L. (2006). *Social research methods: Qualitative and quantitative approaches* (Vol. 6th). Boston: Pearson/AandB.

New Zealand Educational Council. (2015). *New Zealand graduating teacher standards*. Retrieved from https://educationcouncil.org.nz/content/graduating-teacher-standards.

New Zealand Speech-language Therapists' Association (NZSTA). (2015). *NZSTA full member new graduate framework*. Retreived from http://www.speechtherapy.org.nz/wp-content/uploads/2015/07/New-Graduate-Framework-June-2015-Final.pdf.

NICHD Early Child Care Research Network. (2005). Pathways to reading: The role of oral language in the transition to reading. *Developmental Psychology, 42*(428-442).

O'Neill, B. J., & Wyness, M. A. (2005). Student voices on an interprofessional course. *Medical Teacher, 27*(5), 433-438.

O'Toole, C., & Kirkpatrick, V. (2007). Building collaboration between professionals in health and education through interdisciplinary training. *Child Language Teaching and Therapy, 23*(3), 325-352.

Oandasan, I., & Reeves, S. (2005a). Key elements for interprofessional education. Part 1: The learner, the educator and the learning context. *Journal of Interprofessional Care, 19*(S1), 21-38.

Oandasan, I., & Reeves, S. (2005b). Key elements of interprofessional education. Part 2: Factors, processes and outcomes. *Journal of Interprofessional Care, 19*(S1), 39-48.

OECD. (2010). PISA 2009 Results: What Students Know and Can Do- Student Performance in Reading, Mathematics and Science (Volume I).

Olson, R., & Bialocerkowski, A. (2014). Interprofessional education in allied health: A systematic review. *Medical Education, 48*(3), 236-246.

Payler, J., Meyer, E., & Humphris, D. (2008). Pedagogy for interprofessional education – what do we know and how can we evaluate it? *Learning in Health and Social Care, 7*(2), 64-78.

Peña, E. D., & Quinn, R. (2003). Developing effective collaboration teams in speech-language pathology: A case study. *Communication Disorders Quarterly, 24*(2), 53-63.

Portney, L. G., & Watkins, M. P. (2008). Foundations of clinical research: applications to practice (3rd ed.). Upper Saddle River, N.J: Pearson/Prentice Hall.

Purvis, C. J., McNeill, B. C., & Everatt, J. (2015). Enhancing the metalinguistic abilities of pre-service teachers via coursework targeting language structure knowledge. *Annals of Dyslexia*, Advance online publication. doi: 10.1007/s11881-015-0108-9

Reeves, S., & Freeth, D. (2002). The London training ward: An innovative interprofessional learning initiative. *Journal of Interprofessional Care, 16*(1), 41-52.

Reeves, S., Goldman, J., Burton, A., & Sawatzky-Girling, B. (2010). Synthesis of systematic review evidence of interprofessional education. *Journal of Allied Health, 39*(3), 198-203.

Reeves, S., Perrier, L., Goldman, J., Freeth, D., & Zwarenstein, M. (2013). Interprofessional education: Effects on professional practice and healthcare outcomes (update) *The Cochrane Database of Systematic Reviews, 3*(3), Article CD002213.

Ritter, M. J., & Saxon, T. F. (2011). Classroom-based Phonological Sensitivity Intervention (PSI) using a narrative platform: An experimental study of first graders at risk for a reading disability. *Communication Disorders Quarterly, 33*(1), 3-12.

Robey, R., & Schultz, M. (1998). A model for conducting clinical-outcome research: An adaptation of the standard protocol for use in aphasiology. *Aphasiology, 12*(9), 787-810.

Santagata, R., & Guarino, J. (2012). Preparing future teachers to collaborate. *Issues in Teacher Education, 21*(1), 59-69.

Semel, E., Wiig, E. H., & Secord, W. A. (2006). *Clinical Evaluations of Language Fundamentals-4* (4th ed.). Sydney, Australia: Pearson PsychCorp.

Shriberg, L. D., Austin, D., Lewis, B. A., McSweeny, J. L., & Wilson, D. L. (1997). The Speech Disorders Classification System (SDCS): Extensions and lifespan reference data. *Journal of Speech, Language, and Hearing Research, 40*(4), 723-740.

Smith-Lock, K. M., Leitao, S., Lambert, L., & Nickels, L. (2013). Effective intervention for expressive grammar in children with specific language impairment. *International Journal of Language & Communication Disorders, 48*(3), 265-282.

Snow, C. E., Scarborough, H. S., & Burns, M. S. (1999). What speech-language pathologists need to know about early reading. *Topics in Language Disorders, 20*(1), 48-58.

Snow, P. C. (2016). Elizabeth Usher Memorial Lecture: Language is literacy is language - Positioning speech-language pathology in education policy, practice, paradigms and

polemics. *International Journal of Speech-Language Pathology*, Advance online publication. doi: 10.3109/17549507.2015.1112837

Snow, P. C., Eadie, P. A., Connell, J., Dalheim, B., McCusker, H. J., & Munro, J. K. (2014). Oral language supports early literacy: A pilot cluster randomized trial in disadvantaged schools. *International Journal of Speech-Language Pathology, 16*(5), 495-506.

Speech Pathology Australia. (2009). *Position statement on transdisciplinary practice*. Retrieved from http://www.speechpathologyaustralia.org.au/library/position_statements/Transdisciplinary_Practice.pdf.

Speech Pathology Australia. (2011). *Competency-based occupational standards: Entry level*. Retrieved from http://www.speechpathologyaustralia.org.au/library/Core_Assoc_Doc/CBOS_for_Speech_Pathologists_2011.pdf.

Spencer, E. J., Schuele, C. M., Guillot, K. M., & Lee, M. W. (2008). Phonemic awareness skill of speech-language pathologists and other educators. *Language, Speech, and Hearing Services in Schools, 39*(4), 512-520.

Squires, K.E., Gillam, SL., & Reutzel, D.R. (2013). Characteristics of children who struggle with reading: Teachers and speech-language pathologists collaborate to support young learners. *Early Childhood Education Journal, 41*(6), 401-411.

Stanovich, K. E. (2008). Matthew Effects in reading: Some consequences of individual differences in the acquisition of literacy. *The Journal of Education, 189*(1/2), 23-55.

Stoeckel, R. E., Colligan, R. C., Barbaresi, W. J., Weaver, A. L., Killian, J. M., & Katusic, S. K. (2013). Early speech-language impairment and risk for written language disorder: A

population-based study. *Journal of Developmental and Behavioral Pediatrics, 34*(1), 38-44.

Storch, S. A, & Whitehurst, G. J. (2002). Oral language and code-related precursors to reading: Evidence from a longitudinal structural model. *Developmental Psychology*, *38*(6), 934-947.

Strauss, A. L., & Corbin, J. M. (1990). *Basics of qualitative research: Grounded theory procedures and techniques*. Newbury Park, CA: Sage.

Suleman, S., MacFarlane, L., Pollock, K., Schneider, P., & Leroy, C. (2013). Do students talk the talk? A study of the use of professional vocabularies among student speech-language pathologists and teachers through an interprofessional education experience. *Canadian Journal of Speech-Language Pathology and Audiology*, *37*(2), 146-154.

Suleman, S., McFarlane, L., Pollock, K., Schneider, P., Leroy, C., & Skoczylas, M. (2014). Collaboration: More than "working together" An exploratory study to determine effect of interprofessional education on awareness and application of models of specialized service delivery by student speech-language pathologists and teachers. *Canadian Journal of Speech-Language Pathology and Audiology*, *37*(4), 298-307.

Suter, E., Arndt, J., Arthur, N., Parboosingh, J., Taylor, E., & Deutschlander, S. (2009). Role understanding and effective communication as core competencies for collaborative practice. *Journal of Interprofessional Care*, *23*(1), 41-51.

Sutherland, D. E., Gillon, G. T., & Yoder, D. E. (2005). AAC use and service provision: A survey of New Zealand speech-language therapists. *Augmentative and Alternative Communication, 21*(4), 295-307.

Thistlethwaite, J. (2012). Interprofessional education: A review of context, learning and the research agenda. *Medical education, 46*(1), 58-70.

Thistlethwaite, J., Jackson, A., & Moran, M. (2013). Interprofessional collaborative practice: A deconstruction. *Journal of Interprofessional Care, 27*(1), 50-56.

Thistlethwaite, J., Kumar, K., Moran, M., Saunders, R., & Carr, S. (2015). An exploratory review of pre-qualification interprofessional education evaluations. *Journal of Interprofessional Care, 29*(4), 292-297.

Thistlethwaite, J., & Moran, M. (2010). Learning outcomes for interprofessional education (IPE): Literature review and synthesis. *Journal of Interprofessional Care, 24*(5), 503-513.

Throneburg, R. N., Calvert, L. K., Sturm, J. J., Paramboukas, A. A., & Paul, P. J. (2000). A comparison of service delivery models: Effects on curricular vocabulary skills in the school setting. *American Journal of Speech-Language Pathology, 9*(1), 10-20.

Torgerson, C. J. (2006). Publication bias: The Achilles' heel of systematic reviews? *British Journal of Educational Studies, 54*(1), 89-102.

Torgesen, J. K., Morgan, S. T., & Davis, C. (1992). Effects of two types of phonological awareness training on word learning in kindergarten children. *Journal of Educational Psychology, 84*(3), 364-370.

Tunmer, W. E., Chapman, J. W., Greaney, K. T., Prochnow, J. E., & Arrow, A. W. (2013). Why the New Zealand National Literacy Strategy has failed and what can be done about it: Evidence from the Progress in International Reading Literacy Study (PIRLS) 2011 and Reading Recovery monitoring reports. *Australian Journal of Learning Difficulties, 18*(2), 139-180.

UNICEF. (2010). *The children left behind: A league table of inequality in child well-being in the world's rich countries (Vol. Innocenti Report Card 9)*. Florence, Italy: Innocenti Research Centre.

van Bysterveldt, A. K., Gillon, G. T., & Foster-Cohen, S. (2010). Integrated speech and phonological awareness intervention for pre-school children with Down Syndrome. *International Journal of Language & Communication Disorders, 45*(3), 320-335.

Vance, M., & Clegg, J. (2012). Use of single case study research in child speech, language and communication interventions. *Child Language Teaching and Therapy, 28*(3), 255-258.

Walsh, K., Glaser, D., & Wilcox, D. D. (2006). *What education schools aren't teaching about reading and what elementary teachers aren't learning*: Retrieved from www.nctq.org (accessed 14 January 2016).

Washburn, E. K., Joshi, R. M., & Binks-Cantrell, E. S. (2011). Teacher knowledge of basic language concepts and dyslexia. *Dyslexia, 17*(2), 165-183.

Winitana, M. (2012). Remembering the deeds of Maui: What messages are in the tuakana teina pedagogy for tertiary educators? *Mai, 1*(29-37).

World Health Organization. (1988). *Learning together to work together*: Retrieved from http://apps.who.int/iris/bitstream/10665/37411/1/WHO_TRS_769.pdf (accessed 16 January 2016).

World Health Organization. (2010). *Framework for action on interprofessional education and collaborative practice*. Retrieved from http://www.who.int/hrh/nursing_midwifery/en/ (accessed 12 June 2014).

Wright, J. A. (1996). Teachers and therapists: The evolution of a partnership. *Child Language Teaching and Therapy, 12*(1), 3-14.

Wright, J. A., & Kersner, M. (2004). Short-term projects: The Standards Fund and collaboration between speech and language therapists and teachers. *Support for Learning, 19*(1), 19-23.

Wright, J. A., Stackhouse, J., & Wood, J. (2008). Promoting language and literacy skills in the early years: Lessons from interdisciplinary teaching and learning. *Child Language Teaching and Therapy, 24*(2), 155-171.

APPENDIX A

Survey instrument utilised to examine the inter-professional knowledge and perceptions of student SLTs and student teachers

Note. The following represents the student SLT form of the survey. For section 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. Professional knowledge in language and early literacy

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 reading errors and self-corrections that students make during oral reading

c. spelling proficiency by analyzing the type of spelling errors 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 difficult 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. Perceptions about SLT-teacher co-working

3-1. Who do you think should participate in the teaching 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. 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 child in a quiet room out of 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 a child

vi. provide professional development to educators

vii. work with families to help them support the child

3-3. 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 course work and/or student professional practice, have you been provided with any examples or case studies on how to collaborate with a teacher? If yes, please describe in 1 or 2 sentences.

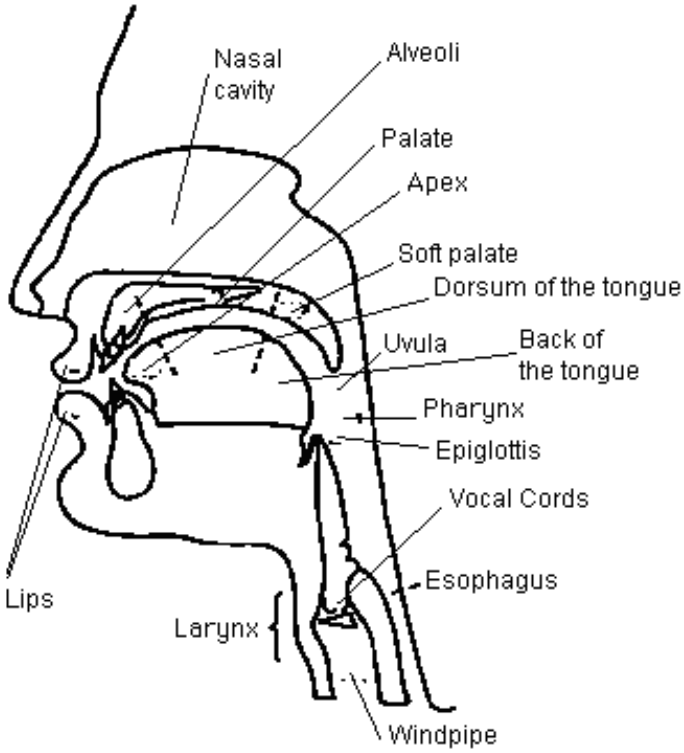
APPENDIX B

Supplemental guided discussion activities utilized in the course-based approaches to IPE

1. Supplemental discussion activities for Group 1 (experimental group)

Inter-professional Experience #1

1) SLT students, please use the diagram to explain the articulation of speech sounds of NZ English to your teaching colleagues. Ensure you explain how consonants sounds differ by place, manner and voicing and how the articulation of vowels differ from consonant sounds.



2) Discuss as a group what does the term *language* mean to you? Please write down a few of the differences and similarities you have found amongst your understandings of 'language'.

Inter-professional Experience #2

shifting			
How may phonemes?	How many consonant phonemes?	How many vowel phonemes?	
How many letters?	How many consonant digraphs/trigraphs? List each.	How many vowel teams? List each.	How many consonant blends? List each.
How many morphemes?	What is the base or root word?	How many prefixes? List each.	How many suffixes? List each.

spell			
How may phonemes?	How many consonant phonemes?	How many vowel phonemes?	
How many letters?	How many consonant digraphs/trigraphs? List each.	How many vowel teams? List each.	How many consonant blends? List each.
How many morphemes?	What is the base or root word?	How many prefixes? List each.	How many suffixes? List each.

Shifting (with answers)			
How may phonemes? 6	How many consonant phonemes? 4	How many vowel phonemes? 2	
How many letters? 8	How many consonant digraphs/trigraphs? List each. 2 digraphs (sh, ng)	How many vowel teams? List each. 0	How many consonant blends? List each. 1 (ft)
How many morphemes? 2 (shift-ing)	What is the base or root word? shift	How many prefixes? List each. 0	How many suffixes? List each. 1 (-ing)

Spell (with answers)			
How may phonemes? 4	How many consonant phonemes? 3	How many vowel phonemes? 1	
How many letters? 5	How many consonant digraphs/trigraphs? List each. 1 digraph (ll)	How many vowel teams? List each. 0	How many consonant blends? List each. 1 (sp)
How many morphemes? 1	What is the base or root word? spell	How many prefixes? List each. 0	How many suffixes? List each. 0

Inter-professional Experience #3

1) Teaching students – please describe to your SLT colleagues the common literacy instructional materials and activities that are used in typical NZ classrooms (e.g., Guided Reading, shared reading, Ready to Read series). Ensure you also discuss the colour wheel that denotes different instructional reading levels. As part of your discussion, use the timetable below to complete a schedule of what a week of literacy instructional time may look like.

	Monday	Tuesday	Wednesday	Thursday	Friday
Morning					
Lunch					
Afternoon					

2) As a group, review the provided curriculum documents (i.e., The Reading and Writing National Standards, The Literacy Learning Progressions and the New Zealand Curriculum) and discuss which of these documents (if any) may be most helpful for collaborative goal setting between teachers and SLTs. Briefly describe your thoughts below.

2. Supplemental discussion activities for Group 2 (comparison control group)

Inter-professional Experience #1

1) As a group, discuss factors that would likely make collaboration among SLTs and teachers challenging. Also brainstorm ideas of how these barriers to collaboration could be addressed or overcome. Briefly describe the ideas generated by the group.

Inter-professional Experience #2

1) Currently, SLT services through the Ministry of Education are only provided to 1% of the school-age population (Communication Practice Framework, 2013). This is of concern given it is estimated that approximately 7% of children enter school with language impairment (Tomblin, Smith & Zhan, 1997) and 6% of school aged children have speech sound difficulties (McLeod & Harrison, 2009). We also know that children with speech and/or language disorders are 4-5 times more likely to experiencing difficulty with literacy learning which has serious academic, social and vocational consequences (Catts & Kamhi, 2005). What could professionals, families and communities do to advocate for increased access to specialized services for this population of children experiencing communication difficulties?

Inter-professional Experience #3

1) Imagine you are part of an advocacy group to promote increased access to specialized services for school age children who are experiencing both spoken and written language difficulties. Discuss and propose:

- a name for your group
- a slogan (e.g., the slogan of a professional association for speech-language therapy is *Hear Well, Speak Well, Live Well*)
- a mission statement (i.e., overarching purpose and goals of the group)

APPENDIX C

Lesson plan coding examples

Student teacher excerpts	Coding	
	Component	Score
Try to use velars (k, g) – sounds from the SLT to encourage correct pronunciation.	Expressive Phonology/ Articulation Co-working	2 (TA) 3 (SG)
Guided Reading- identifying phoneme within words starting with initial phoneme.	Phonological Awareness	2 (TA)
Work with letter/sound skills. Particularly with consonants. Show the child a particular letter and ask what sound it makes. Do this activity also backwards. Model sound to child and ask what letter or letters might make that sound.	Orthographic Knowledge	3 (TA + IA)
Comprehension – not just focusing on reading but giving different strategies to draw meaning from the text. Looking at images. Predicting and retelling, questioning.	Language Comprehension	2 (TA)

Notes. TA=targeted aspect; IA = instructional activities; SG = shared goal

Student SLT excerpts	Coding	
	Component	Score
I would want to address the [child's] articulation errors. I would make [the child] aware of errors and talk about how our mouths make the sounds. I would want Essential Word Lists from the teacher and choose the words likely to be misarticulated as targets. I would then work on a hierarchy to get the child to the level of pronouncing these words.	Expressive Phonology/ Articulation Co-working	3 (TA + IA) 3 (SG)
Within sessions therapist would work on the skills of first segmenting and blending words verbally using coloured blocks. This skill can then also be built up to manipulating the sounds by adding more in or taking them away. This skill will not only help in verbal language but also in spelling as it will give [the child] the skill to sound out the words phonetically to help translate this to written language.	Phonological Awareness	4 (TA + IA+R)
Focus on awareness of letters and their sounds, work on hearing sounds, writing them down i.e., I'm going to say some sounds and I want you to write them down "p","k", "ee", "oo" - build up to the word level with success.	Orthographic Knowledge	3 (TA + IA)
-syntax and narrative discourse, structure of sentences and how they're related to meaning	Language Comprehension	2 (TA)

Note. TA=targeted aspect; IA= instructional activity; SG=shared goal; R=rationale

APPENDIX D

Interview questions utilised to examine student SLTs' and student teachers' perceptions of the course-based IPE

1. Tell me about interacting with the student SLTs/teachers.
2. Is there one key experience or memory from the workshops that sticks out in your mind? If so, please describe it to me.
3. What are two or three things you learned from the workshop?
4. What did you find most useful about the workshop?
5. How do you feel about collaborating with teachers/SLTs when you are a practitioner? How does this compare to how you felt before the workshop?
6. Would you participate in another workshop that brought together student teachers and student SLTs? Please explain your response.
7. From your experience, how could the workshop be improved?

APPENDIX E

Interview questions utilised to examine student SLTs' and student teachers' experiences in the placement-based IPE

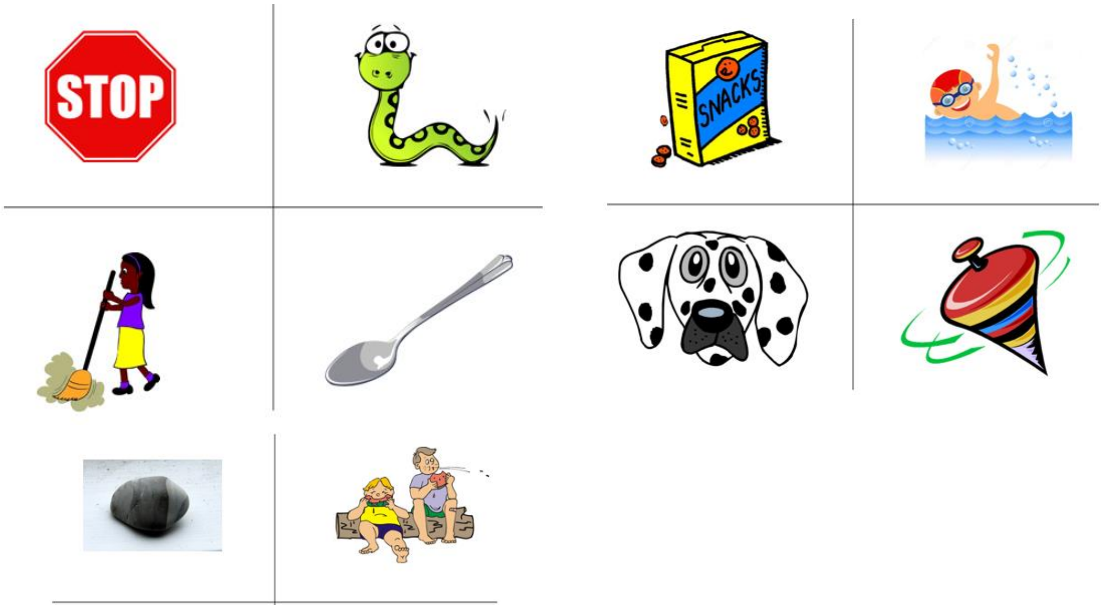
1. Tell me about your experience working in the classroom with the other student professional to support the learning of the child/children selected for the project.
2. Overall, how successful do you feel you and your student colleague were at collaborating?
3. What did you learn as a result of co-working with your student colleague?
4. What do you think your student colleague learned as a result of co-working with you?
5. Tell me about how you and your student colleague worked on the learning goals for the child/children.
6. How would you have ideally wanted to co-work with your student colleague?
7. How do you think the child/children responded to the co-work between yourself and your student colleague?

APPENDIX F

Example of speech probe and phoneme awareness probe for one child who participated in the placement-based IPE

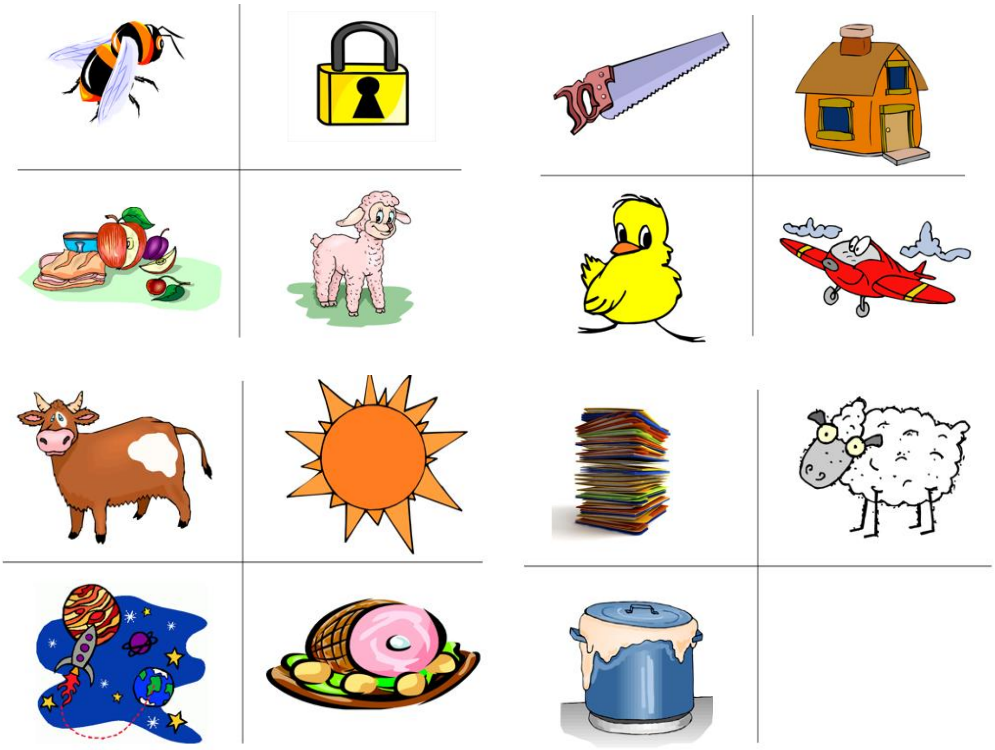
Targeted phonological error pattern: s cluster reduction

Speech probe: The child is asked to name the following items. The following prompting hierarchy is utilized if child is unable to name the item: 1) semantic cue (e.g., It's something you eat with.), 2) sentence completion cue (e.g., I eat my cereal with a _____), and 3) delayed imitation cue (I eat my cereal with a spoon. What do I eat my cereal with?).



Trained Items	Untrained items
stop	stone
snake	snack
spot	spin
spoon	spit
swim	sweep

Phoneme awareness probe: The examiner names each picture and asks the child to tell the examiner what sounds the child hears in each of the words.



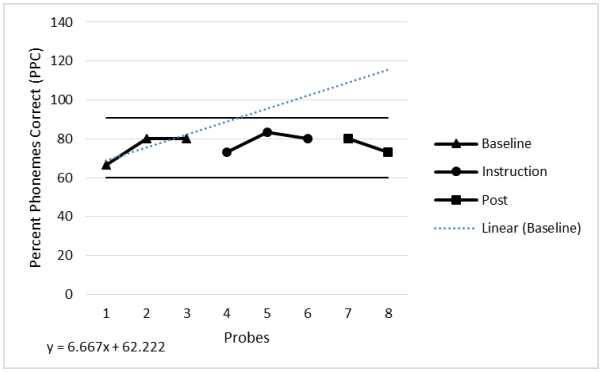
Trained Items	Untrained items
bee	saw
cow	ham
food	pot
lamb	lock
sheep	stack
house	
chick	
sun	
plane	
space	

APPENDIX G

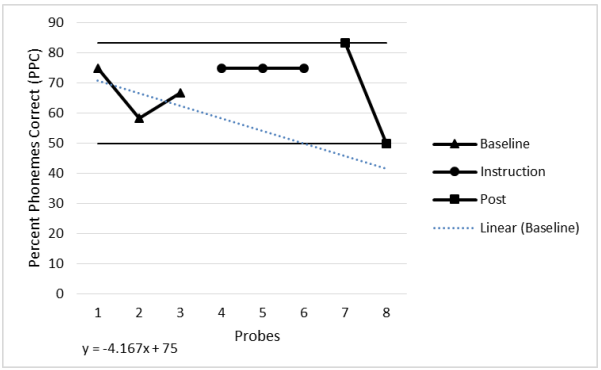
Graphs of children's performance on repeated measures of trained and untrained speech and phoneme awareness items

Child 1

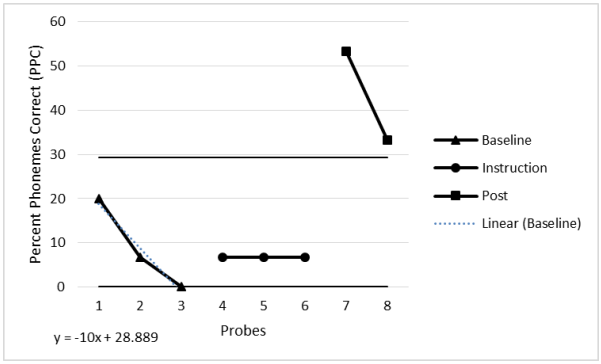
Trained speech items



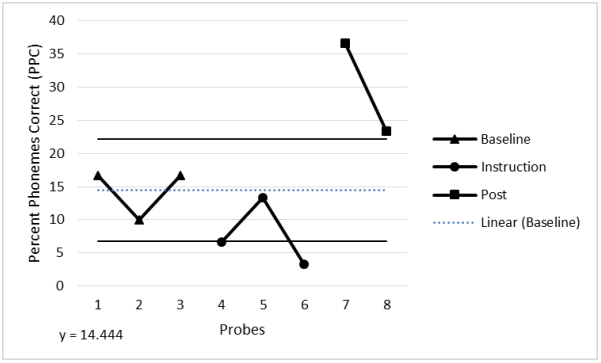
Untrained speech items



Trained phoneme awareness items

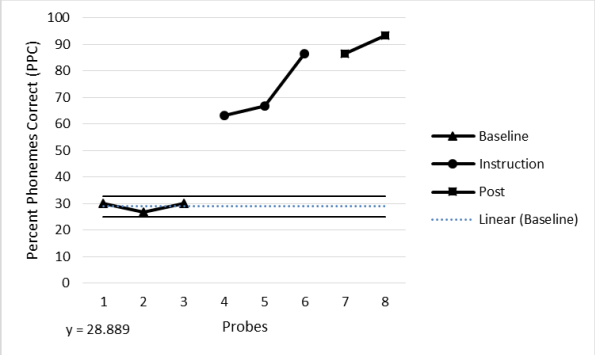


Untrained phoneme awareness items

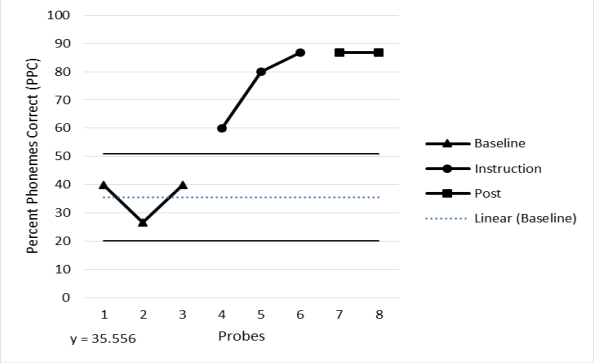


Child 2

Trained phoneme awareness items

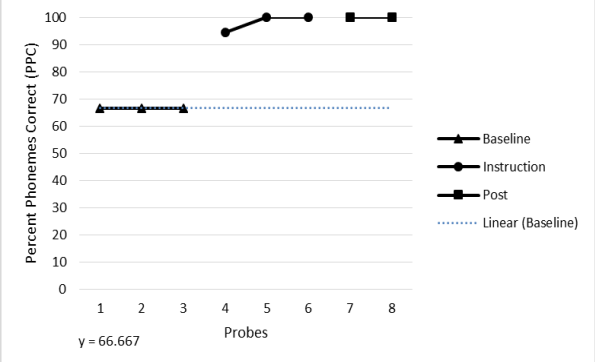


Untrained phoneme awareness items

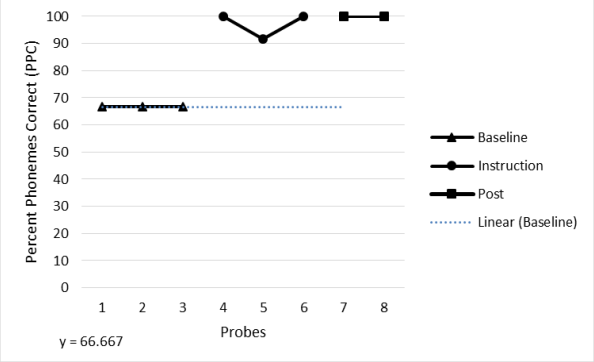


Child 3

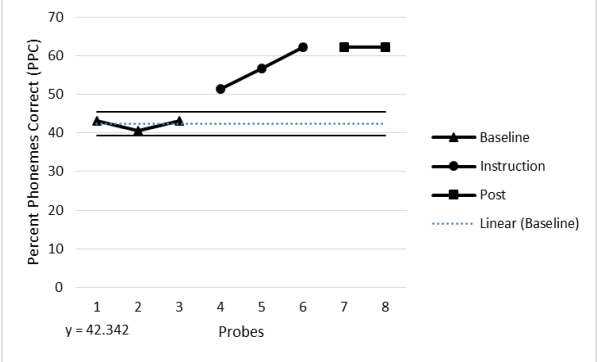
Trained speech items



Untrained speech items

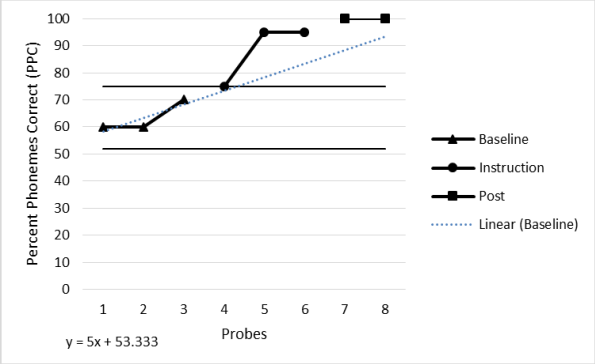


Untrained phoneme awareness items

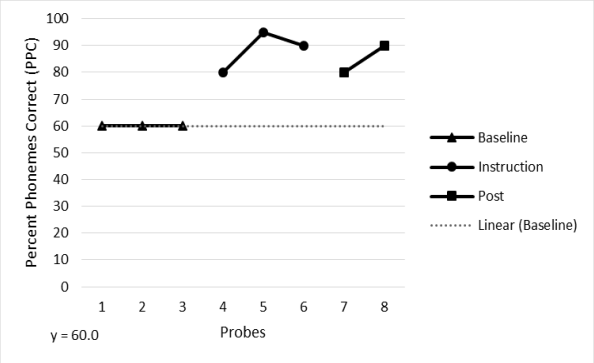


Child 4

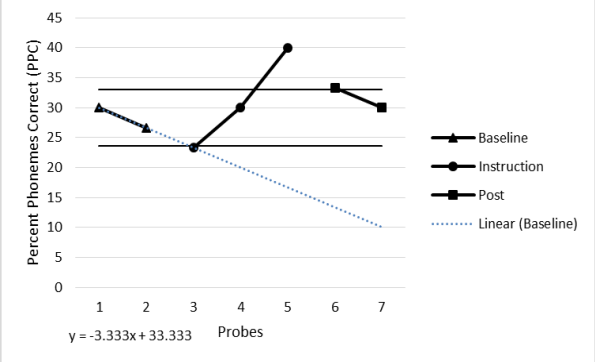
Trained speech items



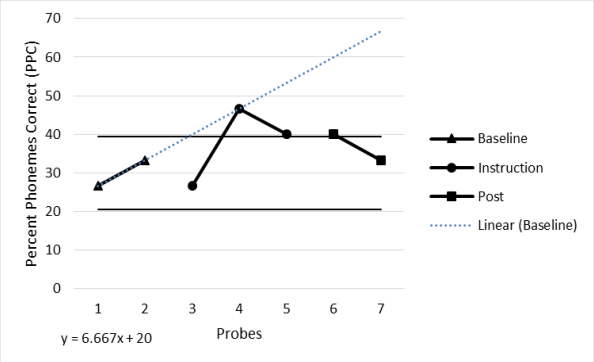
Untrained speech items



Trained phoneme awareness items

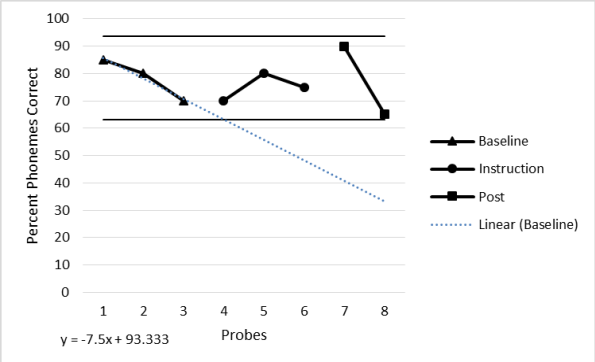


Untrained phoneme awareness items

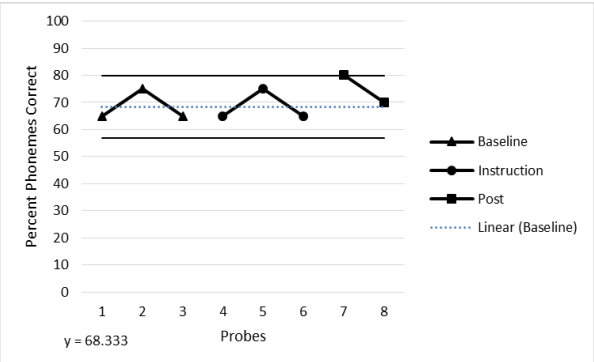


Child 5

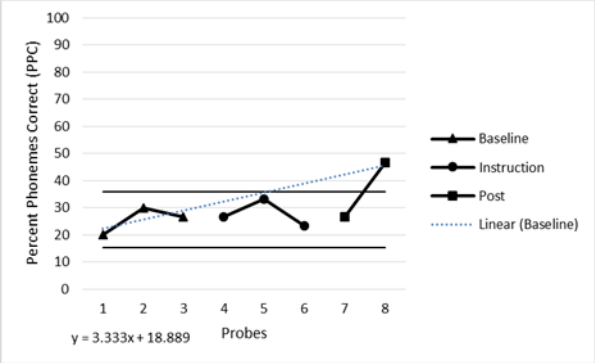
Trained speech items



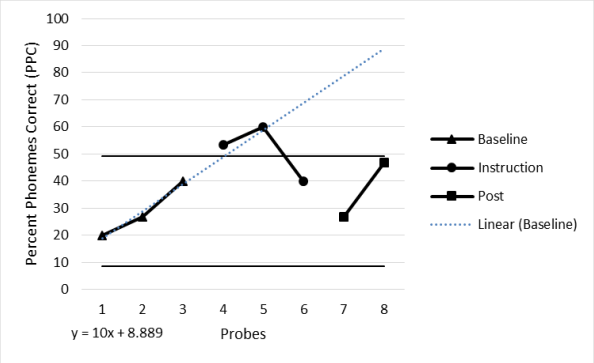
Untrained speech items



Trained phoneme awareness items

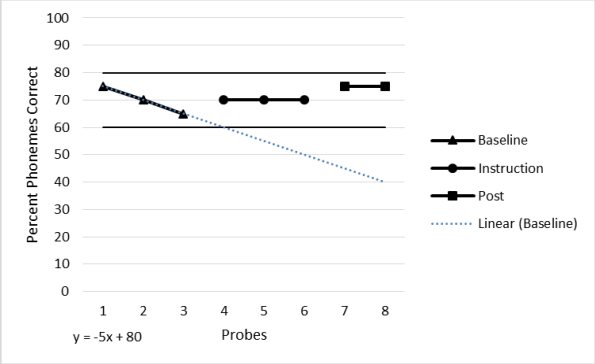


Untrained phoneme awareness items

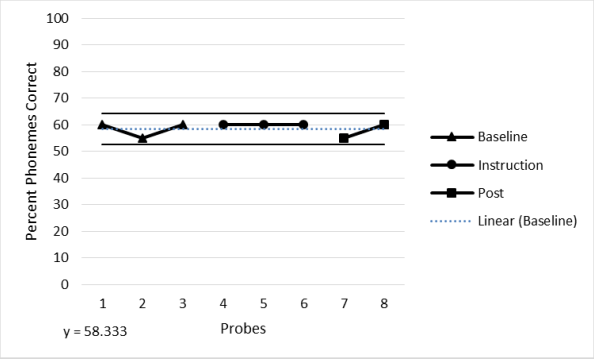


Child 6

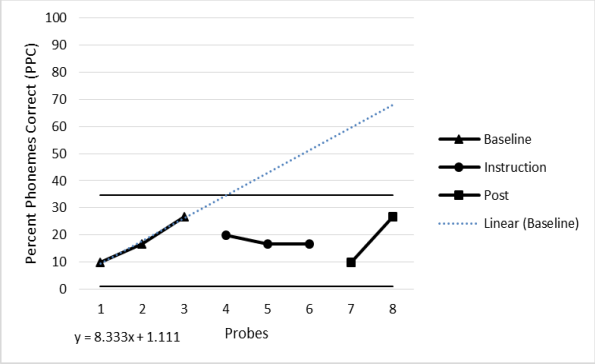
Trained speech items



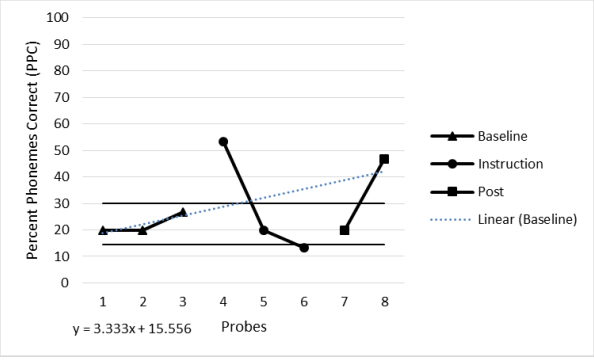
Untrained speech items



Trained phoneme awareness items

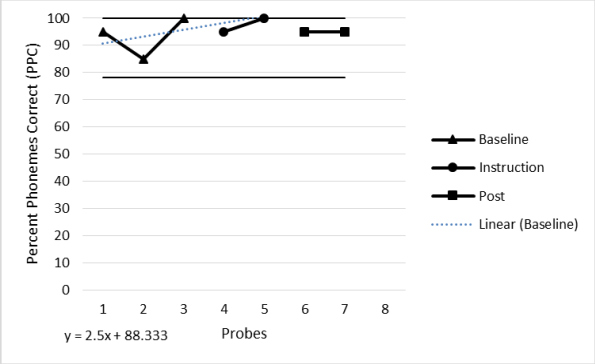


Untrained phoneme awareness items

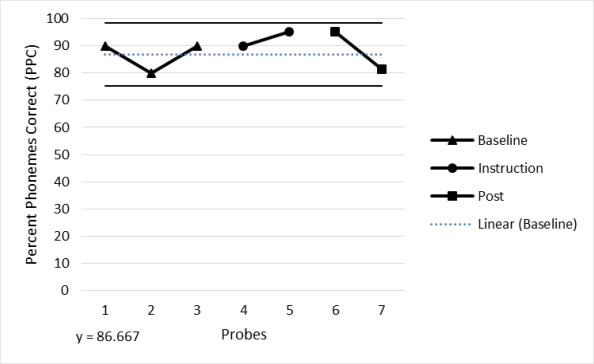


Child 7

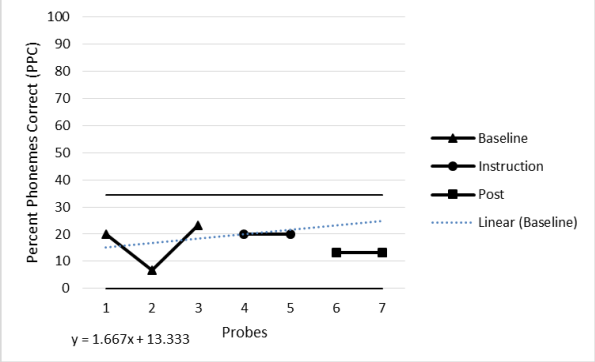
Trained speech items



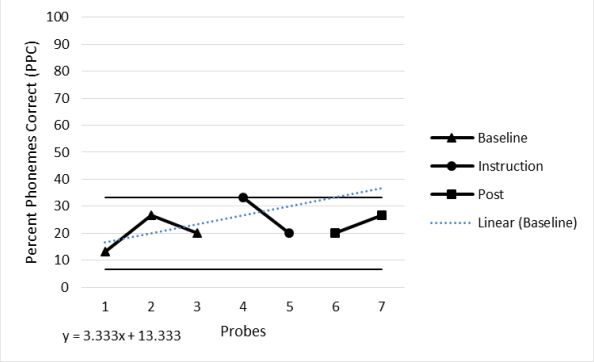
Untrained speech items



Trained phoneme awareness items



Untrained phoneme awareness items



APPENDIX H

Ethical approval from the Educational Research Human Ethics Committee (University of Canterbury) to conduct research project

HUMAN ETHICS COMMITTEE

Secretary, Lynda Griffioen

Email: human-ethics@canterbury.ac.nz

Ref: 2013/64/ERHEC

11 November 2013

Leanne Wilson
School of Teacher Education
UNIVERSITY OF CANTERBURY

Dear Leanne

Thank you for providing the revised documents in support of your application to the Educational Research Human Ethics Committee. I am very pleased to inform you that your research proposal "Advancing interprofessional collaboration to improve children's language and early literacy outcomes" has been granted ethical approval.

Please note that this approval is subject to the incorporation of the amendments you have provided in your email of 7 November 2013.

Should circumstances relevant to this current application change you are required to reapply for ethical approval.

If you have any questions regarding this approval, please let me know.

We wish you well for your research.

Yours sincerely

Nicola Surtees

Chair

Educational Research Human Ethics Committee

"Please note that Ethical Approval and/or Clearance relates only to the ethical elements of the relationship between the researcher, research participants and other stakeholders. The granting of approval or clearance by the Ethical Clearance Committee should not be interpreted as comment on the methodology, legality, value or any other matters relating to this research.