Teaching and Learning in Communication Sciences & Disorders

Volume 6 | Issue 1 Article 3

2022

A Practice-Based Interprofessional Emergent Writing Intervention: Impacts on Graduate Students and Preschoolers

Danika Pfeiffer
Kennedy Krieger Institute, Johns Hopkins School of Medicine, danikapfeiffer@gmail.com

Stacey Pavelko
University of St. Augustine, spavelko@usa.edu

Dannette Allen-Bronaugh
James Madison University, bronauda@jmu.edu

See next page for additional authors

DOI: https://doi.org/10.30707/TLCSD6.1.1649037808.702214

A Practice-Based Interprofessional Emergent Writing Intervention: Impacts on Graduate Students and Preschoolers

Cover Page Footnote

We have no known conflict of interest to disclose. Our work was funded by a Student Engagement Mini Grant from the James Madison University Faculty Senate and Student Government Association. We thank the children, parents, graduate students, administrators, and preschool staff whose participation in the study made this research possible. Appreciation is extended to Elizabeth Richardson and Dr. Susan Ingram, for their support and coordination of the graduate students' participation in this project. Special thanks to Morgan Cornwell, research assistant, who contributed to data collection and analysis.

Authors

Danika Pfeiffer, Stacey Pavelko, Dannette Allen-Bronaugh, Carol C. Dudding, and Geralyn Timler

School-based speech-language pathologists (SLPs) are expected to work collaboratively with other education professionals to enhance children's learning outcomes (American Speech-Language-Hearing Association [ASHA], 2010). As essential members of school faculties, SLPs have a responsibility to work in partnership with other education professionals, families, and students to meet the needs of students. While the majority of ASHA-certified SLPs work in school settings, only 27% of them report formal training in how to work on teams (ASHA, 2017a, 2020). Research has indicated that effective collaborative techniques must be developed, taught, and practiced at the preprofessional level to build competency and produce successful outcomes (Anderson, 2013; Dobbs-Oates & Wachter Morris, 2016; Hong & Shaffer, 2014). Further, SLPs without this training are less likely to engage in interprofessional practice (IPP; Pfeiffer et al., 2019).

The World Health Organization (WHO, 2010) defines IPP in health care as a time when "multiple health care workers from different professional backgrounds provide comprehensive services by working with patients, their families, caregivers, and communities to deliver the highest quality of care across settings" (p. 13). ASHA has expanded the definition of IPP to include school-based professionals to better represent the full scope of practice (Johnson, 2016). Given IPP's importance, ASHA identified the advancement of IPP in both medical and school-based settings as one of its strategic objectives in its Envisioned Future: 2025 document (ASHA, 2017b). To accomplish this objective and promote IPP in the profession, ASHA recognizes the need for training in IPP (i.e., interprofessional education [IPE]) to be integrated into academic programs.

IPE occurs when "two or more professions learn about, from, and with each other to enable effective collaboration and improved health outcomes" (WHO, 2010). In response to the widening gap between professionals' siloed training and the realities of expectations for IPP, the Interprofessional Education Collaborative (IPEC) established four core competencies of IPE to establish a common language across professions (IPEC, 2016): (a) interprofessional teamwork and team-based practice; (b) interprofessional communication; (c) values/ethics; and (d) roles and responsibilities. The Council on Academic Accreditation in Audiology and Speech-Language Pathology (CAA) added IPE to its accreditation standards in 2017 in an effort to increase IPE in graduate training programs in communication sciences and disorders, (CAA, 2017). These standards require accredited programs in speech-language pathology to provide graduate students with both the knowledge and skills needed to work effectively on interprofessional teams. However, there is scant published literature to guide the development and implementation of school-based IPE opportunities (Pfeiffer et al., 2018).

While the IPEC competencies and their definitions serve as a useful tool to guide the creation of IPE for preparation to work in healthcare environments, no such formal framework exists for IPE trainings for preparation to work on education teams. It cannot be assumed that skills learned during IPE trainings in medical environments will generalize to school settings. Recently, Ludwig and Kerins (2019) adapted the IPEC core competencies for the school setting, highlighting the importance of IPE trainings targeting school-based collaborations.

Current Status of IPE for the Educational Setting. Practice-based interprofessional trainings during graduate school have the potential to impact students' future clinical practice. A survey of 1,897 school-based SLPs found that those with a co-teaching experience during their professional training were six times more likely to collaborate in the classroom as a school-based SLP (Brandel

& Loeb, 2011). Only three studies have explored practice-based educational IPE interventions, opportunities where interprofessional learning is embedded into professional practice placements under supervision by certified professionals, for preprofessional SLPs (Miolo & DeVore, 2016; Wilson et al., 2017, 2019). Miolo and Devore (2016) implemented a semester-long consultation IPE intervention for graduate SLP students (n = 29) and undergraduate early childhood special education (ECSE) students (n = 56). Online surveys from one student cohort (n = 38) revealed that the IPE intervention helped them develop some of the IPE competencies, with 68.4% reporting agreeing or strongly agreeing that they developed all four competencies. Wilson et al. (2017) implemented a five-week practice-based IPE intervention for undergraduate SLP students (n = 4) and undergraduate student teachers (n = 4). Students worked in SLP and teacher student dyads in primary schools to support the learning of a child or group of children demonstrating speech, language, and/or literacy learning difficulties. Students were instructed to target speech and literacy-related goals together. Results indicated that the IPE intervention increased the students' acceptance of co-working models and understanding of the shared roles of SLPs and teachers in children's speech development, but not did not increase their understanding of shared roles in literacy instruction (Wilson et al., 2017). Wilson et al. (2017) recommended that future IPE interventions ensure clinical educators provide role-modeling and feedback aligned with effective IPP to enhance students' understanding of shared professional roles.

Many of the studies published to date about IPE interventions focused on the educational setting are one-day seminars employing case-based learning activities (Paul et al., 2020; Strunk et al., 2019; Suleman et al., 2013, 2014; Wilson et al., 2016). The benefits of such interventions resulted in changes in students' content knowledge (Wilson et al., 2016), use of profession-specific terminology (Suleman et al., 2013), instructional planning (Suleman et al., 2014; Wilson et al., 2016), and attitudes/beliefs about IPP (Paul et al., 2020; Strunk et al., 2019). More specifically, through these one-day IPE interventions, students can gain content knowledge of curricular concepts, reduce their use of profession-specific terminology, construct more collaborative lesson plans, and develop more positive attitudes towards IPP. While these one-day workshops are valuable for preprofessional students, practice-based IPE interventions may offer better opportunities for students to develop a broader range of collaborative competencies (Wilson et al., 2017, 2019). Taken together, the findings from these studies suggest that practice-based IPE trainings have the potential to increase students' interprofessional competencies with the proper guidance and modeling support from trained faculty or clinical educators.

Determining the impact of IPE interventions on clinical practice, specifically child outcomes, is crucial to determine if collaborative care is more, or equally, effective as care provided by professionals independently. To date, only one published study of a practice-based speech, language or literacy IPE intervention with SLP students has explored effects on the children receiving the intervention (Wilson et al., 2019). This study found that children's speech and early literacy outcomes can be enhanced even in a short, five-week IPE practice-based intervention and, with increased input from clinical educators specific to IPP and longer training duration, IPE interventions may have greater success in supporting students' IPP (Wilson et al., 2019).

IPE Interventions Targeting Emergent Writing. A search of the literature failed to identify any IPE interventions targeting children's emergent writing skills, despite the importance of this skill for children's development of literacy skills. Writing is one of six variables found by the National

Early Literacy Panel (2008) representing an early or precursor literacy skill with a medium to large predictive relationship with later measures of literacy development. However, an observational study of four- and five-year old children across 81 classrooms found an average of only two minutes a day being spent writing or receiving writing instruction (Pelatti et al., 2014). SLPs and occupational therapists (OTs) are commonly members of Individualized Education Program teams for children with language and literacy needs and both play a critical role in supporting children's emergent writing development (ASHA, 2001; Gerde et al., 2014). While both SLPs and OTs are knowledgeable about writing development, SLPs have additional expertise in language acquisition and emergent literacy, and OTs have expert knowledge in the development of fine motor skills and the mechanics of handwriting. The two professionals shared foundational knowledge about writing development paired with the combination of each profession's specialized skills enhances emergent writing instruction, particularly for children with communication disorders. SLPs and OTs can work on interprofessional teams to target children's development of emergent writing skills to ensure that the curriculum is accessible, and supports are individualized and evidence-based (ASHA, 2010). Despite the importance of supporting emergent writing, no studies have been published to examine the effects of training these two student groups to collaborate while targeting it during service delivery. Without this interprofessional training, it is unlikely that these future professionals will collaborate together in their future clinical practice to deliver these services (Pfeiffer et al., 2019).

Purpose of the Study. The purpose of this pilot study was to explore the effects of a five-week interprofessional emergent writing practice-based intervention for graduate SLP and occupational therapy (OT) students, as well as preschoolers receiving the interventions. Research questions included:

1. Do graduate SLP students gain knowledge in emergent writing from participation in the IPE intervention?
2. Does this IPE intervention impact SLP students' self-reported levels of interprofessional competency?
3. Do preschoolers receiving the emergent writing intervention sessions demonstrate improvement on *Write Letters, Write Name,* and *Write CVC Words* emergent writing tasks?

Methods

Design. This small-scale study is exploratory in nature to identify effective components of the IPE intervention and evaluation measures that are sensitive to graduate student and child change. This IPE intervention consisted of two components: (a) one 2-hour workshop, and (b) five weeks of emergent writing intervention sessions. This pilot study was designed to inform the methodology of larger practice-based IPE emergent writing interventions aimed to increase learning outcomes for both SLP and OT graduate students and child participants. Before recruiting participants, this study received approval from the internal review board at James Madison University.

Participants. Three groups of participants were recruited for this study: graduate students, preschoolers, and clinical educators.

Graduate Students. Nine first-year graduate students volunteered to participate in the study from the speech-language pathology (n = 6) and occupational therapy (n = 3) graduate programs at a

large, Mid-Atlantic state university. The SLP students had completed one graduate course on child language and literacy disorders prior to the start of the intervention, while the OT students had not yet taken any graduate pediatric coursework.

While OT students were included in this IPE intervention, the scope of this paper is limited to discussion of outcomes for the SLP graduate students and preschoolers. SLP students were randomly assigned to one of two conditions: (a) unpaired; or (b) paired. SLP students assigned to the unpaired condition delivered all emergent writing intervention sessions independently throughout the duration of the study. SLP students assigned to the paired condition were assigned an OT graduate student partner at random. These pairs of students collaborated to deliver one of the intervention sessions together each week, while the other session was delivered by the SLP student independently (due to scheduling conflicts). The unpaired SLP students delivered their intervention sessions at one suburban public preschool site while the paired students implemented the sessions in another suburban public preschool.

Preschoolers. The second group of participants, the preschoolers (n = 21), were recruited from two preschools using convenience sampling by classroom teachers who sent home parental consent forms to all children's families with a study description. All preschoolers with signed parental consent were included in the study, without any exclusionary criteria. A total of 10 preschoolers from one classroom in one of the preschool sites were randomly placed into three small groups in the unpaired condition and 11 preschoolers from seven classrooms in the other preschool site were randomly divided into three small groups in the paired condition.

Clinical Educators. Three clinical educators (two ASHA certified SLPs and one licensed OT) with three or more years of clinical experience were also recruited using convenience sampling. Recruitment was conducted by emailing information about the study to clinical educators that had previously provided clinical training and supervision for the speech-language pathology and occupational therapy programs. One SLP clinical educator was assigned to the students in the unpaired condition. The other SLP clinical educator was paired with the OT clinical educator and assigned to work with the students in the paired condition.

Training.

Research Team Training. The research team for this study consisted of the first author (a SLP clinical fellow working in the preschool setting and doctoral candidate in Communication Sciences and Disorders) and a trained research assistant, an undergraduate student in the Communication Sciences and Disorders program. Both members of the research team completed the university's required IRB training prior to the study. The research assistant also received a 2-hour orientation to the study's materials and procedures from the first author. During this time, the research assistant was trained how to prepare the intervention materials, administer the child emergent writing tasks, and lead facilitated discussions with the graduate students. After the 2-hour orientation, the research assistant also observed the first author administering the emergent writing tasks and leading the facilitated discussions before doing so independently.

Clinical Educator Training. The research team conducted one-hour individual training sessions with each of the clinical educators. The research team reviewed the purpose and procedures of the study and provided the clinical educators with the study materials including: graduate students'

DOI: https://doi.org/10.30707/TLCSD6.1.1649037808.702214

supplemental readings about IPP and emergent writing, a copy of the knowledge survey to guide teaching of key emergent writing concepts, and intervention fidelity checklists for each of the emergent writing intervention sessions.

Clinical educators were trained on the emergent writing and IPP concepts that the study aimed to teach the graduate students, including the stages of emergent writing (Byington & Kim, 2017) and the IPEC Core Competencies (IPEC, 2016). Additionally, the clinical educators were trained on the DEAL Model for Critical Reflection (Ash & Clayton, 2004). They were instructed to use this model during their debriefings with the graduate students after each intervention session for consistency across clinical educators.

The DEAL Model consists of three sequential steps: (a) description of experiences during the intervention session in an objective and detailed manner (e.g., what the graduate students did); (b) examination of the experiences in terms of specific learning goals or objectives (emergent writing concepts and IPP); and (c) articulation of learning, including goals for future action to be taken forward into the next intervention session for improved practice and refinement of learning. The clinical educators were given a list of example prompts to use with the graduate students during the debrief sessions to address each of the DEAL model stages. They were instructed to facilitate discussion during each debrief session around at least one prompt from each stage of reflection.

Emergent Writing Intervention.

Workshop. All graduate students took part in a 2-hour didactic, primarily lecture-based workshop provided by the research team prior to the start of the emergent writing intervention sessions. Graduate students learned about emergent writing, IPE, and IPP through didactic instruction delivered via a PowerPoint presentation and whole-group discussion about a problem-solving inventory activity, adapted from Kolb's Learning Style Inventory (Kolb, 1976).

***Emergent Writing Intervention Sessions*.** The graduate students in each condition (unpaired SLP students; paired SLP and OT students) provided the same five activities targeting emergent writing from *Emergent Literacy Lessons for Success* (Cabell et al., 2009), a flexible tool designed to enhance emergent literacy interventions for preschool and kindergarten-age children. The first author selected activities from the book that specifically targeted the development of name-writing and letter-writing skills. Each of the five different activities were implemented twice, for a total of ten 30-minute sessions in locations outside of the preschool classrooms (e.g., library, SLP's classroom). Each 'unpaired' SLP student and SLP and OT student pair were randomly assigned a small group of three or four preschoolers to work with for the duration of the study. The materials and procedures for each activity were standardized across conditions to reduce the possibility of them being confounding variables. However, the lessons were flexible in terms of the ways the preschoolers could complete the activity depending on their stage of emergent writing (e.g., scribbling, letter-like forms, invented spelling). For example, in the "What's My Name?" activity described in Table 1, preschoolers created name tags for Beanie Babies by writing the names on notecards at their level of emergent writing. Therefore, preschoolers in the scribbling stage were encouraged to make marks or scribbles on their notecards while those in the invented spelling stage were supported to sound out the sounds in the Beanie Baby's name as they wrote letters on their notecards. The researcher provided the graduate students with fidelity checklists that included a list of required steps to complete for each lesson which were used for fidelity purposes as well as

a list of optional steps that could be added to the lesson if time allowed. Each clinical educator completed these fidelity checklists while observing the intervention sessions.

Table 1

What's My Name? Lesson Plan

Step 1	Gather materials: notecards with string, Beanie Babies, writing utensils (markers, crayons, pencils).
Step 2	Show the children the Beanie Babies that they need to name as a group.
Step 3	Give each child in the group an opportunity to make a name tag for a Beanie Baby using his/her level of emergent writing.
Step 4	Support each child's writing at their level of emergent writing.
Step 5	Have each child read their Beanie Baby's name to the group.

Note. Lesson is from *Emergent Literacy Lessons for Success* (Cabell et al., 2009).

Facilitated Discussions. Facilitated discussions have been identified in the literature as a method to scaffold student learning during IPE interventions (Pfeiffer et al., 2018; Wilson et al., 2016). The purpose of these discussions was: (a) to facilitate the graduate students' development of emergent writing knowledge and interprofessional competencies by discussing assigned readings; and (b) to help the graduate students bridge research and their hands-on clinical practice by identifying each preschooler's stage of emergent writing and then brainstorming how to best support them in advancing to the next stage. Two facilitated discussions led by the research team took place with the graduate students (after the third and seventh emergent writing intervention sessions). The unpaired SLPs met independently with a research team member while the paired SLPs met with one of the research team members and their OT partner. The readings reviewed during each of these facilitated discussions are provided in Appendix B.

Data Collection.

Graduate Students. Two measures were used to evaluate the graduate students' changes in their emergent writing knowledge and self-reported levels of interprofessional competency: (a) an emergent writing knowledge survey and (b) the Interprofessional Collaborative Competencies Attainment Survey (ICCAS; Archibald et al., 2014; Schmitz et al., 2017).

Emergent Writing Knowledge Survey. To the authors' knowledge, no established instruments assessing graduate students' knowledge of emergent writing had been published at the time of the study. The first and second authors created a 10-question multiple-choice emergent writing knowledge survey (see Appendix A). This survey was modeled after a survey developed by Wilson et al. (2015) to measure SLP students' knowledge relevant to children's spoken and written language learning. It was piloted with two SLP graduate students and two OT graduate students in one of the first author's prior studies and adapted to focus more explicitly on the topics covered in the current intervention. Each question was scored '0' for incorrect and '1' for correct, for a maximum total score of 10 points. The graduate students completed the paper-and-pencil

DOI: https://doi.org/10.30707/TLCSD6.1.1649037808.702214

knowledge survey at pre-intervention during the workshop and again after the completion of their last emergent writing intervention session (post-intervention). Questions addressed the stages of emergent writing and how to support children's emergent writing development.

ICCAS. The ICCAS was designed to assess changes in interprofessional collaboration-related competencies in healthcare students and practicing clinicians before and after IPE interventions (Archibald et al., 2014; Schmitz et al., 2017). This 20-item tool measured graduate students' self-reported competencies in six areas: (a) communication, (b) collaboration, (c) roles and responsibilities, (d) collaborative patient-family-centered approach, (e) conflict management/resolution, and (f) team functioning. This instrument utilizes a retrospective pre-post approach. At the end of the IPE intervention, the graduate students provided two separate sets of competency ratings for the items using a paper-and-pencil version of the assessment. The first ratings indicated their perceived competencies in collaborative skills before participating in the IPE intervention (i.e., pre-intervention self-rating), and the second ratings were an assessment of their perceived collaborative competencies after completing the IPE intervention (i.e., post-intervention self-rating). This method was used in an effort to provide a more sensitive and valid measure of the intervention's effects (Skeff et al., 1992) since ceiling effects have been found with many IPE measures (Oates & Davidson, 2015).

Preschoolers. Emergent writing measures were conducted with the participating preschoolers to assess the impacts of the two graduate student conditions (i.e., unpaired, single-discipline interventions and paired, interprofessional interventions) on the preschoolers' emergent writing skill development. Preschoolers were assessed individually in their preschool programs by the research team before the first intervention session and after the last session with the *Write Letters, Write Name, Write CVC Words* tasks (Puranik & Lonigan, 2011). See protocol outlined in Puranik and Lonigan (2011) for full scoring details.

Write Letters. Letter-writing responses were scored as 0 (incorrect letter or unrecognizable), 1 (poorly formed letter or reversals), or 2 (correctly written letter) depending on how well the letters were formed.

Write Name. In the second task, *Write Name,* the preschoolers were asked to write their name using a pencil and paper. Their responses were scored on a scale from 0 to 9, with a score of 0 or 1 for the absence or presence of nine features: (a) linearity; (b) segmentation; (c) simple characters; (d) left-to-right orientation; (e) first letter of name; (f) complex characters; (g) random letters; (h) many letters- more than half of the letters in their first name; and (i) correctly spelled first name.

Write CVC Words. During the *Write CVC Words* task, the preschoolers were asked to write six CVC words: *mat, bed, duck, cat, fell, hen*. Responses were scored using a 7-point scale ranging from a score of 1 (verbal responses with random letters) to 7 (correct spelling).

Results

The purpose of this study was to explore the effects of an interprofessional emergent writing intervention for SLP students, and the preschoolers receiving their intervention sessions. Fidelity of treatment implementation measured through the clinical educator's completion of fidelity

checklists averaged 95% (*SD* = 3.61%) for the unpaired condition and 93% (*SD* = 2.52%) for the paired condition. As mentioned previously, the scope of this paper is limited to discussion of the SLP graduate students and the impacts of their intervention sessions on the preschoolers' emergent writing skills. The results of this pilot study are organized by four participant groups: (a) unpaired SLPs; (b) paired SLPs; (c) preschoolers in the unpaired condition; (d) preschoolers in the paired condition. Effect sizes were calculated using Hedges' *g* (Hedges, 1981) due to small sample sizes (0.2 small effect, 0.5 medium effect, 0.8 large effect).

Emergent Writing Knowledge Survey.

Unpaired SLP Students. All three participants in the unpaired SLP students condition improved from pre-intervention (*M* = 7.33, *SD* = 1.54) to post-intervention (*M* = 9.00, *SD* = 1.00). Their average change was 1.67 (*SD* = 0.58), *g* = 1.29.

Paired SLP students. The paired SLP students improved from pre-intervention (*M* = 6.67, *SD* = 1.15) to post-intervention (*M* = 8.67, *SD* = 1.15). Two of the paired SLP students' scores increased from pre-intervention to post-intervention while the other had a high score at pre-intervention which remained high at the end of the intervention. The average change from pre-intervention to post-intervention for this group was 2.00 (*SD* = 2.00), *g* = 1.74.

ICCAS. The ICCAS internal consistency (Cronbach's alpha) coefficients were high for both pre (.94) and post (.81) ratings for the nine graduate students. These values are above the currently recommended value of .80 (Cortina, 1993), suggesting that for the nine graduate students in the study, the items on the ICCAS were consistent between themselves to a sufficient degree to be combined with one another. See Table 2 for a summary of ICCAS results across conditions.

Table 2

Descriptive Statistics of ICCAS Scores by Condition at Pre-intervention and Post-intervention

Group	Pre-intervention				Post-intervention				Change		
	M	*SD*	Min	Max	*M*	*SD*	Min	Max	*M*	*SD*	*g*
Unpaired SLPs (*n* = 3)	112.67	8.33	106	122	116	8.72	106	122	3.33	5.77	0.39
Paired SLPs (*n* = 3)	92.33	22.03	71	115	119.33	11.59	107	130	27	10.82	1.53

Unpaired SLP Students. The SLP students in the unpaired SLP students condition (*n* = 3) showed little change in their pre-intervention (*M* = 112.67, *SD* = 8.33) and post-intervention (*M* = 116, *SD* = 8.72) ratings of self-competency. Only one of the three SLP students in this condition reported change in their interprofessional competencies as a result of this intervention. This participant reported a small change of 10 (140 total points possible) in the *Collaborative Patient/Family-Centered Approach* competency.

Paired SLP Students. The paired SLP students (*n* = 3) demonstrated more change when compared to the unpaired SLP students in their pre-intervention (*M* = 92.33, *SD* = 22.03) and post-intervention (*M* = 119.33, *SD* = 11.59) ratings of self-competency. Their average change on this assessment was an increase of 27 points (*SD* = 10.82). Two of the participants in this group

DOI: https://doi.org/10.30707/TLCSD6.1.1649037808.702214

reported greater post-intervention self-competency ratings in all six interprofessional competencies on the assessment, while the third participant reported greater post-intervention ratings in all competencies except *Conflict Management/Resolution*.

Emergent Writing Tasks.

Preschoolers in the Unpaired Condition. Three repeated measures *t*-tests were used to investigate whether the preschoolers in the unpaired condition improved from pre-intervention to post-intervention on the three emergent writing tasks (see Table 3).

Table 3

Preschoolers' Emergent Writing Task Scores in the Unpaired Condition (n = 10)

Tasks	*M* Pre-	*SD* Pre-	*M* Post-	*SD* Post-	*df*	*t*	*p*	*g*
Write letters	11	5.68	15.80	5.20	9	4.24	< .01	0.84
Write name	8.60	0.52	8.40	0.52	9	-1.00	.34	-0.37
Write words	8.70	7.45	19.00	6.77	9	4.57	< .01	1.39

Write Letters. The repeated measures *t*-test showed that mean difference in post-intervention scores was significantly higher (M = 15.80, SD = 5.20) than pre-intervention scores (M = 11, SD = 5.68), $t(9) = 4.24$, $p < .01$, $g = 0.84$.

Write Name. The repeated-measures *t*-test showed that mean difference in post-intervention scores (M = 8.40, SD = 0.52) on this task did not differ significantly from pre-intervention scores (M = 8.60, SD = 0.52), $t(9) = -1.00$, $p = .34$, $g = -0.37$.

Write CVC Words. The repeated measures *t*-test showed that mean differences in post-intervention scores (M = 19.00, SD = 6.77) were significantly higher than pre-intervention scores (M = 8.70, SD = 7.45), $t(9) = 4.57$, $p < .01$, $g = 1.39$.

Preschoolers in the Paired Condition. Three repeated measures *t*-tests were used to investigate whether the preschoolers in the paired condition improved from pre-intervention to post-intervention on the three emergent writing tasks (see Table 4).

Table 4

Preschoolers' Emergent Writing Task Scores in the Paired Condition (n = 11)

Tasks	*M* Pre-	*SD* Pre-	*M* Post-	*SD* Post-	*df*	*t*	*p*	*g*
Write letters	1.45	2.98	2.45	2.16	10	-1.01	0.34	0.37
Write name	3.27	2.05	5.45	2.21	10	-3.13	.01	0.98
Write words	7.82	5.83	14.00	2.83	10	-2.56	0.03	1.30

Write Letters. The repeated measures *t*-test showed that mean difference in post-intervention scores (M = 2.45, SD = 2.16) did not differ significantly from pre-intervention scores (M = 1.45, SD = 2.98), $t(10) = -1.01$, $p = 0.34$, $g = 0.37$.

Write Name. The repeated-measures *t*-test showed that mean differences in post-intervention scores (M = 5.45, SD = 2.21) were significantly higher than pre-intervention scores (M = 3.27, SD = 2.05) on this task, $t(10) = -3.13$, $p = .01$, $g = 0.98$.

Write CVC Words. The repeated-measures *t*-test showed that mean difference in post-intervention scores (M = 14.00, SD = 2.83) was significantly higher than pre-intervention scores (M = 7.82, SD = 5.83) on this task, $t(10) = -2.56$, $p = .03$, $g = 1.30$.

Discussion

The purpose of this study was to investigate the effects of an emergent writing IPE intervention consisting of a 2-hour workshop and five weeks of emergent writing intervention sessions on SLP graduate students' emergent writing knowledge and self-reported interprofessional competencies as well as preschoolers' emergent writing skills. Overall, three main findings from this practice-based IPE intervention emerged: (a) five of the six SLP students demonstrated an increase in emergent writing knowledge after implementing emergent writing intervention sessions with preschoolers, (b) SLP students paired with OT students for experiential learning had greater changes in self-ratings of interprofessional competencies than the unpaired SLP students receiving the same training in IPP during the workshop, and (c) preschoolers' emergent writing skills in both conditions increased as a result of the emergent writing intervention sessions. Each of these findings, with suggestions for SLP academic training programs, will be discussed in further detail in the following sections.

Emergent Writing Knowledge. As a result of this intervention, five of the six SLP students demonstrated growth in their emergent writing knowledge and one maintained high scores at both time points. That is, SLP students in both conditions gained emergent writing knowledge from the intervention. Two main components of the IPE intervention supported the students' emergent writing knowledge: facilitated discussions and structured debrief sessions with their clinical educators. Facilitated discussions including constructs of co-working help students understand that collaboration requires reciprocal sharing of knowledge, perspectives, and responsibilities (Suleman et al., 2014; Wilson et al., 2016). The inclusion of facilitated discussions during this IPE experience allowed the students to not only discuss readings about emergent writing, but also use the information from the readings to analyze their preschoolers' writing samples. These discussions supported the SLP students' application of research to their clinical practice. See Appendix B for references for the readings reviewed during the facilitated discussions that addressed both emergent writing and interprofessional practice.

Another aspect of the IPE experience that supported the graduate students' emergent writing knowledge was the debrief sessions held after each intervention session with the clinical educators. Using Ash and Clayton's (2004) DEAL Model of Critical Reflection, the clinical educators guided discussions about the intervention sessions each day. Specifically, the second step of the DEAL Model encouraged the preprofessional students to examine their experience that day from an academic perspective. The preprofessional students were asked questions such as, "How did you target emergent writing skills in this lesson?" and "How does this experience enhance your knowledge of emergent writing?" During this stage of the guided discussions, the clinical

educators guided the SLP students beyond simply summarizing their experience, into meaning-making tied to the emergent writing content.

Experiential Learning and Interprofessional Competencies. The results of the current study confirm previous research indicating that effective collaborative techniques must be developed, taught, and practiced at the preprofessional level to build competency and produce effective outcomes (Anderson, 2013; Dobbs-Oates & Wachter Morris, 2016; Hong & Shaffer, 2014). Even though both the unpaired and paired SLP students received the same training during the workshop at the beginning of the study, the SLP students in the paired condition demonstrated a much greater change in self-reported interprofessional competencies as a result of their practice-based intervention experience collaborating with the OT students. This finding emphasizes the importance of providing opportunities for preprofessional SLP students to work on interprofessional teams. It is not enough for students to only learn about IPP, they must have time to practice and apply their skills to build confidence and competence in IPP.

To ensure that students in IPE interventions such as this one develop the IPEC Core Competencies, Miolo and DeVore (2016) suggest asking students to demonstrate evidence they are acquiring the competencies and evaluate their acquisition of the competencies during the intervention. This added component could be one way to ensure that students are gaining as much understanding of the competencies as possible. It may also help faculty and clinical educators identify areas to address with the students in more detail before the intervention ends.

Impact on Preschoolers. This IPE intervention expands the limited work exploring the impacts of IPE for education professionals in that it also measured impacts on the preschoolers receiving the emergent writing intervention sessions. By including emergent writing measures of the preschoolers, we were able to assess the impacts of both single-discipline (i.e., unpaired condition) and interprofessional (i.e., paired condition) graduate student interventions. The only other study to report on the impacts of practice-based IPE language and/or literacy interventions on children had a very small sample size of seven children (Wilson et al., 2019). The results of the current study showed that both groups of preschoolers made statistically significant gains in two of the three emergent writing tasks. However, a direct comparison of the size of the preschoolers' gains cannot be made across conditions because the preschoolers' initial skill levels greatly differed at the start of the study. Many preschoolers in the unpaired condition started the intervention sessions in the letter-like forms and letter strings stages of emergent writing (Byington & Kim, 2017) and scored highly on the *Write Name* task at pre-intervention. In contrast, many of the preschoolers in the paired condition were in the scribbling and wavy scribbles stages at pre-intervention and were unable to write their names. The children's writing in the current study confirmed the work of Puranik and Lonigan (2011) who found that children's writing proficiency is task dependent as their representations of objects and events become more symbolic over time.

Limitations. This study has several limitations. First, this study only explored two discipline groups, when many other education professionals are present in schools and could have been included in this study. For example, general and/or special education students could have been included because each of these disciplines plays a role in developing children's emergent writing skills. Further, of the two graduate student disciplines that were included in the study, both student groups were very small limiting the generalizability of the findings. However, due to the limited

research in this area to date, this pilot study provides important information to inform subsequent studies with larger sample sizes. Another limitation is that the results obtained from the ICCAS are restricted in that this tool is a self-report measure. Self-reported measures have limitations such as truthfulness of responses and under-reporting of attitudes that participants believe to be less respected by society (Moore & Tananis, 2009). In addition, since the measure is a retrospective pre-intervention/post-intervention design, it also is subject to recall bias since the accuracy of participants' present ratings of past experiences can be questionable (Sibthorp et al., 2007). To supplement the findings from the self-reported measure, a behavioral observation tool could be used by a researcher or clinical educator to objectively measure the students' mastery of the IPEC Core Competencies in practice. This would allow for comparisons to be made between the students' perceptions of their interprofessional skills and their actual abilities to collaborate on interprofessional teams.

There are a few additional limitations related to measuring the preschoolers' progress. One limitation is that comparisons of preschoolers' gains could not be made across conditions because the preschoolers' initial skill levels differed greatly at the start of the study. Researchers should consider matching preschoolers across conditions in future studies so these comparisons can be made. This information would contribute meaningfully to the literature about the effects of IPP versus single-discipline interventions. Further, since we did not include a control group of preschoolers, we cannot assess how much of the preschoolers' growth was maturation over time as opposed to direct benefit from receiving the intervention. Future research should consider including a control group of preschoolers to address this issue. We also could not control for the preschoolers' class assignment in the statistical analyses. This is a potential confounding variable to the preschoolers' emergent writing task results. However, all preschoolers in both conditions showed gains in at least one emergent writing task from pre-intervention to post-intervention.

Conclusion

Taken together, the three main findings from this study suggest that practice-based IPE interventions have the potential to increase students' knowledge and skills related to emergent writing and the IPEC Core Competencies, as well as the skills of children receiving IPP intervention sessions. While SLP students in both conditions demonstrated similar gains in emergent writing knowledge, the paired SLP students demonstrated greater growth in self-reported interprofessional competencies, emphasizing the importance of experiential learning to develop interprofessional competencies during preprofessional training. To further support students' growth in their development of the IPEC Core Competencies, students could also intermittently assess their own acquisition of them. This would allow faculty and clinical educators to continually assess and support students' development, thus strengthening IPE interventions.

The current study is one of the first to also explore child outcomes of IPE interventions. Preschoolers in both conditions showed improvement in their emergent writing skills during this brief five-week period, suggesting the potential of IPP to positively impact children's outcomes. Future practice-based IPE studies with larger samples that include child outcome measures are needed to build an evidence-base for the effectiveness of IPP.

Disclosures

The first author was awarded a Student Engagement Mini Grant from the James Madison University Faculty Senate and Student Government Association to support this work, as well as a stipend from the university during her doctoral studies. The other authors received a salary from the university at which this research was conducted. None of the authors have relevant non-financial disclosures.

References

American Speech-Language-Hearing Association. (2001). *Roles and responsibilities of speech-language pathologists with respect to reading and writing in children and adolescents [Position Statement]*. https://www.asha.org/policy/ps200100104/#:~:text=Appropriate%20roles%20and%20responsibilities%20for,%3B%20(d)%20providing%20intervention%20and

American Speech-Language-Hearing Association. (2010). *Roles and responsibilities of speech-language pathologists in schools*. https://www.asha.org/policy/pi2010-00317/

American Speech-Language-Hearing Association. (2017a). *Interprofessional Practice survey results*. https://www.asha.org/uploadedFiles/2017-Interprofessional-Practice-Survey-Results.pdf

American Speech-Language-Hearing Association. (2017b). *ASHA's envisioned future: 2025*. https://www.asha.org/About/ASHAs-Envisioned-Future/

American Speech-Language-Hearing Association. (2020). *2019 benefits and programs survey. CCC-SLP survey summary report: Number and type of responses.* https://www.asha.org/Research/memberdata/Schools-Survey/

Anderson, E. M. (2013). Preparing the next generation of early childhood teachers: The emerging role of interprofessional education and collaboration in teacher education. *Journal of Early Childhood Teacher Education*, *34*(1), 23–35. https://doi.org/10.1080/10901027.2013.758535

Archibald, D., Trumpower, D., & MacDonald, C. J. (2014). Validation of the interprofessional collaborative competency attainment survey (ICCAS). *Journal of Interprofessional Care*, *28*(6), 553–558. https://doi.org/10.3109/13561820.2014.917407

Ash, S. L., & Clayton, P. H. (2004). The articulated learning: An approach to guided reflection and assessment. *Innovative Higher Education*, *29*(2), 137–154. https://doi.org/10.1023/B:IHIE.0000048795.84634

Brandel, J., & Loeb, D. F. (2011). *Service delivery and intensity*. *42*(October), 461–491. https://doi.org/10.1044/0161-1461(2011/10-0019)b

Byington, T. A., & Kim, Y. (2017). Promoting preschoolers' emergent writing. *Young Children*, *72*(5), 1–15.

Cabell, S. Q., Justice, L. M., Kaderavek, J., Pence, K. L., & Breit-Smith, A. (2009). *Emergent literacy: Lessons for success*. Plural Publishing.

Cortina, J. M. (1993). What is coefficient alpha? An examination of theory and applications. *Journal of Applied Psychology*, *78*(1), 98–104. https://doi.org/10.1037/0021-9010.78.1.98

Council on Academic Accreditation in Audiology and Speech-Language Pathology. (2017). *Standards for accreditation of graduate education programs in audiology and speech-language pathology*. http://caa.asha.org/wp-content/uploads/Accreditation-Standards-2017.pdf

Dobbs-Oates, J., & Wachter Morris, C. (2016). The case for interprofessional education in teacher education and beyond. *Journal of Education for Teaching*, *42*(1), 50–65. https://doi.org/10.1080/02607476.2015.1131363

Gerde, H. K., Foster, T. D., & Skibbe, L. E. (2014). Beyond the pencil: Expanding the occupational therapists' role in helping young children to develop writing skills. *The Open Journal of Occupational Therapy*, *2*(1), Article 5. https://doi.org/10.15453/2168-6408.1070

Hedges, L. V. (1981). Distribution theory for Glass's estimator of effect size and related estimators. *Journal of Educational Statistics*, *6*(2), 107–128.

Hong, S. B., & Shaffer, L. S. (2014). Inter-professional collaboration: Early childhood educators and medical therapist working within a collaboration. *Journal of Education and Training Studies*, *3*(1), 135–145. https://doi.org/10.11114/jets.v3i1.623

Interprofessional Educational Collaborative (IPEC). (2016). *Core competencies for interprofessional collaborative practice: 2016 update*. Interprofessional Education Collaborative.

Johnson, A. (2016). *Interprofessional education and interprofessional practice in communication sciences and disorders: An introduction and case-based examples of implementation in education and health care settings.* https://www.asha.org/Practice/Interprofessional-Education-Practice/

Kolb, D. A. (1976). *Learning style inventory technical manual*. McBer.

Ludwig, D. A., & Kerins, M. R. (2019). Interprofessional education: Application of interprofessional education collaborative core competencies to school settings. *Perspectives of the ASHA Special Interest Groups*, *4*(2), 269–274. https://doi.org/10.1044/2018_pers-sig2-2018-0009

Miolo, G., & DeVore, S. (2016). Speech language pathology and education students engage in interprofessional collaborative practice to support children with special needs in preschool settings. *Journal of Interprofessional Education and Practice*, *4*, 81–87. https://doi.org/10.1016/j.xjep.2016.06.004

Moore, D., & Tananis, C. A. (2009). Measuring change in a short-term educational program using a retrospective pretest design. *American Journal of Evaluation*, *30*(2), 189–202.

National Early Literacy Panel. (2008). *Developing early literacy skills: A report of the national early literacy panel*. National Institute for Literacy.

Oates, M., & Davidson, M. (2015). A critical appraisal of instruments to measure outcomes of interprofessional education. *Medical Education*, *49*(4), 386–398. https://doi.org/10.1111/medu.12681

Paul, R., Simmons, E., Bowers, D., Carl-Stannard, P., Marotto, J., Rainville, K., Sauvigne-Kirsch, J., & Massucci, E. (2020). A case-based, brief, intensive interprofessional education experience for school practitioners. *Journal of Allied Health*, *49*(1), e43–e50.

Pelatti, C. Y., Piasta, S. B., Justice, L. M., & O'Connell, A. (2014). Language- and literacy-learning opportunities in early childhood classrooms: Children's typical experiences and within-classroom variability. *Early Childhood Research Quarterly*, *29*(4), 445–456. https://doi.org/10.1016/j.ecresq.2014.05.004

Pfeiffer, D. L., Pavelko, S. L., Hahs-Vaughn, D. L., & Dudding, C. C. (2019). A national survey of speech-language pathologists' engagement in interprofessional collaborative practice in schools: Identifying predictive factors and barriers to implementation. *Language, Speech, and Hearing Services in Schools*, *50*(October), 639–655. https://doi.org/10.1044/2019_LSHSS-18-0100

Pfeiffer, D. L., Pavelko, S. L., & Ingram, S. B. (2018). Interprofessional education for preprofessional speech-language pathologists and general-education teachers. *EBP Briefs*, *13*(1), 1-10.

Puranik, C. S., & Lonigan, C. J. (2011). *From scribbles to scrabble: Preschool children's developing knowledge of written language*, *24*(5), 567–589. https://doi.org/10.1007/s11145-009-9220-8.

Schmitz, C. C., Radosevich, D. M., Jardine, P., MacDonald, C. J., Trumpower, D., & Archibald, D. (2017). The interprofessional collaborative competency attainment survey (ICCAS): A replication validation study. *Journal of Interprofessional Care*, *31*(1), 28–34. https://doi.org/10.1080/13561820.2016.1233096

Sibthorp, J., Paisley, K., Gookin, J., & Ward, P. (2007). Addressing response-shift bias: Retrospective pretests in recreation research and evaluation. *Journal of Leisure Research*, *39*(2), 295–315.

Skeff, K. M., Stratos, G. A., & Bergen, M. R. (1992). Evaluation of a medical faculty development program: A comparison of traditional pre/post and retrospective pre/post self-assessment ratings. *Evaluation & the Health Professions*, *15*(3), 350–366. https://doi.org/10.1177/016327879201500307

Strunk, J., Kipps-Vaughan, D., Pavelko, S. L., Allen-Bronaugh, D., Myers, K., Gilligan, T., Kielty, M., Richardson, E., & Tacy, J. (2019). Interprofessional education for pre-service school-based professionals: Faculty and student collaboration. *Teaching and Learning in Communication Sciences & Disorders*, *3*(1), Article 9. https://doi.org/10.30707/TLCSD3.1Strunk

Suleman, S., McFarlane, L. A., 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.

Wilson, L., McNeill, B. C., & Gillon, G. T. (2019). Understanding the effectiveness of student speech-language pathologists and student teachers co-working during inter-professional school placements. *Child Language Teaching and Therapy*, *35*(2), 125–143. https://doi.org/10.1177/0265659019842203

Wilson, L., McNeill, B., & Gillon, G. T. (2015). The knowledge and perceptions of prospective teachers and speech language therapists in collaborative language and literacy instruction. *Child Language Teaching and Therapy*, *31*(3), 347–362.

Wilson, L., McNeill, B., & Gillon, G. T. (2016). A comparison of inter-professional education programs in preparing prospective teachers and speech and language pathologists for collaborative language–literacy instruction. *Reading and Writing*, *29*(6), 1179–1201. https://doi.org/10.1007/s11145-016-9631-2

Wilson, L., McNeill, B., & Gillon, G. T. (2017). Inter-professional education of prospective speech–language therapists and primary school teachers through shared professional practice placements. *International Journal of Language and Communication Disorders*, *52*(4), 426–439. https://doi.org/10.1111/1460-6984.12281

World Health Organization. (2010). *Framework for action on interprofessional education and collaborative practice*. http://www.who.int/hrh/resources/framework_action/en/

Appendix A

Emergent Writing Knowledge Assessment

1. **Writing one's name correctly, writing from left to right, and demonstrating concepts of a curve, line, and circle are skills related to**
a) Emergent writing
b) Alphabet knowledge
c) Print awareness
d) Inferential language
2. **What is the first stage of emergent writing?**
a) Letter strings
b) Drawing
c) Letter-like forms or mock letters
d) Scribbling
3. **What is the first word most children learn to write?**
a) Mom or dad
b) Their last name
c) Their first name
d) Cat
4. **What letter are children usually most interested in learning to write first?**
a) A
b) Z
c) The first letter of their first name
d) The first letter of their last name
5. **How should children be encouraged to develop emergent writing skills?**
a) Write freely at their level of emergent writing
b) Trace letters
c) Always copy from a model
d) Identify the shapes and sounds of letters before trying to write them
6. **How do children initially view their names?**
a) As a string of single letters
b) As a series of lines
c) As a sentence
7. **Which of the following is NOT a way to support children's emergent writing development?**
a) Encouraging them to explore different writing instruments
b) Engaging in activities to strengthen fine motor skills
c) Encouraging them to practice writing on their own without peer interaction
d) Practicing writing the letters of their name
8. **Which skill is positively correlated with knowledge of print concepts, letter names, and letter sounds?**
a) A child's ability to sing the alphabet
b) A child's ability to write his/her own name
c) A child's ability to learn new vocabulary
d) A child's ability to discriminate between uppercase and lowercase letters
9. **The following are characteristics of which stage of emergent writing? Letters with spaces in between to resemble words; letters/words copied from environmental print; letters often reversed**
a) Conventional spelling
b) Beginning word and phrase writing
c) Letter strings
d) Transitional writing
10. **Which of the following is NOT one of the ten easiest letters for preschool children to write?**
a) G
b) O
c) A
d) H

Appendix B

Facilitated Discussion Readings

Facilitated Discussion	Topic	Readings
1	Emergent writing	Byington, T. A., & Kim, Y. (2017, November). Promoting preschoolers' emergent writing. *Young Children*, 74-82. https://www.naeyc.org/resources/pubs/yc/nov2017/emergent-writing
2	Emergent writing	Case-Smith, J., & O'Brien, J. C. (2010). Occupational therapy for children (6th ed.). *Pre-handwriting and handwriting skills* (pp. 557-559). Mosby/Elsevier.
	Interprofessional practice	Interprofessional Education Collaborative. (2016). *Core competencies for interprofessional collaborative practice: 2016 update.* https://ipecollaborative.org/Resources.html

DOI: https://doi.org/10.30707/TLCSD6.1.1649037808.702214