Teaching and Learning in Communication Sciences & Disorders

Volume 9 | Issue 1 Article 7

Speech-Language Pathology and Occupational Therapy Students' Perceptions of an Interprofessional Stroke Workshop: A Mixed Methods Analysis

Casey Keck
Towson University, stewa152@yahoo.com

Ashley Lankford
Towson University, alankford@towson.edu

Danika Pfeiffer
Old Dominion University, dlpfeiff@odu.edu

See next page for additional authors

DOI: 10.61403/2689-6443.1349

Speech-Language Pathology and Occupational Therapy Students' Perceptions of an Interprofessional Stroke Workshop: A Mixed Methods Analysis

Abstract

Stroke rehabilitation often necessitates coordinated intervention services; however, few studies have examined stroke-based interprofessional education (IPE) interventions for graduate speech-language pathology (SLP) and occupational therapy (OT) students. The purpose of this mixed methods study was to examine graduate SLP and OT students' interprofessional collaboration competence before, immediately, and several months after participating in an IPE stroke workshop. Participants were 38 SLP and 14 OT students who took part in a 2-hour case study workshop, completed an online survey, and participated in a 1-hour virtual focus group. Four months later, students were asked to complete the survey again to assess the impact of the workshop on their interprofessional skills over time. Survey results suggested that the workshop advanced students' understanding of the Interprofessional Education Collaborative core competencies and that students maintained their understanding at the four-month follow-up. During the focus groups, students most frequently discussed practicing interprofessional skills related to communication, roles and responsibilities, and teams and teamwork as part of the workshop. Recommendations for future IPE interventions are discussed.

Keywords

Interprofessional education, collaboration, stroke, rehabilitation

Cover Page Footnote

Author Note We have no known conflict of interest to disclose. Correspondence concerning this article should be addressed to Casey Keck, University of St. Augustine for Health Sciences, 5401 La Crosse Ave, Austin, TX 78739 , United States. Email: ckeck@usa.edu

Authors

Casey Keck, Ashley Lankford, Danika Pfeiffer, Alexandra Durfee, and Rachel Guilfoyle

Globally, health care is adopting interprofessional collaborative practice (IPCP) as a process for improving health outcomes and reducing the cost of health care (Institute of Medicine, 2015; Interprofessional Education Collaborative [IPEC], 2023; World Health Organization [WHO], 2010). IPCP occurs when health professionals from different disciplines work with the client and their family to provide quality health care services (WHO, 2010). Stroke is a significant cause of long-term disability and financial burden worldwide (Katan & Luft, 2018). Individuals with stroke often require interprofessional care from speech-language pathology (SLP) and occupational therapy (OT) services, as reduced mobility and communication proficiency are frequent causes of disability post-stroke (Katan & Luft, 2018). As the incidence of stroke continues to rise, it is critical that SLP and OT programs prepare students to work collaboratively with this population (Katan & Luft, 2018) by providing interprofessional education (IPE). IPE is defined by the World Health Organization (WHO, 2010) as a process when "two or more professions learn about, from, and with each other to enable effective collaboration and improve health outcomes" (p. 13).

The Interprofessional Education Collaborative (IPEC), a collaboration of 22 health profession associations, developed core competencies that serve as the learning objectives of IPE. IPEC conceptualizes IPCP as an individual domain comprised of four topic areas, each with multiple sub-competencies (IPEC, 2023). The four core competencies are: (a) Values/Ethics, (b) Roles and Responsibilities, (c) Communication, and (d) Teams and Teamwork (IPEC, 2023). The IPEC core competencies are essential to client-centered care focused on improving the quality of life for clients and their families (IPEC, 2023). To develop interprofessional competence, students need experience applying the IPEC core competencies across a variety of experiences during their training programs (IPEC, 2023; WHO, 2010).

IPE occurs on a learning continuum where students are provided a mix of didactic and clinical experiences that advance from building professional relationships to collaboratively resolving complex clinical scenarios (Cahn et al., 2018; IPEC, 2023; Karpa et al., 2018). The IPEC core competencies are commonly taught by simulating IPCP with case scenarios/case studies (Bogossian et al., 2023; Browne et al., 2021; Maddock et al., 2023). Case-based simulations are a type of inquiry-based learning that requires students from different health professions to work together to solve a medical problem or case (Srinivasan et al., 2007). IPE recommendations suggest that case-based simulations follow a pre-brief, scenario, debrief structure and be led by trained facilitators (Council of Academic Programs in Communication Sciences and Disorders, 2019; International Nursing Association for Clinical Simulation and Learning [INACSL], 2016; Maddock et al., 2023). Within the learning environment, students should feel safe, supported, and have time to establish relationships with their peers (Maddock et al., 2023).

Case-based IPE research varies in learning objectives, disciplines involved, student education level, activities, and duration (Maddock et al., 2023). Several studies have shown that case-based IPE simulations positively alter students' perceptions of their communication and teamwork skills and understanding of other disciplines' professional roles and responsibilities (Hamilton et al., 2022; Mills et al., 2020; Selby et al., 2011). Historically, case-based IPE simulation research has included medical and nursing students. More recent research has included a broader mix of students from other health professions, including occupational therapy and speech-language pathology (Meyer et al., 2021). Although having students work on case studies in small groups is

recommended (Bogossian et al., 2023), group sizes in previously published studies have varied (Browne et al., 2021; Mills et al., 2020). Within these groups, students completed activities related to diagnosing health conditions, managing health condition, discharging/transitioning clients to different health care settings, establishing interprofessional relationships, and resolving challenging client situations (Hamilton et al., 2022; MacKenzie et al., 2017; Mills et al., 2020; Wallace & Benson, 2018). IPE experiences described in published studies also vary in duration; however, several were workshops held over a few hours (Hamilton et al., 2022; MacKenzie et al., 2017; Mills et al., 2020; Wallace & Benson, 2018).

Problem. A limited number of previous case-based IPE studies have focused on stroke and included graduate SLP and OT students. Clinical best practices recommend that individuals with stroke receive collaborative care from a stroke team (Burton et al., 2023). SLPs and OTs are two members of the stroke team that have significant overlap in their scope of practice. To maximize service provisions and promote teamwork, these disciplines must be familiar with each other's roles and responsibilities and communicate effectively (Meyer et al., 2021).

SLP and OT faculty need examples of effective case-based IPE stroke simulations to design and implement quality IPE. Although limited, research suggests that case-based IPE stroke simulations are an effective method for teaching interprofessional collaboration to SLP and OT students (Mills et al., 2020; Wallace et al., 2016; Wallace & Benson, 2018). Effectiveness has primarily been measured by students' self-report via surveys. Surveys are an efficient way to reveal students' perceptions of their IPCP but provide limited information regarding what collaborative skills were learned and which aspects of the simulation contributed to their learning. Case-based IPE stroke simulation research has primarily used pre- and post-test research designs to examine students' learning. Longitudinal research examining students' retention of IPCP skills is needed to determine the lasting effects of IPE stroke case simulation experiences. The results of longitudinal IPE simulation studies on non-stroke cases suggest that students retain learning for more than 18 months after the simulation (Browne et al., 2021).

Current Study. The purpose of this concurrent mixed methods study was to examine graduate SLP and OT students' perceptions of their interprofessional collaboration knowledge and skills before, immediately, and several months after participating in an IPE stroke case workshop (hereinafter "workshop"). The workshop was piloted in 2022 (Keck et al., in press). The pilot study primarily relied on students' self-assessment survey data to determine effectiveness and only compared students' self-assessment ratings pre- and post-workshop. A comprehensive examination of the workshop's effectiveness, including what aspects facilitated or hindered student learning, is needed and necessitates the combination of qualitative and quantitative methods. Our rationale for a mixed methods design was to capture nuances in the students' experiences that could not be captured with either a quantitative or qualitative approach alone. Analyzing both quantitative and qualitative data together provides an opportunity to gain a deeper understanding of the students' experiences in the workshop to inform future IPE training for SLP and OT graduate students. The research questions for the current study were the following:

1. What effects does the workshop have on graduate SLP and OT students' perceptions of their interprofessional knowledge and skills immediately and several months after training?

2. What interprofessional knowledge and skills do graduate SLP and OT students reportedly gain from participating in the workshop?

Workshop. The workshop was developed and led by the SLP and OT faculty who taught the courses (first and fifth authors). The second author served as a workshop facilitator and helped the first and fifth authors by answering student questions and facilitating discussions by posing open-ended questions. The 2-hour workshop was held in a large lecture hall on campus, the only available space large enough to accommodate all students and outside of the courses' regular class schedule due to schedule conflicts. The purpose of the workshop was for students to collaboratively solve a case study related to stroke. The student learning objectives were based on the IPEC core competencies of roles and responsibilities and communication (IPEC, 2023) and included: a) use the knowledge of your own profession and another profession to assess a client's health care needs after stroke, b) communicate your professional role and responsibilities in stroke care to other professionals, c) communicate with professionals from diverse disciplines, and d) collaboratively develop a client-centered treatment plan.

The workshop included pre-brief, case study, and debrief activities. Pre-brief activities introduced students to the workshop's expectations and each other. Faculty explained the workshop agenda, provided an overview of the case study, showed a brief video of professionals from Kennedy Krieger engaged in effective IPCP (American Speech-Language-Hearing Association [ASHA], 2017), and guided students through small group discussions of their disciplines' scope of practice and overlapping roles. The written case study provided medical, social, and standardized test results for a fictitious client who was presenting with communication and mobility impairments post-left hemisphere stroke (see Appendix A for the case study). A video of an individual with stroke completing the *Life Value Interests Cards* (LIV Cards; Haley et al., 2010), an assessment that identifies activity limitations, supplemented the written case study. In their small interprofessional groups, students explained the evaluation results as they applied to their discipline and collaboratively generated a treatment plan targeting a functional activity and included one co-treatment goal (see Appendix B for the workshop instructions).

A large group debrief was conducted immediately following the case study. The workshop's debrief method aligned with reflexive debriefing (Clinard, 2023; Dreifuerst, 2015; INACSL, 2016). Faculty facilitators posed reflection questions that prompted students to examine their workshop experience, consider what they would do differently, and connect their experiences to clinical practice (Clinard, 2023; Dreifuerst, 2015). Sample questions included "What was the most important skill and/or information you learned from participating in the workshop?" "In what ways do you think you'll apply the skills or information learned to your clinical practice?" and "What will you do differently the next time you're a member of an interprofessional clinical team?"

Environment. The study was conducted at 'anonymized' University's main campus within the College of Health Professions. 'Anonymized' University is a mid-sized university located in the mid-Atlantic region of the United States. IPE is a component of the university's strategic plan and the college's Mission and Vision. When this study was conducted, the college held a

separate IPE workshop for graduate students each year but did not have a formal IPE curriculum; however, the college's own campus clinic offered IPCP clinical programs.

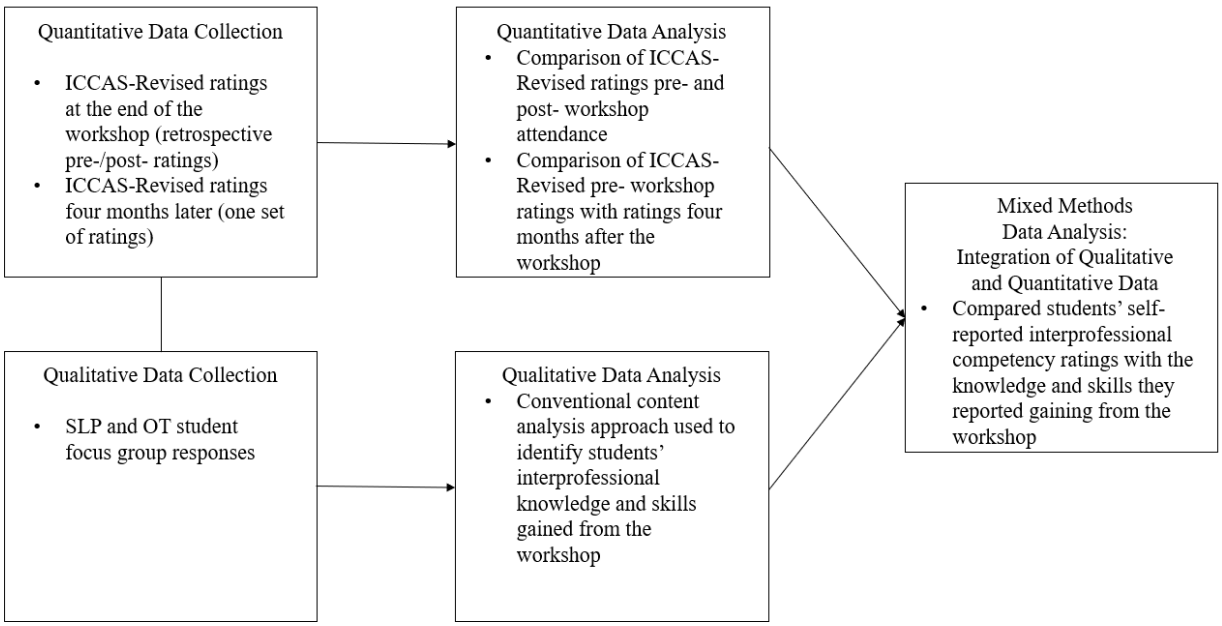
Method

We used the Mixed Methods Reporting in Rehabilitation & Health Sciences (MMR-RHS) checklist to guide the reporting of this study (Tovin & Wormely, 2023). The research team included investigators with expertise in the use of mixed methods design and IPE, as well as clinical experience in the fields of OT and SLP. The fifth author was the instructor of the OT students' course, and the first author was the instructor of the SLP students' course.

Design. This study used a concurrent mixed methods design, with qualitative results weighted more heavily than quantitative results (represented as quan + QUAL). We collected both quantitative (survey) and qualitative (focus group) data together at the end of the workshop. Then, four months after the workshop ended, we administered the survey again to assess the sustained impact of the workshop over time. Figure 1 depicts the process for data collection, analysis, and integration of quantitative and qualitative findings.

Figure 1

Mixed Methods Framework Used for Data Collection, Analysis, and Integration



Participants. Students were eligible to participate if they were graduate SLP or OT students enrolled in either an SLP or OT-focused adult neurogenic disorders course. Students enrolled in these courses were required to attend the workshop; however, they were given the choice of whether to have their workshop outcomes analyzed for research and participate in a focus group. Seventy students attended the workshop. Of the 70 students, 68 (SLP = 54; OT = 14) consented to participate in the research. Consent forms were electronically shared with students via email prior to attending the workshop. During the workshop, before the activities began, students could

ask questions about the research and complete the consent form. Faculty teaching the courses did not have access to the consent forms or workshop data until the end of the semester after final course grades were submitted.

Students were assigned to interprofessional groups of nine students each. Due to differences in the number of students in each discipline's cohort, the number of SLP and OT students per group was disproportionate, with only two OT students per group. When the workshop took place, OT students were in the third semester of an eight-semester doctorate program, while SLP students were in the second semester of a five-semester master's program. Study procedures were approved by the 'anonymized' University Institutional Review Board.

Study Procedure. The workshop included preparatory and workshop activities. Before the workshop, course instructors shared a copy of the consent form with students through their learning management system (i.e., Blackboard). At the workshop, students were emailed a link to an electronic consent form. A faculty member not associated with the courses verified students' consent form submissions. The course instructors (the first and fifth authors) did not participate in the consent or data collection processes to prevent bias. Participants took part in a two-hour workshop, completed an online survey, and participated in a one-hour virtual focus group. Participation in a focus group was voluntary; volunteers were awarded extra credit in their discipline-specific courses. Four months later, participants were asked to complete the survey again to assess the impact of the workshop on their interprofessional skills over time.

Interprofessional Collaborative Competencies Attainment Survey-Revised (ICCAS-Revised). Post-workshop, students completed the ICCAS-Revised (Schmitz et al., 2017). The ICCAS-Revised was designed to assess changes in interprofessional collaboration-related competencies in healthcare students and practicing clinicians before and after IPE interventions. The survey consists of 21, 5-point Likert scale questions assessing self-reported competencies in six areas: (a) communication; (b) collaboration; (c) roles and responsibilities; (d) collaborative client-family centered approach; (d) conflict management/resolution; and (e) team functioning. Liker scale responses ranged from "poor" to "excellent" with "fair," "good," and "very good" ratings in between the two extreme responses. A rating of "poor" equaled a score of 1, and "excellent" equaled a score of 5. At the end of the workshop, students were asked to provide two separate sets of competency ratings for the items using an electronic version of the assessment administered via Qualtrics software.

The ICCAS-Revised is a valid and reliable self-assessment instrument (Archibald et al., 2014; Schmitz et al., 2017). Two questions were added to the ICCAS-Revised to determine students' prior IPCP knowledge and experience. The first was a yes/no question that asked, "Besides the spring 2023 case study event, have you had interprofessional collaborative practice experience(s)? The second was a follow-up, multiple selection questions that asked, "What types of interprofessional collaborative practice experience(s) have you had?"

The first set of ICCAS-Revised ratings indicated the students' perceived competencies in collaborative skills before participating in the workshop and the second set was an assessment of their perceived collaborative competencies after attending the workshop. This method was used to provide a more sensitive and valid measure of the IPE experience's effects (Skeff et al., 1992)

since ceiling effects have been found with many IPE measures (Oates & Davidson, 2015). Four months after the students completed the ICCAS-Revised, they were asked to complete one more set of ratings for the items and answer the same two questions about their IPE experiences.

Focus Groups. Within a month of the workshop, five one-hour virtual focus groups were held using Zoom video conferencing software. Of the 68 students who consented to participating in the research, 52 agreed to join a focus group. Each student participated in one focus group containing SLP and OT students. Focus groups were held at various times, and students chose which focus group to attend. The researchers did not monitor whether students attended the same focus group as the students they interacted with during the workshop. The five focus groups ranged from 10-11 students with SLP to OT student ratios of 11:1, 2:8, 11:4, 4:7, and 7:3. The second and third authors, one OT and one SLP faculty member at the same institution, who were not instructors of the courses led the focus groups. The second author also served as a workshop facilitator. Both focus group facilitators had previous experience conducting focus groups and IPE research. Facilitators followed a semi-structured focus group protocol consisting of 13 questions. Protocol questions could be rephrased for clarification and were guided by the IPEC core competencies (see Appendix C for the focus group questions). Focus groups were video and audio recorded and transcribed verbatim by Zoom. Two undergraduate students trained in transcription by the first author de-identified the transcripts and checked them for accuracy.

Quantitative Analysis. To investigate the effect of the workshop on students' self-reported IPCP competence, ordinal regression was used to compare ICCAS-Revised responses pre- and post-workshop. Students' previous IPE experiences and type of experiences were included as covariates while time (pre vs. post workshop) was included as the independent variable in the models. Item-level ICCAS-Revised survey responses served as the dependent variables and were entered into separate models, resulting in 20 separate models. To account for multiple comparisons, a false discovery rate (FDR) of $p < 0.05$ was used across all models to identify significant models before interpreting any significant effects of the workshop. All analyses were completed using R v.4.3.1. Ordinal regression analyses were completed using the package 'ordinal' (Christensen, 2023).

Due to an anonymization error, ICCAS-Revised responses completed by students at the four-month follow-up timepoint could not be linked to their responses completed pre- and immediately post-workshop. As a result, one-sample Wilcoxon sign rank tests were used to assess survey responses at the item level, resulting in 40 separate comparisons (test/question [20 questions] x 2 time points [pre-workshop, 4-month follow-up] = 40 comparisons). FDR corrections ($p < 0.05$) were completed to correct for multiple comparisons. When analyzing the study's first research question, we generated *a priori* hypotheses that students would rate themselves as "Fair" across survey items (i.e., score = 2) prior to the workshop but, because of participating in the workshop, ratings at 4-months would be better than "Fair" (i.e., score > 2).

Qualitative Analysis. The combined data from all focus groups were analyzed to answer the second research question. The first three authors conducted the analysis, using a conventional content analysis approach (Hsieh & Shannon, 2005). This inductive approach was selected due to the exploratory nature of this study and guided data analysis using participants' words instead of the researchers' preconceived notions or ideas. The researchers used the following steps of the

conventional content analysis approach (Hsieh & Shannon, 2005) by engaging in emergent consensus coding (Creswell & Clark, 2017) using Microsoft Word and Excel.

At the start of the coding process, the analysis team met and coded one of the five focus group transcripts together to develop a codebook with code names and definitions (see Supplemental Materials for the codebook). To generate initial codes, they repeatedly read each response and identified keywords and phrases related to the research questions. Multiple codes were assigned to responses as appropriate. Next, the three coders split into coding pairs to code the remaining data. Within each coding pair, each researcher individually coded their assigned responses and then met with their coding partner to establish consensus. Once the initial coding of the transcripts was complete, the coders engaged in axial coding (the process where data are sorted, synthesized, and organized) to refine, collapse, and consolidate consensus codes and their definitions into subcategories (Charmaz, 2014). Then, subcategories of codes were collapsed into categories.

Multiple methods used in other qualitative studies were used to establish rigor and trustworthiness of the findings (Pfeiffer et al., 2023). We aimed to provide sufficient detail of the analysis for the reader to assess: (a) if participant voices guided the analysis process rather than researcher biases, (b) if the analysis process could be replicated, and (c) to determine the applicability of the findings to other contexts (Johnson et al., 2020). This was accomplished through the use of an audit trail to keep detailed notes about the study methods, procedures, and decisions (Merriam & Tisdell, 2016), the use of multiple coders; rich descriptions providing contextual information (Merriam & Tisdell, 2016); and a detailed report of the research method.

Results

Of the 68 students who consented to the research, 60 submitted pre- and immediate post-workshop surveys. The 60 students' survey data were included in the subsequent statistical analyses. Eighty-two percent of the student participants reported participation in some kind of IPE experience prior to the workshop. Of these students, 61% endorsed a previous IPE experience as part of their coursework, 88% during an on-campus clinical placement, 22% during an off-campus clinical placement, and 14% reported 'other' IPE experience.

At the four-month follow-up, 56 students submitted surveys. Of the 56 students, 77% endorsed previous participation in IPE experiences, with the largest percentage occurring in on-campus clinical placements (79%) followed by coursework (67%), off-campus clinical placements (33%), and other experiences (7%).

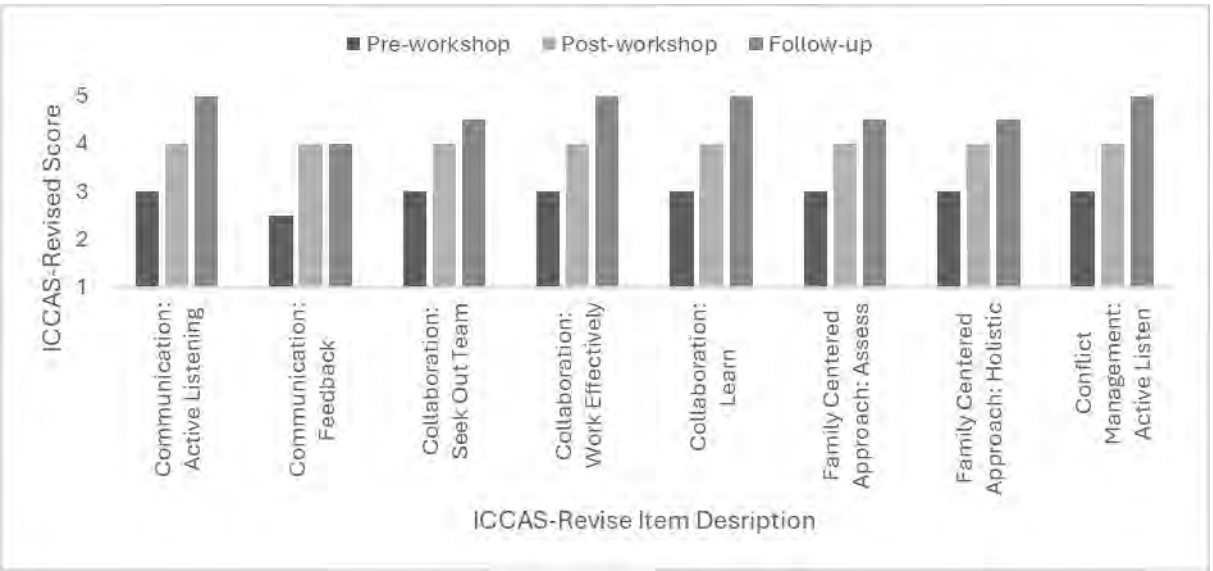
Quantitative Findings. For all ICCAS-Revised items, models were significant after multiple comparison corrections (FDR-adjusted $p < 0.001$). Students consistently rated their performance higher after compared to before the workshop as evidenced by a significant main effect of time ($p < 0.05$). Thus, the workshop appeared to be an effective tool to improve students' perceived IPCP competence.

Both before and four months after the workshop (i.e., follow-up), students rated themselves as more proficient than "Fair" after corrections for multiple comparisons (FDR-corrected $p < 0.05$).

Post hoc follow-up analyses then adjusted the cutoff score to "Good" (i.e., score = 3) since that was the middle score option. Aside from Question 2 at pre-workshop (FDR-adjusted $p < 0.01$), student survey responses at this time point were not statistically different from "Good"; however, survey items answered at four-month follow-up were rated as significantly better than "Good" (i.e., score > 3; FDR-adjusted $p < 0.001$). For all students, their self-reported scores either maintained or increased with every item on the ICCAS-Revised, demonstrating the effectiveness of this workshop to improve SLP and OT graduate students' understanding and implementation of IPE skills. See Table 1 for a summary of ICCAS-Revised responses pre- and post-workshop.

Figure 2

ICCAS-Revised Scores for Items that Increased More than One Point Pre-Workshop to Follow-Up



Note. *Note*. Interprofessional Collaborative Competencies Attainment Survey - Revised (ICCAS-Revised) response options: 1 = "Poor", 2 = "Fair", 3 = "Good", 4 = "Very Good", 5 = "Excellent."

Qualitative Findings. To answer the second research question about the knowledge and skills gained from participating in the workshop, the coders established a final codebook with 76 codes to analyze the focus group transcripts. Nine subcategories were generated during the analysis process, which were combined into three overall categories. We define each of the categories and subcategories below. Subcategories are also italicized for readability. Table 2 provides illustrative quotes from both SLP and OT students for each one.

Knowledge and Skills. The Knowledge and Skills category consisted of three subcategories: *Communication*, *Roles and Responsibilities and Clinical Practices*. This category was the IPCP information, facts, skills, and/or awareness students used or learned by participating in the workshop. During the focus groups, students discussed learning about and using *Communication* skills such as active listening, asking questions, collaboration, avoiding or explaining discipline specific terminology, and sharing experiences related to their discipline and collaboratively solving the case. Students noted that collaboratively solving the case helped them build rapport, establish commonalities, and socialize with peers from the other discipline. Some students

acknowledged difficulty communicating with students from the other discipline. These students experienced frustration and difficulty when explaining discipline-specific concepts but found that working through it made them more comfortable speaking to peers from the other discipline.

Roles and Responsibilities. The second subcategory for Knowledge and Skills was *Roles and Responsibilities,* which included comments about the students' understanding of their own and the other disciplines' roles, responsibilities, and/or perspectives. During the focus groups, students discussed asking questions, building relationships, educating peers from the other discipline about their own discipline, developing collaborative goals, overcoming barriers between disciplines, and considering peers' perspectives. The workshop also clarified students' misconceptions of the roles of the other disciplines. For example, some OT and SLP students were surprised to learn that assessment and intervention of cognitive disorders were within both disciplines' scopes of practice. Students expressed interest in learning about other disciplines and acknowledged that this learning is a continual process. Many students said the workshop was their first chance to work with the other discipline. An SLP student believed that acknowledging their limited understanding of the other disciple's roles and responsibilities facilitated communication during the workshop.

Clinical Practices. The last subcategory in Knowledge and Skills, *Clinical Practices,* encompassed the skills used or learned while developing a collaborative treatment plan. For most students, the workshop was the first opportunity to consider another discipline's perspective when developing treatment goals and activities. They discussed using critical thinking and problem-solving skills to create treatment plans that were mutually beneficial to both disciplines and addressed the client's concerns. Students said collaborative treatment planning taught them about leadership, assessment processes, co-treating with other disciplines, and more about when to make appropriate referrals.

Feelings. The Feelings category consisted of three subcategories: *Positive Experience*, *Negative Experience*, and *Suprise*. This category was comprised of students' emotional reactions to their workshop experience. Generally, students described the workshop as a *Positive Experience* using words such as "insightful," "beneficial," "helpful," "great," "fun," "enjoyable," "informative," "eye-opening," and "encouraging."

A few students reported having a *Negative Experience* during the workshop. Their comments were related to the physical space and composition of student groups. Students used words such as "not positive" to describe their dissatisfaction with the workshop environment. Since their comments included their emotional reactions to the workshop and reflections on their experiences, they were coded under the 'Feelings' and 'Workshop Reflections' categories. The specific environmental components that contributed to their negative experiences are detailed under the 'Workshop Reflections' category. Some students were *Surprised* that they learned something from the workshop and others stated it was a much better experience than they had anticipated.

Table 1

Examples of Students' Focus Group Quotes for the Knowledge and Skills Theme and Subcategories

Theme	Subcategory	Quote
Knowledge and Skills	Communication	"It was nice to know [that] when I go off campus and do [IPCP] in the [*sic*] setting, I'll know I can talk to an occupational therapy clinician, or actual therapist, or student therapist, and not feel judged to ask these [*sic*] questions. (SLP student)
		"[What] I was able to practice … breaking down the concepts that you and your own discipline know to another person that might not be as familiar with [them]." (OT student)
	Roles and Responsibilities	"It was really nice to … get to know what they [OTs] do and compare the relationships between speech and OT." (SLP student)
		"To see that we could still help the same patient in different ways and from different perspectives." (OT student)
	Clinical Practices	"I think it also maybe gives me more knowledge if I ever needed to recommend or recognize the need for speech in a patient in the future." (OT student)
		"We took the time to really make sure that everyone understood the purpose of why certain plans were being put in place." (SLP student)

Workshop Reflections. The third category was students' Workshop Reflections and was comprised of three subcategories: *Simulation, Environment,* and *Workshop Design*. Workshop Reflections captured students' feedback on the workshop components that facilitated their learning and their recommendations for future iterations of the workshop. Students appreciated that the workshop was a *simulation* of IPCP and identified the following as effective workshop components: the sequence of workshop activities, group work, having a realistic case study that provided hands-on experience, and watching videos. Students appreciated that the case study included both disciplines and that it was supplemented with a video. Discussing the case study in small interprofessional groups also facilitated their learning and created a safe learning environment where students were unafraid to ask questions. Students recommended that future workshops include other disciplines, specifically nursing and physician assistants. Both disciplines care for clients with a history of stroke; therefore, students believed their input would be valuable additions to the workshop.

Table 2

Examples of Students' Focus Group Quotes for the Feelings Theme and Subcategories

Theme	Subcategory	Quote
Feelings	Positive Experience	"Getting the chance to do [interprofessional collaboration] before we leave school is [*sic*] really nice [and] to see how it can go when you're given a lot of time." (OT student)
		"We just learned from each other, and that was like one of my favorite parts." (SLP student)
	Negative Experience	"Mine wasn't really that positive. I wouldn't say negative, but I guess we already discussed that we wanted a different room." (SLP student)
		"It did feel slightly intimidating to be only fifteen OT students versus the larger number of speech students." (OT student)
	Surprised	"I really didn't think I was going to learn much. But I did come out of it with a lot of knowledge..." (SLP student)
		"[I was surprised because] …, I thought I knew a lot about aphasia … hearing from the SLPs about what they do …, I learned a lot." (OT student)

Workshop Environment. Students described the workshop environment as distracting. Students stated that the lecture hall's stadium seating arrangement, which prevented students from facing each other, and the proximity of the small interprofessional groups to each other during discussions negatively affected their ability to collaborate. Due to the distracting environment, some small interprofessional student groups moved to the hallway and a nearby student lounge. However, because space near the lecture hall was limited, most small interprofessional groups remained in the lecture hall.

Other students commented that they were disappointed with the disproportionality of SLP and OT students in each small interprofessional group. Disproportionate groups limited the SLP students' opportunity to learn from OT students and created performance pressure for some of the OT students as they had minimal peer support when explaining concepts to the SLP students. An OT student reported feeling pressured to complete the treatment plan assignment, which limited their time for discussion and collaboration with peers from the other discipline.

Workshop Design. Both SLP and OT students provided recommendations for modifying the *Workshop Design*. Students expressed contradictory opinions about the duration of the workshop. Some students stated there was enough time to meet the activity's objectives in the single day workshop and was preferable due to time constraints and possible conflicts with other assignments or responsibilities. Others stated they would prefer a multi-session workshop to ensure more time for collaboration. One SLP student said they would have preferred to watch the case study video prior to attending the workshop to provide more time to complete the treatment

plan and to communicate and collaborate with other students. Students mentioned that it would have been beneficial to have IPE opportunities earlier in their programs to facilitate success in their collaborations during their clinical courses, as well as throughout their educational experience.

An OT student reflected on the overlap in swallowing between the two disciplines' scopes of practice and recommended including swallowing and other practice areas with overlap in future workshops. Some students recommended that future workshops address conflict management and communication skills. To support student learning and monitor time, students suggested the addition of faculty facilitators. Facilitators can help lead and model interprofessional collaboration for student learning. Finally, one SLP student recommended that rather than utilize a video client, incorporate a simulated client who students could interact with.

Table 3

Examples of Students' Focus Group Quotes for the Workshop Reflections Theme and Subcategories

Theme	Subcategory	Quote
Workshop Reflections	Simulation	"It was good practice to actually simulate the kind of conversations that we will end up having in the future." (OT student)
		"I appreciated that we saw the case and then got to talk about it in real time and discuss things just as you would in [*sic*] a professional team." (SLP student)
	Environmental Factors	"I think multiple sessions is helpful, too, because if you have something you want to go do research on and come back with, or you have some time to think over and reflect about what you spoke about." (OT student)
		"I can agree with [name] about the environment. It was fairly distracting. My group, we had to go out in the hallway because we were unable to hear each other and unable to participate." (SLP student)
	Workshop Programming	"I think that having this earlier would have just provided more context, I think and would have given more background knowledge because we are expected to have these interprofessional teams right from the get go." (SLP student)
		"I know that they work on swallowing … I would love to see what they do with food and helping people swallow and stuff like that." (OT student)

Integration of Quantitative and Qualitative Results. Some IPCP knowledge and skills were only captured on the ICCAS-Revised or in the qualitative analyses. Results of the ICCAS-Revised indicated that the workshop improved students' perceptions of their interprofessional skills in several areas: providing feedback to team members, involving clients in the

development of a plan of care, determining each team member's responsibilities when their scopes of practice overlap, taking responsibility for their contributions to the interprofessional team and effectively addressing team conflict. However, despite high self-ratings related to communication and conflict management skills after the workshop, students expressed during the focus groups that they wanted more opportunities to develop these skills further. During the focus groups, students also reported that participating in the workshop reinforced additional skills not included in the ICCAS-Revised, such as critical thinking, problem-solving, leadership, and collaborative treatment planning. Students also noted that the workshop advanced their understanding of both discipline's roles and that they learned when to consult with other disciplines for the client's benefit.

When combined, the ICCAS-Revised and focus group analyses revealed that the workshop enhanced students' perceptions of their IPCP knowledge and skills. Both assessments identified that students perceived that the workshop advanced their active listing skills, improved their ability to succinctly articulate their ideas to interprofessional team members, deepened their understanding of the other discipline's roles and responsibilities, and made them more considerate of other team members' perspectives. In addition, they expressed wanting more support related to communication skills, such as explaining discipline-specific concepts to others, avoiding discipline-specific terminology, and conflict management.

Discussion

The purpose of this mixed methods study was to examine graduate SLP and OT students' perceptions of changes in their interprofessional knowledge and skills from attending an IPE stroke workshop. In the preceding pilot study, Keck et al. (in press) found that the workshop improved graduate SLP and OT students' perceptions of their IPCP knowledge and skills immediately after the workshop based on the use of quantitative survey data alone. The results of the current study extended these findings by showing that students perceived that they retained their learning for four months after the workshop. The inclusion of focus groups in the current study revealed additional areas of perceived growth that the ICCAS-Revised did not capture, including critical thinking, problem-solving, leadership, and collaborative treatment planning. These skills can all enhance students' ability to contribute effectively to an interprofessional team and provide clinical services that improve client well-being.

The current study has four main findings: (a) the IPE stroke workshop improved students' self-reported interprofessional knowledge and skills related to the IPEC core competencies, (b) students maintained their IPCP knowledge and skills for four months after participating in the workshop, (c) despite high post-workshop ratings on the ICCAS-Revised, students expressed a desire to continue developing their communication and conflict management skills, (d) overall, students had a positive workshop experience, but had recommendations for improving future iterations of the workshop. We will discuss each of the main findings in more detail in the sections below and discuss future directions.

Student's Self-Reported Interprofessional Knowledge and Skills. Integration of the ICCAS-Revised and focus group results revealed that the workshop enhanced students' perceptions of their knowledge and skills related to three of the IPEC core competencies: communication, roles

and responsibilities, and teams and teamwork. Although the workshop was designed to enhance students' communication and understanding of roles and responsibilities, students also highlighted competencies related to teams and teamwork. They recognized the importance of team problem-solving, shared leadership practices, conflict management, and diversity among team members (IPEC, 2023). Moreover, they had a greater appreciation for teams and teamwork in healthcare and associated IPE with quality team dynamics.

Absent from the students' focus group discussions were competencies related to the IPEC core competency of values and ethics. This omission may be attributed to the limited time available during the workshop for establishing professional relationships, as students expressed a desire for more time to interact and establish trust. Establishing trust is essential for students to feel comfortable questioning team members' ethical decisions (Houle et al., 2020). Alternatively, students may not have considered the case from a values and ethics perspective. The workshop instructions required them to use a holistic treatment framework to solve the case study. This framework predefined the interprofessional teams' values, which limited the opportunity for students to collaboratively establish their own team values and ethics.

Studies have shown that ethics-based IPE can enhance students' perceptions of their IPCP values and ethics (Knight et al., 2017; Manspeaker et al., 2017). To explicitly support students' development of the values and ethics competency, researchers have recommended that ethics-based IPE be practical and represent ethical dilemmas encountered in clinical practice (Machin et al., 2019). A study that examined the effectiveness of a 4-hour ethics-based IPE workshop found that case scenarios improved the understanding of IPCP values and ethics among students in OT, SLP, athletic training, health management, physician assistant studies, and physical therapy (Manspeaker et al., 2017). The study also found that the ethical dilemma cases provided opportunities for conflict resolution among the students (Manspeaker et al., 2017). Therefore, integrating ethical dilemmas into stroke case studies during IPE events may better facilitate students' development of values and ethics competency.

The results of the current study contribute to the IPE stroke research, demonstrating the effectiveness of a range of inquiry-based case study interventions for SLP and OT students. Inquiry-based case studies that appropriately challenge students to apply and learn IPCP content are recommended for IPE (Bogossian et al., 2023). While previous case-based IPE stroke research has provided evidence for introductory and advanced case-based IPE stroke experiences (Mills et al., 2020; Wallace et al., 2016), this study provides evidence for an intermediate-level IPE stroke workshop. The current study, in combination with the findings of the previous case-based IPE stroke work, suggests that undergraduate and graduate students can benefit from learning about other disciplines' roles and responsibilities in stroke care from IPE stroke workshops. However, follow-up events are needed for students to have additional time to practice communicating with other disciplines about their roles and responsibilities on a stroke team.

Mills and colleagues (2020) used confirmation inquiry, an introductory level of case-based learning, to introduce graduate dietetic students and undergraduate SLP and OT students to interprofessional stroke services (Banchi & Bell, 2008). Their case study involved a series of three unfolding video cases depicting professionals engaged in IPCP. Small groups of students

watched the videos and identified evidence of IPCP (Mills et al., 2020). Analyses of students' survey responses and focus group discussions suggested that the researchers' introductory-level case-based IPE improved students' attitudes toward IPCP and enhanced their understanding of other discipline roles (Mills et al., 2020).

Wallace and colleagues (2016) used guided inquiry, an advanced level of case-based learning, to teach IPCP to undergraduate students from eight different health professions (Banchi & Bell, 2008). Their case study involved a real client 10 years post-stroke and his family attending the IPE stroke workshop. Students worked collaboratively in interprofessional groups to generate questions for the client and his family related to his health care and develop a plan of care. A study by Wallace and colleagues (2016) resulted in a mix of positive and negative changes in students' understanding of each discipline's roles and responsibilities in stroke care. The authors attributed their inconsistent results, in part, to a discrepancy between the students' skill level and the level of inquiry required for the case study (Wallace et al., 2016).

Students Maintained their IPCP Knowledge and Skills. All students' self-reported scores on every item of the ICCAS-Revised either maintained or increased four months after the workshop. This finding aligns with and adds to the outcomes of the only other study, to our knowledge, that examined the long-term effects of a single-day IPE stroke workshop. Wallace (2017) followed up with graduate SLP students one year after they participated in an IPE stroke workshop with students from seven other health care disciplines (Wallace et al., 2016). The SLP students completed a questionnaire related to their clinical experiences since the workshop and their perceptions of it after one year. Results suggested that the workshop was relevant to their clinical experiences and perceived as addressing all IPEC core competencies despite its original purpose of teaching roles and responsibilities (Wallace, 2017).

In contrast to Wallace (2017), the current study's mixed methods results included both SLP and OT, finding that both disciplines perceived the workshop as beneficial over time. Together, the results of the current study and Wallace's (2017) suggest that even single-day IPE case study events can have a lasting impact on students and their perceptions of their contributions to IPCP teams. However, more objective measures of students' IPCP knowledge and skills are needed to determine if their perceptions align with their actual clinical practices.

Continued Development of IPCP Competencies. Students reported that the workshop improved their confidence in communicating with different disciplines on both the ICCAS-Revised and during the focus group discussions; however, they expressed a desire to continue developing their communication skills after the workshop, particularly for managing conflicts. Despite the potential for conflict among healthcare students and professionals working on interprofessional teams, few IPE studies have focused on developing health professions students' conflict management skills (Paradis & Whitehead, 2015).

While the workshop in the current study was not designed to teach conflict management skills, more than 80% of the participating students had prior IPE experiences. Students might have experienced conflict during the workshop and/or their previous IPE experiences and realized the value of conflict management skills when working on an interprofessional team. Future IPE

stroke workshops should consider including training and practice related to conflict management, as this important area is understudied in the IPE literature.

Students' Workshop Experiences and Suggestions for Improvement. Overall, students perceived value in attending the workshop and had a positive experience. During the focus groups, students used terms such as "fun," "insightful," and "encouraging." These results align with previous IPE intervention research examining students' perceptions of IPE (Hamilton et al., 2022; Karpa et al., 2018; Mills et al., 2020). Although many of the students' comments were positive, a few students reported negative experiences related to the workshop environment. Students' comments suggested that features of the physical and small group environments were perceived as workshop limitations. Previous IPE research has also found that the learning context, including the location and the number and mix of students working in groups, are important considerations for planning IPE learning experiences (Bogossian et al., 2023; Mills et al., 2020). Faculty planning IPE experiences should be sure to include thoughtful planning about the learning environment to maximize opportunities for students to collaborate and share ideas in a comfortable, inviting space.

Limitations

Although much consideration was taken into the development and implementation of the workshop, a few limitations must be considered. First, due to the size of the cohorts, there was a disproportionate number of SLP and OT students in each group, with fewer OT students. These imbalances may have contributed to the "pressure" OT students felt during the workshop. Second, the current study did not include a control group. Although including a control group would better capture the impact of participation in this workshop, the researchers did not want to limit students' opportunities to enhance skills needed for success in clinical education and future practice. Third, researchers did not collect participant demographic data beyond their previous IPCP experience. Researchers aimed to explore the knowledge and skills students gained through participation in this workshop, regardless of demographic differences, but recognize that this may limit the generalizability of findings to other universities.

Students self-selected focus groups based on convenience. Focus group facilitators did not document if students attended the same focus group as the students in their small groups at the workshop. This may have impacted what students were willing to share in front of their peers. Similarly, one of the focus group facilitators also facilitated the workshop. Students appeared forthcoming during the focus groups, sharing both positive and negative aspects of the workshop. However, the researchers acknowledge that this dual role may have influenced students' willingness to share their experiences and/or to speak negatively about the workshop. Lastly, this study relied on students' self-reported data for both quantitative and qualitative measures. Due to social desirability bias, students may have over or underestimated their IPCP knowledge and skills (Bowman & Hill, 2011). Future research should evaluate IPCP skills using behavioral data to determine the impact the workshop had on the students' clinical application of the IPCP skills learned. Additionally, the ICCAS-Revised responses at the four-month follow-up were anonymous, preventing the researchers from measuring individual longitudinal change. Moreover, the workshop took place in the spring semester, consequently the four months following included semester breaks when many students may not have had the opportunity to

practice IPCP skills in a clinical setting. Thus, their survey responses could reflect their perceptions of their skills rather than their actual practices.

Future Directions

Based on student feedback and the results of the current study, several recommendations for future IPE stroke workshops are offered. Student engagement was impacted by the workshop's context. Future workshops should use physical spaces where students can face each other, limit background noise from other groups' conversations, and work as a cohesive group. Additionally, several students noted the disproportionate number of SLP students compared to OT students. Future research should ensure an equal distribution of students from each discipline and consider incorporating other disciplines in the workshop, such as physician assistants, nurses, or physical therapists. This would likely change the dynamic of the workshop, as more disciplines bring greater diversity in perspectives. Including different disciplines could shift power dynamics and create opportunities to practice conflict management skills (Gergerich et al., 2018). However, to ensure that students develop these skills in a safe environment, faculty should teach conflict management strategies before placing students in IPE settings where conflict may arise.

Students also reported that time constraints were a barrier to establishing relationships with students from the other discipline. Ensuring that students feel safe offering ideas and providing constructive feedback to peers is an essential component of IPE (Maddock et al., 2023). Future workshops should allocate adequate time for students to establish rapport before beginning group tasks, such as developing a treatment plan.

Lastly, students recommended holding the workshop earlier in their academic experience, rather than midway through their first year of graduate school and voiced interest in sustained IPE events throughout their training programs. The current study's structured inquiry approach could be simplified, advanced, or extended over multiple semesters/courses. The workshop could be simplified by adding confirmatory-inquiry elements, like those used by Mills et al. (2020), advanced by adding guided-inquiry components, like those used by Wallace et al. (2016), or implemented over multiple semesters/courses by combining it with these confirmatory and guided-inquiry approaches.

Several recommendations for future IPE stroke intervention research should also be considered. Future research should employ behavioral or observational methodology to assess students' use of IPCP skills in a clinical setting. Additionally, comparing students' self-ratings of their IPCP skills to their actual usage in a clinical environment would be beneficial. Moreover, future research should continue to evaluate the long-term impact of IPE stroke interventions. As the results reported here demonstrated, students' IPCP knowledge and skills were maintained over a four-month period, it is important to learn if their knowledge and skills were utilized and maintained in clinic-based education and after graduation to professional practice.

Conclusion

The case-based IPE stroke workshop advanced students' understanding and application of IPCP, and students perceived maintained growth over a four-month period. The current study's

findings align with previous IPE stroke intervention research and offer valuable guidance to faculty designing graduate-level IPE stroke workshops. When designing workshops, faculty should consider the students' level of education and prior IPE/IPCP experience, balance the composition of small interprofessional groups, use spaces that are conducive to teamwork, and allot adequate time for effective interprofessional collaboration and skill development.

Disclosures

This study was supported by a Towson University Faculty Academic Center of Excellence Mini Grant. Aside from university and hospital employment, the authors have no other financial or non-financial conflicts of interest to disclose.

References

American Speech-Language-Hearing Association (2017). *Interprofessional practice in action! [Video]*. https://www.youtube.com/watch?v=cIbLxLw69A0&t=94s

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

Banchi, H. & Bell, R. (2008). The many levels of inquiry. *Science and Children, 46*(2). 26-29. https://www.michiganseagrant.org/lessons/wp-content/uploads/sites/3/2019/04/The-Many-Levels-of-Inquiry-NSTA-article.pdf

Bogossian, F., New, K., George, K., Barr, N., Dodd, N., Hamilton, A.L., Nash, G., Masters, N., Pelly, F., Reid, C., Shakhovskoy, R., & Taylor, J. (2023). The implementation of interprofessional education: A scoping review. *Advances in Health Sciences Education, 28*, 243-277. https://doi.org/10.1007/s10459-022-10128-4

Bowman, N.A., & Hill, P.L. (2011). Measuring how college affects students: Social desirability and other potential biases in college student self-reported gains. *New Directions for Institutional Research*, *150*, 73-85. https://doi.org/10.1002/ir.390

Browne, F.R., Zucchero, R., Hooker, E.A., & Tunningley, J. (2021). Longitudinal outcomes of a brief interprofessional education experience with or without an interprofessional education course. *Journal of Interprofessional Care, 35*(1), 74-82. https://doi.org/10.1080/13561820.2019.1702513

Burton, B., Isaacs, M., Brogan, E., Shrubsole, K., Kilkenny, M.F., Power, E., Godecke, E., Cadilhac, D.A., Copland, D., & Wallace, S.J. (2023). An updated systematic review of stroke clinical practice guidelines to inform aphasia management. *International Journal of Stroke, 18*(9), 1029-1039. https://doi.org/10.1177/17474930231161454

Cahn, P.S., Tuck, I., Knab, M.S., Doherty, R.F., Portney, L.G., & Johnson, A.F. (2018). Competent in any context: An integrated model of interprofessional education. *Journal of Interprofessional Care, 32*(6), 782-785. https://doi.org/10.1080/13561820.2018.1500454

Cavanaugh, R. (n.d.). *Classroom Activities* [*Assessment, treatment planning – 4 case studies*]. Aphasia Bank. Aphasia.talkbank.org.

Charmaz, K. (2014). *Constructing grounded theory* (2nd ed.). Sage.

Christensen R (2023). *ordinal—Regression Models for Ordinal Data*. R package version 2023.12-4, https://CRAN.R-project.org/package=ordinal

Clinard, E.S. (2023). Simulation design and facilitation. In C.C. Dudding & S.M. Ginsberg (Eds.), *Simulation-based learning in communication sciences and disorders: Moving from theory to practice* (pp. 73-90). SLACK Incorporated.

Council of Academic Programs in Communication Sciences and Disorders (2019). *Best practices in healthcare simulations: Communication sciences and disorders*. Task force of the Council of Academic Programs in Communication Sciences and Disorders. https://www.capcsd.org/assets/pdf/Best-Practices-in-CSD/

Creswell, J. W., & Clark, V. L. P. (2017). *Designing and conducting mixed methods research.* Sage Publications.

Dreifuerst, K. T. (2015, May). Getting started with debriefing for meaningful learning. *Clinical Simulation in Nursing, 11*(5), 268-275. http://dx.doi.org/10.1016/j.ecns.2015.01.005

Gergerich, E., Daubney, B., & Scott, M.A. (2018). Hierarchies in interprofessional training. *Journal of Interprofessional Care, 33*(5), 528-535. https://doi.org/10.1080/13561820.2018.1538110

Gregson, J. M., Leathley, M., Moore, A. P., Sharma, A. K., Smith, T. L., & Watkins, C. L. (1999). Reliability of the Tone Assessment Scale and the modified Ashworth scale as clinical tools for assessing poststroke spasticity. *Archives of Physical Medicine and Rehabilitation, 80*(9), 1013-1016. https://doi.org/10.1016/s0003-9993(99)90053-9

Haley, K.L., Womack, J.L., Helm-Estabrooks, N., Caignon, D., & McCulloch, K.L. (2010). *The Life Interest and Values Cards*. University of North Carolina Department of Allied Health Sciences.

Hamilton, L.A., Borja-Hart, N., Choby, B.A., Spivey, C.A., & Shelton, C.M. (2022). Impact of stroke interprofessional simulation on health professional students. *Currents in Pharmacy Teaching and Learning, 14*, 938-948. https://doi.org/10.1016/j.cptl.2022.07.007

Helm-Estabrooks, N. (2001). *Cognitive Linguistic Quick Test (CLQT)*. Pearson.

Houle, S.K.D., Lillie, E., Richard, C.L., Slivecka, J., & Miller, A. (2020). The design and impact of an interprofessional education event among pharmacy and nursing students in palliative care-RnRx. *Journal of Hospice & Palliative Nursing, 22*(4), 292- 297. https://doi.org/10.1097/NJH.0000000000000657

Hsieh, H., & Shannon, S.E. (2005). Three approaches to qualitative content analysis. *Qualitative Health Research, 15*(9), 1277-1288. https://doi.org/10.1177/1049732305276687

International Nursing Association Clinical Simulation and Learning (INACSL) Standards Committee (2016, December). INACSL standards of best practice: Simulation[SM] simulation-enhanced interprofessional education (sim-IPE). *Clinical Simulation in Nursing, 12*(S), S34-S38. http://dx.doi.org/10.1016/j.ecns.2016.09.011

Institute of Medicine. (2015). *Measuring the Impact of Interprofessional Education on Collaborative Practice and Patient Outcomes*. Washington, DC: The National Academies Press. https://doi.org/10.17226/21726.

Interprofessional Education Collaborative. (2023). *IPEC Core Competencies for Interprofessional Collaborative Practice: Version 3*. Washington, DC: Interprofessional Education Collaborative.https://www.ipecollaborative.org/assets/core-competencies/IPEC_Core_Competencies_Version_3_2023.pdf

Johnson, J. L., Adkins, D., & Chauvin, S. (2020). A review of the quality indicators of rigor in qualitative research. *American Journal of Pharmaceutical Education, 84*(1), 138-146. https://doi.org/10.5688/ajpe7120

Karpa, K., Pinto, C., Possanza, A., Dos Santos, J., Snyder, M., Salvadia, A., Panchik, D., Myers, R., Fink, M., & Dunlap, A. (2018). Stroke simulation activity: A standardized patient case for interprofessional student learning. *MedEdPortal, 14*, 10698. https://doi.org/10.15766/mep_2374-8265.10698

Katan, M. & Luft, A. (2018). Global burden of stroke. *Seminars in Neurology, 38*(2), 208-211. https://doi.org/10.1055/s-0038-1649503

Keck, C., Guilfoyle, R., & Jozkowski, A.C. (in press). Interprofessional education stroke workshop: Case-based learning for occupational therapy and speech-language pathology students. *Journal of Interprofessional Care*.

Kertesz, A. (2006). *Western Aphasia Battery-Revised (WAB-R)*. Pearson.

Knight, C., Mayo, R., and Porter, M. (2017). Interdisciplinary ethics learning in higher education: Students' perceptions. *Teaching and Learning in Communication Sciences and Disorders, 1*(2), 1-24. https://doi.org/10.30707/TLCSD1.2Knight

MacKenzie, D., Creaser, G., Gubitz, G., MacDougall, P. Blacquiere, D., Miller, S., Sarty, G. (2017). Best practice interprofessional stroke care collaboration and simulation: The student perspective. *Journal of Interprofessional Care, 31*(6), 793-796. https://doi.org/10.1080/13561820.2017.1356272

Machin, L.L., Bellis, K.M., Dixon, C., Morgan, H., Pye, J., Spencer, P., & Williams, R.A. (2019). Interprofessional education and practice guide: Designing ethics-oriented interprofessional education for health and social care students. *Journal of Interprofessional Care, 33*(6), 608-618. https://doi.org/10.1080/13561820.2018.1538113

Maddock, B., Dārziņš, P., & Kent, F. (2023). Realist review of interprofessional education for health care students: What works for whom and why. *Journal of Interprofessional Care, 37*(2), 173–186. https://doi.org/10.1080/13561820.2022.2039105

Manspeaker, S.A., Brown, E.V.D., Wallace, S.E., DiBartola, L., & Morgan, A. (2017). Examining the perceived impact of an ethics workshop on interprofessional values and teamwork. *Journal of Interprofessional Care, 31*(5), 628-637. https://doi.org/10.1080/13561820.2017.1336992

Meyer, J., Leslie, P., Ciccia, A., & Rodakowski, J. (2021). Whose job is it? Addressing the overlap of speech-language pathologists and Occupational Therapists when caring for people with dementia. *Perspectives of the ASHA Special Interest Groups, 6*, 163-166. https://doi.org/10.1016/j.cptl.2022.07.007

Merriam, S. B., & Tisdell, E. J. (2015). *Qualitative research: A guide to design and implementation.* Wiley.

Mills, B., Hansen, S., Nang, C., McDonald, H., Lyons-Wall, P., Hunt, J., & O'Sullivan, T. (2020). A pilot evaluation of simulation-based interprofessional education for occupational therapy, speech pathology and dietetic students: Improvements in attitudes and confidence. *Journal of Interprofessional Care, 34*(4), 472-480. https://doi.org/10.1080/13561820.2019.1659759

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

Paradis, E., & Whitehead, C.R. (2015). Louder than words: Power and conflict in interprofessional education articles, 1954-2013. *Medical Education, 49*(4), 399-407. https://doi.org/10.1111/medu.12668

Pfeiffer, D. L., Feuerstein, J., & Landa, R. J. (2023). Speech-language pathologists' perceptions of language and literacy instruction for pre-K children with developmental language disorder. *Language, Speech, and Hearing Services in Schools*, *54*(4), 1295-1307. https://doi.org/10.1044/2023_LSHSS-23-00002

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. http://dx.doi.org/10.1080/13561820.2016.1233096

Selby, J.P., Fulford-Smith, L., King, A., Pitt, R., & Knox, R. (2011). Piloting the use of an interprofessional stroke care learning package created by and for students. *Journal of Interprofessional Care, 25*(4), 294–295. https://doi.org/10.3109/13561820.2011.552814

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

Srinivasan, M., Wilkes, M., Stevenson, F., Nguyen, T., & Slavin, S. (2007). Comparing problem-based learning with case-based learning: Effects of a major curricular shift at two institutions. *Academic Medicine, 82*(1), 74-82. https://doi.org/10.1097/01.ACM.0000249963.93776.aa

Tovin, M.M., Wormley M.E. (2023). Systematic development of standards for mixed methods reporting in rehabilitation health sciences research. *Physical Therapy, 4*(103). https://doi.org/10.1093/ptj/pzad084

Wallace, S.E. (2017). Speech-language pathology students' perceptions of an IPE stroke workshop: A one-year follow up. *Teaching and Learning in Communication Sciences & Disorders, 1*(1), Article 4. https://doi.org/10.30707/TLCSD1.1Wallace

Wallace, S.E. & Benson, J.D. (2018). Bringing interprofessional case-based learning into the classroom for occupational therapy and speech-language pathology students. *Occupational Therapy in Health Care*. https://doi.org/10.1080/07380577.2017.1414975

Wallace, S.E., Turocy, P.S., DiBartola, L.M., Deluliis, E.D., Astle, J., Cousino, S., Morgan, A., O'Neil, C., Simko, L.C., & Weidman, Y. (2016). Interprofessional education workshop outcomes: Learning and understanding professional roles in stroke care. *Journal of Physical Therapy Education, 30*(3), 50-60. https://doi.org/10.1097/00001416-201630030-00009

World Health Organization Health Professions Networks Nursing & Midwifery Human Resources for Health (2010). *Framework for action on interprofessional and collaborative practices*. https://www.who.int/publications/i/item/framework-for-action-on-interprofessional-education-collaborative-practice.

Appendix A

Workshop Case Study

Instructions: Prior to attending the case study event, students should read the "problem" and review the evaluation results. Students should be ready to discuss the "problem" and discipline specific case study results at the start of the case study event.

Problem: Jack, a retired government employee, had a stroke three years ago on the left side of his brain that resulted in communication and mobility impairments. His wife described him as social, active, and a helpful person, explaining that "he took care of everything for me." Jack attended speech-language pathology and occupation therapy for two years but discontinued services over a year ago because, as his wife stated, "he made lots of progress during the first year of therapy, but not as much progress in the last year, so he decided to take a break." She reported that Jack's communication and mobility issues continue to hinder him from completing household routines and participating in preferred activities.[1]

Jack and his wife have come to your interprofessional clinic for treatment targeting participation in day-to-day activities.

Jack received occupational therapy and speech-language evaluations three months ago during follow-up visits with his previous occupational therapist and speech-language pathologist. His results are provided below.

Speech-Language Pathology Results:

*Western Aphasia Battery – Revised (*Kertesz, 2006)

WAB AQ[2]	max = 100	52.6
WAB Type		Broca
WAB Spont. Speech Info Content	max = 10	4
WAB Spont. Speech Fluency	max = 10	4
Spont. Speech Score for AQ	max = 20	10
WAB Yes/No Questions	max = 60	53
WAB Aud. Word Rec	max = 60	50
WAB Sequential Commands	max = 80	44
Aud. Verbal Comp Score for AQ	max = 10	7
WAB Repetition	max = 100	37
Rep Score for AQ	max = 10	4
WAB Object Naming	max = 60	37

[1] The case study's format and content were adapted from an assignment contributed by Rob Cavanaugh to "Classroom Activities" available on aphasia.talkbank.org (Cavanaugh, n.d.).

[2] Abbreviations were intentionally used in the case to give students opportunities to explain discipline- specific concepts to the other discipline. Speech-language pathology acronyms included Western Aphasia Battery-Revised (WAB); Aphasia Quotient (AQ); Spontaneous (Spont.); Auditory (Aud.); Recognition (Rec.); Comprehension (Comp.); Repetition (Rep.); Sentence (Sent.).

WAB Word Fluency	max = 20	7
WAB Sent Comp	max = 10	4
WAB Responsive Speech	max = 10	3.45
Naming Score for AQ	max = 10	5.3

Cognitive Linguistic Quick Test (Helm-Estabrooks, 2001)

Cognitive Domain	Severity Rating
Attention	4
Memory	4
Executive functions	4
Language	1
Visuospatial skills	3
Composite Score	3.2

- 4 = WNL; 3 = Mild; 2 = Moderate; 1 = Severe

Occupation Therapy Results:

UE ROM[3]

Direction	Left (in degrees)	Right (in degrees)
Shoulder flexion	168	88
Shoulder abduction	155	92
Elbow flexion/extension	0-140	-20-145
Pronation/supination	90/90	50/90
Wrist flexion	65	70
Wrist extension	70	-10
Digits	WFL	UTA

MAS (Gregson et al., 1999)

Direction	Left	Right
Latissimus	0	2
Pectoralis	0	2
Bicep	0	3
Tricep	0	0
Wrist flexors	0	2
Wrist extensors	0	0
Notes:		

Vision Screen:

Right homonymous hemianopsia

[3] Occupational therapy abbreviations included Upper extremity (UE); Range of motion (ROM); Unable to assess (UTA); Lower extremity (LE); *Motor Assessment Scale* (MAS); Minimal assistance (MIN A).

Right neglect

Activities of Daily Living Assessment:
Self-feeding: MIN A seated with MIN verbal cues to attend to right
Grooming: MIN A seated with MIN verbal cues to attend to right
UE bathing: MIN A seated on shower chair
UE dressing: MOD A with button up shirt
LE bathing: MIN A seated on shower chair
LE dressing: MIN A seated
Transfers: MIN A stand pivot with cues for safety

Appendix B

Workshop Instructions

Instructions: Each team should select a facilitator. Facilitators will record the team's responses. Team members, discuss your answers to the following questions. Teams will have 45 min. to complete these questions. At the end of the 45 min. Students will share their answers with the group.

1. What does this patient's case history (problem and test results) tell you about his language, communication, activities of daily living, and mobility strengths and weaknesses? Develop a problem list. Each team member should present discipline specific information about the patient and his presenting problem.

2. What activity from the patient's *Life Interests and Values Cards* ([LIV cards]; Haley et al., 2010) results will your team focus on? Why?

3. What information from the patient's diagnoses, evaluation results, and case history will help your team create a treatment plan for your selected LIV cards activity?

4. Develop a team-based treatment plan of your selected LIV cards activity. Treatment must take place in the clinic (i.e., team members aren't able to go to the patient's home or community locations). Treatment plans should include:
    a. Treatment participants/team members
    b. Treatment rationale
    c. Treatment activities/approaches
        i. Treatment plans must include at least one co-treat (OT/SLP)
    d. Team members responsibilities/roles during treatment

Appendix C

Focus Group Questions

1. What word or phrase would you use to describe what you learned about collaboration during this IPE experience?
2. What experience or experiences did you have at the IPE event that taught you this new skill, concept, or piece of information?
3. What is interprofessional collaboration?
4. What skills and/or behaviors are required for successful interprofessional collaboration?
5. How can interprofessional collaboration benefit service providers?
6. How can interprofessional collaboration benefit patients/clients?
7. What are the disadvantages for service providers when collaborating with other health professionals to provide services to clients/patients?
8. What are the disadvantages for patients/clients when receiving interprofessional care?
9. What ways, if any, did participating in the IPE experience impact your interprofessional knowledge and skills?
10. Describe your experience participating in the IPE event.
11. What surprised you the most about this experience?
12. What will you take with you from this experience into your future clinical practice?
13. What did we miss? Are there any other comments you would like to make about your experience participating in the IPE event?