Outcomes of Service Delivery Models in School-Based Therapies

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Outcomes of Service Delivery Models in School-Based Therapies

May 2019

This evidence project, submitted by
Nicholas Kasovac, Daniel Krupicka, Katherine Woodworth, Maryann Zmuda

has been approved and accepted
in partial fulfillment of the requirements for the degree of
Master of Science in Occupational Therapy from the University of Puget Sound.

Project Chairperson: Sheryl Zylstra, DOT, OTR/L, BCP

OT635/636 Instructors: George Tomlin, PhD, OTR/L, FAOTA; Renee Watling, PhD, OTR/L, FAOTA

Director, Occupational Therapy Program: Yvonne Swinth, PhD, OTR/L, FAOTA

Dean of Graduate Studies: Sunil Kukreja, PhD

Key words: service delivery models, collaboration, consultation, push-in, pull-out
Abstract

Kristin Brubaker, a licensed occupational therapist in the University Place School District, proposed the following question to a student research team: “What are the student, therapist, and teacher outcomes of different school-based service delivery models?” Following a review of 22 articles with qualitative and quantitative methods, studies were grouped into three categories of school-based service delivery models: collaborative-consultative, mixed, and direct. Research demonstrated that collaborative-consultative service delivery models provide positive outcomes such as stronger relationships between therapists and teachers, opportunities for therapists to implement and adapt intervention techniques within the classroom, increased effectiveness in teaching strategies, and improved academic skills and participation for students. Research on mixed models found positive outcomes for teachers, including awareness of student impairments as well as visual motor skill development for students. Research on the direct service delivery model, though limited, found benefits in developing handwriting skills of students, as well as other fine, gross, and visual motor skills. The student researchers concluded that a collaborative-consultative service delivery model elicits the most positive outcomes for teachers, therapists, and students. The student researchers also acknowledge positive outcomes for students using a direct model, and both students and teachers using a mixed design. Recommendations for future research include gathering more evidence to determine the most effective service delivery model and identifying how to best foster collaboration between therapists and teachers to optimize positive outcomes for students.
Executive Summary

The research group met Kristin Brubaker, the collaborator, in the fall of 2018 to formulate a research question for the capstone project. At that time, the University Place School District employed a traditional service delivery model in which children are seen individually or in small groups one to two times a week outside the classroom. Through discussion, the collaborator shared that the district special education administrator was interested in introducing the 3:1 model of service delivery, which was the topic the collaborator wanted the student researchers to investigate. The original question was focused on finding research related to the 3:1 service delivery model. However, due to a lack of published literature on this topic, the student researchers expanded the question to examine outcomes associated with all service delivery models used in schools to deliver therapies. The collaborator, project chair, and project mentor approved the topic.

Student researchers explored several databases, which included: ERIC, ProQuest, Medline, PubMed, CINAHL, EBSCO Academic Search Complete, WorldCat, and OT Seeker. Key terms used included: school, schools, school-based, students, service delivery model, 3:1, push-in, pull-out, traditional, direct, workload, caseload, collaboration/consultation, P4C, intervention, service delivery models, intervention, collaboration, communication, professional development, advocacy, satisfaction, academic performance, social participation, motor performance, fine motor skills, classroom participation.

Additionally, other studies were found through reference checking, as well as suggestions from the project chair. A total of 83 articles that fit original criteria were identified through title and abstract review, and each had abstracts that addressed the research question. After duplicates were removed and the remaining articles were assessed more thoroughly through full text review, 22 articles met the inclusion criteria and were included in the CAT table. Student researchers used three themes to group all of the articles: collaborative-consultative, mixed, and direct, though a majority of these articles were identified as collaborative-consultative. Interestingly, this literature review revealed a limited amount of
research examining a direct service delivery model, which has been the traditional approach used in school-based therapies.

Preliminary conclusions indicated implications for consumers (students, parents), practitioners (teachers, therapists), administrators, and researchers. When a collaborative-consultative service delivery model is used, it is likely that more students receive the benefit of occupational therapy interventions. A collaborative-consultative model using early intervention services may mitigate emerging developmental delays or functional difficulties from increasing in severity, thereby reducing the future need of intensive treatment. In addition, federal mandates, treatment plans, and student goals can be addressed and implemented by a cohesive team in an effective and efficient way.

Necessary factors to achieve a collaborative model, with consultation, include 1) thoughtful planning to implement, 2) knowledge and appreciation of unique roles, 3) regular and consistent communication, and 4) coherence of buy-in and participation from all members. This also allows for the consideration of natural environments, classroom curriculums, school staff engagement, and overall best practice for occupational therapists.

It was decided, after consultation with the collaborator, the knowledge translation would be most beneficial if shared with special education administrators and the Professional Learning Community (PLC) group at the school district, which is made up of related service providers. An informational brochure was determined to be the preferred method for knowledge translation and was developed to include the key findings. In addition, a survey was disseminated to the PLC to garner their perceptions of the 3:1 model being used in their district, and to determine their level of preparedness to advocate for a collaborative model. Results have been compiled and disseminated.
GUIDELINES FOR THE CRITICALLY APPRAISED TOPIC (CAT) PAPER

Focused Question

What are the outcomes associated with the various service delivery models used in school-based therapy services?

Prepared By

Nicholas Kasovac, Daniel Krupicka, Katherine Woodworth, Maryann Zmuda

Date Review Completed

11/28/18, 5/17/19

Professional Practice Scenario

A special education administrator was interested in implementing a 3:1 service delivery model within the University Place school district. A school-based occupational therapist, who works with the special education administrator, wanted to know what the student, therapist, and teacher outcomes are of different school-based service delivery models in order to help her better serve her students. This includes all service delivery models, such as push-in, pull-out/direct, consultative, 3:1, and more. At the time, a traditional model was being used in which children are seen individually or in small groups once or twice a week. The therapist typically pulled children out of the classroom for treatment, or, less frequently, provided instruction within classroom during appropriate times. Recently, the University Place school district implemented a 3:1 service delivery model.

Search Process

Procedures for the selection and appraisal of articles

Inclusion Criteria

- Articles published 1998 or later
- Articles should:
  - Examine outcomes (for students, OTs, teachers, and/or parents)
  - Examine SDM in school-based therapies
- All tier services (1, 2, 3)
- AOTA Levels of Evidence: I, II, III, IV, and V
- School-based OT, PT, SLP literature

Exclusion Criteria

- Articles published 1997 or earlier
- Dissertations and theses
- Outpatient, EI, inpatient OT, PT, or SLP
- Psychology literature
- Intervention focused on adaptive equipment
### Search Strategy

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<th>Categories</th>
<th>Key Search Terms</th>
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<tr>
<td>Patient/Client Population</td>
<td><em>School</em>&lt;br&gt;<em>Schools</em>&lt;br&gt;<em>School-based</em>&lt;br&gt;<em>Students</em></td>
</tr>
<tr>
<td>Intervention (Assessment)</td>
<td>Occupational therapy:&lt;br&gt;  <em>Service Delivery Model</em>&lt;br&gt;  <em>3:1</em>&lt;br&gt;  <em>Push-in</em>&lt;br&gt;  <em>Pull-out</em>&lt;br&gt;  <em>Traditional</em>&lt;br&gt;  <em>Direct</em>&lt;br&gt;  <em>Workload</em>&lt;br&gt;  <em>Caseload</em>&lt;br&gt;  <em>Collaboration/Consultation</em>&lt;br&gt;  <em>P4C</em>&lt;br&gt;  <em>Intervention</em></td>
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<td>Comparison</td>
<td>Service Delivery Model&lt;br&gt;Service Delivery Models&lt;br&gt;Intervention</td>
</tr>
<tr>
<td>Outcomes</td>
<td>Therapist/teacher outcomes:&lt;br&gt;  <em>Collaboration</em>&lt;br&gt;  <em>Communication</em>&lt;br&gt;  <em>Professional development</em>&lt;br&gt;  <em>Advocacy</em>&lt;br&gt;  <em>Satisfaction</em>&lt;br&gt;Student outcomes:&lt;br&gt;  <em>Academic performance</em>&lt;br&gt;  <em>Social participation</em>&lt;br&gt;  <em>Motor performance</em>&lt;br&gt;  <em>Fine motor skills</em>&lt;br&gt;  <em>Classroom participation</em></td>
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**Databases, Sites, and Sources Searched**

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</table>

**Search Outcomes/Quality Control/Review Process**

Our original question was focused on finding research related to the 3:1 service delivery model. However, due to a lack of research studies on this topic, we expanded our question to examine outcomes associated with all service delivery models used in school-based therapies. Our collaborator, project chair, and project mentor approved this topic. Group members split up databases to search using agreed upon key terms. In addition to searching University of Puget Sound databases, our search included the UW-Tacoma campus’ databases, articles found by our project chair, and reference checking. After a meeting with our project chair, we also decided to expand our search to include articles that did not mention specific service delivery models, but still used specific components of a service delivery model during intervention. Therefore, we were not solely reviewing literature that used the term “service delivery model” or “service delivery models.”

A total of 83 articles were selected through database searching and reference checking after reviewing and identifying abstracts that appeared to address our research question. Five additional articles were identified and provided to us by our project chair. From those five articles, we included four in our CAT table. After duplicates were removed and the remaining articles were scanned, 43 full-text articles were further assessed more thoroughly for eligibility. Of the remaining 43 articles, 10 were removed because the study did not address how the intervention was given, 8 were removed because the study did not address the research topic, and 3 were removed because the intervention utilized adaptive equipment. A final number of 22 articles were included in our CAT, 5 studies included in the qualitative synthesis and 17 studies included in the quantitative synthesis.

Limitations exist within the search strategy for our CAT. We did not perform an exhaustive search on all topics and may have missed connected literature. Limitations
impact the thoroughness of our search and may result in breaches to a comprehensive literature review.

Key players involved in this process include Dr. Renee Watling, our project mentor, and Dr. Sheryl Zylstra, our project chair, both of whom are occupational therapists with extensive experience in pediatrics. Another key player is our collaborator, Kristen Brubaker, who is an occupational therapist within the University Place school district.

**Description of Terminology**

**Direct Service Delivery Model:** Direct service OT can include both one-on-one or group treatment approaches and can take place within a variety of school settings, commonly within an OT treatment room (Mackay et al., 2010).

**Collaborative Service Delivery Model:** A collaborative model is defined by Bose & Hinojosa (2008) as, “a style of interaction characterized by volunteer participation and the equal status of all parties engaged in the collaborative process as they work toward a common goal.” Decision-making, resources, and accountability for outcomes are shared among those who collaborate, resulting in an appreciation for this interpersonal style and the development of mutual trust (Bose & Hinojosa, 2008).

**Consultative Service Delivery Model:** The consultation model’s focus is for OTs to assess the functional abilities of children and suggest strategies for teachers and parents to implement and support occupational performance in their natural environments (Bayona et al., 2006).

**Collaborative-Consultative Service Delivery Model:** Collaboration and consultation are terms that are sometimes used interchangeably within the literature. The distinction between collaboration and consultation is not always clear since both include the partnering of OTs with teachers and/or other school-based personnel for the benefit of the student. For this reason, and the fact that relatively few articles were found in either area, we have chosen to combine both models into one, termed “collaborative-consultative models” for the purpose of this review.

A variety of collaborative-consultative models exist within school-based therapy services. These include Partnering for Change (P4C), Response to Intervention (RtI), 3:1, as well as general collaboration and consultation (see Appendix A). In these models, core interventions used include educating teachers, teaching assistants, and parents; making recommendations or referrals; and assisting with implementation of recommendations (Reid et al., 2006).

According to Bazyk et al. (2009), the current emphasis on integrating services into the classroom reflects IDEA’s mandate for education in the least restrictive environment. Both the teacher and OT can monitor student responses and outcomes when OT interventions are embedded in the classroom, working together to adapt intervention strategies as needed (Case-Smith et al., 2014; Selankiyo, Weintraub, & Yalon-Chamovitz, 2018). Teacher education and integration of OT treatment techniques and activities, and use of collaborative
planning, provides a natural way for OTs to contribute to positive student outcomes in occupational performance and quality of life (Bazyk et al., 2009; Reid et al., 2006).
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PRISMA Flow Diagram

Records identified through database searching (n = 55,370)

Additional records identified through other sources (n = 10)

Records after duplicates removed (n = 55,365)

Abandoned search results after 10 pages (n = 2,455)

Records excluded for not meeting inclusion/exclusion criteria (n = 40)

Records screened (n = 83)

Full-text articles assessed for eligibility (n = 43)

Full-text articles excluded, with reasons:
- Study did not address how intervention was delivered (10).
- Study did not address the research topic (8).
- Intervention was adaptive equipment (3)

Studies included in qualitative synthesis (n = 5)

Studies included in quantitative synthesis (n = 17)
### Summary of Study Designs of Articles Selected for the CAT Table

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<th>Pyramid Side</th>
<th>Study Design/Methodology of Selected Articles</th>
<th>Number of Articles Selected</th>
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</table>
| Experimental | ___Meta-Analyses of Experimental Trials  
2 ___Individual Blinded Randomized Controlled Trials  
2 ___Controlled Clinical Trials  
___Single Subject Studies | 4 |
| Outcome      | ___Meta-Analyses of Related Outcome Studies  
1 ___Individual Quasi-Experimental Studies w/ Covariates  
2 ___Case-Control or Pre-existing Groups Studies  
6 ___One Group Pre-Post Studies | 9 |
| Qualitative  | ___Meta-Syntheses of Related Qualitative Studies  
3 ___Group Qualitative Studies w/ more Rigor  
___Prolonged engagement with informants  
1 ___Triangulation of data (multiple sources)  
2 ___Confirmation (peer/member-checking; audit trail)  
___Comparisons among individuals, w/ a person  
2 ___Group Qualitative Studies w/ less Rigor  
___Qualitative Study on a Single Person | 5 |
| Descriptive  | ___Systematic Reviews of Related Descriptive Studies  
1 ___Association, Correlational Studies  
2 ___Multiple Case Series, Normative Studies, Descriptive surveys  
1 ___Individual Case Studies | 4 |
| AOTA Levels  | I- 1  
II- 6  
III- 6  
IV- 2  
V- 2  
NR- 5  
Comments: Qualitative studies are not considered in the AOTA Levels and are not rated (NR). | 22 |
### QUANTITATIVE:

<table>
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<tr>
<th>Author Year Journal Country</th>
<th>Study Objectives</th>
<th>Study Design/ Level of Evidence/ PEDro</th>
<th>Participants: Sample Size, Description, Inclusion and Exclusion Criteria</th>
<th>Interventions &amp; Outcome Measures</th>
<th>Summary of Results</th>
<th>Study Limitations</th>
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<tbody>
<tr>
<td>Bazyk et al. 2009 AJOT USA</td>
<td>To measure FM &amp; emergent literacy outcomes in a convenience sample of kindergarten-age children who received fully integrated OT services.</td>
<td>One-group pretest-posttest O4 III PEDro=3/10</td>
<td>37 children in kindergarten w/ and w/out disabilities</td>
<td>I=Indirect: curriculum ed, CR observations, CC w/ teachers &amp; parents, &amp; prep activities to address ind student needs. Direct: group &amp; ind assessment &amp; intervention embedded in CR curriculum (focus on students w/ disabilities, included students w/out disabilities); children w/ disabilities had avg of 28 sessions, children w/out disabilities had avg of 18 sessions O=PDMS-2 (fine motor performance), VMI (visual-motor skills), pegboard (IHM), pencil grasp observed during VMI, Letter ID subtest of OSELA, Approximation to Text</td>
<td>Each class (n = 37) made stat sig changes at p &lt; .05 level in all of FM and emergent literacy measures. Children w/ disabilities made stat sig changes in 2 FM assessments and 3 emergent literacy tests.</td>
<td>W/out ctrl group, not possible to infer causality</td>
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<tr>
<td>Study</td>
<td>Design</td>
<td>Sample Size</td>
<td>Intervention</td>
<td>Control</td>
<td>Outcome Measures</td>
<td>Findings</td>
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<tr>
<td>Donica et al., 2015</td>
<td>Explore the effectiveness of the HWT kindergarten printing curriculum in gen ed through a consultative approach w/ OT.</td>
<td>N=59 (19 ctrl, 20 HWT1 – 1st yr experimental group, 20 HWT2 – 2nd yr experimental group)</td>
<td>I (HWT1 &amp; HWT2)= Throughout kindergarten, received printing instruction from teachers using HWT (wood pieces and mat, slate chalkboards, Roll a Dough set, “Rock, Rap, Tap, and Learn” CD); OT or 2 OT grad students present 1x/wk</td>
<td>Ctrl=Throughout kindergarten, received teacher-developed instruction using D’Nealian style of writing; No OT consultation</td>
<td>Ctrl: M percentile = 36.63; Tx effect for overall standard score (d = 0.81 for HWT1, d = 1.03 for HWT2, and d = 1.00 for HWT combined).</td>
<td></td>
</tr>
<tr>
<td>Bayona et al., 2006</td>
<td>Evaluate the utility of OT services for children w/ FMD. Evaluate the process of service delivery, including the consultative model.</td>
<td>N=23 (19 boys, 4 girls), 23 parents &amp; 23 teachers</td>
<td>I=SBOT services delivered w/ consultative model</td>
<td>O=VABS-C, SFA, CSF, CSECT, CSQ, &amp; SOTQ.</td>
<td>VABS-C: Sig difference in written comm at posttest (t(21)=-3.99, p&lt;0.001, one-tailed). No sig difference on FMS subscale. SFA: Sig diff on written work at posttest (t(21)=-</td>
<td></td>
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<tr>
<td>extent to which OTs implemented consultation services as intended.</td>
<td>PEDro=3/10 consented to participate, child b/w 5-8 yo. Excl=Receiving therapy from another source, dx w/ neurological disorder.</td>
<td>1.96, p &lt; 0.05, one-tailed) &amp; using materials subscale (t(18)= -2.31, p &lt;0.05, one-tailed). CSF: 100% of OTs had face-to-face comm w/ teachers, &amp; 65% w/ parents, 100% of OTs had telephone comm w/ parents CSECT: Sig more child-individualized strategies used post test (t=5.84). CSQ: On avg, teachers indifferent or mildly dissatisfied (2.7/4) w/ services. Parents mostly satisfied (3.3/4). SOTQ: Teachers mod satisfied (4.2/7) &amp; parents mod to high satisfaction (5.5/7) to other factors.</td>
<td></td>
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<tr>
<td>Reid et al.</td>
<td>Address perceived occupational performance changes among school-aged children w/ FMD after receiving OTSBC services; address teacher awareness &amp; degree of implementatio of OT recommendations by teachers</td>
<td>Pretest-posttest design</td>
<td>N=91 students (M &amp; F; Kindergarten - Grade 5)</td>
<td>I=12-13 visits. OTs provided ed to 89% of children’s key school personnel (teacher, sped teacher), 26% of other school personnel (teaching assistant), &amp; 65% of parents/caregivers. Ed for teachers=specialized approaches such as multi-sensory &amp; biomechanical/postural, analyses of FM tasks, how to use alternative written comm, &amp; modification of printing &amp; writing tasks</td>
<td>COPM performance ↑ from pre ($M = 3.80$) to post ($M = 5.30$)</td>
<td>Lack of a ctrl group; lack of ctrl for maturation factors &amp; regression towards mean; data collection limited to single group serving children w/ FMD</td>
</tr>
<tr>
<td>2006</td>
<td>Canada</td>
<td>O4</td>
<td>Incl=Students referred to COTA Health w/ primary CCAC referral dx of FM delay, FM &amp; GM delay, or FM &amp; GM deficit Excl=Referrals for assessments, short-term services, or w/ dx of PDD or phys disability or DD in addition to FM problems; COPM not completed within 4 visits</td>
<td>COPM satisfaction ↑ from pre ($M = 3.70$) to post ($M = 5.70$); related to ↑ in teacher knowledge &amp; implementation of OT recommendations</td>
<td>TAS: Teachers’ awareness of students’ special needs changed in positive direction, though not stat sig; 80% teachers implemented/transferred knowledge acquired from OTs</td>
<td>CFQ: 84.4% teachers rated consultative service as excellent or good; 81.1% parents rated service as excellent or good; teachers identified 9 satisfaction areas</td>
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<tr>
<td>CJOT</td>
<td></td>
<td>III</td>
<td>PEDro=3/10</td>
<td>O=COPM; TAS; CFQ</td>
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<tr>
<td>Barnes &amp; Turner 2001</td>
<td>Explore relationships b/w collab team practices &amp; student IEP goals met, &amp; b/w team practices &amp; teacher perceptions of OT contributions to student skill development.</td>
<td>Correlation D2 IV PEDro=2/10</td>
<td>N=40 teachers N=47 students Incl=N/A Excl=N/A</td>
<td>I=Teacher questionnaire about OT w/ sped student; record review of student’ IEP files O=Percentage of IEP objectives met; teachers’ perceptions of the OT contributions to student skill development; correlation b/w collab &amp; student outcome variables.</td>
<td>Mean percentage of IEP objectives met per student (n=33) was 61%, mean number of IEP objectives per report was 28. 40-62.5% of teachers agreed that OT contributed to skill development in 6 skill areas. 3/7 correlations b/w team collab practices &amp; % of IEP objectives met were sig (p&lt;.05) &amp; had negative correlations of rho ≥ -.34. 6/7 correlations b/w collab &amp; teachers’ perceptions of OT were sig (p&lt;.05) &amp; rho ≥ .34.</td>
<td>Study was conducted in metropolitan school district in Texas, findings are not generalizabl e to other locations. Objectives were reported as met or unmet so sensitivity to changes in students’ skills may have been ↓.</td>
</tr>
<tr>
<td>Missiuna et al.</td>
<td>Examine whether children who received OT services after formally ID’d &amp; placed on waitlist differed from children ID’d in CR through observation &amp; dynamic performance analysis via P4C.</td>
<td>N=246 children (4-13 yrs); 115 ID’d from health care agency waitlist, 131 ID’d from OTs</td>
<td>I=OTs delivered P4C service 1 day/wk in 40 schools. In yr 1, OTs built relationships w/ educators, observed CRs &amp; collaboratively ID children not fully participating w/ the educators.</td>
<td>Children ID by OTs, nearly identical to waitlist group on all measures. Children ID’d by OTs were sig younger &amp; more likely to be girls than those referred under traditional model; in the referral-based model, only 3 children under 6 yrs were referred.</td>
<td>Young children not able to be referred in traditional model, age difference conclusions b/w groups cannot be made w/ certainty</td>
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<td><strong>British Journal of Occupational Therapy</strong></td>
<td><strong>London</strong></td>
<td>Evaluative study</td>
<td>D4 IV PEDro=3/10</td>
<td>Evaluative study</td>
<td>Evaluative study</td>
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<tr>
<td>Ohl et al.</td>
<td>Examine effect of 10 wk RtI (collab) program on FM &amp; visual-motor skills of gen ed kindergarten students</td>
<td>8 gen ed CRs from 4 urban elementary schools; 2 kindergarten CRs from each school, 1 tx, 1 ctrl.</td>
<td>I=STEPS-K program; Step 1 - 10, 30 min, OT led intervention lessons w/ teacher collab 1x/wk for 10 consec wks; Step 2 - CR FM center w/ new activities throughout 10 lessons; Step 3 - additional consultation time b/w OT &amp; teacher during 10 wk intervention; Ctrl=did not receive STEPS-K program</td>
<td>BOT-2: Tx=stat sig improv pre vs. post (t(75)=-2.06, p&lt;.05, d=-0.24), w/ small effect size; Ctrl=no stat sig improv VMI: Tx=stat sig improv pre vs. post (t(75)=-2.46, p&lt;.01, d=-0.34), w/ small effect size; Ctrl=no stat sig improv Pencil Grip: no stat sig differences in pencil grip b/w</td>
<td>Small sample size, 1 geographic location, outcome measures only for performance skills and not functional performance</td>
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<tr>
<td><strong>AJOT</strong></td>
<td><strong>USA</strong></td>
<td>Mixed methods experimental &amp; descriptive</td>
<td>E3 II PEDro=4/10</td>
<td>8 gen ed CRs from 4 urban elementary schools; 2 kindergarten CRs from each school, 1 tx, 1 ctrl.</td>
<td>I=STEPS-K program; Step 1 - 10, 30 min, OT led intervention lessons w/ teacher collab 1x/wk for 10 consec wks; Step 2 - CR FM center w/ new activities throughout 10 lessons; Step 3 - additional consultation time b/w OT &amp; teacher during 10 wk intervention; Ctrl=did not receive STEPS-K program</td>
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<td>male, 13 female, related services received by 11</td>
<td>VMI-SF; Developmental Scale of Pencil &amp; Crayon Grips; Therapist-Teacher Interaction Log; Teacher Survey at 3mo follow-up (n=4)</td>
<td>groups at pretest or posttest. Therapist-Teacher Interaction Log: OT’s spent 573 min total w/ teacher throughout 10 wkly lessons; OT’s spent avg of 6 to 33 min/wk consulting w/ teachers; most common topic was integration of OT into curriculum. Survey: 75% of teachers still used FM center; all teachers using strategies taught by OT; most common strategies were grasp patterns, 3 teachers referred 1 child to OT, 1 teacher referred 2 children, 3 teachers cont to consult w/ school OT.</td>
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<td>Study</td>
<td>Participants</td>
<td>Intervention</td>
<td>Outcomes</td>
<td>Notes</td>
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<td>Case-Smith et al. 2014 AJOT USA</td>
<td>Examine the effectiveness of the co-taught WSP for first-grade students across 2 yrs.</td>
<td>Prospective Cohort E3 PEDro=4/10 N=80 (tx group) N=58 (ctrl group)</td>
<td>I=WSP: 24, 45 min sessions, 2x/wk for 12 wks. Curriculum taught by teacher, OT, &amp; interventional specialist. The program included immediate feedback, self-evaluation, peer modeling, &amp; supports/adaptations. Ctrl: handwriting instructions 3-4 days/wk, 15-20 min/day. Included writing assignments, word books, and practice. District curriculum. O=ETCH-M; Writing Fluency and Writing Samples test of the WJIII Both groups stat sig improv in handwriting legibility (p &lt; .001), w/ students in WSP improv sig more than standard instruction group F(1,136)= 15.8, p &lt; .001. Both groups made stat sig improv in speed (p&lt; .001). At 6mo follow up, WSP students improv sig more than ctrl group in writing fluency. Lowest performing WSP students improv sig more F(4, 148)=11.44, p &lt; .0001.</td>
<td>Group assignment was not randomized, sample from middle-class suburb w/ limited diversity. The WJIII Writing Samples test had a ceiling effect w/ this sample</td>
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<td>Selanikyo, Weintraub, &amp; Yalon-Chamovitz 2018 AJOT Israel</td>
<td>1) Is the Co-PID an effective program for enhancing participation in CR-related activities in students w/ IDD?</td>
<td>Pretest-posttest case-ctrl design O3 PEDro=5/6 2 schools Teachers: (Tx, n=4; Ctrl, n=7); Incl=worked at school ≥ 3 days/wk &amp; taught at school ≥ 1 yr. Students: (Tx, n=28, M) I=(16 wks): Co-PID: (phase 1) 1.5 hr in-service &amp; workshop; (phase 2) 8, 45-min consultation meetings b/w OT &amp; teacher, activity selection &amp; implementation.</td>
<td>SOSPiC: Sig ↑ in choosing for Co-PID, t(27)=3.39, p&lt;.05. Overall sig large group effect, F(3, 55)=44.11, p&lt;.001, η²p=.71. GAS: Both groups sig improv attaining ind goals. Med Gap in intervention duration b/w groups; low internal consistency of subcomponents of SOSPiC;</td>
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2) Does the Co-PID have a transfer effect to participation in school environments other than the CR?

<table>
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<tr>
<th>McCartney et al. 2011</th>
<th>Do children receiving indirect consultant intervention make language gains comparable with children in direct SLT delivery</th>
<th>Cohort study w/ hist ctrl from previous RCT</th>
<th>Tx Group: N=36 (31 male, 7 female; M age=105 mo) Hist Ctrl: N=31 (27 male, 4 female; M age=97 mo)</th>
</tr>
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<tbody>
<tr>
<td><strong>UK</strong></td>
<td>Do children receiving indirect consultant intervention make language gains comparable with children in direct SLT delivery</td>
<td>Cohort study w/ hist ctrl from previous RCT</td>
<td>Tx Group: N=36 (31 male, 7 female; M age=105 mo) Hist Ctrl: N=31 (27 male, 4 female; M age=97 mo)</td>
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<td>Cohort study w/ hist ctrl from previous RCT</td>
<td>Tx Group: N=36 (31 male, 7 female; M age=105 mo) Hist Ctrl: N=31 (27 male, 4 female; M age=97 mo)</td>
<td>I=SLT/teacher consultation to ID language targets/activities pre-intervention. Language learning materials (manual that lists activities to support comprehension monitoring and vocabulary development) were delivered by class teachers, learning support teachers and/or CR assistants. Same schedule as RCT, over 4-mo period.</td>
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<td><strong>O3</strong></td>
<td>O3</td>
<td>“Consultancy” approach for RE-LI &amp; E-LI had same outcomes as RCT suggesting it takes at least 22 hrs of direct service by SLT to affect change. No stat sig differences b/w pre- &amp; post-intervention receptive or expressive scores on CELF-3&lt;sup&gt;UK&lt;/sup&gt;</td>
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<td><strong>II</strong></td>
<td>II</td>
<td>Small # of children in cohort study; Incomplete logs of language-learning activity; study schools had difficulty sustaining &amp; recording language-learning activity, lack of triangulation of findings w/ additional measures such as observations.</td>
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| Ctrl: One IS meeting, two 45 min meetings to discuss CR activities. O=SOSPiC; SFA; GAS group effect for GAS, F(3, 56)=11.20, p<0.001, $\eta^2_p=0.38$. Co-PID > 28% reached goals; IS 6% reached goals on comm & initiating, & 20% on choosing goals. SFA: Co-PID group had sig improv in participation. |

age=14.68, $SD=3.88$, 60.7% male; Ctrl, $n=32$, $M$ age= 13.5, $SD=4.7$, 50% male; Incl=dx of mod IDD, ind mob, no secondary dx of ASD or sensory disabilities, & studying at school for ≥ 1 yr
| Excl=No neurological impairment, no PDD, >75 on WASI, no speech, fluency, swallowing or alternative/augmentative comm needs, & no other factors requiring SLT | O=Changes in CELF-3\textsuperscript{UK} scores, NARA-II, & PhAB scores, NARA-II, & PhAB. | despite other advantages. No limitations specified in article |
## QUALITATIVE:

<table>
<thead>
<tr>
<th>Author Year Journal Country</th>
<th>Study Objectives</th>
<th>Study Design/ Level of Evidence</th>
<th>Participants: Sample Size, Description Inclusion and Exclusion Criteria</th>
<th>Methods for enhancing rigor</th>
<th>Themes and Results</th>
<th>Study Limitations</th>
</tr>
</thead>
<tbody>
<tr>
<td>Campbell et al. 2012 CJOT Canada</td>
<td>Describe the experiences of OTs who implemented the P4C collab SDM.</td>
<td>Phenomenological Q3 NR</td>
<td>N=7 OTs Incl=Participated in training session, online training course, &amp; monthly peer support meetings. OT mentor visited each therapist 2-3 times during school yr. Filled out questionnaires, participated in focus group, ind interviews. Excl=N/A</td>
<td>Member checking Peer checking Interviewer was not an OT</td>
<td>Themes: (1) Yr of growth for OTs (2) Helped create stronger connections. (3) Key Ingredients of P4C: Take time to establish relationships, be in the CR. (4) A balancing act of how to use time, resources, &amp; location of services. (5) Providing services that made an impact: success of P4C due to services in CR, supporting all students, &amp; consistency. (6) CC: enhanced when OTs learn about curriculum &amp; CR practices, &amp; dedicate time to build relationships. P4C has possibility of benefitting every child, &amp; was positive &amp; rewarding experience for OTs.</td>
<td>Small sample size, findings cannot be generalized to all OTs experiences w/ P4C, schools represented 1 school board, OTs were volunteers, not every OT able to spend a complete yr in each school, &amp; any comparisons that OTs made only reflects OT practice in Ontario.</td>
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<tr>
<td>Wilson, A. &amp; Harris, S.</td>
<td>Explore teachers’ experiences of P4C, a collab model, when supporting students w/ range of special needs at British Columbia elementary school.</td>
<td>Phenomenological</td>
<td>17 teachers recruited via convenient sampling; 1 teacher recruited via purposive sampling</td>
<td>Investigator reflexivity, member checking</td>
<td>Themes: Collaborating in Thick of it All: ↑ opportunity for collab w/ OT Learning and Taking Risks: Having the OT model strategies “in the moment” made it easier for teachers to see how strategies complimented daily routines Managing Limited Time and Resources: teachers preferred OT discussions in the CR Appreciating Responsive OT Support: teachers preferred OT support that responded to their needs, appreciated the OT scheduled CR visits to help out, &amp; informal conversations</td>
<td>Short duration of P4C; OT limited time to collab w/ parents; some teacher’s missed email to collab w/ OT; OT’s dual role as school therapist &amp; lead investigator; some teachers may be uncomfortable disclosing thoughts &amp; feelings to OT; P4C’s transferability; inexperienced OTs may have difficulty generalizing model’s steps to students w/ different challenges; no saturation b/c study terminated at end of yr</td>
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<td>Physical &amp; Occupational Therapy in Pediatrics Canada</td>
<td></td>
<td>Q2</td>
<td>NR</td>
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<tr>
<td>Garfinkel, M. &amp; Seruya, F. 2018</td>
<td>Journal of Occupational Therapy, Schools, and Early Intervention USA</td>
<td>Explore SBOT’s perception of 3:1(collab) SDM; determine if able to manage wkld responsibilities more than when using traditional sdm approach</td>
<td>Qualitative Phenomenological</td>
<td>5 OTs and 5 SLPs working in school-based practice</td>
<td>Study methods: Completion of online survey and semi-structured interviews</td>
<td>Themes: Provision of services in natural environments, expanded scope of practice, flexibility to differentiate SDM based upon stakeholder need, more effective time management w/ wkld-oriented service, &amp; perception of others created opportunities &amp; challenges to implementation of 3:1 SDM</td>
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<td>Hutton 2009</td>
<td>British Journal of Occupational Therapy</td>
<td>Explore the impact that therapists had on knowledge &amp; skills of teaching team &amp; determine</td>
<td>Qualitative Phenomenological</td>
<td>Head Teachers (n=2), Sped Needs Coordinators (n=2), Class Teachers (n=6), &amp; TAs (n=8)</td>
<td>Peer &amp; Member Checking, Triangulation of data, prolonged engagement w/ participants</td>
<td>Themes: Implementing Motor coordination programs in the schools: TA’s ↑ understanding of program, collab w/ therapist, children improv &amp; enjoyed program. Good Sitting: teachers ↑ knowledge of motor &amp;</td>
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**Themes:**
- Implementing Motor coordination programs in the schools: TA’s ↑ understanding of program, collab w/ therapist, children improv & enjoyed program. Good Sitting: teachers ↑ knowledge of motor &
<table>
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<tr>
<th>UK</th>
<th>school’s view about the structure &amp; timing of FIZZY, a CC motor coordination program</th>
<th>therapist worked closely w/ over duration of intervention</th>
<th>sensory development &amp; impact on learning &amp; engagement. Expectations: Teachers &amp; TAs surprised by scope of OT practice; used to OT pull-out, lists of “things to do” w/ insufficient support, &amp;/or no prior experience. Becoming Part of the School Team: personal relationships &amp; trust facilitated sharing of knowledge, advice, &amp; ideas. Timing of the Intervention: Teachers &amp; TAs wanted to “make the most” of time w/ OT, longer intervention preferred w/ more family collab, confident to continue initiatives OT started</th>
<th>occurred shortly after intervention w/ no follow up to see long term impact, views of treated children not obtained.</th>
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<tbody>
<tr>
<td>Bose, P. &amp; Hinojosa, J. 2008 AJOT USA</td>
<td>Describe OT collab and experiences when interacting w/ elementary teaching personnel</td>
<td>Grounded Theory Study Q2 NR</td>
<td>6 SBOTs (5 female, 1 male) from 30 inquiries by purposive sampling Incl= licensed to practice; ≥ 2 yrs of clinical Data collection to saturation point (33 interviews) Member checks, support group, external auditing,</td>
<td>Themes 1. Benefits of collab: “It’s Not Like I Don’t Value Collaboration” 2. Challenges of Interactions: “Collaboration—I Can’t Do It Alone!”</td>
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<td>Sample size; less rigor</td>
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</table>
| experience; ≥ 20 hr/wk work in school; ≥4 hr/wk in preK, K, 1st grade, or 2nd grade in one inclusive ed program; reported regular interactions w/ teachers; agree to participate and signed consent form; proximity to researchers for repeated interviews | extended engagement, & negative case analysis. | 3. Attachment to the Expert Status: “My Opinion, Please Ask for It” 
4. Interactions in Practice: “Is This Collaboration?” Results 
OT collab w/ teachers difficult; therapists’ self-view as experts over teachers impedes ability to collab effectively; OTs identified lack of time & teacher responsiveness as barriers. |
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<tr>
<th>Author</th>
<th>Year</th>
<th>Journal</th>
<th>Country</th>
<th>Study Objectives</th>
<th>Study Design/Level of Evidence</th>
<th>Number of Papers Included, Incl/Excl Criteria</th>
<th>Interventions &amp; Outcome Measures</th>
<th>Summary of Results</th>
<th>Study Limitations</th>
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<tr>
<td>Ball, M.</td>
<td>2018</td>
<td>Journal of Occupational Therapy, Schools, &amp; Early Intervention</td>
<td>USA</td>
<td>Explore legislative mandates and evidence for best practice while providing application to practice &amp; solutions to potential barriers including MH &amp; CC models.</td>
<td>Narrative literature review D3 V</td>
<td>$N=28$ articles (1982-2016) No Incl/Excl mentioned</td>
<td>Outcomes of intervention in school-based practice: Prevention, health &amp; wellness, quality of life, participation, &amp; well-being Therapist perspectives: Feelings of belonging to school community; improved job satisfaction; consistency of provision of services</td>
<td>New legislation supports OT collab w/ school staff to develop MH promotion &amp; RtI prevention programs. Recommendations for OTs: OTs should look for SDMs, like P4C, that embrace a wkld approach, &amp; support incl of health promotion &amp; prevention interventions. Use effective collab &amp; comm w/ all school staff, review evidence for best-practice, articulate OTs distinct value to school administrators outside 1:1 service delivery, &amp; provide direct services in presence of trained</td>
<td>Additional studies without emphasis on specific diagnosis needed for P4C model</td>
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Villeneuve 2009  
*CIOT*  
Canada

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<tr>
<th>Author</th>
<th>Methodology</th>
<th>Study Design</th>
<th>Inclusion Criteria</th>
<th>Exclusion Criteria</th>
<th>Relationship to CC &amp; Outcomes</th>
<th>Limitations</th>
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</thead>
</table>
| Villeneuve 2009 | Synthesize research literature on CC services in SBOT. | Narrative literature review | N=11  
  n= 6: outcomes of CC in SBOT  
  n= 5: factors influencing collab | Incl=examined outcomes of SBOT services & investigated CC or consultation SDMs, English, published after 1990.  
  Excl=did not examine consultation or CC services | I=CC in SBOT  
  O=Teacher assessment of student goal attainment, teacher rating of success.  
  Standardized measures of functional status, GAS, parent/teacher satisfaction, OTs intervention checklist, % of indicated objectives met, teacher perception of collab & OTs contribution, FMS, OTs self ratings.  
  Teacher rating of student performance & satisfaction | Studies had small sample sizes, lack of ctrl groups, & a frequency of visits that exceeds those usually provided by OTs in schools. Clear definitions of collab lacking in many of the articles reviewed. This review only used 3 databases & summary of results may contain bias. |
### Tables Summarizing the Direct Service Delivery Model

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<tr>
<th>Author Year</th>
<th>Study Objectives</th>
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<tr>
<td>Case-Smith 2002</td>
<td>Examine the effects of direct SBOT service on children’s handwriting &amp; associated school functions</td>
<td>Pretest-posttest ctrl group design O2 II PEDro= 5/6</td>
<td>N=38 2nd, 3rd, &amp; 4th graders, Tx (n=29): M age=8.6, male=24, female=5, Ctrl (n=9): M age=9.08, male=4, female=5; No dx, visual, or auditory problems</td>
<td>l=12 OT’s in 5 districts delivered direct OT services (30 min/wk); # of sessions, goals, activities, &amp; SDM documented &amp; summed for 7-mo intervention period. Time for each session &amp; total time for all sessions computed. O=IHM, DTVP-2 (position in space, figure ground, copying); BOTMP (visual motor ctrl, upper limb speed &amp; dexterity); Nine-hole peg test; ETCH; SFA</td>
<td>Tx group IHM (t(29)=3.78, p&lt;.001, effect size=1.51, BOTMP visual motor ctrl (t(28)=-2.1, p&lt;.05, effect size=0.58), &amp; DTVP-2 position in space (t(27))= -2.44, p&lt;.05, effect size=0.67. ETCH: Tx group stat sig gains in handwriting legibility (tx: pretest mean=75.8%, SD=13.1; posttest mean=90%, SD=5.4; ctrl: pretest mean=85.8%, SD=7.8; posttest mean=91.6%,</td>
<td>Sample size, one geographic location, use of descriptive outcomes limits interpretation of effectiveness, info about academic program &amp; other services not collected, evaluators not blind to group status, imbalance of group sizes</td>
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<tr>
<td>Study</td>
<td>Intervention Details</td>
<td>Design</td>
<td>Sample Characteristics</td>
<td>Outcomes</td>
<td>Strengths and Limitations</td>
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<td>Mackay et al. 2010</td>
<td>Determine the feasibility &amp; outcomes of a small group, in school, direct OT service handwriting remediation program (Log Handwriting Program)</td>
<td>Pretest-posttest single group design</td>
<td>N=16, male=13, female=3, n=5 received prior therapy services. Incl=yr 1 or 2 (6-8 yo), writing difficulty, ≤ 30 on MHA, no comorbid physical/intellectual disability, no concurrent handwriting intervention or services</td>
<td>I= 8 wkly handwriting sessions of 45 min (6 hrs total) in groups of 2 or 3. 5-8 min warm up activity, 20-30 min handwriting training &amp; practice, 3-5 min FM game. 3 pages of homework/wk w/ workbook. O=MHA (legibility, form, alignment, space, size, speed)</td>
<td>Stat sig improv &amp; % change in handwriting performance observed for all subscales except speed at p&lt;.01. Legibility: mean improv=4.1, p=0.00. Form: mean improv=5.3, p=.001. Alignment: mean improv=7.8, p=.002. Size: mean improv=7.9, p=.002. Space: mean improv=5.3, p=.002. Speed: mean difference=-3.9, p=.043.</td>
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<td>AJOT Australia</td>
<td>No ctrl group, 2nd follow up limited to immediately after tx conclusion, small sample size, non-randomized.</td>
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<tr>
<td>Peterson &amp; Nelson (2003)</td>
<td>Determine effect of direct OT handwriting tx group for economically disadvantaged 1st graders</td>
<td>Pretest-posttest experimental design</td>
<td>N=59 (31 girls, 28 boys; $M_{age}=7.1$, $SD=0.4$). Tx ($n=30$), Ctrl ($n=29$). Incl=enrollment in 1 of 3 1st grade CRs served by federally funded school-based health center for economically disadvantaged children, informed consent, remain in school until end of study &amp; attendance of at least 10 of 20 group sessions. Excl=missing more than 10 sessions</td>
<td>I=20 OT sessions 2x/wk for 10 wks in addition to regular academic instruction. Tx sessions individualized w/ biomechanical, SM, &amp; teaching-learning principles. Ctrl: regular academic instruction w/ no OT services. O=MHT (legibility, space, line, size, form, &amp; speed)</td>
<td>OT tx group stat sig improv on handwriting compared to ctrl group (Hotelling-Lawley Trace value=0.606; $F(5, 53)=6.43$, $p&lt;.0001$; effect size=.378; power=.994. no sig changes for ctrl group from pretest to posttest. Tx group and ctrl group were stat sig different at $p&lt;.01$ on Space ($F(1, 57)=11.43$, $d=.88$), Line ($F(1, 57)=7.94$, $d=.73$), &amp; Size ($F(1, 57)=24.74$, $d=1.3$) w/ med-large effect sizes.</td>
<td></td>
</tr>
<tr>
<td>AJOT</td>
<td>PEDro=8/10</td>
<td></td>
<td>Children in tx group received more attention than ctrl group by removal from CR for 30 min, 2x/wk. Administrators of MHT were not blind to experimental condition. Intervention consisted of multiple factors,</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>Denton et al.</td>
<td>Investigate the effectiveness of 2 interventions (sensorimotor &amp; therapeutic practice) on handwriting &amp; SM components.</td>
<td>3 group pre-posttest randomized experimental design</td>
<td>N=36 (ages 6-11.2yrs; 12 girls; 26 boys). SM (n=14), TP (n=15), Ctrl (n=9). Incl=6-12 yo, no known physical problems affecting handwriting, normal or corrected vision, no exceptional ed need, poor handwriting (≥1.5 SD below mean for age group on THS). Excl=not attend one of 6 private schools recruiting occurred, &lt;6yo or &gt;12yo, ID’d disability/ed need.</td>
<td>I=SM or TP provided 40 min sessions 4x/wk for 5 wks by OT, out of CR. SM Group: activities addressing visual perception, visual-motor integration, kinesthesia/proprioception, &amp; IHM. TP Group: writing, writing for fun, &amp; worksheet. Ctrl group: no intervention, attended normal CR activities. O=THS; DTVP-2; TMP; IHM</td>
<td>Neither SM or TP groups were stat sig from ctrl. With all handwriting scales collapsed TP stat sig better than SM (F(2, 32)=8.44, p=.001, effect size (f)=.72. Visual perception of SM group was stat sig from ctrl group (p=.02) No other SM components stat sig b/w groups.</td>
<td>Generalizability &amp; interpretation of results is limited as sample size was small, children did not have known ed need or dx, &amp; groups were not equally sized. Other factors contributing to handwriting were not assessed in this study (e.g. attention, speed of thinking, interest).</td>
</tr>
</tbody>
</table>
### Tables Summarizing a Mixed Methods Model

**QUANTITATIVE:**

<table>
<thead>
<tr>
<th>Author Year</th>
<th>Study Objectives</th>
<th>Study Design/ Level of Evidence/ PEDro</th>
<th>Participants: Sample Size, Description Inclusion and Exclusion Criteria</th>
<th>Interventions &amp; Outcome Measures</th>
<th>Summary of Results</th>
<th>Study Limitations</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ratzon et al. 2009</td>
<td>Compare efficacy of 3 different short-term SDMs on 1st grade children w/ soft neurological signs who experience visual-motor difficulties.</td>
<td>Prospective study w/ pre- post evaluations O4 III PEDro=3/10</td>
<td>N=147 1st grade students; DT (n=29), CT (n=24), CC (n=38), Ctrl yr 1 (n=30), Ctrl yr 2 (n=26). Incl=21st percentile or lower on VMI Excl= CNS dysfunction dx; severe sensory loss; emotional, behavioral or MH problems; children from sped classes; children already receiving OT or physiotherapy; children unable to complete program due to absences</td>
<td>I: DT: 12, 45 min sessions for 12 wks provided by 10 OT students under supervision. CC: consultation meetings 1/wk for 12 wks, tx by teachers after collab &amp; consultation w/ OTs. CT: 45 min DT 1/wk &amp; 15 min tx 3x/wk, teacher assigned special activity for child following OT monitoring - All SDMs were short-term interventions; enhanced visual-motor skills by paper &amp; pencil assignments, &amp; IHM activities O=VMI, DTVP-2, SDM</td>
<td>All three SDMs (DT, CC, &amp; CT) sig improv children’s visual motor skills compared to ctrl (F=6.32, p&lt;.001). CC just as effective as DT.</td>
<td>Did not assess effect of tx on writing skills</td>
</tr>
</tbody>
</table>
Abbreviations Key:

↑ = increase(d)
↓ = decrease(d)
AJOT = American Journal of Occupational Therapy
avg = average
b/w = between
CC = Collaborative consultation
CCAC = Community Care Access Center
CELF-3<sup>UK</sup> = Clinical Evaluation of Language Fundamentals—Third Edition UK
CFQ = Client Feedback Questionnaire
CJOT = Canadian Journal of Occupational Therapy
collab = collaborative
comm = communication
Co-PID = Collaborative Consultation for Participation of Students with Intellectual Disability
COPM = Canadian Occupational Performance Measure
COTA = Certified Occupational Therapy Assistant
CR = classroom
CSECT = Checklist for Strategies Employed By Classroom Teachers
ctrl = control
CT = combined treatment
CSF = Consultation Summary Form
CSQ = Client Satisfaction Questionnaire
DCD = developmental coordination disorder
DD = developmental delay
DT = direct treatment
DTVP-2 = Developmental Test of Visual Perception – 2<sup>nd</sup> edition
ed = education(al)
E-LI = expressive language impairment
ETCH-M: Evaluation Tool of Children’s Handwriting-Manuscript
Excl = exclusion
FM = fine motor
FMD = fine motor difficulties
FMS = fine motor skills
GAS = Goal Attainment Scaling
gen = general
GM = gross motor
Hist = historical
I = Intervention
Ind = independent
ID = identified/identification
IDD = Intellectual and Developmental Disabilities
IEP = Individualized Education Program
IHM = In-Hand Manipulation
improv = improvement/improved
Incl = inclusion
ind = individual
info = information
IS = In-Service
MABC-2 = Movement Assessment Battery for Children - 2nd Edition
Med = medium
MHA = Minnesota Handwriting Assessment
MHT = Minnesota Handwriting Test
mo(s) = month(s)
Mod = moderate
N/A = not applicable/available
NARA-II = Neale Analysis of Reading Ability: Second Revised British Edition
O = outcome measures
OSELA = Observation Survey of Early Literacy Achievement
OTSBC = Occupational Therapy School Based Consultation
OT = occupational therapy
OTs = occupational therapist(s)
P4C = Partnering for Change
PDD = pervasive developmental disorder
PDMS-2 = Peabody Developmental Motor Scales-2
PhAB = Phonological Assessment Battery
prep = prepare
RCT = randomized control trial
RE-LI = receptive/expressive language impairment
RtI = Response to Intervention
SBOT = school based occupational therapy
SDM = service delivery model
SDQ = Strengths and Difficulties Questionnaire
SFA = School Functional Assessment
SHSS = School Health Support Services
sig = significant
SLT = speech language therapist
SM = Sensorimotor
SOTQ = School-Based Occupational Therapy Questionnaire
SOSPiC = Structured Observations of Students’ Participation in Classroom
sped = special education
Stat = statistically
STEPS-K = specialized teaching and enhancement of performance skills for kindergarteners
TA = Teacher Assistant
TAS = Teacher Appreciation Scale
THS = Test of Handwriting Skills
THS-R = Test of Handwriting Skills-Revised
TMP = Test of Manual Pointing
TP = Therapeutic practice
VABS-C = Vineland Behavior Scales-Classroom Edition
VMI = Test of Visual Motor Integration
w/ = with
wk = week
w/out = without
WASI = Wechsler Abbreviated Scale of Intelligence
WJIII = Woodcock-Johnson III
wkday = weekday
wkld = workload
WNL = within normal limits
WSP = Write Start Program
x/wk = times per week
yo = years old
yr = year
Summary of Key Findings

Summary of Collaborative-Consultative

Sixteen of the 22 articles (Ball, 2018; Barnes & Turner, 2001; Bayona et al., 2006; Bazyk, 2009; Bose & Hinojosa, 2008; Campbell et al, 2012; Case-Smith, 2014; Donica, 2015; Garfinkel & Seruya, 2018; McCartney et al, 2011; Missiuna et al, 2017; Ohl et al., 2013; Hutton, 2009; Reid et al, 2006; Selanikyo, Weintraub, & Yalon-Chamovitz, 2018; Wilson & Harris, 2018) included a collaborative-consultative service delivery model (see Appendix B). Positive outcomes were found in 13 of 16 articles (Ball, 2018; Barnes & Turner, 2001; Bayona et al., 2006; Bazyk, 2009; Campbell et al, 2012; Case-Smith, 2014; Donica, 2015; Garfinkel & Seruya, 2018; Hutton, 2009; Missiuna et al, 2017; Reid et al, 2006; Selanikyo, Weintraub, & Yalon-Chamovitz, 2018; Wilson & Harris, 2018) and negative outcomes were found in 4 of 16 articles (Barnes & Turner, 2001; Bose & Hinojosa, 2008; Garfinkel & Seruya, 2018; McCartney et al, 2011).

In this review, a collaborative-consultation service delivery model elicited many positive outcomes for students involved. For students, 7 of 16 articles (Bayona et al., 2006; Bazyk, 2009; Case-Smith, 2014; Donica, 2015; Missiuna et al, 2017; Reid et al, 2006; Selanikyo, Weintraub, & Yalon-Chamovitz, 2018) described positive outcomes and 2 of 16 (Barnes & Turner, 2001; McCartney et al, 2011) described negative outcomes. When OTs spent time learning about the classroom curriculum, making observations, engaging in collaboration with teachers, and undertaking preparation activities to address student needs, students portrayed statistically significant improvement in fine motor and emergent literacy outcomes, and transferred improved participation to a variety of environments (Bazyk, 2009; Selanikyo, Weintraub, & Yalon-Chamovitz, 2018). After OTs and teachers engaged in collaboration and OTs educated teachers in specialized approaches, students displayed improvements in COPM performance and satisfaction scores, written communication, using school-related materials, and in SOSPic, SFA, and GAS scores (Bayona, 2006; Reid et al., 2006; Selanikyo, Weintraub, & Yalon-Chamovitz, 2018). Students also experienced positive outcomes in handwriting legibility after use of consultation and co-teaching when implementing specific programs such as the “Write Start Program” or “Handwriting Without Tears” (Case-Smith, 2014; Donica, 2015).

Teachers and therapists both showed benefit from use of a consultative-collaborative approach. For teachers, 5 of 16 articles (Barnes & Turner, 2001; Case-Smith et al, 2014; Hutton, 2009; Selanikyo, Weintraub, & Yalon-Chamovitz, 2018; Wilson & Harris, 2018) described positive outcomes and 1 of 16 (Garfinkel & Seruya, 2018) described negative outcomes. For OTs, 6 of 16 articles (Ball, 2018; Bazyk et al, 2009; Campbell et al, 2012; Garfinkel & Seruya, 2018; Hutton, 2009; Selanikyo, Weintraub, & Yalon-Chamovitz, 2018) described positive outcomes and 1 of 16 (Bose & Hinojosa, 2008) described negative outcomes. After an average of six to 45 minutes per week of OT-teacher collaboration or consultation, teachers were said to enjoy learning strategies from OTs and typically continued to use them within the classroom (Ohl et al., 2013; Selanikyo, Weintraub, & Yalon-Chamovitz, 2018; Wilson & Harris, 2018). After teachers were educated in certain OT practice areas, such as a motor coordination program or motor and sensory development of children, their knowledge of OTs’ scope of practice and perceptions of OT contributions to skill development of students improved (Barnes & Turner, 2001; Hutton, 2009).
However, the collaborative model with consultation presented some challenges to OTs and potentially teachers. In this model, OTs may spend a frequent amount of time educating teachers within the classroom (Bazyk et al., 2009). Fewer IEP objectives were met as the frequency of collaboration increased (Barnes & Turner, 2001). In their article, Bose and Hinojosa (2008) indicated that OTs found collaboration with teachers to be difficult, and they were frustrated by the lack of teacher responsiveness and time for direct service. According to Case-Smith (2014), the collaborative-consultative model requires high levels of flexibility, open communication, and the willingness to adapt a plan.

**Summary of Direct Intervention**

Our review found 5 articles that included a direct service delivery approach. Four out of five articles described positive outcomes for students (Case-Smith, 2002; Mackay et al., 2010; Peterson & Nelson, 2003). Direct OT is typically described as the traditional model for services. Current literature indicates that school-based OT practitioners continue to use a traditional service delivery model, forming their therapy schedules around IEP mandates (Garfinkel & Seruya, 2018). Although this is a frequently used model, limited research that examined the effectiveness of this model in school-based therapies was found.

Several authors suggest that direct treatment might be beneficial for developing handwriting skills of students (Case-Smith, 2002; Denton, 2006; Peterson & Nelson, 2003). This was also reflected in Ratzon et al. (2009) who found that direct sessions provided by OT graduate students led to positive outcomes in eye-hand coordination, copying, visual-motor speed, and spatial relations of students. However, teachers preferred the collaborative-consultative or combined treatment over direct treatment, when all showed similar results. In another study, direct OT led to statistically significant improvements in IHM, BOTMP visual motor control, and DTVP position in space (Case-Smith, 2002).

**Summary of Mixed Methods**

Limited research was found that examined the effectiveness of a mixed methods approach in school-based therapies. However, one article (Ratzon et al., 2009) reported positive outcomes for students and teachers. Ratzon and colleagues (2009) found that a combination of direct treatment in the school’s OT room and OT-teacher consultation enhanced the teachers’ awareness of a child’s visual-motor difficulties and provided them with a variety of visual-motor activities that could be integrated into the classroom. The combined treatment allowed students to receive 45 minutes of direct treatment, as well as another 15 minutes of treatment in the classroom, 3 times per week. Following the OT monitoring, the teacher assigned a specific activity for the student to complete. As compared to the control group, children’s visual-motor skills of eye-hand coordination, copying abilities, and spatial relations skills significantly improved after implementation of a combined treatment with paper and pencil assignments and in-hand manipulation activities. (Ratzon et al., 2009). However, the addition of 15 minutes three times a week, given by teachers after OT monitoring, did not add to the effectiveness of the combined treatment.
**Implications for Consumers**

In this CAT paper, primary consumers are considered to be school-based OTs, teachers, and students, with parents/guardians and school administrators as secondary consumers. Occupational therapists have an important role in advocating for and implementing collaboration within the school. According to 11 collaborative-consultative articles, OTs are distinctly qualified to provide collaborative-consultative services for inclusion, integration, and consultation in the school setting. When working from a collaborative model, it is especially vital for OTs to first develop an understanding of school board policies, curriculum, and classroom practices as well as speak with teachers, parents, administrators, and students themselves (Villeneuve, 2009).

The collaborative-consultative model emphasizes that the relationship between teachers and OTs should be established and reciprocal. Collaboration requires teachers and OTs to have an understanding of each other’s roles, responsibilities, and scope of practice. Then, by working and speaking with OTs, teacher’s knowledge of strategies to implement within the classroom and their understanding of what OTs can do for their students will likely increase (Barnes & Turner, 2001; Hutton, 2009; Ohl et al., 2013; Reid et al., 2006; Selanikyo, Weintraub, & Yalon-Chamovitz, 2018; Wilson & Harris, 2018).

When a collaborative-consultative model is used, students experience improvements in a variety of skills, as well as increased participation within the classroom. If OTs are present within a classroom or if the teacher is educated on specific OT strategies, student learning tends to be better generalized to general education (Reid et al., 2006). Typically, in a direct model, OTs and teachers might collaborate on IEP goals, but the students may not experience benefits from increased teacher knowledge of OT strategies (Case-Smith, 2002).

Secondary consumers, who consist of parents and school administrators, also benefit from this information. Two articles discussed a positive parental experience when using a collaborative-consultative model (Bayona et al., 2006; Reid et al., 2006). Parents can speak with their schools’ OTs, teachers, or school administrators to determine if said services are being used and if not, discuss why they might be beneficial. Administrators are typically facilitators of change, and if a change in service delivery model or increased collaboration is suggested, they should implement change as needed (Villeneuve, 2009).

Ultimately, OT utilizes client-centered care, and consideration of what is best for the client should be at the forefront of decisions when determining from which service delivery model to work. We found that many positive outcomes procured from an intentional collaborative-consultative approach, as 16 of 22 articles suggest, that service delivery models which utilize collaborative and consultative aspects may support outcomes for OTs, teachers, and students.
Implications for Practitioners

Occupational therapists will contend with many factors regarding service delivery models within schools. These include: OT professional practice guidelines; federal, state, and local laws; district administration expectations or contractual obligations; school policies, procedures, and protocols; professional relationships and collegiality with school staff; effective communication with parents/caregivers; and therapeutic relationships with the students they serve. Each service delivery model will require different combinations of the above listed factors, and OTs should examine the requirements of each school or district, consider impact on consumers, outcomes for students, as well as fiscal implications to determine which service delivery model would be most beneficial to implement in their school/school district (Villeneuve, 2009). As inclusion from the beginning will increase the likelihood of buy-in from all team members, OTs should work with other staff members to advocate for program changes and implementation of a new model. These program changes should be carefully and thoughtfully considered, ensuring that stakeholders participate in all phases of development.

If a collaborative model is already in place, OTs should develop an understanding of the classroom practices and curriculum of which each of their students are a part. This will make it easier for the OTs and teachers to develop a relationship based upon a mutual understanding of a student’s difficulties, the environment in which they typically partake, and what the vital roles of “OT” and “educator” are for that specific student.

Implications for Researchers

A common theme that emerged from the current research was the need for additional research on OT outcomes in the schools, as well as how service delivery models support outcomes for students, teachers, and OTs. According to our findings, it would be helpful if researchers specified which service delivery model was used or addressed in their study, even if service delivery models are not the focus of the study. Researchers should consider questions that address differences or similarities in outcomes based on service delivery model used. For example, does a purely consultative, purely direct, or purely collaborative model best serve students who have difficulty with fine motor deficits?

Use of specific collaborative-consultative models as they relate to school-based OT and outcomes, such as the 3:1 service delivery model, should be further explored. One specific way to improve evidence-informed practice is for OTs to be data collectors themselves, keeping track of how their interventions are delivered and with what populations. Ultimately, research should include more involvement with OTs at the classroom and system level (Donica, 2015).
Bottom Line for Occupational Therapy Practice/ Recommendations for Best Practice

For school-based OTs, research suggests that utilizing an integrated or consultative service delivery model may result in improved collaboration with teachers, higher likelihood of inclusion in classrooms, better student outcomes, and increased understanding of OTs’ scope of practice by consumers. Occupational therapists should consider the perspectives of other school colleagues and the context of the environment in which they provide service when determining which service delivery model may be most appropriate to implement. As well, OTs should be equipped and willing to advocate for their profession regarding their ability to provide services at a larger level than solely through direct service. More research is needed for specific service delivery models to determine efficacy, however, results from this CAT suggest a collaborative-consultative approach has the greatest impact on student, teacher, and therapist outcomes compared to other service delivery models.
References


Appendix A

Collaborative-Consultative Service Delivery Models

Partnering for Change (P4C)
The P4C model shifts service delivery away from “fixing” impairments, and towards a collaborative approach in which the therapist works with teachers, or other school colleagues, to change the classroom environment and enhance participation (Ball, 2018; Campbell et al., 2012). According to Missiuna et al. (2017), the OT’s role is to collaborate with educators to design physical, social, and learning environments that facilitate successful participation of all students. They are able to observe entire classrooms of school-aged children and identify those in need of support who may not have been previously identified. After delivering the P4C model one day per week in 40 schools, OTs were able to use observation and dynamic performance analysis to identify children with similar difficulties as those who came from a waitlist (Missiuna et al., 2017). Therefore, waitlists for services were eliminated for all children. After implementation of the P4C model, the OTs described a sense of belonging to the school community, improved job satisfaction, and consistency in provision of services (Campbell et al., 2012).

RtI
Response to intervention (RtI) is a process that monitors success of instructional strategies and services that are being implemented individually, in small groups, or classroom wide (Donica, 2015). After incorporation of OT services into a general education classroom during a 10 week RtI collaboration program on fine motor and visual-motor skills of kindergarten students, students portrayed statistically significant improvements on the BOT-2 and VMI (Ohl et al., 2013). Three months after implementation of the program, 75% of teachers were still utilizing techniques learned from OTs (Ohl et al., 2013).

3:1
The 3:1 is a collaborative model that acknowledges direct and indirect work that therapists do on behalf of their students and the school community (Garfinkel & Seruya, 2018). Direct intervention is provided three weeks out of the month, and indirect intervention occurs on the fourth week in a variety of ways. According to Garfinkel & Seruya (2018), challenges and benefits of the model were found after interviewing five SLPs and five OTs with experience in use of the 3:1 model. Challenges included teachers’ negative perception of the therapists’ use of time, students’ desire for weekly services during the indirect week, and scheduling among teachers and therapists. Benefits included increased collaboration and opportunities to meet on behalf of students, opportunities to work with students in their natural settings such as in the classroom or at recess, flexible scheduling, opportunities to become involved in whole-school programming, and increased job satisfaction.
Appendix B

Description of Outcomes

<table>
<thead>
<tr>
<th>SDM</th>
<th>Outcomes</th>
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</table>
| Collaborative-Consultative | *Students:*  
|                          |  
|                          |  
|                          | *Positive:*  
|                          |  
|                          | • Improvement in written communication and use of materials (Bazyk, 2009; Case-Smith, 2014; Donica, 2015)  
|                          | • Identifies child’s needs before diagnosis, therefore, easier to treat (P4C) (Missiuna et al, 2017)  
|                          | • Improvement of students’ occupational performance and their quality of life (Reid et al, 2006)  
|                          | • Improved participation transferred to other environments beyond the classroom (Selanikyo, Weintraub, & Yalon-Chamovitz, 2018)  
|                          | • Improvement in all fine motor and emergent literacy measures (Bazyk et al, 2009)  
|                          | • Improvement in handwriting skills (Donica, 2015)  
|                          |  
|                          | *Negative:*  
|                          |  
|                          | • Fewer IEP objectives were met due to increased OT/teacher collaboration, and accountability and scrutiny of objectives (Barnes & Turner, 2001)  
|                          | • Students with speech impairments did not improve speech/language skills when SLP activities administered by teaching staff (McCartney et al, 2011)  
|                          |  
|                          | *Teachers:*  
|                          |  
|                          | *Positive:*  
|                          |  
|                          | • Teachers improved perceptions of OT skills and scope of practice (Barnes & Turner, 2001)  
|                          | • Teachers increased monitoring of student responsiveness when OT embedded in classroom (Case-Smith et al, 2014)  
|                          | • Teachers able to adapt strategies to improve effectiveness when OT embedded in classroom (Case-Smith et al., 2014)  
|                          | • OTs supported teachers in execution of strategies to enhance students’ participation (Wilson & Harris, 2018)  
|                          | • Effective in facilitating participation in classroom-related activities among students w/ IDD (Selanikyo, Weintraub, & Yalon-Chamovitz, 2018)  
|                          | • Improvement in children’s motor coordination due to TA’s increased knowledge from OT (Hutton, 2009)  
|                          | • Improvement in children’s learning and engagement due to teachers’ increased knowledge of seating strategies from OT (Hutton, 2009)  
|                          | • Sharing knowledge between teaching staff and OTs developed trust and improved relations (Hutton, 2009)  |
### Teaching staff preferences:
- Teaching staff preferred more time with OTs to capitalize on utilization (Wilson & Harris, 2018).
- Increased confidence of teaching staff to continue OT initiatives (Hutton, 2009).

**Negative:**
- Negative perception of the therapists’ use of time in 3:1 model, such as using the time to perform documentation (Garfinkel & Seruya, 2018).

### OTs:

**Positive:**
- Sense of belonging to school community (Ball, 2018; Campbell et al., 2012).
- Improved job satisfaction (Ball, 2018; Campbell et al., 2012; Garfinkel & Seruya, 2018).
- Consistency in service provision (Campbell et al., 2012).
- Increased monitor of student responsiveness when OT embedded in classroom (Bazyk et al., 2009).
- -related activities among students w/ IDD (Selanikyo, Weintraub, & Yalon-Chamovitz, 2018).
- Sharing knowledge between teaching staff and OTs developed trust and improved relations (Hutton, 2009).

**Negative:**
- Frustrated by lack of teacher responsiveness (Bose & Hinojosa, 2008).

### Direct Students:

**Positive:**
- Increased ”gains” in IHM, BOTMP visual motor control, DTVP-2 position in space, handwriting legibility, total letter legibility (Case-Smith, 2002).
- Improvements and positive percent changes in handwriting skills, including legibility, form, alignment, size, space (Mackay et al., 2010).
- Improvements in handwriting skills, including space, line, size (Peterson & Nelson, 2003).
- Therapeutic practice demonstrated a statistically significant increase in handwriting skills compared to sensorimotor techniques (Denton et al., 2006).
- Improvement in visual perception skills (Denton, Cope, & Moser, 2006).

**Teachers:**

**Negative:**
- Preferred collaborative-consultative or combined treatment over direct treatment (Ratzon et al., 2009).

### OTs:

- Improved job satisfaction.
- Consistency in service provision.
- Increased monitor of student responsiveness when OT embedded in classroom.
- -related activities among students w/ IDD.
- Sharing knowledge between teaching staff and OTs developed trust and improved relations.
Mixed Methods

<table>
<thead>
<tr>
<th>No positive or negative implications found in referenced articles.</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Students:</strong></td>
</tr>
<tr>
<td><strong>Positive:</strong></td>
</tr>
<tr>
<td>• Significant improvement in children’s visual-motor skills, though not more significant than a solely collaborative approach (Ratzon et al., 2009).</td>
</tr>
<tr>
<td><strong>Teachers:</strong></td>
</tr>
<tr>
<td><strong>Positive:</strong></td>
</tr>
<tr>
<td>• Increased understanding of children’s difficulties (Ratzon et al., 2009).</td>
</tr>
<tr>
<td><strong>OTs:</strong></td>
</tr>
<tr>
<td>No positive or negative implications found in referenced articles.</td>
</tr>
</tbody>
</table>
Involvement Plan

Introduction

The student researchers met with their collaborator and determined that a sufficient means to represent the findings would be an informational brochure to provide outcomes and implications of collaboration within schools. The target audience was the University Place School District Professional Learning Community (PLC), which consists of related service providers (OT, SLP, PT, vision), and special education teachers. In addition, the student researchers provided the school district with an annotated bibliography containing important research articles from the critically appraised paper. The provision of an in-service was discussed, but the collaborator determined that a brochure would be the most beneficial and efficient way to translate the findings. A survey for PLC members was also created to collect data on collaboration prior to and post implementation of the 3:1 model.

The collaborator reported that, due to high caseloads and time constraints, many therapists perceive a need for change in regards to how services are delivered. They want to work more efficiently, support positive student outcomes, and decrease personal stress. With the support of the special education administrator, the University Place School District implemented a 3:1 service delivery model for occupational therapy services. As the district has made changes in how services are delivered, the collaborator expressed interest in using the brochure to present the findings in a way that would provide supporting evidence for this change. In addition, the student researchers hoped that providing outcomes from evidence-based articles would increase the PLC’s knowledge of how a collaborative model is useful for students, therapists, and teachers. Therefore, it is hoped that the findings will provide occupational therapists and related service providers in the University Place School District information to advocate for their specific profession, define their role within a collaborative approach, and the important outcomes for their students.

Context
The knowledge translation pieces were affected by the implementation of the 3:1 model within the University Place School District halfway through the research process. Factors that impacted the knowledge translation pieces include the limited number of PLC members (5) that completed the survey. Each individual’s perception of the implemented 3:1 model, as well as their specific profession (i.e. OT and PT), could have affected how members answered the survey questions, perhaps influencing the survey results and implications.

Outcomes to Monitor and Evaluate

Preferred outcomes of the student researcher’s involvement plan were increased occupational therapist and related service provider knowledge of outcomes associated with collaboration in schools and the related implications. The outcomes of the brochure and the annotated bibliography were not directly monitored or evaluated. The outcomes of the implementation of the 3:1 model were measured via a survey on Google Forms. Members of the PLC were sent several reminder emails to take the survey. Google Forms compiled results into pie charts and frequency distributions to enable effective monitoring of survey results.

Knowledge Translation Activities and Products

Brochure

The intent of the brochure was discussed prior to its’ creation, and consideration was given to whether information about both collaborative and direct models should be included. Ultimately, it was determined that the purpose would be to provide a synopsis of the collaborative model findings from the critically appraised paper. Direction from the collaborator and the research chair guided student researchers to conclude that outcomes and implications of collaboration within schools would best represent these findings. The brochure included background information on common service delivery models, supporting evidence for a collaborative model with consultation, and student/therapist/teacher outcomes and implications (Appendix A). The desired outcomes of the brochure was to increase general knowledge regarding different service delivery models, highlight the benefits of using a collaborative-consultative approach, and equip therapists with information to advocate for their profession and their students.
Survey

Student researchers discussed and disseminated a pre- and post-survey of the PLC’s knowledge change concerning collaboration within the schools. The pre-survey would have been administered prior to the group’s retrieval of the brochure, and the post-survey would have been administered after the group had an opportunity to review the brochure. A discussion with the research chair resulted in student researchers deciding to implement one survey to collect detailed information on the PLC’s perception of the newly implemented 3:1 model, and how prepared they were to advocate for collaboration within the schools after experience with the 3:1 model (Appendix B). Student researchers also wanted to determine whether changes in levels of collaboration occurred by examining the extent to which PLC members were collaborating prior to and post-implementation of the 3:1 model.

Results: A total of five service providers (3 OTs, 2 PTs) from the University Place school district PLC group completed the survey. Below is a summary of the results.

- Current level of preparedness to advocate for OT/teacher collaboration:

![Pie chart showing preparedness levels]

- Only one service provider (Physical Therapist) had used the 3:1 model prior to the recent implementation.
- Current level of satisfaction with the 3:1 model:
Collaboration with teaching staff prior to and since implementing the 3:1 model:

- Prior: OT’s answered multiple times per week; PT’s answered 1x per week or multiple times per week.
- Since: Collaboration has remained similar with teaching staff, however one OT has decreased from multiple times per week to now one time per month.

Collaboration with parents/caregivers prior to and since implementing the 3:1 model:

- Since implementing the 3:1 model, collaboration with parents/caregivers has not changed.
- There is wide variability in that OT’s answered 1x per week, 1-3x per year, and never; and PT’s answered 1-3x per year and multiple times per week.

Collaboration with other disciplines (OT/PT/SLP) prior to and since implementing the 3:1 model:
o OTs answered 1-3x per year or 1 time per week prior to implementation, while PT’s answered 1x per month or multiple times per week.

o Since implementing the 3:1 model, collaboration with other disciplines has changed only slightly, with one OT increasing from 1-3 times per year to once a month.

- Current barriers to collaboration include not finding enough time, difficulty with scheduling, and not all PT clients using the 3:1 model (requiring 4 direct service treatments each month).

- Three out of the five service providers did not believe the current level of collaboration using the 3:1 model is sufficient for meeting each child’s need(s).

- Thoughts on the 3:1 model:
  
o Occupational therapists report that ideally the 3:1 model will allow more collaboration; however, all members need to be committed to collaborating during the flex week (currently this week is too often used to catch up documentation). Although it’s reported to be a “great model”, it’s suggested that it should be implemented at the start of the school year with designated times for collaboration.

o Physical therapists report they would like to have more students who receive PT on a 3:1 model, as well as line up schedules with other specialties (e.g. OT) to collaborate. It’s
also reported that much of the collaboration happens “on the spot” rather than during the flex day.

- What’s working?
  - It’s reported that the 3:1 model is helping bring awareness to the therapist’s job in providing “services on behalf of the student”, which requires structured time outside of direct treatment. The flex week is helping some service providers collaborate with teachers, observe students in other settings, review progress, and update treatment plans. For others the additional time is used for materials prep, email collaboration, equipment adjustment, records keeping, and parent outreach. It’s acknowledged that having a designated week to collaborate is helpful.

- What isn’t working?
  - It’s reported that there is some difficulty finding ways to collaborate with Speech Language Pathologists regularly, and that some therapists are more interested in collaboration than others. In person collaboration with other service providers remains challenging to coordinate, particularly when they are at a different site. Finally, not all students are on the 3:1 model.

Annotated Bibliography

The research chair determined that provision of an annotated bibliography of relevant research articles, as well as copies of the articles themselves, would be another meaningful piece of knowledge translation. The annotated bibliography was given to the collaborator to use as a resource for future practice. Student researchers selected eight articles with important student, therapist, and/or therapist outcomes after implementation of a collaborative model with consultation (Appendix C).
## Table of Met Dates

<table>
<thead>
<tr>
<th>Task/Product</th>
<th>Deadline Date</th>
<th>Steps to Achieve Final Outcome</th>
<th>Date of Actual Completion</th>
</tr>
</thead>
</table>
| **Survey**                    | May 3rd       | 1. Met with group members to begin discussing context of survey by March 25th  
2. During meeting on March 25th, determined online platform for survey to be created on  
3. Finished survey questions April 1st  
4. Shared survey questions with Sheryl on April 1st, and waited for her feedback  
5. After receiving feedback from Sheryl, completed corrections and translated questions onto the online platform for survey by April 5th  
6. Emailed Kristin link to final survey April 8th, and gave her suggested deadline for survey completion (April 30th)  
7. Met with group members to review survey results by 5/3/19 |
| **Brochure**                  | April 8th     | 1. Met with group members to begin discussing brochure content by March 25th  
2. Met with group members, as needed, to review CAT and create brochure by April 1st  
3. Shared brochure with Sheryl on April 1st  
4. After receiving feedback from Sheryl, completed corrections and completed brochure by April 8th  
5. Sent brochure to Kristin by April 8th |
| **Binder of Annotated Bibliography** | April 8th     | 1. Met with group members to determine which articles should be included in the binder of annotated bibliography by March 25th  
2. Each group member completed annotated bibliographies for two to three articles, for a total of at least eight, by April 1st  
3. Shared annotated bibliography with Sheryl on April 1st |

1. March 26th  
2. March 26th  
3. April 1st  
4. April 1st  
5. April 8th  
6. April 9th  
7. May 8th  
1. March 26th  
2. April 1st  
3. April 1st  
4. April 9th  
5. April 9th  
1. March 26th  
2. April 1st  
3. April 1st  
4. No corrections required  
5. May 16th
Outcomes and Effectiveness

The knowledge translation piece of this project took a different course than was originally expected. The student researchers focused on providing information via a brochure, which included information about collaboration and consultation as well as an annotated bibliography with relevant articles. Multiple factors, such as limited time to monitor outcomes, limited benefit for PLC members, implementation of the 3:1 model over the course of this knowledge translation, and the nature of the pieces contributed to the decision that outcomes of the brochure and annotated bibliography would not be collected.

Student researchers also collected data on PLC’s perspectives and their collaboration before and after implementing the 3:1 model via a survey. Based on survey results, PLC members have not been able to increase collaboration with teachers, parents, and other related service providers after implementation of the 3:1 service delivery model. While the model would ideally allow for increased collaboration and communication among team members, three out of five members reported that current levels of collaboration using the 3:1 model is not sufficient for meeting the needs of each student. To see complete survey results refer to the Knowledge Translation Activities and Products section.

Due to the unique nature of the knowledge translation, data on the impact of the survey results was not collected. Student researchers provided the collaborator with the survey results with the hope that it could serve as a way to reflect on their current use of the 3:1 model. The results may impact how PLC members use their time within the 3:1 model and consider ways to increase collaboration and make
adjustments to maximize benefits for their students. It may also serve as a way to track changes in the future if the University Place School District so chooses.

**Analysis of Overall Process**

Collaboration with a clinician in the community to formulate a research topic was a unique experience for all members of the student research team. They found it rewarding to potentially contribute to current practice in the community. The topic was expanded to cover all service delivery models in school-based therapies, with the help from the course mentor, chair, and collaborator, after finding limited data on the 3:1 model. Searching through numerous databases with different combinations of key words multiple times as the topic expanded was a frustrating and consuming process, but helped to refine skills related to identifying relevant research. This also meant that some relevant research was missed in the search.

The student researchers experienced challenges in balancing different writing styles and strengths while putting the CAT together in a cohesive manner. They had to be deliberate to ensure consistency and to reduce redundancy throughout the paper. Since the 3:1 model was implemented during the research process, the focus of knowledge translation shifted with it. Student researchers appreciated the input from their chair and collaborator to create something that could still benefit the collaborator and her PLC group. Creating a brochure and survey served as valuable practice for disseminating knowledge to clinicians. Student researchers were happy to complete the process and provide supportive research on collaboration and consultation, two approaches that may be used within a 3:1 model.

The project came with several challenges that included: refining the topic, expanding the search parameters, adapting to changes within the collaborator’s setting, and determining a knowledge translation component that would be beneficial to the collaborator. The value of flexibility was emphasized at several points throughout the process. Despite these challenges, the overall process has contributed to the students’ research skill development and confidence in examining and evaluating the literature.
Recommendations for the Future

Throughout this process, student researchers have determined that there is a need for additional research on the efficacy of various occupational therapy school-based service delivery models. The traditional model of direct service has long been the standard; however, a number of different models pose the question of which model offers the greatest benefits. As seen in the limited research available, there are both positive and negative outcomes associated with each model. Additional research is needed to compare specific outcomes from each model to understand which approach best supports the students, therapists, teachers, and other educational personnel. Furthermore, many collaborative or consultative models are not clearly defined and do not provide guidelines or principles to follow for consistent application across multiple settings. For example, the 3:1 model does not have established guidelines for implementation, resulting in different variations of use. The 3:1 model allows therapists the opportunity to provide direct service with a student three times per month, then use every fourth treatment of the month to perform duties other than direct service. However, it is unclear what the fourth session should entail. Despite the apparent flexibility in models such as this, the absence of clear definitions, lack of established guidelines, and unavailable working principles makes it challenging to understand outcomes and identify efficacies. Further research is needed to identify the best way to implement school-based service delivery models.
Appendix A

Brochure
Overview

Background:
Occupational therapist's recognize a need to move away from traditional "direct" service delivery models towards a more collaborative approach that includes consultation with teachers and parents. 5

Service Delivery Models:

- Direct: Traditional service delivery models include one-on-one, or group, sessions that typically occur in a designated OT room. 8

- Collaboration: Collaborative service delivery models include volunteer participation and equal status of all parties engaged, working towards a common goal. Decision making, resources, and accountability are shared, resulting in trust and appreciation for each others' interpersonal style. 4

- Consultation: Consultation is often involved within collaborative models. Occupational therapists assess the functional abilities of children, support their performance in natural environments, and suggest strategies for teachers and parents to implement. 9

References

School-Based Collaborative Consultative Service Delivery Models

OTS:
Nicholas Kasovac
Daniel Krupicka
Katherine Woodworth
Maryann Zmuda

UPS School of Occupational Therapy
<table>
<thead>
<tr>
<th>Students</th>
<th>Teachers</th>
<th>Therapists</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Outcomes:</strong></td>
<td><strong>Outcomes:</strong></td>
<td><strong>Outcomes:</strong></td>
</tr>
<tr>
<td>- Improvement in written communication/handwriting 5, 6, 7</td>
<td>- Sense of belonging to school community 5</td>
<td>- Improved perceptions of OTs’ scope of practice 1</td>
</tr>
<tr>
<td>- Improvement in fine motor and emergent literacy measures 3</td>
<td>- Improved job satisfaction 5, 6</td>
<td>- Better adapt strategies for students in the classroom 6</td>
</tr>
<tr>
<td>- Improvement in occupational performance and quality of life 2</td>
<td>- Increased monitoring of student responsiveness 2</td>
<td>- Knowledge of seating strategies 9</td>
</tr>
<tr>
<td>- Participation is easily transferred to other environments 10</td>
<td>- Able to adapt student strategies within classroom 12</td>
<td>- Improved trust and relationship with therapists 9</td>
</tr>
<tr>
<td>- Students’ needs identified before diagnosis 11</td>
<td>- Improved trust and relationship with teachers 9</td>
<td></td>
</tr>
<tr>
<td>- Improved motor coordination 9</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Implications:</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Students experience improvements in a variety of areas (handwriting, fine motor skills, quality of life, occupational performance, written communication, and participation). If OTs are present within a classroom or if the teacher is educated on specific OT strategies, student learning tends to be better generalized to general education. A collaborative-consultative approach supports students’ occupational performance in the school setting and empowers teachers to support student needs and IEP goals.</td>
<td>Occupational therapists will contend with many factors regarding service delivery models within schools. If a collaborative model is already in place, therapists should develop an understanding of classroom practices and curriculum. This will make it easier for all involved staff to develop a relationship based upon a mutual understanding of students’ difficulties, the environment in which they typically participate in, and what the vital roles of “OT” and “educator” are for specific students.</td>
<td></td>
</tr>
</tbody>
</table>
|                                                                         |                                                                         | Teachers may experience many benefits from using a collaborative service delivery model. For example, they may improve their perception of OT, learn new strategies to use within the classroom, or build stronger relationships with therapists. Collaborative problem solving produces solutions that are different from those that any one individual can produce independently, it supports best practice for team interactions in both special education and occupational therapy literature, and ultimately leads to successful education outcomes.
|                                                                         |                                                                         |                                                                            |
Appendix B

Survey: Collaboration in the 3:1 Service Delivery Model

1. What is your position at the school?
   a. OT
   b. PT
   c. SLP
   d. Other ___________________________

2. How prepared are you currently to advocate for OT/teacher collaboration in schools?
   a. Extremely
   b. Very
   c. Moderately
   d. Slightly
   e. Not at all

3. Have you used a 3:1 model prior to the recent implementation in your district?
   a. Yes
   b. No

4. How satisfied are you currently with the 3:1 service delivery model recently adopted in your district?
   a. Very satisfied
   b. Satisfied
   c. Neither satisfied nor dissatisfied
   d. Dissatisfied
   e. Very dissatisfied

5. Prior to implementation of the 3:1 model, how often did you collaborate with teaching staff?
   a. Multiple times per week
   b. 1 time per week
c. 1 time per month

d. 1-3 times per year

e. Never

6. Since implementing the 3:1 model, how often do you currently collaborate with teaching staff?

a. Multiple times per week

b. 1 time per week

c. 1 time per month

d. 1-3 times per year

e. Never

7. Prior to implementation of the 3:1 model, how often did you collaborate with parents/caregivers?

a. Multiple times per week

b. 1 time per week

c. 1 time per month

d. 1-3 times per year

e. Never

8. Since implementing the 3:1 model, how often do you currently collaborate with parents/caregivers?

a. Multiple times per week

b. 1 time per week

c. 1 time per month

d. 1-3 times per year

e. Never

9. Prior to implementing the 3:1 model, how often did you collaborate with other disciplines on your team (OT/PT/SLP)?

a. Multiple times per week

b. 1 time per week
c. 1 time per month  
d. 1-3 times per year  
e. Never  

10. Since implementing the 3:1 model, how often do you currently collaborate with other disciplines on your team (OT/PT/SLP)?  
a. Multiple times per week  
b. 1 time per week  
c. 1 time per month  
d. 1-3 times per year  
e. Never  

11. What are your current barriers to collaboration?  
______________________________________________________________________________  
______________________________________________________________________________  

12. Is the current level of collaboration using the 3:1 model sufficient for meeting each child’s need(s)?  
a. Yes  
b. No  

13. What are your thoughts on the 3:1 model?  
______________________________________________________________________________  
______________________________________________________________________________  
• What is working?  
______________________________________________________________________________  
______________________________________________________________________________  
• What isn’t working?  
______________________________________________________________________________  
______________________________________________________________________________
Appendix C

Annotated bibliography


Summary: This study describes the collaborative practices between teachers and occupational therapists. It explores the relationship between these practices and student IEP goals, as well as teachers’ perceptions of OT contributions to student skill development and collaborative practices. Teachers and OTs collaborated in the classroom by jointly developing goals, monitoring interventions, and reviewing progress. As collaborative practices increased, teachers’ perceptions of OT contribution to skill development increased.


Summary: Kindergarten children with and without disabilities received approximately 28 sessions of integrated occupational therapy services over the span of seven months. Occupational therapists spent time learning about the classroom curriculum, provided in-services for teachers and support staff, and consulted with teachers and support staff weekly. This collaborative consultation progressed from a directive to a nondirective, interactive approach. Of the eight fine motor and emergency literacy measures, students with disabilities made significant improvements in five and students without disabilities made significant improvements in eight after all services were delivered.

**Summary:** This qualitative paper describes the experiences of occupational therapists who participated in a year long project implementing the P4C model and their perspectives on how it differs from a direct service delivery model. Five major themes were identified through analysis of year end interviews by occupational therapists: year of growth, becoming a community, the key ingredients of P4C, a balancing act, and providing services that make an impact. Therapists gained confidence through personal growth in their roles; they began to see themselves as part of a community with their OT colleagues and larger school community; key ingredients of P4C included building strong relationships, being in the classroom, being inclusive, and providing consistent and responsive services; challenges included the balance of deciding whether to provide whole class services or pulling individual children out, and concerns of not reaching children other than those with DCD; therapists felt more positive about the impact they made through the P4C model versus the traditional model.


**Summary:** The authors conducted a phenomenological study of school-based practitioners (OT, SLP) that had experience with the 3:1 service delivery model, as it aligns with a workload approach in contrast to a caseload approach. Benefits included increased collaboration and opportunities to meet on behalf of students, opportunities to become involved in whole-school programming and to work with students in their natural settings such as in the classroom or at recess, flexible scheduling, and increased job satisfaction.

doi:10.1177/030802260907200707

**Summary:** This article presents a piloted OT program in two UK primary schools. Occupational therapists were placed in each school twice a week to increase skills of teachers and teaching assistants on school-based occupations. Notably, the interventions were intended to be provided for the whole school, not merely individual children. The OTs worked with the teachers and assistants to become part of the team and capitalize on opportunities for learning interventions that were best for the schools. Positive outcomes included the following: improvements in children’s motor coordination, learning, and engagement due to increased knowledge translation between the OT and teachers/teacher assistants; development of trust and improved relationships; and increased confidence of teaching staff to continue OT initiatives.


doi:10.1177/000841740607300406

**Summary:** As part of the occupational therapy school-based consultation model (OTSBC), core interventions used are educating teachers and parents/caregivers, making recommendations or referrals, and assisting with the implementation of these referrals. In this study, the Canadian Occupational Performance Measure (COPM) and Teacher awareness Scale (TAS) were used to identify perceived changes in students’ functional ability and teachers’ awareness of student difficulties after implementation of OTSBC services. The COPM performance and satisfaction scores showed improvement and teachers’ awareness changed in a positive direction.

**Summary:** This study examined the effectiveness of the Co-PID intervention, an approach that focuses on skills of communicating, choosing, and initiating and improving participation in school-related activities for students with IDD. Two schools participated in the study with one offering the Co-PID intervention and the other using an in-service (control). The Co-PID intervention included a collaborative consultation aspect in which OTs and teachers brainstormed activities that could be implemented to enhance participation by the students. Results found that the Co-PID collaborative-consultative approach facilitated choosing and overall participation of students, supported teachers role in enhancing participation, and transferred outside of the classroom.


**Summary:** This study explored how teachers experience occupational therapy services delivered using the Partnering for Change (P4C) model to support children with a variety of needs. Four themes emerged that indicated teachers strongly preferred collaborative occupational therapy services based on the P4C model. Students were also supported in classrooms as teachers learned new strategies from the occupational therapists and found ways to embed these strategies in their daily routines.
Acknowledgements

We would like to thank Renee Watling and Sheryl Zylstra for their continual support and guidance over the course of this research project. We are thankful for the numerous edits that have been made by each. Additionally, we would like to thank Kristin Brubaker for her initial interest in this topic as it related to the current situation within University Place school district, and for her continual encouragement and work to send knowledge translation pieces to the Professional Learning Community (PLC). Lastly, we would like to thank members of the PLC who completed the survey and contributed to the knowledge translation piece.
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Name: Nicholas Kasovac Date: ______________________

Signature of MSOT Student

Name: Daniel Krupicka Date: ______________________

Signature of MSOT Student

Name: Katherine Woodworth Date: ______________________

Signature of MSOT Student

Name: Maryann Zmuda Date: ______________________

Signature of MSOT Student