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A Longitudinal Descriptive Study of Service Delivery Employing Collaborative Classroom-based or Pull-out Service Delivery

Courtney L. Benefiel
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A Longitudinal Descriptive Study of Service Delivery

Employing Collaborative Classroom-based or Pull-out Service Delivery
(TITLE)

BY

Courtney L. Benefiel
1979-

THESIS

SUBMITTED IN PARTIAL FULFILLMENT OF THE REQUIREMENTS
FOR THE DEGREE OF

Master of Science

IN THE GRADUATE SCHOOL, EASTERN ILLINOIS UNIVERSITY
CHARLESTON, ILLINOIS

2001
YEAR

I HEREBY RECOMMEND THAT THIS THESIS BE ACCEPTED AS FULFILLING
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Running head: A LONGITUDINAL STUDY OF SERVICE DELIVERY

A Longitudinal Descriptive Study of Service Delivery Employing Collaborative Classroom-based or Pull-out Service Delivery

Courtney L. Benefiel

Eastern Illinois University

Abstract

This study investigated whether there was a difference in SLP behaviors during 40 minutes of speech-language intervention using a collaborative classroom-based model of intervention versus 40 minutes of traditional pull-out intervention. Additionally the study evaluated whether there was a difference in the amount of child practice productions of IEP goal behaviors during 40 minutes of speech-language intervention provided in the classroom versus 40 minutes of intervention provided in the pull-out speech room. One-half of the subjects participated in the collaborative classroom-based model, while the other half participated in the traditional pull-out intervention. Four hours of classroom-based or pull-out treatment were observed over the course of a school year for each of eighteen children with speech or language disorders. Results indicated that overall children with communication impairments received more practice producing IEP objectives during equal amounts of classroom-based and pull-out intervention. Children with language disorders however, received very similar amounts of practice in pull-out and the classroom, while children with articulation disorders produced less than half as many IEP objective productions in the classroom compared to the pull-out setting. Results followed a similar trend for SLP treatment behaviors. Overall, the SLP used more treatment behaviors to target IEP goals in pull-out than classroom-based intervention. The SLP however, used very similar amounts of treatment behaviors for children with language impairments in pull-out and the classroom, whereas she used significantly fewer treatment behaviors in the classroom compared to the pull-out setting for children with articulation disorders.

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CHAPTER I

Introduction

A variety of service delivery models have been developed to address the needs of children with speech-language deficits in the school setting (Cirren & Penner, 1995; Miller, 1989). The most common and frequently used service delivery model in speech-language intervention is the traditional pull-out model. This model provides therapy for all types and severities of communication disorders on either an individual basis or in a small group. Services take place away from the student's regular classroom, with the speech-language pathologist (SLP) being solely responsible for the advancement and management of intervention.

Cirren and Penner (1995) identified several reasons for the prevalence of the traditional method of service delivery including the history of the medical model approach in school speech pathology (an often simplistic view of language that ignores the larger school context), and the control the SLP has of the communication context. Several benefits to traditional speech-language therapy have been identified including the following: (a) it allows for very structured training, (b) a variety of learning approaches can be used without concern for whether it will fit in the lesson plan or be appropriate for other students, (c) if a deficit is identified, it can be addressed immediately and directly without linking it to the curriculum, and (d) it is ideal for intervention that requires repetition and one-to-one interaction therapy techniques (Meyer, 1997).

Both landmark educational legislation and changes in theory have led to the development of alternative service delivery models in speech-language therapy. These models are collectively known as collaborative and classroom-based intervention. The

most familiar service delivery model for children with speech-language deficits in the school setting has been the pull-out model. Noted advantages of this include "more engaged learning time" (Merritt & Cullatta, 1998), more repeated practice of specific skills, and fewer distractions.

Recently, speech-language intervention has taken a more functional approach, employing curriculum-based and classroom-based approaches to service delivery. Reported advantages of the collaborative classroom-based service delivery models include a natural environment to link language and curricular goals, better carryover and generalization, and role sharing which allows the speech-language pathologist (SLP) and teacher to learn more about each others areas of expertise (Cirren & Penner, 1995; Lowe, 1993; Miller, 1989;).

According to surveys by Elksnin and Capilouto (1994), Beck and Dennis (1997), and Paramboukas, Calvert, and Throneburg (1998), approximately 70% of speech-language pathologists in school settings are providing some classroom-based services. Benefits of these services reported from surveys include classroom teacher's assistance in targeting speech-language goals, goals being functionally practiced, and an increase in generalization. Reported disadvantages involve lack of individualization in targeting speech-language goals and difficulties coordinating planning time with the teacher.

Although theoretical literature suggests the benefits of alternative service delivery models and surveys report their use, research comparing collaborative classroom-based intervention versus the traditional pull-out model with school-age children is limited. Most school-age studies (Farber & Klein, 1999; Hadley, Simmerman, Long, & Luna, 2000; Throneburg, Calvert, Sturm, Paramboukas, & Paul, 2000) have only compared

whole classrooms of children who received collaborative instruction with whole classrooms who received teacher-only instruction. There are no studies reporting progress of speech-language impaired children in speech-language deficit areas.

Despite the assumed advantages and disadvantages to classroom-based and pull-out intervention models noted in the literature, only one study has been completed that describes intervention in these two settings. Roberts, Prizant, and McWilliams (1995) described communication interactions between preschool cognitively and developmentally impaired children and SLPs in pull-out and classroom-based intervention. They found significant differences between SLP and child interactions during classroom-based therapy as compared to pull-out therapy. The study revealed that SLPs took more turns and used more acknowledgements in the pull-out session than in the classroom-based intervention. They also found that children were more compliant with requests made during pull-out intervention. However, children did not differ significantly in the number of turns, types of turns, or language functions.

The study by Roberts et al. (1995) is the only study that described intervention in the two intervention settings. No studies have been conducted to descriptively compare classroom-based and pull-out speech-language intervention with school-age children. The purpose of the present study was to describe speech-language intervention in the classroom as compared to traditional intervention in a pull-out speech room.

CHAPTER II

Review of Literature

Service Delivery

A variety of service delivery models have been developed to address the needs of children with speech-language deficits in the school setting (Cirren & Penner, 1995; Miller, 1989). A service delivery model is "an organized configuration of resources aimed at achieving a particular educational goal" (Cirren & Penner, 1995, p. 333). Cirren and Penner (1995) assert that two critical aspects define a service delivery model. These aspects are the setting where intervention is provided, and the direct or indirect role that service providers take on. The most common and frequently used service delivery model in speech-language intervention is the traditional pull-out model. Therapy is provided for all types and severities of communication disorders either on an individual basis or in a small group. Services take place away from the student's regular classroom. The responsibility of advancement and management of the intervention lies solely with the speech-language pathologist (SLP).

The prevalence of this traditional method of service delivery is based on several premises identified by Cirren and Penner (1995) including, the history of the medical model approach in school speech pathology, an often simplistic view of language that ignores the larger school context, and the control the SLP has of the communication context. Block (1995) notes that this type of therapy can separate children from their peers, creating barriers to successful education.

Meyer (1997) cited several benefits to traditional speech-language therapy, including the following: (a) it allows for very structured training; (b) a variety of learning

approaches can be used without concern for whether it will fit in the lesson plan or be appropriate for other students; (c) if a deficit is identified, it can be addressed immediately and directly without linking it to the curriculum; and (d) it is ideal for intervention that requires repetition and one-on-one interaction therapy techniques, or when a student feels uncomfortable working in the presence of peers. Some authors have suggested that "students who have deficits in the area of language form and structure" (Cirren & Penner, 1995, p. 356) may achieve greater success in intervention outside of the regular classroom. Merritt and Culatta (1998) note that pull-out therapy also may result in "more engaged learning time" (p.75), and may be more appropriate for students who need repeated practice in specific skills.

Recently there has been a significant shift in educational philosophy and theory, leading to the development and implementation of alternative service delivery models in speech-language pathology. New models are designed to provide services in the more naturalistic environment of the students' regular or special education classrooms (Block, 1995; Cirren & Penner, 1995; Miller, 1989). These alternative models are collectively referred to as collaborative and classroom-based intervention. Several different classroom-based models exist. Classroom-based direct services emphasize the SLP providing "some regularly scheduled direct intervention services to students within the classroom" (Cirren & Penner, 1995, p. 335). Intervention is provided in the natural environment of the classroom in order to integrate the students' communication goals with the curriculum, and to allow for collaboration with teachers. In this context, the SLP and classroom teacher together assume a variety of roles in offering direct services within the classroom.

Elksnin and Capilouto (1994) explain several approaches to collaborative classroom-based services, including the following teaching models: one teach-one observe, one teach-one "drift", station teaching, parallel teaching, remedial teaching, supplemental teaching, and team teaching. Each of these forms of collaborative classroom-based intervention assumes that the professionals involved voluntarily accept dual responsibility for the students, and that each person's values are supported by the others as they work toward a common end (Block, 1995).

There are several notable advantages to classroom-based models of intervention. One identified advantage is the relevance of language goals and their generalization to natural environments (Cirren & Penner, 1995; Lowe, 1993; Miller, 1989). Taking advantage of the students' curricular content and materials allows the students to make inferences concerning the relationship between language skills and the use of those skills in the classroom. Also, group skills and social dynamics are enhanced (Miller, 1989). Lowe (1993) explains that classroom services provide a more applicable means of encouraging generalization and carryover. A further advantage is that students who are not identified as qualifying for speech and language services but who are at-risk, have an opportunity to benefit from the combined efforts of the SLP and the classroom teacher (Cirren & Penner, 1995). The negative effects of pull-out intervention are reversed, in that children do not have to be absent from important curriculum or be required to make-up missed class work (Cirren & Penner, 1995; Miller, 1989). Other advantages include the heterogeneous grouping, increased student motivational level, and a strong working relationship between the professionals involved (Lowe, 1993). Merritt and Culatta (1998) cite further advantages to a collaborative method of service delivery including: (a)

teachers have the opportunity to learn interactive language techniques that they may personalize for their own use and apply to their own teaching methods; (b) SLPs may learn about the curriculum, as well as specific teaching methods and the expectations for average-achieving students; (c) by having two individuals engaged in the collaborative teaching effort, one is able to facilitate a particular student's response or mediate learning, while the other can concentrate on content and; (d) a collaborative teaching method encourages analyses of discourse styles of both the teacher and the SLP, which can facilitate modifications in instruction that may enhance learning.

Collaborative classroom-based speech-language services are not without disadvantages. These include a lack of flexibility, lack of student privacy, and a less structured environment which may not be conducive for providing the individual assistance that is often necessary for language structure and articulation goals (Cirren & Penner, 1995). Other disadvantages associated with the implementation of these models include resistance to change by the SLP and classroom teachers, and the time involved with the initial collaborative development and later in regularly scheduled collaborative planning.

Survey Results

Several surveys have recently been conducted regarding the types and frequency of classroom-based or integrated service delivery models used by SLPs and classroom teachers (CTs). These surveys also identified the strengths and weaknesses of classroom-based models in comparison to traditional pull-out models based on SLP and CT perceptions.

Elksnin and Capilouto (1994) sampled 31 speech-language pathologists from a southeastern school district. Fifty-eight percent of this sample were adopters and 42% were nonadopters of integrated service delivery models. The models most frequently implemented by those SLPs who had used an integrated service delivery approach (adopters) were models in which the professionals worked in an independent manner within the classroom. These approaches included one teach-one drift, and one teach-one observe. However, SLPs perceived team teaching as the most effective approach. The study also examined the perceived appropriateness of integrated service delivery in the areas of language, articulation, fluency, and voice. Both groups were in 100% agreement that classroom-based intervention was appropriate for language. Adopters and nonadopters disagreed somewhat about the extent classroom teachers are open to suggestions and willing to assist with speech-language goals. Thirty-one percent of the nonadopters expressed concerns over whether the teacher would be willing to accept others' teaching strategies, however none of the adopters viewed this as a disadvantage.

Beck and Dennis (1997) obtained results similar to those of Elksnin and Capilouto (1994) in a survey conducted with SLPs and CTs. Both groups ranked team teaching as the most appropriate approach. However, when asked what method they used most frequently, the one teach-one drift approach was reported most often by both groups. Twenty-four percent of the teachers felt that the primary advantage of collaborative services was that teachers became better able to help target and understand speech-language goals for students. Additionally, Beck and Dennis looked at SLP and teacher's perceptions of factors relating to classroom intervention. They found that both agreed that clients learn from their peers and that turn taking skills are enhanced. Also, they

found that although the majority of both groups felt that the SLP enhanced communication skills of nontargeted children and that carryover skills were enhanced, the SLPs agreed more strongly than the teachers. The survey also examined SLP and teacher views concerning data collection and planning. Both groups noted that planning time was difficult to find, and therefore, a primary disadvantage to collaborative services. Additionally, 43% of SLPs and 24% of teachers listed the SLP's inability to always target specific speech-language goals as another disadvantage of collaborative classroom-based intervention.

The surveys by Elksnin and Capilouto (1994) and Beck and Dennis (1997) both revealed similar views of CTs and SLPs regarding classroom-based interventions. Results agreed that the most appropriate method was team teaching, although it might not be implemented most often. The primary advantage of integrated service delivery models perceived by the professionals in both surveys was that speech-language impaired students were able to remain in a natural environment where more functional goals could be addressed and the possibility for carryover increased. The main disadvantage identified was the lack of individualization in targeting specific speech and language goals. Another disadvantage cited was the additional planning time needed in order to implement the services effectively.

A survey conducted by Paramboukas, Calvert, & Throneburg (1998) examined the service delivery practices of speech-language pathologists in school settings in Illinois. Results indicated that of the SLPs providing classroom-based services, 71% were providing those services for an average of 2.5 hours per week, with only 30% using curriculum to guide these classroom-based services. The one teach-one drift model was

again reported by the SLPs as the most frequently utilized integrated model, along with the SLP-teach model, where the classroom teacher was not present in the classroom during the SLP's language intervention. The study also found that 76% of the SLPs providing classroom-based intervention did not have scheduled planning time with the classroom teacher. Thirty percent of speech-language pathologists providing classroom-based services reported that they felt teachers shared responsibility for achieving speech-language goals.

Classroom-Based Vs. Pull-out Service Delivery (Preschool Age)

Although the literature cites many advantages of classroom-based services and surveys indicate the increased use of classroom-based services, very few research studies have been conducted to compare the effectiveness of pull-out and classroom models for speech-language intervention. Wilcox, Kouri, and Caswell (1991) assessed the effectiveness of classroom intervention versus traditional pull-out for preschool-aged children with language delays. Subjects included twenty children between the ages of 20 and 47 months, who were recruited from a university speech and hearing clinic and a community early intervention program. All of the subjects scored at least 1.5 standard deviations below the mean on either the receptive and expressive portions of the Sequenced Inventory of Communication Development (Hendrick, Prather, & Tobin 1984) or the communication subsection of the Battelle Developmental Inventory (Newborg, Stopck, Wneck, Guidubaldi, &Svinicki, 1984). A parental report and a mother-child language sampling noted the children's language abilities were limited to single-word utterances, and their productive expressive vocabularies were between 2 and 21 words. Intervention for these children was provided twice a week for 12 weeks, with

individual sessions lasting 45 minutes and classroom sessions lasting three hours (9:00-12:00 a.m.). Classroom intervention was jointly provided by an early childhood special educator and a speech-language pathologist, while pull-out sessions took place at the early intervention program in a large room that resembled a family room. During both sessions, each child received at least 10 models of each of his/her target vocabulary words through interactive modeling techniques. The results of the study by Wilcox et al. (1991) showed similar lexical knowledge gain at the time of post-tests. However, children who received classroom intervention demonstrated greater carryover of targeted word use in their homes than children in the pull-out condition.

Valdez and Montgomery (1997) examined the differences in effectiveness between a collaborative classroom-based model of intervention and the traditional pull-out model. The subjects consisted of 39 African American children from an inner-city Head Start program with documented speech-language delays. Each child received 90 minutes of treatment, one day each week, for six months. The children with speech/language delays in the inclusion group received treatment with 10 to 15 of their typical peers in a classroom setting. The subjects were post-tested using the CELF-Preschool. Results indicated similar gains between the inclusion group and the pull-out group in total language scores, receptive language scores, and expressive language scores, however statistics were not applied to analyze the results.

Collaboration Vs. Traditional Service Delivery (School Age)

Studies that investigated collaborative classroom-based services with school-age children have primarily evaluated the progress of whole classes of children who received collaborative services and whole classes who received teacher-only instruction in the

classroom. Studies which evaluate the impact of service delivery model on communication deficits are rare for school-age children with speech-language disorders are rare. Farber and Klein (1999) performed a year long comprehensive study of classroom teacher and speech-language pathologist collaborative intervention. The study consisted of 552 students from 12 kindergarten and first grade classrooms at six different elementary schools. Treatment groups received direct, weekly collaborative intervention by the speech-language pathologist and classroom teacher at a frequency of three sessions per week for a total of 2.25 hours. The control group received regular instruction from their classroom teachers. Curriculum for the MAGIC (Maximizing Academic Growth by Improving Communication) program, and MAGIC testing items were developed by 16 school-certified speech-language pathologists. The results of the posttests indicated that the treatment groups scored significantly higher on the listening and writing subtests, as well as the total test, as compared to the control group. Near significant differences were also seen in the reading subtest. Although this study examined the effect of collaboration on curricular goals with kindergarten and first grade students, it failed to examine the effect this type of therapy had on students who were identified as having speech and/or language goals.

Hadley et al. (2000) conducted a six month study that examined the effectiveness of collaboration on vocabulary and phonological awareness skills for kindergarten and K-1 children. Subjects ranged in age from 5:0 to 6:9 and were from an inner city elementary school. Four classrooms participated in the experiment, with two classrooms serving as controls while the other two participated in the collaborative service delivery model. The control groups were assigned a paraprofessional to maintain the adult-to-

student ratio. The two experimental groups received collaborative intervention from the SLP and classroom teacher 2 1/2 days per week. Children with speech-language goals were provided with direct services either on an individual basis or in a small group outside of the classroom. The control teachers were able to use the paraprofessional in any manner they chose (tutoring etc.). Vocabulary and phonological awareness instruction were incorporated into the curricular activities of the experimental classrooms. Also, the SLP led a 25 minute small-group activity center that entailed explicit instruction in phonological awareness. Results obtained from posttests indicated that students in the experimental classrooms made greater gains in vocabulary and phonological awareness than students in the control classrooms.

Throneburg, et al. (2000) completed a study examining the differences in effectiveness between a collaborative approach to intervention, a classroom-based intervention model with the SLP and classroom teachers working independently, and traditional pull-out intervention on curricular vocabulary skills. Subjects included 177 children in kindergarten through third grade at two different elementary schools. This study looked at the vocabulary skills of regular education children, as well as those who received speech and language services. The same curricular vocabulary words were used for all of the groups. Collaborative language sessions were conducted in the classroom with the classroom teacher, SLP, and two graduate students present. Instruction was shared by all present, using a team teaching approach. In the classroom-based model where the teacher and SLP functioned independently, children received classroom-based intervention from the SLP and three Communication Disorders and Sciences students without collaboration from the classroom teacher. The lessons' goals and activities were

the same as those presented at the collaborative school, however the classroom teacher was not involved in planning the activities or present during the language lesson. In the collaborative and the classroom-based settings, both speech-language and curricular vocabulary goals were targeted. An additional 15 minutes of pull-out intervention was provided for children with IEP goals in both classroom interventions. In the traditional condition, the children who qualified for speech or language services received curricular-based intervention and were seen in small-group or individual pull-out sessions in the speech room. Results suggested that the collaborative model was more effective for teaching curricular vocabulary to students who qualified for speech or language services than a classroom-based model where the teacher and SLP worked independently, or a traditional pull-out model. The study also found that vocabulary skills for those students not enrolled in speech or language services were increased to a significantly greater degree than those students receiving only regular instruction from the classroom teacher.

In a recent pilot study completed by Barlage, Calvert, and Throneburg (1999), differences in effectiveness between traditional pull-out therapy and collaborative classroom-based treatment for students' short-term speech and language objectives were examined. Subjects included nine first grade children with speech-language individualized education plan (IEP) goals from two elementary schools. One subject received speech services, five received language services and three subjects received both speech and language services. Students' short-term language objectives included receptive and expressive identification of semantic targets including associations, definitions, categories, attributes, and functions of objects and pictures of items. Short-term speech objectives mainly included targeting late developing phonemes at the

isolation, word and sentence level. Five children received collaborative intervention and four children received pull-out intervention. In the traditional pull-out approach, students received individual or small group therapy in a room away from the classroom for a number of minutes consistent with the required time stated on the child's IEP. In the collaborative approach, children received intervention from their respective classroom teacher, a speech-language pathologist, and a graduate student in Communication Disorders & Sciences from Eastern Illinois University. The instruction targeted the specific speech and language IEP objectives of the individual students, and listening and reading comprehension within the context of language arts curricular activities. Parallel teaching was implemented during small group activities in the curricular lesson, with children who had speech-language objectives being placed in the same group. The SLP then targeted individual speech-language goals during the small group activities. Intervention was provided for approximately 40 minutes per week for a 10-week period. In addition, four of the five children in the collaborative group also received 15 to 20 minutes of pull-out intervention each week to meet the required number of minutes specified on their IEPs. One student required an additional 60 minutes of pull-out therapy to meet the IEP requirements. Short-term IEP objectives were baselined prior to and at the conclusion of the study. Results indicated that the collaborative and pull-out groups made similar mean percent gains on short-term language objectives, while the pull-out group obtained slightly higher but comparable scores on the speech objectives.

SLP Instructional Characteristics in Collaboration

Roberts et al. (1995) examined the effects of traditional pull-out versus classroom services on communication interactions between children with speech-language

impairments and the SLP. The subjects consisted of 15 children, ages one to five years, who had been diagnosed with mild or moderate cognitive and developmental delays. Before the study began, children were matched in pairs according to developmental profiles. The two groups did not initially differ significantly in their scores on the ABILITIES Index (Simmeonson & Bailey, 1980) or on the Battelle Developmental Inventory (Newborg et al. 1984). Each child received two twenty-five minute sessions of either traditional pull-out therapy or classroom intervention. The intervention procedures were similar in both groups, with a shared curriculum and consistent schedule. A turn was defined as an opportunity to speak during the session or activity. Each speaker's (SLP or child) turn was coded using the following criteria: (a) type of turn- whether the speaker initiated or responded; (b) target- who the speaker was communicating with; and (c) function- the purpose of the communication. Child turns were also coded for effect, which was defined as the child's response to a request. Each turn was then coded into one of the following mutually exclusive categories: (a) type of turn- initiation, transition, obligatory response, nonobligatory response; (b) target- focal child, teacher, peer, other adult, self, group; (c) function (child)- request object/action, protest object/action, request social routine, request comfort, call/show off/ greet, comment on object/action, request information, acknowledgement, or unclear turn; (d) function (speech-language pathologist) behavior request, information request, test request, permission request, information sharing, acknowledgement, protest, or positive social feedback; and (e) effect- compliance, incorrect, noncompliance, no effect, and distracted. Self-directed speech was not coded for turn type or function. Five variables which had been identified in previous studies as being important, were then selected for statistical analysis. The

five variables for the SLP were as follows: number of turns, percentage of responses, percentage of information sharing, percentage of behavior requests, and percentage of acknowledgements. The five variables for the child included number of turns, percentage of responses, percentage of behavior regulation, percentage of compliance to requests, and percentage of requests to which the child did not respond. Results indicated that the speech-language pathologist took considerably more turns in pull-out intervention. However, the SLP did not vary in the percentage of responses, information sharing, behavior requests, or acknowledgements. It was also found that the children took the same amount of turns in both settings. Children also did not significantly differ in the percentage of responses or the percentage of behavior regulation, however they were found to be more compliant in the traditional therapy setting.

Benefiel, Throneburg, Calvert, and Paul (2000) completed a study which described the amount of child practice productions and SLP behaviors exhibited during speech-language intervention in the classroom and pull-out intervention in the speech room. The subjects consisted of 20 children enrolled in first and second grades diagnosed with identified speech-language deficits. The subjects were matched based on type of disorder (speech, language, or both) and severity of their speech or language impairment. Subjects diagnosed with language deficits scored at least one standard deviation below the mean on a standardized language test. Subjects diagnosed with articulation delay scored at least one standard deviation below the mean on one standardized articulation assessment. In the traditional pull-out condition, the SLP provided pull-out intervention for 40 minutes each week in a room away from the classroom. In the collaborative classroom-based condition, the SLP collaborated with the

classroom teachers in the collaborative group each week, and provided collaborative lessons focusing on curricular and speech-language goals for 30 minutes each week using a team teaching approach. Students with IEP goals received an additional 10 minutes of classroom-based intervention each week with the SLP and teacher employing a one-teach/one-drift model. Traditional pull-out intervention was defined as the speech-language pathologist independently providing speech-language services in the speech room. Data was collected at the beginning of the school year. The frequency that speech-language goals were addressed for each child was tallied through direct observation. The number of models, elicitations and feedback that the SLP provided to each child were tallied. The study found that the SLP used significantly more general and specific feedback in the traditional pull-out setting than in the collaborative classroom-based setting. Further findings included that the SLP behaviors differed significantly according to the child's disorder. The SLP provided significantly more elicitations, models, general feedback and specific feedback to children with speech only disorders, while language intervention was similar in the two settings. Additionally, the study found that there were significantly more child production practice opportunities for both the speech and language children in the pull-out setting as compared to classroom-based intervention. Children with speech only deficits received more production practice than children with language only deficits.

Summary and Statement of Objectives

Changes in the last several decades in educational legislation and theory have led to the development of classroom-based service delivery models. The traditional service delivery model for children with speech-language deficits in the school setting has been

the pull-out model. Reported advantages of the pull-out model in the literature include "more engaged learning time" (Merritt & Culatta, 1998), more repeated practice of specific skills, and fewer distractions. Reported advantages of the collaborative classroom-based service delivery models include a natural environment to link language and curricular goals, better carryover and generalization, and role sharing that allows the SLP and teacher to learn more about each others areas of expertise.

Recent surveys (Beck & Dennis, 1997; Elksnin & Capilouto, 1994; Paramboukas et al. 1998) indicate that approximately 70% of speech language pathologists in school settings are providing some classroom-based services. Benefits of collaborative classroom-based services reported from surveys include that classroom teachers can learn to help target speech-language goals, goals were functionally practiced, and generalization increased. Disadvantages reported include a lack of individualization in targeting speech-language goals and difficulties coordinating planning time with the classroom teacher.

Research comparing collaborative classroom-based speech-language intervention with the traditional pull-out model with school-age children is limited. Most school-age studies (Barlage, 1999; Farber & Klein, 1999; Hadley et al. 2000; Throneburg, et al., 2000) have only compared whole classrooms of children who received collaborative instruction with whole classrooms who received teacher-only instruction. Only one non-published pilot study has reported the progress of speech-language impaired children in speech-language deficit areas. Although the theoretical literature and surveys have listed several assumed advantages and disadvantages to classroom-based and pull-out intervention, only two studies have been completed to describe intervention in these two

settings. Roberts et al. (1995) described communication interactions between preschool cognitively/developmentally impaired children and SLPs in pull-out and classroom based intervention. They found significant differences between SLP and child interactions during classroom-based therapy as compared to pull-out therapy. SLPs took more turns and used more acknowledgements in the pull-out session than in the classroom-based, and children were more compliant to requests made during pull-out intervention. However, the children did not differ significantly in the number of turns, types of turns or language functions. Additionally, Benefiel, Throneburg, Calvert, & Paul (2000) compared speech-language intervention in the classroom with pull-out intervention in the speech room to determine whether there was a difference in SLP behaviors or in the number of productions from the child in either service delivery model. Results indicated that the SLP used significantly more general and specific feedback in the pull-out setting than in the collaborative classroom-based setting. Findings also indicated that the SLP behaviors differed significantly according to the child's disorder, with the SLP providing significantly more elicitations, models, general feedback and specific feedback to children with speech only disorders. Further findings indicated that significantly more individual child's production practice opportunities occurred in the pull-out setting as compared to the collaborative classroom-based intervention.

Currently, only one study has been completed to descriptively compare classroom-based and pull-out speech-language intervention with school-age children and it was conducted at the beginning of the school year within one month of the onset of collaborative services. There is currently no longitudinal information available about SLP treatment behaviors or child production practice opportunities over the course of a

school year. Information such as how SLP treatment behaviors as well as the opportunities for children to practice communication goals vary in classroom-based compared to pull-out treatment is needed. Therefore, the purpose of the present investigation was to compare speech-language intervention in the classroom with pull-out intervention in the speech room longitudinally. Specific research questions were as follows:

1. Throughout the school year, is there a statistically significant difference in the number of productions of communication IEP goals from a child during 40 minutes of intervention:
    a. Provided in the classroom versus the speech room?
    b. Targeting speech IEP goals versus language IEP goals?
2. Throughout the school year, is there a statistically significant difference in SLP behaviors during 40 minutes of intervention:
    a. Provided in the classroom versus the speech room?
    b. Targeting speech IEP goals versus language IEP goals?
3. Does SLP teaching or child production practice opportunities vary in either of the two settings (classroom versus speech room) over time (beginning of the year, midyear, end of the school year)?

CHAPTER III

Methods

Subjects

Subjects were 18 children enrolled in first and second grades at Carl Sandburg Elementary School located in Charleston, Illinois who returned signed permission slips. The principal at the elementary school assigned children to their respective classrooms without regard to the current study. Nine classrooms of students were assigned to either the integrated collaborative condition or the traditional non-integrated condition for the larger study. There were 40 children identified with speech-language deficits in the nine classrooms. For the current study, 18 of the 40 speech-language impaired subjects were chosen to participate using matched pairs. Nine subjects participated in the integrated collaborative condition and nine participated in the traditional condition. The subjects were matched based on type of disorder (speech, language, or both) and severity of their speech or language impairment. Seven of the nine pairs were also matched by grade. In the collaborative condition, four subjects were in first grade and five subjects were in second grade. This group had a mean age of 7:5 years. In the pull-out setting, four subjects were in first grade and five subjects were in second grade. Mean age for this group was 7:0 years. Refer to Appendix A for a table of specific individual characteristics of each subject.

Four subjects in each group were diagnosed with language deficits only. Subjects diagnosed with language deficits scored at least one standard deviation below the mean on a standardized language test that the school SLP had administered in the last six months. Subjects were then given a severity rating based on their standard score. Three

subjects in each group scored between 1 and 1.5 standard deviations below the mean and were labeled with a mild language delay. One subject from each group scored between 1.5 and 2.5 standard deviations below the mean and was labeled with a moderate language delay.

Five children in each group were diagnosed with articulation delays only. These children scored at least one standard deviation below the mean on one standardized articulation assessment. The Goldman Fristoe Test of Articulation (Goldman & Fristoe, 1986) was administered to all subjects diagnosed with articulation delays to determine sounds in error at the beginning of the study. Two subjects in each group with 1 to 2 speech sound errors were classified as having a mild speech delay. Two subjects in each group with 3 to 4 speech errors were classified as moderate, while 1 child in each group with 5 errors or greater was classified as severe.

Table 1 displays the number of subjects in each condition and their characteristics.

Intervention

One speech-language pathologist participated in the study, providing both the collaborative classroom-based and the traditional speech and language pull-out services to nine first and second grade classrooms. As part of a larger project examining service delivery effects on child outcomes, the SLP met with the classroom teachers participating in the study prior to the beginning of the semester. Children with speech and language deficits were assigned to their classrooms at the beginning of the school year by the principal of the school without regard for the present study. Six of the nine classrooms were then randomly assigned to participate in either the pull-out or collaborative

Table 1. Subject Characteristics

Characteristics	Pull-Out Group	Collaborative Group
Mean Age	7:0 years	7:5 years
Total Number of Subjects	9	9
Language Only	4	4
Mild Language	3	3
Moderate Language	1	1
Severe Language	0	0
Speech Only	5	5
Mild Speech	2	2
Moderate Speech	2	2
Severe Speech	1	1

treatment groups. Two classrooms were assigned to the pull-out condition due to other commitments of the teachers. Additionally, one classroom that originally was not going to be included in the study, was later assigned to the collaborative condition in order to make the number of children with IEP goals in each setting more equivalent. In the larger study, curricular as well as speech-language goals were targeted.

Collaborative classroom-based speech-language intervention or the traditional intervention approach was conducted with children participating in the study. Collaborative classroom-based intervention was defined as the SLP and classroom teacher working together to address curricular and speech-language goals within the classroom setting. Traditional non-integrate intervention was defined as the two

professionals working independently with the speech-language pathologist targeting speech-language goals in a pull-out setting and the classroom teacher targeting curricular goals within the classroom.

Collaborative Classroom-Based Intervention

The SLP collaborated with each collaborative classroom teacher individually during regularly scheduled meetings throughout the semester to plan specific details of the classroom intervention and activities that would be implemented during the next week's collaborative classroom-based language arts lesson. The collaboration meetings were scheduled for 30 minutes every week for each of the five classroom teachers (a total planning time of 150 minutes for the SLP). A graduate student was included in the collaborative meetings. A checklist documenting discussion and planning was completed by the graduate student during the weekly collaborative meetings.

Children in the five classes participating in the collaborative intervention received instruction from their respective classroom teacher and the speech-language pathologist using primarily a one-teach/one-drift collaborative approach, with the SLP primarily teaching and the teacher drifting. Instruction occurred during the language arts curricular lesson, which was provided 30 minutes per week during the 2000-2001 school year. At the beginning of the school year a range of 1 to 6 ($\underline{M}$= 3.70) students with IEP goals were in each collaborative classroom. At the end of the school year, after the SLP added students to her caseload, a range of 1 to 9 (M=5.11) students were in each collaborative classroom, with a overall mean of 4.41 students in each collaborative classroom for the entire year. Students with speech-language IEP goals received an additional 10 minutes of classroom-based intervention each week with the speech pathologist and teacher

employing a one-teach/one-drift model in order to fulfill the required minutes per week specified by IEPs. The additional intervention took place during a time scheduled by the SLP and the classroom teacher. The time was chosen during a curricular period which would facilitate speaking (not during math that mainly involved listening). While the teacher taught the curricular lesson, the SLP targeted the child's IEP goals with curricular materials from the lesson.

Traditional Pull-Out Intervention

Intervention was provided in two 20-minute therapy sessions per week. Therapy was either provided individually or in small groups (1-2 children) in a traditional pull-out model of therapy in a separate room away from the classroom environment. Groups ranged from 1 to 2 students with a mean of 1.60 students at the beginning of the school year and a mean of 1.89 students at the end of the school year after the SLP added students to her caseload, with an overall mean of 1.75 students for the entire school year. Intervention used curricular narrative materials, with each lesson typically revolving around a story.

Measures

The frequency that speech-language goals were addressed for each child was tallied through direct observation during 6 weeks of treatment throughout the school year. Two weeks of treatment were observed for each child at the beginning of the school year in mid-October, a second two weeks was observed for each child in the beginning of February, and a final two weeks was observed during the end of April. The observation was completed during 40 minutes of classroom-based intervention (30-minute team-taught collaborative lessons and the 10 minutes of one-teach-one-drift intervention) and

during the 40 minutes (two 20 minute sessions each) of pull-out intervention. Therefore, 4 hours of treatment were observed throughout the year for each child, with a total of 72 hours of observation and measurement of classroom-based and pull-out treatment. The observation was completed by a certified SLP and a graduate student in Communication Disorders and Sciences.

The clinician who provided the intervention in both settings was aware of general purposes of the larger study comparing the effectiveness of classroom-based and pull-out services. She was unaware however, that the number of child practice productions and the behavioral treatment techniques that she used were being counted with specific children during these six weeks. Graduate students and/or the university SLP investigator observed most collaborative classroom-based treatment sessions and many pull-out sessions throughout the year. Therefore the SLP treatment behaviors and children's IEP productions were not likely biased by the presence of the investigators.

Behavioral Therapy Measures

Three techniques commonly used by SLPs in behavioral therapy approaches were counted by a CDS graduate student or certified SLP. These included (a) models, (b) elicitation/production practice, and (c) feedback.

Models

Modeling was defined as explicit instruction about, or demonstration of an IEP target behavior by the SLP, not accompanied by an elicitation of the target response. A model was presented when "the adult produces the model with a clear intention of presenting the child with an example, essentially indicating, here's how it's done" (Nelson, 1993 p. 201). Models of IEP goal targets presented to the whole class or the

individual child were counted as a model for the child with the IEP goal. A model for a student other than the child with the IEP goal was also counted if the student with the IEP goal could hear the model. Additionally, an elicitation from a child other than the child with the IEP goal followed by specific feedback was counted as a model for the student with that IEP goal.

Examples of Models for Speech Goals.

Each emphasized word or explained production was counted as one model. For example, if the target sound was /s/, and the teacher said, "We are going to talk about *s*nakes today. ***S***nakes- what do you know about *s*nakes?" This counted as three models, one for each emphasis of the /s/ sound. If the teacher said the same thing, but then added, "We are going to remember to use our good /s/ sound today," it still only counted as three models. However, if the teacher said, "We are going to remember to use our good sssssssssss sound…," and actually produced the sound that /s/ makes, it was counted as four models.

Examples of Models for Language Goals.

Each example provided by the SLP to explain the target behavior counted as one model. For example, if the SLP said, "If I were to ask you how a shoe and a sock were similar, you could tell me that you wear them both on your feet." This was still counted as one model, even though the explanation lasted for several seconds. Additionally, if the SLP combined several models into one explanation, each model was counted. For example, "If I were to ask you how a shoe and a sock were similar, you could tell me that you wear both of them on your feet. If I asked how a goat and a cat are similar, you could tell me they were both animals. A pear and a banana are similar because they are

both fruit." This explanation would have been counted as three models, because it contains three explicit examples of the target behavior.

Elicitation

Elicitation was defined as a prompt from the SLP for the child with speech or language goals to produce their IEP targeted behavior. For example, the SLP asked the student with an objective to produce /s/ in the initial position of words, to say the word "soap". An example of an elicitation for a language goal would be if the SLP asked the student to identify a similarity after reading two versions of a story. If the SLP elicited a target behavior from the whole class, it was counted as an elicitation for the child with the IEP goal. Elicitation was dependent on the child's response. For example, if the SLP said, "Tom say your /s/ sound. (Pause) Let me hear your /s/. (Pause) Please say your /s/," and the child never answered, it was not counted as an elicitation. If the SLP asked the child to say the sound three times and he/she did finally answer, it was only counted as one elicitation. If the SLP elicited a target behavior from a child, other than the IEP child, and then gave general feedback, the elicitation was not counted for the IEP child.

Feedback

Feedback was defined as a response by the SLP to a child's production of their targeted behavior. Feedback might have followed an elicitation. It might also have occurred after a child's spontaneous production of a target behavior. Feedback was tallied as specific or general. General feedback was tallied when the SLP responded verbally or nonverbally in a nonspecific manner following the child's production of an IEP targeted behavior. Examples include nodding the head, or saying "ok" or "good." Repetition of the child's response by the SLP was also counted as general feedback.

General feedback was counted only when it was given directly to the child with the IEP goal. Specific feedback was tallied when the SLP provided feedback concerning the accuracy of the response, pointing out what the child with the IEP goal did well or incorrectly. For example, a child with an articulation objective might have received accuracy information by the SLP saying, "that was a good /s/ sound." An example for a child with language goals could include the SLP saying, "you answered the similarity question very well, you told me that both stories were about a dog." Specific feedback was only counted if it was given directly to the child with the IEP goal. If specific feedback was given to another individual child or the class as a whole, it was counted as a model for the child with an IEP goal. See Table 2 for a list of behaviors and their definitions.

Child Productions

Child productions were defined as an attempt by the child to produce their targeted behavior. Child productions may have been spontaneous, or as a response to a model, elicitation, general or specific feedback.

Child productions and SLP treatment behaviors of providing models, elicitations, and feedback were tallied by a CDS graduate student or a certified SLP for each child and for each goal during 40 minutes of therapy per week for two weeks. Generally, instances of models, elicitations, and feedback were tallied for the single child to whom it applied. However, when more than one child had the same goal, models, elicitations and feedback directed towards the whole class were tallied for each child. For example, if Joe and Sue both had a goal of /s/ and the SLP or teacher modeled a correct /s/, each received a tally for a model of their /s/ goal.

Table 2. SLP Behavior While Targeting IEP Goals

SLP Behavior	Definitions
Model	SLP models the target behavior with the clear intention of giving the child an example but doesn't elicit target response (e.g., "here's how it's done").
Elicitation	SLP prompts the child with speech-language goals to produce the IEP target behavior; it is dependent on a response from the child (e.g., "here's how it's done, now you do it.").
General feedback	SLP gives feedback about the accuracy of the response but does not specify what the child did correct or incorrect (e.g., head nodding or saying "good).
Specific feedback	SLP gives explicit feedback to the child's correct or incorrect response ("that was a good /s/ sound; you answered the similarity questions very well").

Reliability

SLP behaviors of providing models, elicitations, and feedback and child productions of IEP objectives were tallied by a graduate student or certified SLP for each child during 40 minutes of therapy per week for six weeks over the course of the year. Ten percent of classroom-based and pull-out treatment were simultaneously observed by the two investigators. Interjudge reliability for measuring the occurrence of these SLP treatment behaviors and child productions was calculated by two observers simultaneously measuring 10% of the observations in pull-out or the classroom. The Pearson Product Moment Correlation was 0.93 for SLP treatment behaviors and was 0.91 for child productions.

Descriptive statistics, such as mean, range and standard deviation, were calculated for each measure (model, feedback, elicitation) for the collaborative and pull-out groups. Differences between the groups over time throughout the school year were evaluated using a repeated measures MANOVA.

CHAPTER IV

Results

Children's Production Practice

Children received 40 minutes of speech-language treatment weekly. Two weeks of treatment were observed near the beginning, middle and end of the school year. The mean number of child practice productions on IEP goal behavior was calculated for children with speech disorders or language disorders during 40 minutes of pull-out or collaborative classroom-based intervention. Results are presented in Table 3 and Figure 1.

A 2x2x3 (Treatment Group x Disorder x Time) Repeated Measures ANOVA was performed for child productions. The main effect for the treatment group was significant F (1, 32)=16.80, p<.001. Inspection of Table 3 shows that children in the pull-out group produced significantly more practice productions (Ms=59-93) than children in the classroom-based setting (Ms=28-59). The main effect for disorder was also significant, F(1,32)=50.31, p<.001. Table 3 reveals that the children with speech deficits had significantly more practice productions (Ms=32-139) than children with language disorders (Ms=21-29). Additionally, the main effect for time was also significant, F(2,31)=11.16, p<.001. Less child productions were produced during treatment over time, throughout the school year.

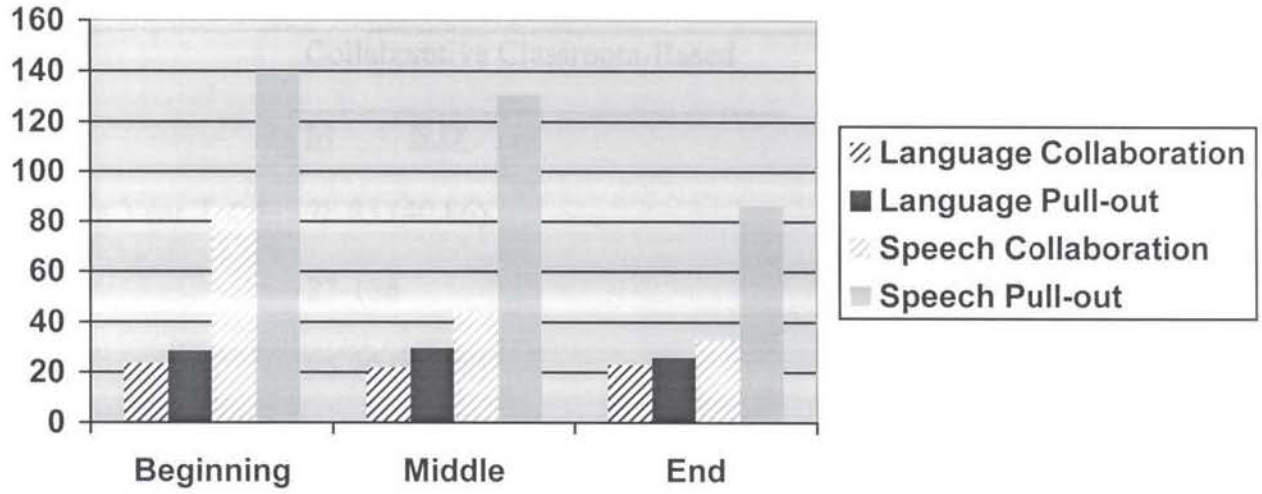
A significant interaction was found between treatment groups and type of disorder, F(1,32)=12.23, p=.001. The children with language disorder's practice productions were more similar in pull-out (Ms=25-29) and the classroom (Ms=21-23), whereas there was a larger difference in the amount of child practice productions for the

Table 3. The mean, standard deviation, and range of child productions per week of pull-out or collaborative classroom-based intervention shown by group for the whole school year.

Disorder	Collaborative Classroom-Based	Traditional Pull-out
	M S.D.	M S.D.
Beginning Year Total	59.85 (42.51)	93.05 (66.07)
	11-185	20-234
Speech	85.10 (42.09)	139.90 (53.81)
	40-185	82-234
Language	23.50 (7.80)	28.50 (6.99)
	11-34	20-39
Middle Year Total	33.61 (15.56)	85.67 (75.57)
	11-65	18-281
Speech	43.10 (12.65)	130.60 (75.41)
	28-65	66-281
Language	21.75 (9.62)	29.50 (8.12)
	11-40	18-39
End Year Total	28.39 (12.04)	59.33 (38.79)
	13-65	14-148
Speech	32.70 (14.82)	86.20 (31.64)
	13-65	57-148
Language	23.00 (3.21)	25.75 (6.88)

19-29	14-34

Figure 1. Children's Production Practice of IEP Target Behaviors at the Beginning, Middle, and End of the School Year.



children with speech disorders in pull-out (Ms=86-139) as compared to the classroom (Ms=32-85). There was also a significant interaction between type of disorder and time, $F(2,31)=9.79$, $p=.001$. Throughout the school year the children with language disorders maintained a similar amount of practice productions. However, the children with speech disorders produced significantly less practice productions over time. The interaction between service delivery group, time and disorder was not significant, $F(2,31)=.84$, $p=.44$.

SLP Treatment Behaviors

The total mean number of SLP behaviors to target children's speech or language IEP objectives during 40 minutes of pull-out or collaborative classroom-based intervention per week were calculated over two week periods near the beginning, middle,

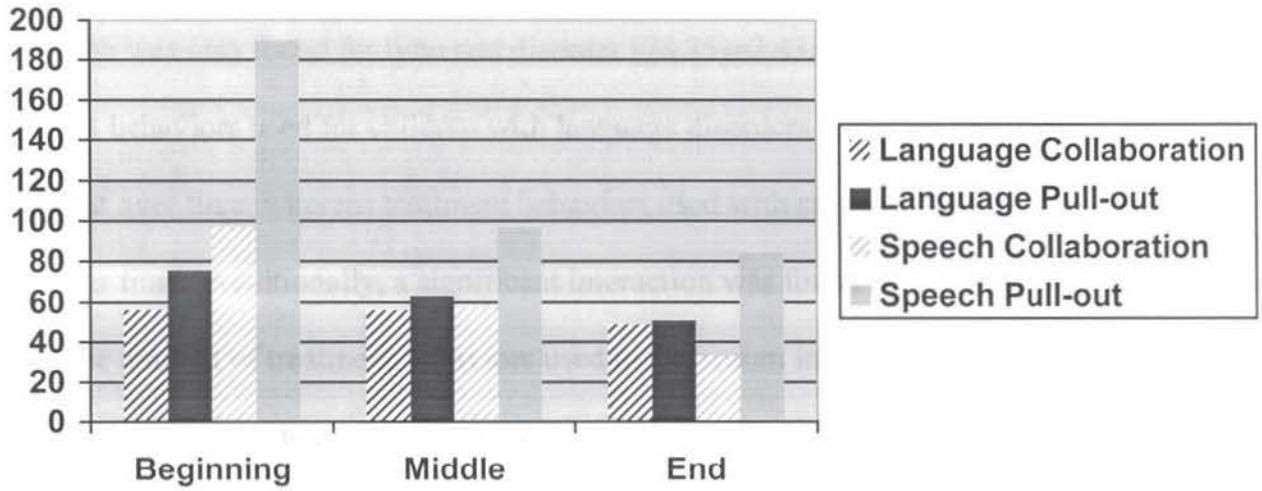
and end of the school year. Total SLP treatment behaviors (sum of models, elicitations, general feedback, and specific feedback) are presented in Table 4 and Figure 2.

Table 4. The mean, standard deviation, and range of SLP behaviors per week of pull-out or collaborative classroom-based intervention shown by group for the whole school year.

Disorder	Collaborative Classroom-Based	Traditional Pull-out
	M S.D.	M S.D.
Beginning Year Total	78.83 (40.86)	139.11 (85.45)
	27-186	48-346
Speech	96.90 (45.78)	189.90 (83.98)
	35-186	72-346
Language	56.25 (17.64)	75.75 (20.21)
	27-84	48-99
Middle Year Total	56.61 (19.75)	81.67 (37.03)
	23-97	36-160
Speech	57.20 (21.24)	96.50 (42.75)
	23-97	36-160
Language	55.88 (19.13)	63.13 (16.50)
	26-80	36-92
End Year Total	39.94 (15.28)	69.28 (27.19)
	12-58	35-144
Speech	32.90 (14.43)	84.10 (27.20)
	12-55	47-144
Language	48.75 (11.82)	50.75 (11.73)

23-58	35-67

Figure 2. SLP Behaviors While Targeting IEP Goal Behaviors at the Beginning, Middle, and End of the School Year.



A 2x2x3 (Treatment group x Disorder x Time) Repeated Measures MANOVA was performed. A significant main effect was found between treatment groups $F(4,29)=11.77$, $p<.001$. The SLP used significantly more treatment behaviors during pull-out intervention (Ms= 69-139), than classroom intervention (Ms=39-83). A significant main effect was also found for disorder, $F(4,29)=11.88$, $p<.001$. The SLP provided significantly more treatment behaviors during intervention with children with speech disorders (Ms=32-189) than during intervention for children with language disorders (Ms=48-75). Additionally, a significantly main effect was found for time, $F(8,25)=9.43$, $p<.001$. The SLP decreased the number of treatment behaviors used over the course of the year.

A significant interaction was found for treatment group and disorder $F(4,29)=13.71$, $p<.001$. The SLP used a similar amount of treatment behaviors for children with language disorders in the classroom (Ms=48-56) and pull-out (Ms=50-75) sessions, whereas she used more treatment behaviors for children with speech disorders in pull-out (Ms=84-189) compared to classroom sessions (Ms=32-96). A significant interaction was also found for time and disorder $F(8,25)=2.43$, $p=.043$. The amount of treatment behaviors used for children with language disorders remained relatively consistent over time, whereas treatment behaviors used with speech disorders decreased more over time. Additionally, a significant interaction was found for treatment group and time. The amount of treatment behaviors used in classroom intervention remained more consistent over time whereas the number of treatment techniques used in pull-out sessions decreased over time, $F(8,25)=3.46$, $p=.008$. The interaction between group x disorder x time was not significant, $F(8,25)=2.05$, $p=.082$.

Data regarding SLP treatment behaviors were calculated separately for the average number of elicitations, models, general and specific feedback provided. Figures 3-6 present the data for elicitations, models, general and specific feedback.

Figure 3. Total mean number of SLP models of IEP objectives per child in 40 minutes of collaborative classroom-based or pull-out treatment near the beginning, middle, and end of the school year.

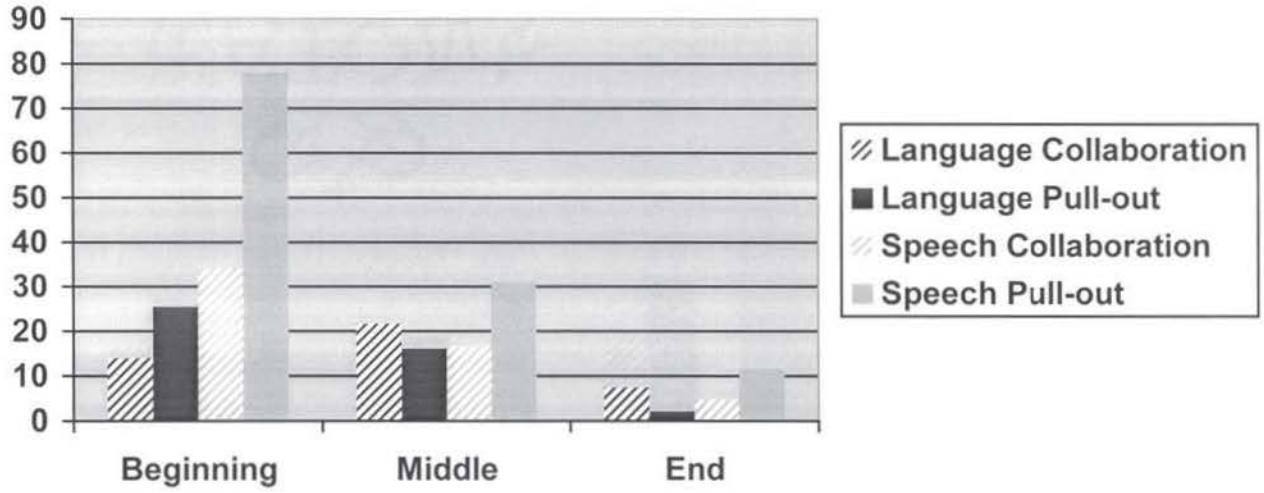


Figure 4. Total mean number of SLP elicitations of IEP objectives per child in 40 minutes of collaborative classroom-based or pull-out treatment near the beginning, middle, and end of the school year.

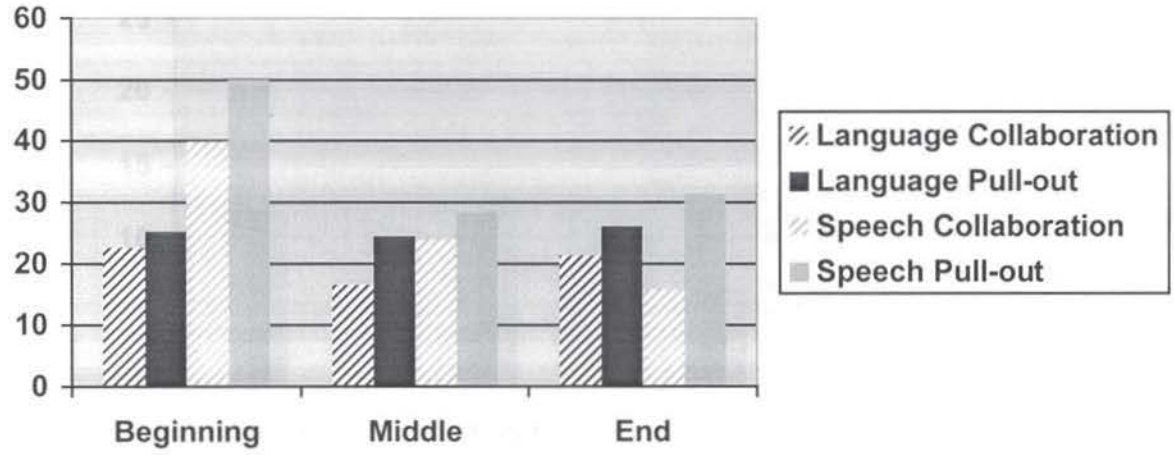


Figure 5. Total mean number of SLP general feedback regarding child IEP productions in 40 minutes of collaborative classroom-based or pull-out treatment near the beginning, middle, and end of the school year.

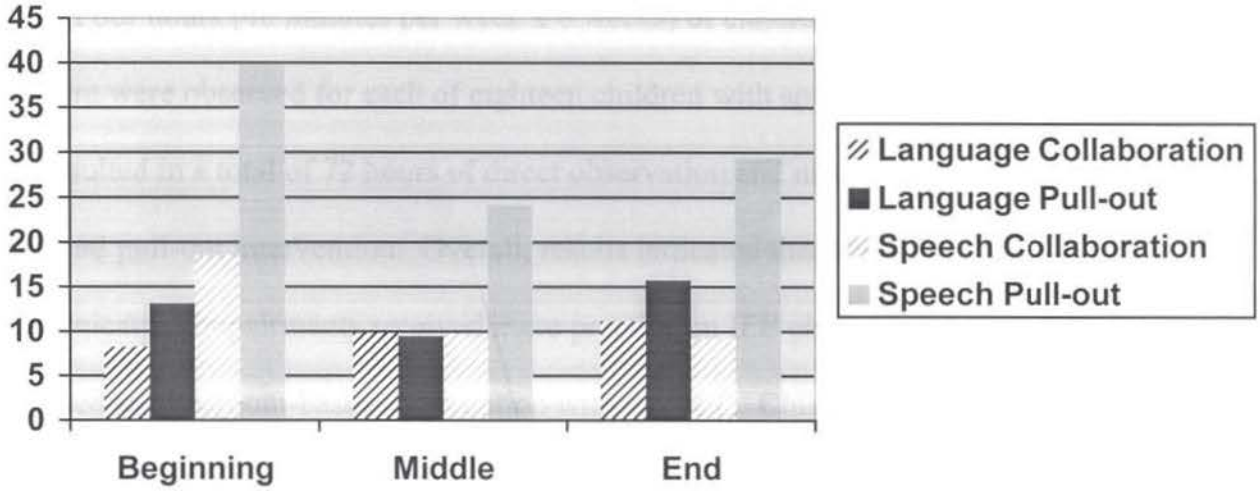
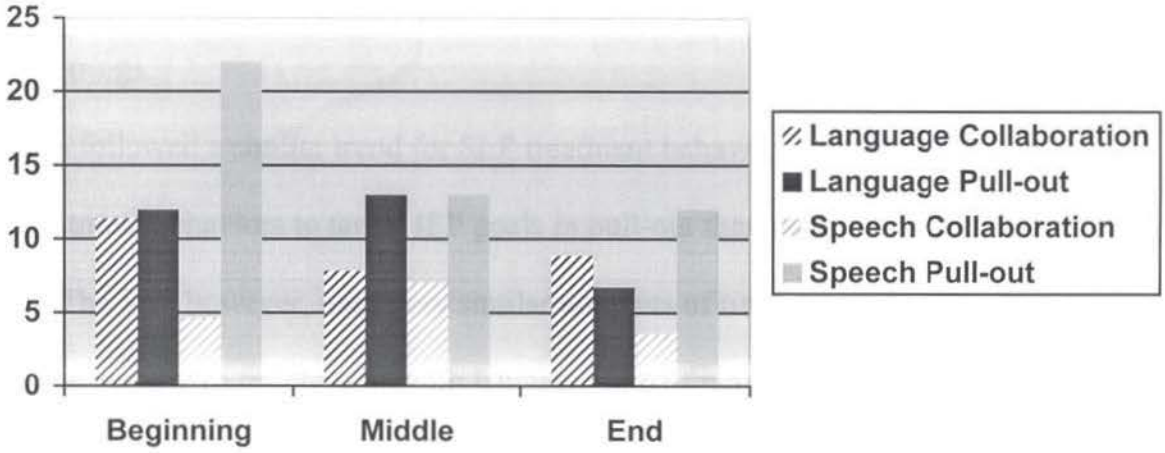


Figure 6. Total mean number of SLP specific feedback regarding child IEP productions in 40 minutes of collaborative classroom-based or pull-out treatment near the beginning, middle, and end of the school year.



CHAPTER V

Discussion

Four hours (40 minutes per week x 6 weeks) of classroom-based or pull-out treatment were observed for each of eighteen children with speech or language disorders. This resulted in a total of 72 hours of direct observation and measurement in classroom-based and pull-out intervention. Overall, results indicated that children with communication impairments received more practice on IEP objectives during pull-out compared to classroom-based intervention with the SLP. Children with language disorders however, received very similar amounts of practice in pull-out and the classroom, while children with articulation disorders produced less than half as many IEP objective productions in the classroom compared to the pull-out setting. Additionally, it was found that throughout the school year, fewer child productions were produced over time in both settings.

Results followed a similar trend for SLP treatment behaviors. Overall, the SLP used more treatment behaviors to target IEP goals in pull-out than classroom-based intervention. The SLP however, used very similar amounts of treatment behaviors in pull-out and the classroom for children with language impairments, while she used significantly fewer treatment behaviors in the classroom compared to the pull-out setting for children with articulation disorders. Once again, it was found that over the course of the school year, the SLP decreased the number of treatment behaviors used. While the amount of treatment behaviors used for children with language disorders remained relatively consistent throughout the year, the treatment behaviors used for children with speech disorders decreased more over time. Additionally, the treatment behaviors used

by the SLP in the classroom remained relatively consistent over time, whereas the number of treatment techniques used in pull-out decreased over time.

The findings of the current study support Roberts et al. (1995) for treatment of children with language disorders. Their study found that children with language impairments took similar numbers of turns in pull-out and classroom-based treatment. The current study found that the children with language disorders produced similar amounts of practice productions on IEP goals in the two settings. The current study, however, adds to the knowledge base by demonstrating the discrepancy in production practice in the two settings for children with articulation disorders. Roberts, Prizant, and McWilliams (1995) found that the SLP did not vary in the percentage of responses, information sharing, behavior requests, or acknowledgements in treatment provided in the classroom or pull-out condition. The current study found that the SLP used a similar amount of treatment behaviors for the language group in pull-out and the classroom. Additionally, results of the current study supported SLP concerns about targeting IEP goals in classroom-based as compared to pull-out treatment, especially for children with speech disorders (Beck & Dennis, 1997; Elksnin & Capiluto, 1994).

The larger amount of production practice by the children, and frequency of the SLP targeting IEP behavior in pull-out as compared to collaborative classroom-based intervention, may be attributed to several factors. The first factor was the number of students with speech-language deficits in the treatment groups for the two settings. Children in the pull-out group were treated in two twenty-minute sessions with 1 to 2 children present. In classroom-based intervention, 30-minutes focused on co-teaching or large group instruction by the SLP. There were 1 to 9 children with speech-language

deficits in each class, as well as approximately 15 to 20 children without speech-language deficits. For ten minutes weekly, the SLP worked with each child on IEP goals individually within the classroom setting. It is possible that the larger number of children who were treated together in the classroom-based intervention contributed to a lower mean number of production practices by individual children in the classroom-based intervention.

A second factor that may have influenced the differences between the collaborative and pull-out conditions was the number and type of goals targeted during intervention. During collaborative classroom-based intervention, the SLP and teacher targeted curricular as well as speech-language skills. During pull-out sessions, only speech-language skills were targeted.

Another important factor to keep in mind when interpreting the results was the differences between the children with speech and language deficits in the two settings. The SLP behaviors for targeting language goals and the child's production of language goals were relatively similar in the two settings. Conversely, the SLP treatment behaviors in targeting speech goals and the children's production practice of speech goals were markedly lower in the classroom as compared to the pull-out condition. The greater amount of treatment behaviors used with children who only had speech deficits may be attributed to the nature of speech therapy. A model and feedback for a speech target sound can be provided easily. In contrast, models and feedback for a language concept may require a more lengthy explanation. Therefore, more speech sound models can be presented in a shorter amount of time.

Clinical Implications

Several authors (Cirren & Penner, 1995) have indicated that a collaborative classroom-based setting provides a less structured environment which might not be conducive for providing the individual assistance that is often necessary for language structure and articulation goals. The current study supported this supposition in that the amount of production practice by the speech impaired group was significantly less in the classroom as compared to the pull-out setting. However, the language impaired only group received comparable amounts of practice in the two settings. If more structured practice is needed for language form or articulation goals, this study indicated that pull-out was the most appropriate setting; whereas, if language content or use goals require less practice but a more functional environment, then classroom-based services may be most appropriate. However, this study is not indicative of learning.

Limitations

The 40 minutes of weekly treatment observed for children in pull-out was probably a very accurate reflection of the total amount of practice received on their communication IEP objectives throughout the week. There are several indications however, that children in the classroom-based treatment received additional practice, feedback, and models from their teacher and peers throughout the week (other than only the 40 minutes per week spent with the SLP).

Two graduate students in Communication Disorders and Sciences interviewed each of the nine first and second grade classroom teachers at the conclusion of the study. All of the teachers were able to list the students in their classroom who received speech-language services with the exception of one pull-out teacher who was unable to recall one

of her students with a communication deficit. The classroom teachers who participated in the nonintegrated pull-out condition incorrectly identified the type of communication disorder (speech, language, or both) for one-third to one-half of the children with communication disorders in their classroom. Four of the five collaborative teachers correctly identified the type of communication disorder for all of the speech-language impaired children in their classroom. The collaborative teacher who had nine children with communication disorders in her classroom correctly identified the type of speech and/or language disorder that seven of the nine children evidenced. Additionally, each of the collaborative teachers were able to discuss the specific speech-language goals/objectives that were being targeted for the children with communication disorders in their classrooms. In contrast, none of the pull-out teachers were able to discuss specific goals/objectives.

All five of the collaborative teachers indicated that they targeted communication deficits in the classroom while only two of the pull-out teachers did. The collaborative teachers reported targeting speech goals an average of once daily for children with articulation deficits in their classrooms, while the pull-out teachers indicated that they either rarely targeted speech/articulation goals in the classroom, or did not target them at all. Two of the collaborative teachers stated that classroom peers called attention to the speech-language students' errors and reminded them to correct their mistake. In comparison, the pull-out teachers reported that peers never called attention to speech-language students' errors in their classrooms.

The investigators frequently observed peer modeling of IEP objectives during the collaborative classroom-based lessons. Peers provided natural models during classroom

activities, often evaluated their own speech-language skills, and gave feedback to children with communication disorders in a helpful manner. Although both the SLP and peers called attention to speech-language productions, the students with communication disorders reacted either neutrally, or in a positive manner. In fact, peers occasionally requested similar attention or made self-referrals for their own error productions.

One limitation of the current study was the lack of total random assignment of the classrooms to either the collaborative classroom-based or traditional nonintegrated pull-out condition. The number of children with communication disorders in each classroom was also unevenly distributed (due to assignment by the school principal) with a range of 1-9 children. Thirty-minutes of the classroom-based intervention consisted of the SLP teaching or co-teaching the whole class while targeting speech-language and curricular goals. Therefore the dissimilar numbers of children with communication disorders in each class may have played a role in the amount of practice an individual child received on their IEP objectives during a single period. (i.e. The students in the classroom with nine children with IEP objectives probably received less practice than the child in the classroom with only one child with IEP objectives).

Another limitation of the current study was the scope. Although the current study provides some valuable initial data concerning targeting speech-language objectives in the classroom or the pull-out setting, it was conducted with one SLP (who has previous collaborative experience), in one school, and with only eighteen children.

Future Research

Future research should expand upon the current study by involving more speech-language pathologists with varying degrees of experience with collaboration, additional

children, and children with a greater range of disorders. Future research should also evaluate the effectiveness of the service delivery models in relationship to children's individualized educational plan goals to determine the best model for serving children in the school setting.

Further studies may also wish to evaluate the role of the teacher and peers in collaborative classroom-based intervention. Researchers might want to evaluate the role of the child, as well as the roles of the SLP and the teacher, and their effects upon the amount of learning that occurs.

Although this study reported clear trends of practice and treatment differences and similarities in the two service delivery models, the current study does not report child learning/IEP progress in the two models. Perhaps less practice in a natural/functional environment would result in greater learning and generalization than more practice in isolated settings. Conversely, increased distractions in classroom-based intervention could interfere with learning, even when similar amounts of practice occur in the two settings. Therefore, the clinical implications of the current study must be interpreted carefully until results are replicated and the children's gains in speech and language skills in the two models are substantiated.

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APPENDIX A

Individual Subject Characteristics

Appendix A. Individual Subject Characteristics.

Subject	Collaboration Or Pull-out	Grade	Age	# in P.O group or # of IEP children in classroom	Speech/ Language	Severity Rating	Test Scores* Or Sounds in Error
11	Collaboration	1	6:8	2	Language	Mild	EOWPVT- 85 ASSET- 75
1	Pull-out	1	7:4	2	Language	Mild	TOLDP3-85 ASSET- 73
12	Collaboration	2	9:0	6	Language	Moderate	LPT- 81 PPVT-77 TOLDP3-62
2	Pull-out	2	7:5	2	Language	Moderate	LPT-77 ASSET-66
17	Collaboration	1	6:7	2	Language	Mild	ASSET-79
7	Pull-out	2	7:2	2	Language	Mild	ASSET-79
19	Collaboration	1	7:2	1	Language	Mild	ROWPVT-85
9	Pull-out	1	7:6	2	Language	Mild	ASSET-82
13	Collaboration	1	6:2	4	Speech	Moderate	/s/, /z/, /r/ G-Fristoe-10%
3	Pull-out	1	7:0	1	Speech	Moderate	/s/, /z/, /r/ G-Fristoe-14%
14	Collaboration	2	8:0	4	Speech	Mild	/s/ G-Fristoe-51%
4	Pull-out	2	7:7	2	Speech	Mild	/r/ G-Fristoe-63%
15	Collaboration	2	7:7	4	Speech	Mild	/r/, /l/ G-Fristoe-20%

5	Pull-out	2	7:0	1	Speech	Mild	/s/, /z/ G-Fristoe-11%
16	Collaboration	2	7:9	4	Speech	Severe	/l/, /s/, /z/, /r/, both /th/ G-Fristoe-1%
6	Pull-out	2	7:8	1	Speech	Severe	/s/, /ch/, /z/, /l/, /sh/, /dz/, both /th/ G-Fristoe-3%
18	Collaborative	2	7:11	6	Speech	Moderate	/th/, /r/, /v/ G-Fristoe-19%
8	Pull-out	1	6:11	2	Speech	Moderate	/th/, /r/, /l/ G-Fristoe-31%

*Expressive One Word Picture Vocabulary Test (EOWPVT) (Gardner, M. F., 1990)
Language Processing Test-Revised (LPT) (Richard, G. J. & Hanner, M. A., 1995)
Peabody Picture Vocabulary Test (PPVT) (Dunn, L. M. & Dunn, L. M. 1997)
Receptive One Word Picture Vocabulary Test (ROWPVT) (Gardner, M. F., 1985)
Assessing Semantic Skills Through Every Day Themes (ASSET) (Barrett, M., Zachman, L., & Huisingh, R., 1988)
Test of Language Development Primary-3 (TOLD-P3) (Newcomer, P.L. & Hammill, D.D., 1997)
Goldman Fristoe Test of Articulation (Goldman, R. & Fristoe, M., 1986)

Appendix B

Participation Authorization Form

9-14-00

Dear Parents,

Mrs. Pam Paul, a speech-language pathologist at your child's school, and your child's teacher are working with two professors from Eastern Illinois University (Rebecca Throneburg and Lynn Calvert) to assess the effectiveness of speech-language services provided in the classroom and in the speech room. There are many reported advantages to each type of service. The purpose of our project is to determine if one is more effective.

Please sign the form below and check whether or not you give permission for your child to participate in the evaluation of speech-language skills at the beginning and end of the school year to evaluate the effectiveness of these lessons.

Graduate students from Eastern Illinois University will assist with the evaluations. The evaluation will include listening to a story, retelling the story, and other brief activities related to your child's speech or language needs. Pam may share information from your child's IEP with the faculty from Eastern. Results and information obtained will be confidential. If you would like information about your child's progress we would be happy to share this with you. Eastern Illinois University faculty may use summary information for groups of children (no individual children will be identified or discussed) for teaching or publications. Please return this letter to your child's teacher by Friday.

Sincerely,

Pam Paul, Speech-Language Pathologist

Lynn Calvert, Associate Professor

Rebecca Throneburg, Assistant Professor

Please check one of the following and return to your child's teacher or the front office.

I give permission for my child to participate in the evaluation and for Eastern faculty to have knowledge of information from my child's IEP.

I do not give permission for my child to participate in the evaluation or for Eastern faculty to have knowledge of information from my child's IEP.

_____
(parent signature)

_____ Teacher/Class_____
(child's name)

(date)