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From 'Training Wheels for Teaching' to 'Cooking in Your Mother-in-Law's Kitchen': Highlights and Challenges of Co-Teaching among Math, Science, and Special Education Teacher Candidates and Mentors in an Urban Teacher Residency Program

Leila Ansari Ricci
Division of Special Education and Counseling
California State University, Los Angeles

Kimberly Persiani
Division of Curriculum and Instruction
California State University, Los Angeles

A.Dee Williams
Division of Curriculum and Instruction
California State University, Los Angeles

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Abstract

Urban teacher residencies (UTRs) have emerged as an innovative alternative to recruiting and preparing high quality teachers for traditionally underserved, urban schools. UTRs offer opportunities for teacher candidates and mentors to use co-teaching models to differentiate instruction, particularly as schools adopt more inclusive practices emphasizing collaboration and co-teaching among educators. Co-teaching in residencies is an area that remains largely unexplored. This study describes experiences of 37 residents and 35 mentors in three cohorts of a yearlong urban residency program as they engaged in co-teaching together in secondary math, science, and special education classrooms. Data included surveys on co-teaching and collaboration from residents and mentors, along with reflections on highlights and challenges of their co-teaching in the residency. Findings indicate that both residents and mentors had positive perceptions about the benefits of co-teaching, engaged in behaviors associated with effective co-teaching at least 1-2 times per week, and shared ideas related to communication and feedback, varied perspectives and shared ideas, benefits for students, logistics of co-teaching, sharing authority, and the motivation to do better.

Keywords: co-teaching, teacher residency, teacher preparation, preservice educators

From 'Training Wheels for Teaching' to 'Cooking in Your Mother-in-Law's Kitchen': Highlights and Challenges of Co-Teaching among Math, Science, and Special Education Teacher Candidates and Mentors in an Urban Teacher Residency Program

Introduction

Although millions of dollars are spent each year to prepare new teachers, schools still lack highly qualified teachers to meet the needs of students in traditionally underserved, high-need urban areas, particularly in math, science, and special education, and they are not retaining sufficient numbers of the teachers they do recruit (National Center for Teacher Residencies, 2014). Furthermore, as schools adopt more inclusive practices with increasing numbers of students with special needs being taught in general education classrooms, there is a need to prepare teacher candidates who are skilled in collaboration and co-teaching (Friend & Cook, 2007; Magiera, Smith, Zigmond & Gebauer, 2005; Snell & Janney, 2000). While there is much to learn about preparing teachers for successful collaboration and co-teaching practices in general (Cramer, Liston, Nevin, & Thousand, 2010), this area remains largely unexplored in regards to those trained in urban teacher residency models. Residency models in which teacher candidates, or residents, complete coursework while simultaneously working in a mentor's classroom, offer opportunity for using co-teaching models in student teaching to differentiate for students with diverse learning needs (Bacharach & Heck, 2011; Bacharach, Heck, & Dahlberg, 2010).

Urban teacher residencies (or UTRs) have recently emerged as an innovative, promising way to address the need for recruiting, preparing, and retaining teachers for high-need urban schools (Guha, Hyler, & Darling-Hammond, 2017; Hammerness, Williamson, & Kosnick, 2016;

Williamson, Apedoe, & Thomas, 2016). UTRs aim to ensure that future generations of teachers are well prepared to help students meet rigorous academic standards and skills for college and career readiness (National Center for Teacher Residencies, 2014). Key principles of UTRs include weaving education theory and classroom practice tightly together in a yearlong residency; focusing on the residents' learning alongside an experienced, trained, and well-compensated mentor; and preparing residents in cohorts to cultivate a professional learning community, foster collaboration, and promote school change (Berry et al., 2008; Berry, Montgomery, & Snyder, 2008). The residency model builds on teacher education through year-long clinical apprenticeships, where residents are immersed in urban schools so that they can fully participate in the practices of those contexts and communities, and thus be better prepared to understand the policies and norms that shape them (Williamson, Apedoe, & Thomas, 2016).

Currently, there is an increased focus on innovative teacher preparation practices that result in improved student performance in grades K-12 (Darling-Hammond et al., 2019). One approach has been to apply the service delivery model of co-teaching (traditionally between in-service general and special education teachers in inclusive classrooms) to the implementation of preservice teacher preparation. Co-teaching between in-service general and special educators can assist students both with and without special needs in general education classrooms (McDuffie, Mastropieri, & Scruggs, 2009). There are several benefits of co-teaching between general and special educators, including opportunities to differentiate instruction and assessments, scaffold learning experiences, and monitor students' understanding.

Co-teaching also promotes equitable learning opportunities and equal access to the curriculum for all students. Some of the important understandings related to K-12 co-teaching include, but are not limited to, recognizing the teaching approach of one's co-teaching partner

(Murawski, 2003), deciding on the readiness of when it is time to implement specific co-teaching strategies, as well as clarifying and understanding the roles, responsibilities, and expectations of co-teaching (Murawski & Dieker, 2004), making time for shared planning (Friend & Cook, 2007), and developing effective communication opportunities, including meaningful dialogue and conflict resolution (Graziano & Navarette, 2012).

Learning to co-teach is a developmental process. When two teachers are in a new co-teaching partnership, the easiest form of co-teaching is *one teach, one assist* (Cook & Friend, 1995). This is especially true for novice teachers who want to start slowly and ease into the co-teaching approach. Planning for implementation of the co-teaching models is a good place to begin in developing as a team. It is important that the two teachers get comfortable with one another's philosophy of education, content knowledge and skills, and pedagogy. Eventually, as the additional co-teaching models are implemented, there can be more of a natural give and take between the two teachers. This takes time, trust and practice. When co-teaching occurs on a regular basis, it becomes more organic and both teachers and their students benefit greatly.

In most instances, the six co-teaching strategies, *one teach/one observe, one teach/one assist, station teaching, parallel teaching, alternative teaching,* and *team teaching* are planned for in advance and often implemented in this order. The first one is self-explanatory and a bit more easily employed while the other five take more carefully conscious planning and execution once trust and teaching experience are established. Some co-teaching approaches require greater commitment to, comfort with, and skill in collaborative planning and role release. It is recommended that the teachers select co-teaching approaches based upon the curriculum demands of a unit or lesson and student learning characteristics, needs, and interests.

When deciding which approach to use in a given lesson, the goal should be to improve the educational outcomes of students through the selected co-teaching strategies. As co-teaching skills and relationships strengthen, co-teachers venture into various combinations of the co-teaching approaches that require more time, coordination, and knowledge of and trust in one another's skills. *Station teaching* includes dividing the instructional content into parts assigned to a workstation then each teacher divides students into small groups who then rotate among those workstations, with each teacher teaching a small group at a station. *Parallel teaching* requires each teacher to simultaneously instruct half the class, often with the same instructional objectives, material, and teaching strategies. *Alternative teaching* allows for differentiation in that one teacher teaches most students in the class, while the other teacher works with a small group of students, often on assessment, pre-teaching, remediation, or enrichment. Finally, *team teaching* allows for both teachers to actively teach the same lesson to the class of students, with an ease of instruction between the two. Teachers work as a team leading the lesson and complementing each other's instruction. From the students' perspective, there is no clearly defined leader as both teachers share the lead instruction, resulting in those 'spontaneous contributions during co-teaching' as described earlier.

Co-teaching can be an enriching experience when planning and communication are in place. Six steps that are helpful when preparing for a co-teaching experience include, but are not limited to: establish rapport, identify teaching styles and use them to create a cohesive classroom, discuss strengths and weaknesses, discuss individualized education plans and regular education goals, formulate a plan of action and act as a unified team and take risks and grow. Given the benefits of co-teaching and the complexities involved in doing it well, preparing preservice teachers to be effective co-teachers ought to be an important component of teacher education

curricula (Graziano & Navarette, 2012). Furthermore, given the teacher shortages in critical need areas such as math, science, and special education, the use of co-teaching between residents and mentors offers an opportunity to implement this innovative approach to meet the needs of varied learners. The present study describes the use of co-teaching between mentors and residents in a year-long, urban teacher residency program.

The Los Angeles Urban Teacher Residency (LAUTR) program at California State University, Los Angeles is a Teacher Quality Partnership (TQP) funded urban teacher residency program, in partnership with the Center for Collaborative Education (CCE), Families In Schools (FIS), WestEd, and four urban public school districts—Los Angeles Unified School District (LAUSD), Alhambra Unified School District (AUSD), Montebello Unified School District (MUSD), and Pasadena Unified School District (PUSD). As a two-time TQP awardee, the LAUTR program trains future high school teachers in math, science, and special education, along with a master's degree in integrated STEM teaching, and has thus far graduated seven cohorts of credentialed teachers. Built on the key principles of urban teacher residencies, the LAUTR program pairs residents for an entire school year with experienced mentor teachers who assist them in integrating theory learned in university coursework with practical applications in the classroom. Residents and mentors attend an initial, weeklong orientation to the residency program, during which they are introduced to models of co-teaching and their importance in facilitating differentiation for students with diverse learning needs. After the initial summer training, residents are placed in their mentors' secondary math, science, and special education classrooms for a full academic year, in which they engage in co-planning time with mentors, co-instruct using various co-teaching models, and co-assess students. See Table 1 for a description of the co-teaching models used in the program.

Table 1

Models of Co-teaching Used in the Urban Teacher Residency Program

Co-Teaching Model	Teachers' Roles within the Model
One teach, one observe	One teacher leads instruction, while the other teacher gathers specific data on particular students or other aspects of instruction (such as collecting behavioral data or noting how many students understand given instruction).
One teach, one assist	One teacher leads instruction, while the other teacher provides substantial support (such as monitoring/responding to behaviors, checking and assisting students with classwork, or acting as the "voice" for students who may not understand or are having difficulties with assigned tasks).
Station teaching	After dividing the instructional content into parts assigned to a workstation, educators divide students into small groups who then rotate among those workstations, with each teacher teaching a small group at a station. Students spend a designated amount of time at each teacher-led station before rotating to the next station. This model often includes an independent station and/or a station led by a paraprofessional.
Parallel teaching	Each teacher simultaneously instructs half the class, often with the same instructional objectives, material, and teaching strategies. This model reduces the teacher to student ratio when delivering instructional content.
Alternative teaching	One teacher teaches most students in the class, while the other teacher works with a small group of students, often on assessment, pre-teaching, remediation, or enrichment. This approach also allows for different approaches to teaching the same content.
Team Teaching	Both teachers are actively teaching the same lesson to the class of students, with a seamless flow of instruction between the two. Teachers work as a team leading the lesson and complementing each other's instruction. From the students' perspective, there is no clearly defined leader – as both teachers share the lead instruction.

Adapted from Bacharach & Heck (2011) and Murawski (2010).

Given the emphasis on using co-teaching models within an apprenticeship in the LAUTR single subject and special education residency pathways, this study explored the perceptions and experiences of residents and mentors in relation to their collaboration and co-teaching at the end of the residency year. Specifically, the study examined whether there were differences in the experience of co-teaching between residents and their mentors, and what benefits and challenges of co-teaching were encountered during the year-long residency program. This descriptive research study followed all procedures pertaining to human subjects and was approved by the Institutional Review Board (IRB) of California State University, Los Angeles.

Method

Participants

Participants in this study were 37 residents and 35 mentors in the math, science, and special education residency pathways across cohorts 5, 6, and 7 in 2014-2017. There were 25 residents in the single subject teacher preparation route, and 12 residents in the special education route. The mentors consisted of 24 single subject mentors and 11 special education mentors. The residents consisted of 19 females and 18 males, and mentors were 28 females, and 7 males. The cohorts consisted of 30% Caucasian, 43% Hispanic, 25% Asian American, 7% African American, and 7% multi-racial residents. The mean age for residents was 32 years.

Measures

Survey on co-teaching (Murawski, 2010). At the end of the residency year, both residents and mentors completed a survey on their beliefs about co-teaching. This survey consists of four Likert-style questions on a 5-point scale (with 1 being strongly agree and 5 being strongly

disagree). The items were the following: 1) I benefited from this co-teaching arrangement, 2) My mentor/resident benefited from this co-teaching arrangement, 3) Students with special needs benefited from this co-teaching arrangement, and 4) Students without special needs benefited from this co-teaching arrangement. The survey also contains open-ended questions that asked participants to share the strengths and weaknesses of their co-planning, co-instructing, and co-assessing, respectively.

Are We Really Co-Teachers? Scale (Villa, Thousand, & Nevin, 2004*).* At the end of the residency year, the residents and mentors completed the Are we really co-teachers? Scale, in which they rated how often they performed various behaviors associated with successful co-teaching. This survey consists of 34 items on a 5-point Likert scale, with 1 being less than once a week and 5 being daily. Items on this survey include the following: we share responsibility for deciding what to teach; we share responsibility for differentiating instruction; we have regularly scheduled times to meet and discuss our work; and we can use a variety of co-teaching approaches. A complete listing of survey items is provided in the results section of this study.

Reflections on co-teaching. At the end of the residency, both residents and mentors were asked to respond to several open-ended questions related to their experience in co-teaching together. In written responses, they described the rewarding and challenging aspects of co-teaching in the residency, along with their likelihood to co-teach in the future and their thoughts on their co-teaching in general (for example, what they would like to keep or change about their experience).

Collaboration Self-Assessment Tool (CSAT; Ofstedal & Dahlberg, 2009). The residents and mentors also completed this survey on their collaboration skills both at the beginning and end of their residency year together. The CSAT requires residents and mentors to rate themselves on the following skills important for effective collaboration: contribution, motivation/participation, quality of work, time management, team support, preparedness, problem solving, impact on team dynamics, interactions with others, role flexibility, and reflection. For each item, scores range from 1 to 4 (with 1= low, unable to demonstrate the skill to 4 = high, consistently demonstrate the skill), and the items are added together to yield a total collaboration score. The CSAT total scores in the 10-25 range indicate emerging collaboration skills, total scores in the 26-34 range indicate developing collaboration skills, and total scores in the 35-44 range indicate established collaboration skills.

Procedures

This mixed method study used both quantitative and qualitative research methodology. Quantitative data was analyzed using SPSS, a software commonly for analyzing data and conducting statistical tests. Descriptive statistics using frequency counts and percentages of responses, as well as independent and paired samples t-tests were examined to determine the trends in the data. Qualitative data was analyzed using grounded theory as described by Creswell (2013) and procedures for conducting credible qualitative research as recommended by Brantlinger, Jimenez, Klingner, Pugach, and Richardson (2005).

Data triangulation (use of multiple data sources). Researchers collected data from several sources: open-ended and quantitative responses from both residents and mentors on the

Murawski survey, open-ended responses from both residents and mentors on the co-teaching reflections, along with quantitative data from two other surveys. The data was analyzed, generating and comparing themes that emerged in these multiple data sources, noting the overlap of themes across measures and between both residents and their mentors. Use of several sources of data thus contributed to the credibility of findings.

Researcher triangulation (interrater reliability and coding validity). Two authors of this article, full-time faculty members in their university's special education and general education teacher preparation programs, separately served as coders of the data, and together reached agreement on coding outcomes. The authors coded the data using the grounded theory approach (Creswell, 2013; Glaser & Strauss, 1967). To ensure the validity of this study, the two researchers engaged in procedures recommended for the sound analysis of qualitative data (Brantlinger et al., 2005). The two authors met during the process of data coding to discuss and debrief in order to enhance the credibility of the qualitative coding. The system of codes and determination of themes were finalized based on these discussions.

Open codes. First, the participants' responses to the open-ended questions were coded using initial open codes. Every sentence that contained a complete thought was given a code. Many of the codes were based on the key words that represented the main idea of the participants' responses. The two authors independently came up with 36 codes, as they separately coded 100% of the data. They reached 84% agreement in their initial codes.

Central themes. During the next step of data analysis, each of the two authors analyzed the codes for emerging themes. The two authors independently came up with central themes, as they separately coded 100% of the data. They reached 74% agreement on their initial themes. After discussion and consensus, the initial open codes and themes were collapsed into six central themes. The two authors then independently coded 30% of the participant responses for these six central themes, initially reaching 76% agreement. After debriefing ratings for each participant together and resolving any differences, they came to 100% consensus on the coding for the third of the participants. One of the authors then coded the remaining participants for the central themes. As part of coding the comments and determining these emerging themes, the researchers also tabulated the yes/no responses of each of the participants related to the question of whether they would engage in co-teaching in the future after their experience in the residency.

Results

Survey on co-teaching

Independent samples t-tests of items on the survey on co-teaching (Murawski, 2010) showed no significant differences between residents and mentors, indicating that their perceptions of the benefits of co-teaching during the residency year were similar. Residents and mentors both agreed that they and their students with and without disabilities all benefited from their co-teaching experience. See Table 2 for mean scores of residents and mentors on the survey on co-teaching.

Table 2

Mean Scores of Residents and Mentors on Murawski Survey

Item	Residents Mean (SD)	Mentors Mean (SD)
I benefited from this co-teaching arrangement.	1.65 (1.03)	1.66 (.68)
My resident/mentor benefited from this co-teaching arrangement.	1.73 (1.05)	1.50 (.66)
Students with special needs benefited from this co-teaching arrangement.	2.03 (1.04)	1.66 (.68)
Students without special needs benefited from this co-teaching arrangement.	1.84 (.90)	1.71 (.71)

Six key themes emerged from the responses of both residents and mentors on the Murawski survey questions about the strengths and weaknesses of co-planning, co-instructing, and co-assessing during the year of residency. These themes are: logistics of co-teaching (mentioned by 81% of residents and 73% of mentors); varied perspectives and shared ideas (mentioned by 49% of residents and 46% of mentors); communication and feedback (mentioned by 38% of residents and 54% of mentors); sharing authority (54% of residents and 41% of mentors); benefits for students (49% of residents and 24% of mentors); and motivation to do better (3% of residents and 3% of mentors). Examples of responses related to each of these themes from the Murawski survey are provided in Table 3.

Table 3

Examples of Comments on Murawski Survey for Each of the Key Themes

Themes	Examples of Participants' Responses
Logistics of co-teaching	*Residents* • Limited co-planning time and materials; having uninterrupted meeting time with mentor • Not enough time spent on assessing student learning TOGETHER • The fixation of the classroom furniture really hindered our choices and methods for co-teaching as stationed and parallel teaching were not available • implementing <u>various</u> models of co-teaching *Mentors* • Finding a time and space to co-assess in a systematic way • Fully implementing the different models of co-teaching • Carving out time to plan and create rubrics • A few students had hard time getting used to co-teaching model
Varied perspectives and shared ideas	*Residents* • Bouncing ideas off each other • Bringing different perspectives to the classroom; combining our ideas and techniques • We were each able to use our own expertise when co-assessing. We knew things the other didn't and used this advantageously • our ability to bring in different sets of knowledge that help provide students with relevant examples and stories that make learning fun and relevant *Mentors* • Sharing ideas and teaching techniques and protocols with one another • We brought different perspectives to assessing, my experience and repertoire of testing materials, my resident with knowledge of new digital technology • We each brought a different view to the lesson. I had the experience to foresee possible setbacks and he had a fresh new view and new ideas to add to the lessons • Two heads are better than one. We both offered different perspectives, mine from experience, my resident's from her current classes and fresh ideas
Communication and feedback	*Residents* • Strong communication in formulating formative and summative assessments • We had very good lines of communication • We consistently debrief with one another

	• I would like to keep the mutual trust, respect, understanding, and open communication that my mentor teacher and I had this year *Mentors* • Setting up and maintaining clear communication • There were miscommunications few times where it could have been prevented • We were on the same page in terms of what we expected the students to learn or grasp from each lesson • Open communication; we took feedback in a positive way
Sharing authority	*Residents* • Division of workload • We were able to divide the planning to lighten the load for everyone • One person undermining the other (mentor gave opposite directions and wrong information) • One person wanting things to happen a certain way, having that be the dominant opinion *Mentors* • We adapted a rhythm of one of us was the lead teacher and the second teacher was at the ready for managing group activities • Effectively role switching • Sharing the workload equally • Having an equal presence in the classroom, dividing up parts of the lesson well
Benefits for students	*Residents* • We were able to find students' strengths and needs and support them • Differentiating questions to meet the needs of individual students • Trying to include technology to support all learners • Developing more hands-on activities for the students *Mentors* • Having ability to pinpoint students at risk. We assisted many students one-on-one to pass our class • We struggled with differentiating some lessons for our EL students in particular • Giving students timely feedback on formative assessments • Developing activities that added to the students' knowledge and to deepen their understanding of the concepts
Motivation to do better	*Residents* • I would like to continue to take risks and feel supported by those with more experience

- I welcome constructive feedback and suggestions on how to improve my practice. My mentor has been great at providing this

Mentors
- I wish I could have had more time with her to show her blended learning techniques, or the integration of technology in the classroom in general
- I would like to invite other teachers and administrator to obtain feedback about our co-teaching

Are We Really Co-Teachers? Scale (Villa, Thousand, & Nevin, 2004).

Results of this survey indicated that residents and mentors engaged in most of these behaviors associated with successful co-teaching an average of three times per week. On average, none of the co-teaching behaviors were reported to occur less than once or twice a week by either the residents or the mentors. The five most frequent co-teaching behaviors engaged in by residents and their mentors were the following: 1) We share ideas, information and materials, 2) We are flexible and make changes as needed during a lesson, 3) We are each viewed by our students as their teacher, 4) We communicate freely our concerns, and 5) We identify student strengths and needs. Of these most frequent co-teaching behaviors, the top three were reported as occurring an average of more than four times per week by both residents and mentors, with the last two behaviors occurring more than three times per week according to residents and more than four times per week by mentors. Conversely, the co-teaching behaviors that occurred least frequently between residents and mentors during the residency year were the following: 1) We teach different groups of students at the same time; 2) We are mentors to others who want to co-teach; 3) We explain the benefits of co-teaching to the students and their families, 4) We communicate our need for logistical support and resources to our administrators, and 5) We include other people when their expertise or experience is needed. Residents and mentors on average reported these co-teaching behaviors as occurring one to two times per week.

There were significant differences reported by residents versus mentors on the frequency of some of the behaviors associated with successful co-teaching on this survey. On these seven items in which they differed, the mentors rated the frequency on average as higher than the residents did. See Table 4 for the items on which residents and mentors differed in their reporting of frequency of co-teaching behaviors.

Table 4

Frequency of Behaviors Associated with Successful Co-teaching

Item	Resident Mean (SD)	Mentor Mean (SD)	*t*	*p* <
We are aware of what one another is doing even when we are not directly in one another's presence.	3.65 (1.34)	4.24 (1.03)	-2.061	.05
We are flexible and make changes as needed during a lesson.	4.05 (1.18)	4.61 (.79)	-2.276	.05
We identify student strengths and needs.	3.76 (1.14)	4.33 (.82)	-2.406	.05
We can show that students are learning when we co-teach.	3.14 (1.34)	3.82 (1.21)	-2.230	.05
We give feedback to one another on what goes on in the classroom.	3.95 (1.31)	4.53 (.80)	-2.268	.05
We communicate freely our concerns.	3.84 (1.57)	4.55 (.94)	-2.314	.05
We have regularly scheduled times to meet and discuss our work.	3.08 (1.42)	3.85 (1.28)	-2.364	.05

Reflections on co-teaching.

In responding to open-ended questions about the rewarding and challenging aspects of co-teaching together in the urban teacher residency, the same six key themes emerged for both residents and mentors in this study, with roughly similar percentages as in the Murawski survey. On their co-teaching reflections, residents and mentors discussed the six key themes with the following frequency: *logistics of co-teaching* (76% of residents and 38% of mentors); v*aried perspectives and shared ideas* (41% of residents and 52% of mentors); *communication and feedback* (43% of residents and 38% of mentors); *sharing authority* (5% of residents and 33% of mentors); *benefits for students* (14% of residents and 38% of mentors); and *motivation to do better* (3% of residents and 33% of mentors). See table 5 for examples of comments related to each of these themes from the co-teaching reflections of residents and mentors.

Table 5

Examples of Comments on Co-teaching Reflections for Each of the Key Themes

Themes	Examples of Participants' Responses
Logistics of co-teaching	*Residents* • Lack of knowledge of what a co-teaching team looks like in real life • Co-teaching with a mentor teacher is like cooking in your mother-in-law's kitchen • Not enough time to co-plan • The students were not used to co-teaching arrangement that it was very hard to engage them into small groups • I would like to have used 'team teach', 'station teach', and 'parallel teach' way more often than I did • Creating the space to do alternative teaching or parallel teaching without speaking over each other; agreeing on specific approaches to co-teaching for some lessons. *Mentors* • Organization, having enough time to set aside to meet one on one • Taking the time to plan long term lessons and units were a challenge

	• Not being able to change things at the specific times and having to wait for debriefs • Time had to be carved out to brainstorm and plan for the co-teaching. Also, both teachers had to be in the right mode to brainstorm and be creative. If one teacher was off their game, it slowed the process down and added little to the design of the lesson • It's like training wheels for teaching
Varied perspectives and shared ideas	*Residents* • The ability to reflect and bounce ideas with another individual who is experienced in the field of teaching • Having someone to share experiences with and who could provide advice and suggestions • Different philosophical approaches to teaching and assessing learning • Some resistance in incorporating new techniques/approaches within the classroom *Mentors* • The creative new ideas brought to the table were refreshing • Resident brought in fresh, new, ideas and strategies, which hooked in the students and kept them engaged. Mentor provided strategies on how to assist in classroom management and insight on how to teach a certain concept. It was a great working partnership • It was fun to have another adult in the room to bounce ideas off of • It is so nice to have another point of view and to have two people working together
Communication and feedback	*Residents* • Having someone to consult with, particularly in receiving feedback; Also, having support, both academic and emotional support. • Receiving a continuous level of feedback from mentor to help enhance teaching skills. • Learning the trade/profession from an experienced veteran who was able to provide feedback at all times. • Being able to receive and offer immediate feedback *Mentors* • Having a soundboard for ideas and open communication • having very meaningful conversations about education, curriculum, student engagement, and achievement • It was difficult to give feedback on certain aspects of teaching including mannerisms and presence in the classroom • Dealing with conflict was difficult for me

Sharing authority	*Residents* • Taking over teacher's day-to-day duties and experiences • Feeling like an extra burden to my mentor teacher. Not feeling like a "teacher" at first • Imbalance of power between mentor and resident • It was challenging to teach in someone else's classroom that has a particular set-up and vibe…physical set-up and routines *Mentors* • Getting used to sharing authority at the beginning of the school year was really different for me. This was the first time I had to do that • The most challenging aspects were relinquishing classroom and curriculum control; giving up my class • Letting go; observing without interfering • Making sure that quality of the lesson stays the same no matter who is teaching
Benefits for students	*Residents* • Co-teaching helped to provide effective lessons that were adapted to our students' strengths and challenges • Great way to give the students more individual attention with the instructors and allows for more oversight during group activities • we were able to focus on the strengths of individuals and allow that individual to use their strengths • Meeting the needs of students with special needs *Mentors* • Co-teaching provided more opportunities to provide one-to-one learning and for small group • Extra support for students' styles • My students really enjoyed the diversity in teaching • With two teachers in a classroom, students definitely have a greater chance of bonding with an adult in the classroom
Motivation to do better	*Residents* • Provides me with a personal growth and reflection on my teaching methods • I am glad I have trained in co-teaching as I feel this is the future of education. I look forward to bringing my knowledge to my school in the fall • I'm looking forward to the potential of collaborating with special ed co-teachers in the future to further meet the needs of students with disabilities

Mentors
- Every year that I mentor a resident, 1) I learn something new and learn more about myself
- I really enjoyed reflecting on teaching as I watched my resident wrestle with certain high-level teaching skills like questioning. Being a mentor teacher is outstanding personal development
- I really was mindful of my teaching practice and able to improve it because of that
- The ability to reflect on my own personal teaching style

There were some differences in the frequency of these themes between the Murawski survey and the co-teaching reflections. For the residents in this study, there were differences in the theme of benefits for students and shared authority: these two themes were less prominent for residents when discussing the rewards and challenges of co-teaching, as opposed to strengths and weaknesses of their co-planning, co-instructing, and co-assessing with their mentors. For the mentors, the two themes with the most difference between the Murawski survey and the co-teaching reflections were logistics of co-teaching and motivation to do better. The mentors discussed more about logistics of co-teaching when discussing the strengths and weaknesses of co-planning, co-instructing, and co-teaching; however, in reflecting on the rewards and challenges of co-teaching, mentors discussed more about their motivation to do better as a result of their experience co-teaching with their resident in their classrooms.

On their co-teaching reflections, in response to whether they would co-teach again after the residency year, 92% of the residents said yes, while 76% of the mentors stated that they would like to co-teach in the future. In looking at single subject versus special education credential residents, both of these groups averaged 92% in wanting to co-teach in the future. Of the mentors, 80% of the special education mentors stated that they would co-teach in the future, as compared to 75% of single subject mentors.

Residents' and mentors' evaluation of their own collaboration skills

The average total scores for both residents and mentors from the beginning and the end of the residency year indicated that they consider their collaboration skills to be in the established range. Although the mean total CSAT scores for both residents and mentors showed an increase from the beginning to the end of the year, paired samples t-tests showed that only the mentors believed they had made significant improvement in their collaboration skills during the residency experience (Pre-CSAT score for residents X = 36.32 (3.72); post-CSAT score for residents X = 37.24 (2.74), ns; Pre-CSAT score for mentors X = 37.42 (3.44); post-CSAT score for mentors X = 39.05, $p < .05$). The item on which mentors reported the most improvement from the beginning to the end of the school year was flexibility (Pre X = 3.40 (.60), Post X = 3.60 (.47), $p < .05$). For residents, two items on the CSAT were significantly different from the beginning to the end of the residency year. On average, residents reported that their collaboration skill of contribution increased significantly during the residency year (Pre X = 3.31 (.68), Post X = 3.62 (.50), $p < .05$), while their mean on their collaboration skill of interactions with others decreased from the beginning to the end of their residency (Pre X = 3.81 (.49), Post X = 3.54 (.51), $p < .05$).

Discussion

The purpose of this study was to examine the perceptions of residents and mentors related to their collaboration and co-teaching at the end of an urban teacher residency program. Given the emphasis on co-teaching models within the LAUTR single subject and special education pathways, this study aimed to explore the experiences of the 37 residents and 35 mentors across three cohorts. Findings showed that both residents and mentors were similar in their perceptions of the benefits of co-teaching; both groups agreed that their co-teaching arrangement benefited

them, their mentor/resident, students with special needs, and students without special needs in their classrooms.

Although both residents and mentors reported their collaboration skills as being in the established range at the beginning of the residency, the mentors improved in their overall collaboration skills from the beginning to the end of year, as opposed to residents who scored themselves the same at both time points. This finding shows that while UTRs are focused on developing the skills of preservice educators, the mentors within residency programs can also benefit from this experience. In this study, the mentors reported that they improved in their overall collaboration skills, with flexibility as the area showing the most improvement. Having an eager preservice teacher in the classroom to guide throughout the year, while also maintaining all other obligations as teacher of record, can call upon these mentors to exercise their collaboration skills in more extensive ways. Interestingly, while residents' overall collaboration scores did not change, they did report an increase in their skills in the area of contribution, while reporting a decrease in their interactions with others. Residents make significant contributions to the classroom above and beyond what a solo teacher could do. Their presence in the mentors' classrooms for the duration of the academic year lowers the student-to-teacher ratio and allows for the use of various models of co-teaching. Being in a real classroom with intensive practical application of teaching skills can also teach residents that interacting with others is much more nuanced than they initially thought. In these placements, residents get first-hand knowledge about the realities of daily collaboration and co-planning at school sites.

The same six themes emerged for both residents and mentors when discussing the strengths/weaknesses and the rewards and challenges of their co-teaching: communication and feedback, varied perspectives and shared ideas, benefits for students, logistics of co-teaching,

sharing authority, and motivation to do better. These six themes emerging from residents and mentors from their year-long experiences are aligned with previous studies on co-teaching (Cook & Friend 1995; Goodwin, Roegman, & Reagan, 2016; Grillo, Moorehead, & Bedesem 2011; Hamilton-Jones & Vail 2014; Murawski & Dieker 2004; Trent et al., 2003).

Furthermore, both residents and mentors reported engaging in behaviors associated with effective co-teaching at least 1-2 times per week, with most behaviors occurring on average three times or more per week. It is highly encouraging that the behaviors residents and mentors reporting engaging most often included sharing ideas, information, and materials; communicating their concerns freely; identifying student strengths and needs; and each being viewed by their students as their teacher. Research shows the importance of both adults being viewed as teachers by students, open communication, and sharing of information during co-planning to differentiate for student's diverse learning needs in leading to more successful co-teaching (Murawski, 2010).

However, the behaviors least often engaged in by the residents and mentors included teaching different groups of students at the same time, being mentors to others who want to co-teach, explaining the benefits of co-teaching to students and their families, and communicating the need for logistical support and resources to their administrators. It seems reasonable that residents and mentors engaged in co-teaching during a residency apprenticeship may not yet be ready to serve as mentors to others who want to co-teach together. However, the researchers would hope that residents and mentors feel more comfortable in communicating their logistical needs to their administrators, and the benefits of their co-teaching to their students and parents. More support in these areas is needed during teacher preparation and mentor training to empower

both residents and mentors to seek resources, mentor others, and explain the benefits of their co-teaching.

The limitations of this study should be considered. First, the small sample size of this study may limit its generalizability. The cohort sizes in a residency with the intensity and rigor of LAUTR somewhat limited the number of teacher candidates enrolled in this program, thus reducing the number of participants in this study. The data from this study was also self-reported by residents and mentors in various surveys. Observational data could have strengthened this study's findings. However, the collection of data across three cohorts in three years, along with the triangulation of quantitative and qualitative data across multiple data sources, lend credibility to this study's findings.

Despite these limitations, this study is nevertheless one of few exploring the perceptions of residents and mentors engaging in co-teaching in a single subject and special education UTR, indicating that co-teaching between mentors and residents benefits students with and without disabilities as well as enriches the professional development of both in-service and preservice teachers. In highlighting this promising model of teacher preparation, this study provides insights into how future generations of educators can be better developed to fill the national shortage and be skilled at collaboration in this age of inclusivity and education for all students.

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