

## **Research Article**

# **How Professional Development in Co-Teaching Impacts Self-Efficacy Among Rural High School Teachers**

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*The purpose of this study is to examine the impact of professional development in co-teaching on teacher self-efficacy amongst general and special education rural high school teachers. A causal-comparative research design was used to survey 256 rural high school teachers from the South and Midwest regions of the U.S. to measure their self-efficacy in student engagement, instructional practices, and classroom management. One-way analysis and independent samples t-test were used to analyze these data using SPSS statistical software. The results indicated a significant difference between teachers with and without experience in a co-taught classroom regarding their efficacy in using instructional practices. Furthermore, ANOVA results indicated a significant difference in the number of hours of professional development a teacher received in co-teaching as it relates to their efficacy in student engagement, instructional practices, and classroom management. Further discussion and recommendations are also included.*

In the last 20 years, researchers have identified a trend towards more students with disabilities receiving instruction in the general education classroom versus the resource classroom (Boudah et al., 2008; Friend, 2008; Shaffer & Thomas-Brown, 2015). Additionally, federal mandates such as the least restrictive environment (LRE) requirement of the Individuals with Disabilities Education Improvement Act (IDEIA) of 2004, require students with disabilities to be taught by qualified teachers in their LRE. This mandate has been a primary driving force for including students with special needs in the general education classroom (U.S. Department of Education, 2020). Many schools have implemented co-teaching as a way to meet the needs of diverse learners. Co-teaching is a collaborative effort between a general education teacher and a special education teacher in a shared classroom space (Friend, 2008).

As the need for inclusion has grown, so has co-teaching. Collaboration, in the form of co-teaching, is considered the best practice for inclusion (Friend, 2008). Several studies have explored the attitudes of general and special education teachers and found that teachers generally possess positive attitudes towards co-teaching; however, they note many challenges in implementation (Mainzer & Mainzer, 2008; Scruggs et al., 2007). These included reports of teachers not receiving sufficient training on how to successfully co-teach in an inclusive classroom (Hang & Rabren, 2009; Scruggs et al., 2007).

There is a vast amount of research that focuses on the practices and implementation of co-teaching,

but little research has been conducted on the self-efficacy of the teachers that participate in co-teaching relationships (Hang & Rabren, 2009; Shoulders & Krei, 2016). Additionally, current research on co-teaching in rural communities is limited and dated (Hammond & Ingalls, 2003; Shoulders & Krei, 2015). Rural educators often have limited access to teacher training and professional development opportunities due to budget constraints and remote location (Butera & Dunn, 2005; Glover et al., 2016; Hammond & Ingalls, 2003).

Shoulders and Krei (2016) identified that professional development was a strong predictor of self-efficacy among rural teachers in inclusive classrooms. Loveless (2014) asserted that professional development is how the profession of education is improved, and this is accomplished through government funding at all levels. Thus, the purpose of this study is to examine the impact of professional development in co-teaching on teacher self-efficacy among rural high school teachers.

## **Literature Review**

### **Co-teaching**

Co-teaching is an instructional delivery option where two or more certified professionals share ownership, instructional responsibilities, and accountability for a diverse group of students in a shared workspace (Cook & Friend, 1995). Co-teaching may appear differently regarding the shared responsibilities between the general and the special educators depending on the model being utilized.

There are five widely adopted models of co-teaching presented in an often-accepted developmental order based on the amount of planning time and trust each teacher has for one's partner (Cook & Friend, 1995): one teaching-one assisting, station teaching, parallel teaching, alternative teaching, and team teaching. Past research regarding co-teaching concluded that co-teachers generally supported the practice. Still, they faced several challenges including varying student skill levels in the classroom (Scruggs et al., 2007), inadequate planning time (Dieker, 2001), limited training/professional development (Pancsofar & Petroff, 2016; Scruggs et al., 2007), and unclear division of responsibilities in the classroom (Friend, 2008). Those challenges frequently lead to teachers relying on the one teaching-one assisting model (Dieker, 2001; King-Sears & Strogilos, 2020; Pancsofar & Petroff, 2016; Solis et al., 2012). The one teaching-one assisting model is often used because of the lack of effort required to implement it, but it is not recommended in the literature (Bouck, 2007; Friend, 2008; Moin et al., 2009).

Co-teachers specifically at the secondary level encounter many unique challenges when attempting to implement effective co-teaching practices. First of all, secondary education emphasizes specific subject matters. Content areas are often abstract and require students to draw from vicarious experiences and critically analyze materials. Those aspects are especially challenging for students with disabilities because they must make progress towards their academic goals as well as their behavioral and social/emotional goals as outlined in their individualized education plan (IEP) (Shaffer & Thomas-Brown, 2015). Meeting these needs requires a higher level of coordination and collaboration between co-teachers to plan for the varied instructional, behavioral, and social needs of the class.

Secondly, general education teacher preparation emphasizes content mastery more than special education preparation. However, special education teachers are better prepared to identify learning differences and provide accommodations. Discrepancies in teacher training can lead to stress for co-teachers at the secondary level. Given the variances in preparation, special education teachers' roles may be limited to a consultant/assistant rather than a co-teacher (Keefe & Moore, 2004; Friend & Cook, 2007; Weiss & Lloyd, 2002). Thus, successful co-teaching should focus on recognizing and building upon one another's strengths (Dieker & Murawski, 2003), such as providing adequate time to plan together. However, in reality, many special education teachers are assigned to multiple content areas (Dieker & Murawski, 2003; Pancsofar & Petroff,

2016; Weiss & Lloyd, 2002), which prevents them from gaining subject area expertise and allows little time to collaborate with their co-teachers.

Moreover, standardized testing and increased pressure of accountability for student achievement have complicated co-teaching practices at the secondary level. Students with disabilities are expected to achieve comparably to their general education peers in academics and meet state standards (Hartwig & Sitlington, 2008; Katsiyannis et al., 2007). However, the achievement gap between general and special education students still exists and appears to be more evident at the secondary level (Gilmour et al., 2019; Thurlow et al., 2016). Secondary teachers, especially those in co-teaching relationships often experience stress and pressure to meet the learning needs of all students, because, in many states, the result of standardized assessments is an indicator of student achievement and teaching effectiveness (van Hover et al., 2012). Thus, the need for high-quality co-teaching is critical at the secondary level.

### ***Professional Development in Co-teaching***

Professional development is considered training that takes place after the initial teacher preparation program (Postholm, 2012). It can be provided by external expertise or through collaboration between or within schools through formal and informal experiences that support teachers' continual improvement. Professional development opportunities often focus on enhancing teachers' professional knowledge, competencies, skills, and effectiveness. The traditional view of professional development focuses on teachers' learning and application of new knowledge in the classroom (Postholm, 2012). School districts should strive to provide professional development opportunities to their teachers annually by delivering meaningful and relevant training. Teachers generally report a need to receive effective professional development in areas that they perceive as useful (Cooper et al., 2008; DeSimone & Parmar, 2006; Mainzer & Mainzer, 2008; Rea & Connell, 2005). While the majority of schools provide professional development to their teachers, many do not lead to improved co-teaching relationships (Pancsofar & Petroff, 2013). Moreover, teachers are often required to prematurely implement co-teaching in inclusive classrooms and are frequently not provided the necessary professional development to ensure success (Pancsofar & Petroff, 2013; Rea & Connell, 2005; Shoulders & Krei, 2016).

Challenges to the implementation of inclusion can hinder program effectiveness. DeSimone and

Parmar (2006) examined the issues and challenges that middle school mathematics teachers faced in inclusive classrooms and stressed the importance of collaboration between general and special education teachers. The researchers made several recommendations to better prepare teachers to co-teach. First, preservice teacher education programs should include more observations and study of inclusion classrooms, as well as design effective instructional strategies to meet the needs of students receiving special education supports (DeSimone & Parmar, 2006). Second, the school administration must provide general and special education teachers with professional development opportunities that focus on effective inclusive teaching strategies within different disciplines (DeSimone & Parmar, 2006). Third, teachers need more support and training on the implementation of co-teaching with special education teachers and paraprofessionals (DeSimone & Parmar, 2006).

Further research supports the claim that co-teaching models were being started without properly training teachers in the best practices. Rea and Connell (2005) suggested that co-teaching models, in some schools (rural and non-rural), are initiated without proper professional development; therefore, inadequately training teachers for the task. Research completed by Nichols et al. (2010) surveyed 24 school districts to determine their use of a co-teaching model, and the amount of training that districts support staff, teachers, and administrators had before its start. Their study indicated that the co-teaching models in some schools were started without appropriate professional development. The researchers claimed that co-teaching was being started largely for conformity with the law and less for quality instruction for students with disabilities and their nondisabled peers.

Effective co-teachers are characterized by professionalism and an interest in the course content (Rice et al., 2007). They share the ability to differentiate lessons to meet student needs, correctly assess student growth, implement a variety of teaching styles, and work with students with varied cognitive abilities (Rice et al., 2007; Shaffer & Thomas-Brown, 2015). Furthermore, successful co-teachers acknowledge each other's roles and strengths (Shaffer & Thomas-Brown, 2015), have an optimistic attitude towards inclusion, and a strong sense of pedagogy (Silverman, 2007). Moreover, a school district should have a special interest in providing professional development that focuses on the shared ability to differentiate lessons (Dixon et al., 2014). School leaders should understand that a teachers' sense of efficacy plays a vital role in the teachers' success (Dixon et al., 2014).

Similar results were found by Van Reusen et al. (2000) in their survey of 125 teachers in a large suburban high school, which investigated secondary educators' attitudes towards inclusion in the regular classroom. They reported that secondary teacher attitudes about inclusion were often negative and viewed as a challenge to their current roles and responsibilities. The researchers noted that successful inclusion in high school was dependent upon the attitudes of teachers involved, as well as the support they received during the implementation process. They recommended that school leaders consider teacher attitudes before implementing co-teaching within an inclusive environment. Furthermore, they suggested that to improve teacher attitudes towards co-teaching and inclusion, ongoing professional development programs should address teacher concerns.

### Rural Education

Although high-quality co-teaching is shown to promote greater academic achievement of all students (Hang & Rabren, 2009), it has mostly been explored in urban or suburban areas. Many of the proven effective practices do not translate easily to rural settings (Dahill-Brown & Jochim, 2018). Rural schools have unique characteristics as they are often smaller in size, located in less densely populated locales, distant from other school choices, deeply embedded in their local context, and serve a diverse student population (Ayalon, 2004; Mitchem et al., 2006; Rude & Miller, 2018; Theobald, 2006). Those characteristics can affect rural schools in negative ways. For instance, a remote and smaller rural community may have a limited tax base and are further away from resources to support their local schools (Hodge & Krumm, 2009). Additionally, inadequate funding is a paramount issue in rural schools.

Besides all the identified barriers to implementing high-quality co-teaching reviewed earlier in this article, the unique characteristics of rural schools further complicate the practice of inclusion and co-teaching. Rural schools often experience more difficulties attracting and retaining highly qualified teachers. Current rural special education teachers are three times more likely to be non-certified than their nonrural counterparts (Mitchem et al., 2006), and many are teaching on emergency certifications (Berry et al., 2011). Rural secondary schools also struggle to implement least restrictive environment mandates as set forth by the Individuals with Disabilities Education Act (IDEIA) (Arfstrom, 2001). The problem is accentuated since rural districts struggle to allocate funds adequately

between general and special education budgets (Arfstrom, 2001).

Students in rural school districts have fewer school choices; therefore, students with disabilities often have limited service and placement options available (Hammond & Ingalls, 2003; Hodge & Krumm, 2009). General education teachers, specifically in rural schools, have to face inherent challenges to meet the diverse learning needs in the classroom and many teachers do not believe they have the knowledge and experience to successfully teach students with disabilities (Shoulders & Krei, 2016). The need for professional development to support the ongoing growth of both general and special education teachers is prevalent within the literature; yet inadequate professional development has long been recognized as a recurring issue among rural schools (Butera & Dunn, 2005; Hammond & Ingalls, 2003; Mitchem et al., 2006; Lock, 2001). This challenge is even more salient for the lack of professional training that is specifically tailored to schools in rural communities (Butera & Humphreys, 2010).

Hammond and Ingalls (2003) conducted a study on teacher attitudes toward inclusion in three rural school districts and shed light on issues that need to be addressed when implementing co-teaching, particularly in inclusive settings. They reported that rural educators either felt negatively or uncertain about inclusion. Although inclusion programs were in place, teachers were not fully committed to the concept of inclusion. The researchers noted that it is a major concern to operate an inclusion program without the commitment of teachers who are intimately involved with the implementation, especially since an unsuccessful program would only strengthen negative attitudes or uncertainty regarding inclusion and co-teaching.

Co-teaching can only flourish in a healthy, inclusive environment. Past research has reinforced the idea that co-teaching is a beneficial practice that promotes greater academic achievement of all students (Hang & Rabren, 2009). Also, increased student achievement has been linked to teacher efficacy (Ashton & Webb, 1986; Ross, 1992; Tschanen-Moran, Hoy, & Hoy, 1998). The following section will further explore the important implications teacher self-efficacy has on professional development and co-teaching.

### **Teacher Efficacy**

Teacher self-efficacy can be defined as the belief in oneself to perform task-specific behaviors successfully (i.e. co-teaching). Bandura (1977) defined teacher self-efficacy as a cognitive

mechanism that controls behavior. It develops and grows as the individual teacher develops in self-assurance, knowing they have become proficient at the competencies necessary to achieve the desired outcomes (Goddard et al., 2000). Empirical research conducted by Brownell and Pajares (1999) noted that the overall feelings and outlooks of teachers, as well as actions, play a vital role in shaping student outcomes. This belief is associated with Bandura's (1991) social cognitive theory (SCT), which states that self-efficacy develops from past experiences, from successes and failures, from persuasions of others, and one's emotional state.

Research conducted by Brownell and Pajares (1999) and Buell et al. (1999) defined the construct of teacher self-efficacy as the belief of teachers that they can positively affect student outcomes in the inclusive setting. Teacher expectations, beliefs, and attitudes and how the students perceive them can have a dramatic effect on how students respond in their learning environment (Jordan et al., 1997).

Researchers Buell et al. (1999) surveyed 289 regular and special education teachers to determine the perception of professional development needs as it related to teacher efficacy in teaching students with disabilities. The goal of this study was to explore factors that added to the ability of secondary teachers to meet the needs of students with disabilities in the inclusive classroom. The researchers found that general education teachers did not feel adequately prepared to teach students with disabilities. Furthermore, Buell et al. (1999) suggested that to achieve higher teacher efficacy, schools should include teachers in the development of classroom curriculum, classroom policies, and professional development activities. The researchers concluded teacher attitudes and teacher self-efficacy impacted students with disabilities in the regular classroom setting.

In another study addressing attitudes and efficacy, Hamill and Dever (1998) noted that at the secondary level, teachers should provide instruction that addresses the general education curriculum, along with instruction that addresses transition into adulthood. Unlike elementary school teachers, who may have the privilege of only working with one or two co-teachers, secondary special education teachers have the additional challenge of co-teaching or consulting with multiple general education educators.

Despite all the benefits of co-teaching in meeting various students' needs in a classroom, how to effectively implement co-teaching among rural high schools is an ongoing topic in the field of special education and needs more research attention. Rural high schools are often geographically remote, on a limited budget, and urgently in need of quality

teachers. Co-teaching models would be particularly beneficial to rural schools to meet the wide range of learning needs with increasingly demanding goals of secondary students in both academics and social/emotional areas. However, co-teaching itself faces its unique challenges such as the need for balanced pre-service teacher training, proper professional development, and institutional arrangement to provide adequate time for planning and team building. It is safe to infer that secondary teachers in rural high schools may have varying degrees of self-efficacy toward co-teaching. In addition, past research suggests that more professional development is needed for co-teachers when implementing a co-teaching model, particularly in inclusive settings. Thus, the purpose of this study was to examine the impact of professional development in co-teaching on teacher self-efficacy among rural general and special education high school teachers.

The following research questions were used to address our research aim:

1. Is there a difference in the efficacy in student engagement, instructional practices, and classroom management between teachers with experience in teaching in a co-taught class (one general education teacher and one special education teacher) and teachers that have no experience in teaching in a co-taught classroom?
2. To what extent does the number of professional development hours impact the efficacy of teachers in student engagement, instructional practices, and classroom management?

### Methodology

A causal-comparative research design was used to survey 256 rural high school teachers from the South and Midwest regions to measure their self-efficacy in student engagement, instructional practices, and classroom management. One-way analysis and independent samples *t*-test were used to analyze these data using SPSS statistical software.

### Participants

The participants in this study were rural high school teachers from Tennessee and Indiana. The U. S. Department of Housing and Urban Development (HUD) defines a rural area in three keys ways: a place that has less than 2,500 inhabitants, a location with an urban population of 20,000 inhabitants or fewer, and a place with a population that does not exceed 20,000 inhabitants and is not located in a

Metropolitan Statistical Area (n.d). This definition helped identify and select rural counties within Tennessee and Indiana. A list of all the school districts in the state was accessed on the Tennessee Department of Education and the Indiana Department of Education websites. Additionally, the U. S. Census Bureau's (2012) *Annual Estimates of the Resident Population* was also referred to when reviewing population numbers of rural areas to determine counties with a population of less than 20,000 and not located in a metropolitan statistical area. A total of 39 schools were identified using this method in both Tennessee and Indiana. After Tennessee and Indiana counties that meet the selection criteria had been identified, the director of schools and superintendents in each of the counties were contacted by e-mail to seek permission to ask secondary principals for approval to conduct the study in their schools. The researchers then contacted the principals of each high school through email. They described the study and asked for voluntary participants that met the study's criteria.

Using the selection criteria described above, the participants for this study included the population of regular education teachers (who teach or have previously taught students with disabilities in their classroom) and special education teachers (who work or previously worked collaboratively in a co-teaching setting with a regular education teacher) from 15 public rural high schools in Tennessee and 6 public rural high schools in Indiana. Due to the purpose of selecting only rural counties within the state of Tennessee and Indiana, a purposive and convenience sample was used as the sampling procedure. A list of regular and special education teachers was obtained by position listings on the websites of each school district and by school office personnel. The study sample included 212 regular education teachers and 44 special education teachers.

Of the 39 schools selected to participate in this study, only 54% ( $N = 21$ ) chose to be included. Of the 21 schools, 15 public high schools were from Tennessee and 6 public high schools from Indiana. A total of 724 teachers were sent the link to the Teachers' Sense of Efficacy Scale (TSES) scale to participate in the study, but only 256 teachers completed the TSES survey using Qualtrics online survey software. The response rate was 35.4%. Teacher participants that reported having experience teaching in a co-taught class were 53.5 % ( $n = 137$ ), and 46.5 % ( $n = 119$ ) of participants indicated they had no experience teaching in a co-taught classroom. When reviewing the average years of teaching experience of the participants, 44.5 % ( $n = 114$ ) reported 0-9 years of experience, 29.7 % ( $n = 76$ )

Table 1  
*Reliabilities of the Teachers' Sense of Efficacy Scale*

Scale	Short-form		
	M	SD	Cronbach's alpha
TSES	7.10	.98	.90
Engagement	7.20	1.20	.81
Instruction	7.30	1.20	.86
Management	6.70	1.20	.86

reported 10-19 years of experience, and 25.8 % ( $n = 66$ ) reported more than 20 years of experience.

### Research Procedures

A causal-comparative quantitative design was used for this research to determine the impact of professional development in co-teaching on teacher self-efficacy among rural general and special high school teachers. Causal-comparative studies attempt to study relationships and involve electing two groups differing on some independent variable and comparing them on some dependent variable.

Prior to the start of the study, approval by the Institutional Review Board (IRB) was granted. Additionally, the participating school districts were sent an e-mail seeking permission to contact principals for approval to conduct the study within their respective schools. An e-mail was sent to each principal explaining the intent of the study and asking for permission to contact their teachers via an anonymous survey. Once permission was granted, the researchers sent a link to the TSES (Tschanne-Moran & Hoy, 2001) to the teachers and principals in the identified schools using the Qualtrics online software tool. Data were collected from regular and special education teachers working with students with disabilities and/or co-teaching arrangements in rural high schools in Tennessee and Indiana.

### Instrumentation

The instrument, often referred to as the Ohio State Teacher Efficacy Scale (OSTES), was developed at Ohio State University by Tschanne-Moran and Hoy (2001). The researchers prefer to have the scale referred to as the Teachers' Sense of Efficacy Scale (TSES). The purpose of the TSES is to measure teacher attitudes towards working with students and covers the areas of engagement, instruction, and management (Tschanne-Moran & Hoy, 2001). The results of three different studies used to determine reliability and validity indicate that the TSES can be considered reasonably valid and reliable (Tschanne-Moran & Hoy, 2001). Table 1 indicates the reliability of the TSES, as reported by

Tschanne-Moran and Woolfolk-Hoy (2001). The 12-item scale is of reasonable length and should be used as a tool to measure the construct of teacher efficacy (Tschanne-Moran & Hoy, 2001). Positive correlations with other methods of personal teaching efficacy offer evidence for construct validity (Tschanne-Moran & Hoy, 2001).

The 12-question short form was selected based on the recommendations of the developers since the population was inservice teachers (Tschanne-Moran & Woolfolk-Hoy, 2001). The survey used a 9-point Likert scale (1 indicated nothing to 9 indicated a great deal). The purpose of the instrument was to measure teacher's attitudes towards their ability to work with students in three constructs: student engagement, instructional strategies, and classroom management (Tschanne-Moran & Woolfolk-Hoy, 2001). Example survey questions included: (1) How much can you do to control disruptive behavior in the classroom?; (2) How much can you do to help your students value learning?; (3) How well can you implement alternative teaching strategies in your classroom? Along with the 12 survey questions from TSES, teacher participants were asked to self-report their experience in teaching in a co-taught classroom (students with and without disabilities) and then the number of hours they had received in co-teaching professional development.

### Findings

Two analytical steps were used to investigate the research questions. In the first step, we used an Independent Samples *t*-test to determine if there were any mean differences in the efficacy toward student engagement, instructional practices, and classroom management between teachers with and without experience in teaching in co-taught classes shown in Table 2. There was no significant difference found between the groups in the areas of student engagement and classroom management. However, there was a significant difference between the groups when looking at their efficacy in instructional practices. When comparing their means, teachers with experience in co-teaching reported a higher

**Table 2**  
*Results of Mean Differences in Efficacy Constructs for Teachers with and without Experience in a Co-teaching Classroom*

	Teachers with experience in co-teaching		Teachers with no experience in co-teaching		<i>t</i> (254)	<i>p</i>	Cohen's <i>d</i>
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>			
Efficacy in student engagement	6.14	1.29	5.93	1.24	1.36	.174	.08
Efficacy in instructional practices	7.25	1.17	6.93	1.09	2.25	.025	.11*
Efficacy in classroom management	7.17	1.22	7.27	1.18	-.66	.509	-.04

**Table 3**  
*Descriptive for the Number of Hours of Professional Development in Co-teaching*

Variables		<i>n</i>	<i>M</i>	<i>SD</i>	95% Confidence Interval for Mean		
					Lower Bound	Upper Bound	
Engagement	None (0 hours)	70	5.88	1.11	5.62	6.15	
	Minimal (1-6 hours)	100	5.83	1.17	5.60	6.06	
	Some (7-12 hours)	42	6.02	1.48	5.55	6.48	
	Considerable (13-18 hours)	20	6.70	1.18	6.15	7.25	
	Extensive (19 or more)	24	6.86	1.39	6.28	7.45	
Instructional practices	None (0 hours)	70	7.11	1.11	6.85	7.38	
	Minimal (1-6 hours)	100	6.79	1.14	6.56	7.02	
	Some (7-12 hours)	42	7.15	1.14	6.80	7.51	
	Considerable (13-18 hours)	20	7.58	0.95	7.13	8.02	
	Extensive (19 or more)	24	7.87	0.93	7.48	8.26	
Classroom management	None (0 hours)	70	7.15	1.31	6.84	7.46	
	Minimal (1-6 hours)	100	7.06	1.15	6.83	7.29	
	Some (7-12 hours)	42	7.21	1.37	6.79	7.64	
	Considerable (13-18 hours)	20	7.54	0.84	7.14	7.93	
	Extensive (19 or more)	24	7.84	0.82	7.49	8.19	

sense of efficacy in instructional practices than teachers without experience. One could surmise that the strategies used in teaching students with disabilities are varied compared to students without disabilities. Teachers that have experience in co-teaching feel more confident in using those instructional practices and strategies than teachers that did not report experience in co-teaching.

For the second step, Table 3 displays the descriptive variables for the analysis of variance (ANOVA) used to examine if there was a difference among means of teachers' efficacy in student engagement, instructional practices, and classroom management based on the number of professional development hours reported in co-teaching.

Table 4 indicates the ANOVA results were performed to determine if there were any mean differences in the number of professional development hours in co-teaching and their efficacy between teachers with and without experience in a co-taught classroom. Analysis of the data revealed a significant difference in teachers' efficacy as relates to the number of professional development hours.

Since the overall *F* tests were significant, follow-up tests were conducted to evaluate pairwise differences among the means. A Tukey post hoc procedure was used to assume equal variances. Follow-up Tukey post hoc analysis indicated that teachers with considerable (13-18 hours) and extensive (19 or more hours) professional development were more efficacious in student engagement, instructional strategies, and classroom management than teachers with less than 13 hours of professional development.

## Discussion and Implications

The purpose of this study was to examine the impact of professional development in co-teaching on teacher self-efficacy among general and special education rural high school teachers. The study also expands current knowledge about efficacy and co-teaching, which was imperative since previous research on teacher efficacy regarding co-teaching was limited (Hang & Rabren, 2009; Shoulders & Krei, 2016). While exploring the first research question, the study found that after receiving

Table 4  
*Results for ANOVA in Efficacy in Co-teaching*

Variables		SS	df	MS	F	p
Student engagement	Between Groups	31.08	4	7.77	5.11	*.001
	Within Groups	381.3	9	251	1.52	
	Total	412.4	7	255		
Instructional practices	Between Groups	28.60	4	7.15	5.90	*.000
	Within Groups	304.3	5	251	1.21	
	Total	332.9	5	255		
Classroom management	Between Groups	14.33	4	3.58	2.54	*.040
	Within Groups	354.0	4	251	1.41	
	Total	368.3	7	255		

professional development in co-teaching, participants felt more efficacious in their ability to engage students and implement successful classroom management practices, but not in their implementation of instructional strategies. Meaning, participants lacked confidence in the instructional strategies they currently use in a co-taught classroom. This finding confirms Lock's (2001) findings that suggested instructional strategies were an issue for rural teachers.

Additionally, Mainzer and Mainzer (2008) found that purposeful professional development in instructional strategies was necessary. One of the main components of a co-taught classroom is the implementation of varied instructional strategies (Kinne et al., 2016), particularly for students with special needs who require specifically designed instruction for them to be successful in the classroom (IDEIA, 2004). The TSES (Tschannen-Moran & Woolfolk -Hoy, 2001), the survey instrument used, included instructional strategy questions such as using a variety of assessments, providing alternative explanations or examples, crafting good questions for students, implementing alternative instructional strategies, responding to difficult questions, adjusting lessons to meet individual students' needs, gauging student comprehension, and appropriately challenging students. Many of these survey questions mirror the Council for Exceptional Children's *High Leverage Practices* (McLeskey et al., 2017), which current and future teachers of students with disabilities need to be able to implement effectively and should be the primary focus of training opportunities. Finally, we suggest that schools provide professional development on implementing instructional strategies, so teachers feel more efficacious when teaching students with special needs in a co-taught classroom; this is particularly important for teachers without any experience in co-teaching.

The second research question sought to determine how many professional development hours

it took to impact teachers' self-efficacy toward student engagement, instructional practices, and classroom management. The participants reported the number of hours of professional development teachers received in co-teaching. Since the statistical analysis revealed that teachers with considerable (13-18 hours) and extensive (19 or more hours) professional development hours felt more efficacious toward each of the constructs of teacher efficacy, we recommend teachers have at least 13 or more hours of professional development, related to co-teaching, before they begin teaching in a classroom that employs a co-teaching model. Previous literature specifically highlights that one of the key challenges co-teachers face is the limited training and professional development opportunities available to rural teachers (Pancsofar & Petroff, 2016). These professional development opportunities were found to be a predictor of higher efficacy in student engagement in rural secondary teachers (Shoulders & Krei, 2016). Pancsofar and Petroff (2016) posited that it is critical for schools to implement systems for training. Their study particularly emphasized that development opportunities are especially important for early career teachers, but ongoing support and training for teachers throughout their careers should be considered.

Additionally, prior literature found that co-teaching models were often implemented in schools without proactive or proper training provided to the co-teachers (Kinne et al., 2016; Nichols et al., 2010; Rea & Connell 2005; Rice et al., 2007; Woods, 2017). Duran et al., (2019) suggested that these primary topics always be included in training programs: a) plan for co-teaching sessions before the session begins, b) implement the co-teaching for a period of time and collect data on the process of working together, student learning, and determine if initial objectives were met c) assess the entire co-teaching process by analyzing the data to make changes to the interactions and structure of the classwork. Lastly, it is suggested that the training

program should include co-teachers, principals, and school administrators (Lofthouse & Thomas, 2017).

### Limitations

This study relies on self-report data by teachers on their perceived efficacy as it relates to co-teaching and professional development. This study was also completed in two different states, Tennessee and Indiana, and other states may have different requirements for professional development. Additionally, this study is not representative of the total population of rural high school teachers in Tennessee and Indiana. Therefore, the results can only be generalized to the population that was selected to participate in this study from rural high schools in the two states. Another potential limitation is that the present study did not take into consideration how the difference between specific co-teaching models could influence a teacher's feelings of self-efficacy. Moreover, other constructs not observed in this study could have an impact on teachers' self-efficacy.

### Future Research

This study contributes to the current knowledge on teacher self-efficacy but raises additional

questions for future research. One need is for more qualitative or mixed methods research to determine which other attributes could be affecting a teacher's sense of efficacy and how those attributes impact students. A different methodological approach to similar research questions has the potential of providing a deeper and more complete understanding of the relationship between teacher efficacy and co-teaching.

Additionally, looking at a teacher's sense of efficacy and their students' achievement could help show the importance of a high sense of efficacy or if efficacy is even related to student achievement. This research would be a worthwhile endeavor because if co-teaching were proven to increase students' academic achievement, then there would be a stronger case for more co-teaching partnerships and training to ensure quality implementation.

Since the present study found that teachers feel less efficacious in implementing instructional strategies for students with special needs, it would be prudent for future research to explore which instructional strategies rural secondary teachers feel more or less efficacious to implement and why. This research would assist in creating focused professional development opportunities and training to build critical pedagogical skills for rural teachers.

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#### Suggested Citation:

Colson, T., Xiang, Y., & Smothers, M. (2021). How professional development in co-teaching impacts self-efficacy among rural high school teachers. *The Rural Educator*, 41(1), 20-31. <https://doi.org/10.35608/ruraled.v42i1.897>

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