The Effect of Co-teaching on Student Cognitive Engagement

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Delivering special education to students with disabilities requires highly prepared and collaborative teachers, inclusive learning environments, and strategies that promote cognitive engagement, but many students lack access to these necessities. In rural schools teacher shortages and traditional teaching methods may contribute to disengagement. Some rural districts have turned to co-teaching to disrupt this pattern of inequity. Effective co-teaching between two highly prepared teachers in a general education setting offers students the opportunity to be included and may improve engagement for all students. To investigate the relationship between co-teaching and student cognitive engagement, this study observed teachers in eight rural secondary schools in West Virginia to evaluate differences in student cognitive engagement in co-taught versus solo-taught classrooms. Four district personnel were trained on both cognitive engagement strategies and co-teaching approaches and collected observational data. The Instructional Practices Inventory was used during short walk-throughs to measure cognitive engagement during 701 solo-taught and 181 co-taught observations. Observations occurred in 5th- through 12th-grade classes in reading, mathematics, science, and social studies throughout one full school year. Statistical tests compared mean engagement scores across the different models of instruction. Results indicated that students in co-taught classrooms were more cognitively engaged than students in solo-taught classrooms. These results suggest the need for increased professional development for teams to move beyond the one teach, one support model of co-teaching, additional research on cognitive engagement and co-teaching, and teacher preparation programs to include more examples of, and training in, quality co-teaching models.

Keywords: co-teaching, collaborative teaching, cognitive engagement, Instructional Practices Inventory, co-teaching competencies, secondary education, inclusive education

It was a great moment in history when students with disabilities were no longer institutionalized or separated from their peers and community to receive their education. Yet, almost 50 years later we still struggle with how to educate students with disabilities, now that they are predominantly included in general education classes. For the last three decades many states have been using co-teaching, or two teachers in the same classroom, to provide the support needed for students with special needs in these settings. Despite the many best practices and initiatives, a long-standing and pervasive achievement gap between students with disabilities and those without disabilities (Schulte & Stevens, 2015) has existed since data was first collected on student performance. It was highlighted with the No Child Left Behind Act of 2001 and is an indicator scrutinized by its successor, the Every Student Succeeds Act of 2015. Improving state assessment results has become the most sought-after yet unattainable metric to reduce this

achievement gap (Schulte, Stevens, Elliott, Tindal, & Nese, 2016).

Substantial research supports that increased student engagement positively affects student outcomes. In their summary Trowler and Trowler (2010) present significant evidence showcasing the relationship between engagement and outcomes, stating that since the 1984 publication the National Institute of Education's *Involvement in Learning* report, "virtually every report . . . emphasized to varying degrees the important link between student engagement and desired outcomes of college" (Kuh, cited in Trowler & Trowler, 2010, p. 9). Trowler and Trowler emphasize that "the value of engagement is no longer questioned" (p. 9).

State assessments are most typically used to measure student outcomes. Thus, increased student engagement should lead to improved state assessment results. Dowson and McInerney (2001) found that students who were engaged learned more also retained more and enjoyed school more than students who were not engaged; Garwood (2013) highlighted that low levels of student engagement were a predictor of increased school dropout rates. Research by Valentine (2005) suggests students who spend additional time actively engaged in higher-order thinking experiences gain in course work, exam, and state assessment scores. Thus, overall student engagement is clearly a critical component to increase student academic success. Inclusive classes that have students with and without identified disabilities need to have strong engagement strategies in place to ensure all students achieve maximal success.

The National Assessment of Educational Performance (2017) analysis of national achievement scores found that many subgroups are the impetus for poor-performing schools. The inequity of some students not receiving instruction in the same learning environment as that of other students can often be an underlying cause of subpar performance these subgroups. Inequity may be exacerbated in rural environments (Biddle & Azano, 2016; National Rural Education Association, n.d.). Students who receive services in exclusive, pullout environments may not have exposure to a full, robust curriculum, which can result in poor performance relative to students who receive the comprehensive curriculum in a general educational setting (Bakken, 2016; Karin, Ellen, Evelien, Mieke, & Katja, 2012). Can improved co-teaching between special and general education teachers be a way for rural schools to ensure that PK-12 students are more cognitively engaged in their learning and thus increase their academic outcomes?

Review of the Literature

Inclusive Learning Environments

More than 40 years after the implementation of the Education for All Handicapped Children Act of 1975, later called the Individuals With Disabilities Education Improvement Act (2004), students with disabilities are increasingly spending their day in general education classrooms. The percentage of students with mild to severe disabilities who were placed in a general education setting for 80% of their day rose from 62% in 1998 to 80% in 2016 (Snyder, de Brey, & Dillow, 2018). While the least restrictive environment (LRE) component of the law requires that students with disabilities be educated, to the extent possible, with their nondisabled peers, teachers, parents, and administrators continue to struggle with the appropriateness of vaguely defined LRE conditions. Despite that struggle, the number of students taught in the general education classroom continues to rise.

Co-teaching as a Service Delivery Model. Because co-teaching presents a solution to the push for more inclusion and the imperative to provide effective education for students in the LRE, it is now frequently used as the preferred service delivery option (Friend, 2016; Murawski & Bernhardt, 2015). Further, the Council for Exceptional Children (2008) has included co-teaching in its ethics and standards guidelines for special educators. Standard IGC10K4 clearly articulates "co-planning and co-teaching methods to strengthen content acquisition of individuals with learning exceptional learning needs" (p. 39), thereby solidifying the use of co-teaching as a service delivery model.

True Co-teaching Defined. The terminology used for co-teaching is essential. Although *co-*

teaching and *collaboration* are often referenced interchangeably, the models diverge when defining student support and services. Various researchers have developed definitions of co-teaching throughout the years. Lynne Cook and Marilyn Friend (1995) proposed the idea of co-teaching, defining it as "two or more professionals delivering substantive instruction to a diverse, or blended, group of students in a single physical space" (p. 1). Beninghof (2012) defined co-teaching as "a coordinated instructional practice in which two or more educators simultaneously work with a heterogeneous group of students in a general education classroom" (p. 7). While the definition has progressed, with many adaptations, for the purposes of this research we used Murawski's (2003) definition that "co-teaching requires two or more professional educators to *co-plan, co-instruct, and co-assess* a group of students with diverse needs in the same general education classroom" (p. 10, emphasis added).

Co-teaching and Student Outcomes.

The first meta-analysis of co-teaching research found that co-teaching had a "moderate effect (0.40 mean effect size) for influencing outcomes" on students with disabilities (Murawski & Swanson, 2001, p. 258). The authors cautioned, however, that in their review of 89 articles, only 6 met the criteria for review of student achievement, and only 2 of those contained academic outcomes. Khoury (2014) synthesized the quantitative findings to determine if there were positive effects on the academic outcomes for students with disabilities educated in a co-taught classroom. The results of this synthesis were an effect size of $g = .281$, indicating that "co-teaching did have a significant effect on increasing academic outcome measures of students with disabilities, compared to other instructional settings" (p. 28). Mirza and Iqbal (2014) conducted a study of 118 eighth-grade students in Pakistan. Their results indicated that students in co-taught classrooms outperformed those in non-co-taught classrooms and suggested that growth rates of students in co-taught mathematics classes exceeded those of their peers in solo-taught classes. They concluded that co-teaching "is a better alternative to single teacher teaching in mathematics" (p. 20).

Fontana (2005) added to the research on the effect of co-teaching on students with learning disabilities in the subject areas of math and reading. Students in the co-taught classrooms scored significantly higher than those who were not in co-taught classrooms (Fontana, 2005). Witcher and Feng (2010) studied the effect of co-teaching on fifth-grade math achievement scores, concluding that "co-teaching benefits the students" (p. 24). Tremblay (2013) compared 12 co-taught inclusive classes to a control group of 12 special education classes. Results indicated that the co-taught classes resulted in improved outcomes for reading, writing, and attendance. Taken together, these studies consistently suggest that students with and without disabilities across content areas and settings who are in co-taught settings make significantly greater academic gains than do solo-taught students. Additional rigorous research needs to investigate the effects of co-teaching in rural secondary education settings.

Student Engagement

While student engagement is a broad topic, for the goals of this research we used the definition initially proposed by Christenson et al. (2008), that engagement entails "students' investment in and commitment to learning, belonging and identification at school, and participation in the institutional environment and initiation of activities to achieve an outcome" (p. 42). Baker (2017) wrote that "high levels of engagement are associated with many positive outcomes for K–12 classrooms" (p. 1) and cited other researchers who concluded that students who are highly engaged in their learning show higher achievement on the following: end-of-unit assessments, statewide standardized tests, and final grade point averages. As previously stated, the value of student engagement is no longer debated (Trowler & Trowler, 2010).

Student engagement can be described in many ways. Here we emphasize three types: disengagement (the reciprocal of engagement), active versus passive engagement, and cognitive engagement (Fredericks, Blumenfeld & Paris, 2004). All three play a role in the learning environment. Therefore, scholars distinguish

between the types of engagement to understand the expectations for each.

Disengagement. Student disengagement is often palpable in a classroom. Students exhibit behaviors that are off task and are not involved in learning. Often this may be a precipitating factor for other behaviors. Teachers learn that classroom management is about keeping students engaged to alleviate risk of off-task behaviors.

Active Versus Passive Engagement. A student who is not disengaged must be engaged, but is the engagement considered active or passive? Active engagement is when the student is actively involved in learning. A typical classroom scenario might involve a teacher standing at the front of the classroom as class discussion transitions from one student to the next, with each taking a turn to answer a question. How many students are actively engaged? Only the few who are answering a question.

According to Freeman et al. (2014), active versus passive engagement has a significant impact on student achievement. In their meta-analysis of 225 studies, they compared passive learning and traditional lecturing to active participation. Their results revealed that "average examination scores improved by about six percent in active learning sections, and students in classes with traditional lecturing were 1.5 times more likely to fail than were students in classes with active learning" (p. 8410). Teaching strategies for active learning included group work, problem solving, worksheets or tutorials completed in class, and personal response systems with and without peer support. Further, researchers have reported a direct correlation between cognitive retention and active learning (Bachelor, Vaughn, & Wall, 2012; Van de Bogart, 2009).

Cognitive Engagement. While engagement has many interpretations, cognitive engagement, rooted in Piaget's theory of cognitive development, is more narrowly defined and has been researched for many years. Cognitive engagement involves learning information and developing new meaning with the information. It requires more than simple memorization or skill-building activities. "Indicators of cognitive engagement include asking questions

for clarification of ideas, persistence in difficult activities, flexibility in problem-solving, use of learning strategies (e.g., relating new information to existing information), and use of self-regulation to support learning" (Finn & Zimmer, 2012, p. 111). Chaipichit, Jantharajit, and Chookhampaeng (2015) developed a learning management model based on the constructivist theory that further supported critical thinking in secondary students. Valentine and Collins (2009) pointed out that teachers must embrace a pedagogy that includes questions to have students use higher-order thinking skills. Kamil (2003) added that "effective teachers encourage students to engage in higher-order thinking skills by creating lessons that direct students to analyze, evaluate, synthesize, or create" (p. 4). Further, the effective teacher also encourages student-engaged learning by setting the tone of the classroom as one of inclusion, creating an atmosphere conducive to learning (Gauen, 2009).

Impact of Cognitive Engagement

From data collected using the Instructional Practices Inventory (IPI; see Valentine, 2015), Collins and Valentine (2011), using two- and three-level hierarchical linear modeling and structural equation modeling, identified three significant relationships: (a) between the degree to which students were engaged in higher-order/deeper-learning experiences across a school and student achievement scores on high-stakes accountability assessments; (b) between the degree to which students were disengaged from learning during class time throughout the school and the lower student achievement scores on high-stakes accountability assessments; and (c) between schools considered highly successful academically and schools considered unsuccessful academically.

Gauen (2009) used the IPI and collaborative conversations to determine the impact of increasing classroom higher-order thinking engagement on student state achievement scores. Results suggested that as higher-order thinking increased, so did student engagement, and state achievement scores were higher than the previous year for the same grade level. Additional research needs to investigate the variability of student engagement in solo- and co-taught classrooms to determine a

potential promise of co-teaching as a service delivery model for improving student outcomes.

Purpose of the Study

This study determined if co-teaching as an instructional model has a positive effect on the cognitive engagement of all students in the inclusive general education classroom. Murawski and Spencer (2011) espoused that "true co-teaching is when two or more educators in the same classroom are doing *something substantively different and better for students* than what one of them could do alone" (p. 96, emphasis added). Because many education systems look to co-teaching as an appropriate service delivery model for students with individualized education programs (IEPs) who need to be educated in the LRE (Scruggs, Mastropieri, & McDuffie, 2007), it was imperative to ascertain whether this model is effective in increasing the cognitive engagement of students. Therefore, this study sought to answer two research questions in the setting of rural secondary public schools:

- Is there a difference between student engagement levels in solo-taught and co-taught classes?

- To what extent are students disengaged, minimally engaged, or highly engaged in solo-taught and co-taught classes?

Methodology

A quasi-experimental design was used to determine potential effects of co-teaching on student engagement for the selected sample of rural secondary schools. First, purposeful sampling of schools provided participants. Second, highly trained observers conducted random observations of a preplanned number of solo-taught and co-taught classes to represent the general population. The highly reliable and validated IPI instrument (Valentine & Collins, 2009) was used to rate student engagement during classroom observations. Third, data were analyzed using rigorous statistical analyses to ensure internal and external validity.

Instrumentation

The IPI is a classroom walk-through observation tool that identifies six levels of student engagement, with three broad student cognitive engagement categories: student engagement in higher-order skills, student engagement in lower-order thinking skills, and student disengagement (Valentine & Collins, 2009). At the highest level of student engagement, category 6, students are actively engaged in higher-order thinking skills or activities. Category 5 is also characterized by student engagement in higher-order thinking skills or activities, but students might be involved in peer-to-peer conversations during the activities. Categories 4, 3, and 2 are characterized by student engagement in lower-order skills. For example, teacher-directed instruction would be category 4, students who are actively engaged by a teacher who is attentive to the students' needs but not asking higher-order thinking questions is category 3, and a category 2 is coded if the teacher is not attentive to the students' needs but they are still engaged somewhat. Category 1 is coded when students are disengaged (Valentine & Collins, 2009).

Participants

Purposeful sampling procedures were used to recruit eight rural public secondary schools within one school district in the southeastern United States, with grades ranging from 5th through 12th. Schools provided full access to all solo-taught and co-taught classes in the district for one school year. All administrators and teachers received training in the use and purpose of the IPI observation tool to support teachers' self-monitoring of strategies to increase students' cognitive engagement. All classrooms in the district, both solo-taught and co-taught, were considered equally eligible for observations related to student engagement levels. No specific demographic data were collected on teachers or students, to control for possible researcher and participant bias. Because participants did not perceive researchers' observations as evaluative, they were less likely to change their instruction as a consequence of the researcher entering the class to record student engagement.

Classrooms observed were in the four major content areas, English language arts, math, social studies, and science, with time slots selected randomly by school personnel to allow a maximum

number of data collection opportunities and to avoid the influence of schedule factors (such as observing all English classes in the morning). A total of 701 observations of disparate solo-taught classes and 181 co-taught classes were observed using the same walk-through format on cognitive engagement using the IPI. Fewer co-taught classes exist in the district; thus, we considered co-taught classes comprising 20% of the overall observations (181 of 882) a reasonable percentage. Table 1 lists the enrollment at the selected middle and high schools, including the number of students with IEPs/disabilities and those who receive free and reduced meals (FARMs). Student enrollment demographics for both students with disabilities and students receiving FARM were higher than those of rural public schools on average (National Center for Education Statistics, 2019) most rural schools average 12% students with disabilities, versus 19% and 14% in our sample, and only one-third of rural schools have the same percentage of students receiving FARMs (~50% in our sample).

Interrater Reliability

Specific coaches, consultants, and school improvement coordinators were trained in both IPI and the co-teaching core competencies and collected data as part of the school improvement process. Observers consisted of two school consultants and two school improvement coordinators who collected and reviewed the data in all eight schools as part of the district's IPI coding team. These four individuals participated in IPI training workshops and took a reliability .

assessment, scoring 80% or better. Reliability of scoring procedures for this sample was measured using Cronbach's alpha ($\alpha = 0.92$).

Data Collection

Data were collected over 8 months during the 2018–2019 school year. To determine the level of classroom student engagement and the quality of the student cognitive engagement, observers applied the IPI tool (Collins & Valentine, 2011). The IPI was used to measure engagement during 701 (79.5%) solo-taught and 181 (20.5%) co-taught observations using 5-minute time-sampling intervals.

When coding for engagement, the observer took a mental snapshot of the level of engagement at a specific time and coded it immediately on the IPI. The coding was based on how most students in the class were engaged; for example, if most students were engaged in a higher-order activity and two students were discussing a noneducational event, the code recorded reflected higher-order activity. Observers collected ratings throughout the school year at random times using partial-interval time sampling after 5 minutes of class time had passed. Most observations included three to five IPI ratings per classroom visit. Observers rated engagement on a scale of 1–6 to correspond with the six levels of engagement on the IPI. A mean score for each classroom visit was computed to create the *engagement* variable used for statistical analyses.

Table 1
*Demographics of rural West Virginia secondary schools observed (*n = 8)

Grade level	Measure	n	%
Middle school (*n* = 3)	Observations recorded	287	32.5
	Total enrollment	1,495	
	Students with IEPs	285	19.1
	Students with FARMs	796	53.2
High school (*n* = 5)	Observations recorded	595	67.5
	Total enrollment	2,435	
	Students with IEPs	350	14.4
	Students with FARMs	1,192	48.9

Data Analysis

Each IPI observation was coded as either a solo-taught core content class or a co-taught core content class, with a cognitive engagement rating between 1 and 6. All 882 data points (IPI observations of both solo- and co-taught classes) were entered on one Excel spreadsheet and then cleaned and coded.

To examine differences between student engagement levels in solo-taught and co-taught classes, we used the SPSS statistics tool to run a one-way ANOVA. We used an ANOVA rather than a simple t test to account for possible error related to variation in the number of observations from each group (King & Minium, 2008). Because there are more solo-taught classes than co-taught ones, we ensured that 20% of observations were from co-taught classes and 80% were from solo-taught classes. These numbers also mirrored the distribution of students with IEPs in co-taught classes in rural districts (i.e., students with special needs comprised 20% of each co-taught class).

To determine the extent to which students were disengaged, engaged at low levels, and engaged at high levels in solo-taught classes compared to co-taught classes, we used SPSS Crosstabs to determine significant differences between cells. SPSS Crosstabs reports if expected means for each level based on teaching context significantly differ from reported means.

Results

Our first research question addressed the effects of co-teaching versus solo teaching on higher-order thinking skills in rural secondary public schools. Descriptive statistics on the 882 observations indicated that the mean engagement level obtained for solo-taught classes was 3.85 (*SD* = 0.86) and for co-taught classes was 4.48 (*SD* = 4.45). Levene's test for homogeneity of variance was not significant, supporting the assumption of equal variance among groups. Results of the ANOVA (see Table 2) indicated that there was a significant difference between the means of the two groups, $F(1,880) = 64.27$, $p < .001$. Students in co-taught classes exhibited significantly higher levels of engagement than did students in solo-taught classes.

The second research question investigated the difference in levels of engagement by teaching style to more fully describe the teaching contexts. A chi-square was calculated to measure differences among engagement levels in co-taught versus solo-taught classes, revealing a significant interaction, $\chi^2(2) = 117.64$, $p < .001$ The same number of observations were coded as disengagement in both solo-taught and co-taught classes ($n = 3$). Of the observations of classes that demonstrated low-engagement (categories 2-4; n=660), a significantly higher percentage occurred in solo-taught classes ($n = 581$, 88%) compared to co-taught classes ($n = 79$, 12%). In those classes that demonstrated higher engagement on the IPI (categories 5 and 6; n= 216), a similar percentage occurred in solo-taught ($n = 117$, 54.2%) and in co-taught ($n = 99$, 45.8%) classes.

Table 2

Engagement in Solo-Taught and Co-taught Classes (One-Way ANOVA)

Comparison	df	MS	F
Between	1	55.92	64.27**
Within	880	0.870	
Total	**881**		
MS = mean square.			

** $p < .001$

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Table 3
Frequencies of IPI Coding Level by Teaching Context

Teaching context	Disengaged (category 1)	Low engagement (categories 2–4)	High engagement (categories 5, 6)	Total
Solo-taught	3 (0.01%)	581 (82.3%)	117 (16.7%)	701 (100%)
Co-taught	3 (1.7%)	79 (43.6%)	99 (54.7%)	181 (100%)
Total	**6**	**660**	**216**	**882 (100%)**

On the other hand, the distribution of rates of engagement differed significantly between teaching styles (see Table 3 and Figure 1): most of the co-teaching observations were coded as higher-level cognitive engagement (categories 5 and 6; n=216), while most of solo-teaching observations were coded as low-level cognitive engagement (82.3%; see Figure 1). These findings indicate that the co-taught classes provided greater opportunities for higher-level cognitive engagement than did solo-taught classes. In practice this means that, in a class with two credentialed teachers, more students with and without disabilities were participating (because scores reflected engagement levels of most students), asking and answering questions and actively engaged in their learning, than in a class with one teacher.

Interpretation of Findings and Implications

Our study found that students who were in the co-taught settings with two credentialed teachers were more cognitively engaged at higher levels, as determined by the IPI, than their peers in solo-taught settings. The inclusive classrooms sampled in this study included students with and without disabilities. While this study did not specify the number of students with IEPs in the general education setting, co-taught classes typically have more students with disabilities than do solo-taught
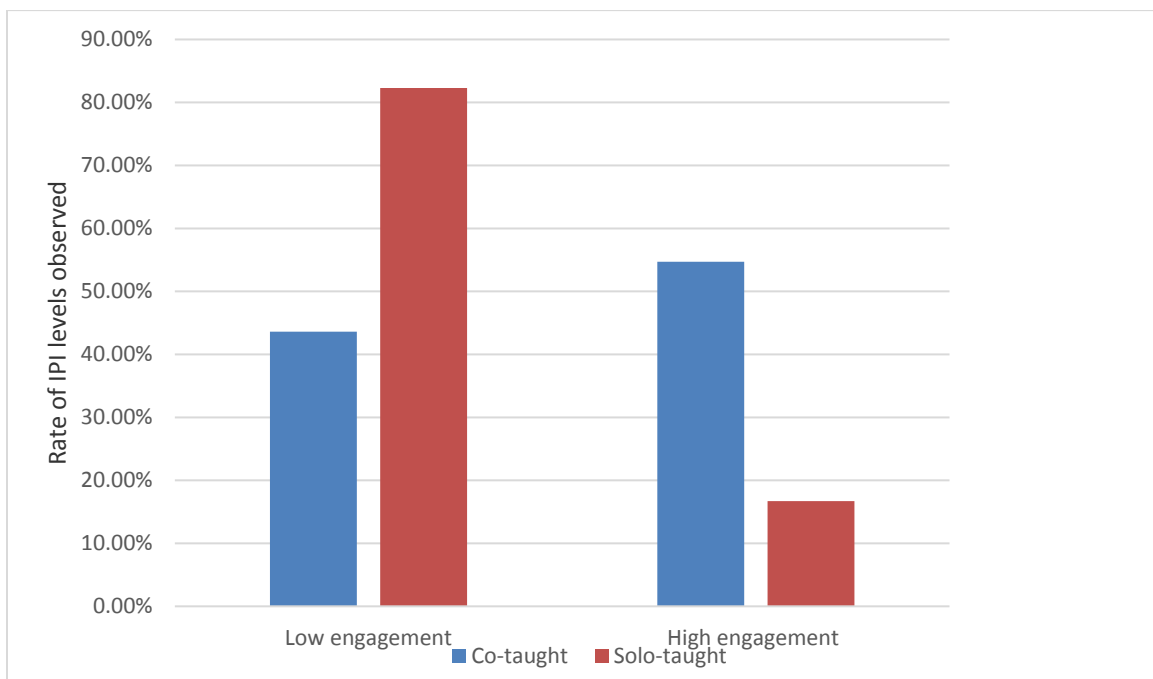

Figure 1. Levels of student engagement in co-taught and solo-taught classrooms

classes. Having a special education teacher in the co-taught classroom makes this more apparent. Thus, having students in the co-taught classes more cognitively engaged than those in the solo-taught classes implies that more students with special needs were able to be engaged by their instructors.

West Virginia state policy allows up to 50% of the students in the co-taught classroom to receive specialized instruction, because a special education co-teacher is present. Conversely, in solo-taught classrooms, the maximum number of students with disabilities in the classroom is 30% (West Virginia Department of Education, 2017, p. 68). This statistic further exemplifies the importance of these results: more students in co-taught settings were engaged at higher levels, including students with disabilities. In the past, the model has been to pull students with disabilities out of general education classes to provide specialized services in separate classrooms. Often these classrooms have been criticized for being watered down and ineffective (Scruggs et al., 2007). Based on our findings, when students receive instruction in the LRE with access to general education content while supported by a co-teacher, they can be more cognitively engaged at higher levels.

While the emphasis of co-teaching is often to view what is best for students with disabilities, this study also has implications for general education students. Families may communicate concern about their children who do not have disabilities being educated with those who do, due to a fear of less rigorous learning environments (Scruggs et al., 2007). The results of this study seem to counter that assertion by illustrating that general education students also benefit from being in a co-taught classroom, where they experience engagement at higher cognitive levels.

The statistical results of the study demonstrate that classes with two credentialed teachers (a special education teacher and a general education teacher) had more students engaged overall than did classes with only one teacher. Because the protocol of the IPI is to give a score based on the majority of the class, more students both with and without disabilities were included in each observation and score. By breaking down the

observations into disengaged, low cognitive engagement, and high cognitive engagement, we were also able to determine the level of engagement occurring. Students in the co-taught class not only were more engaged but also engaged with their teachers more actively. Because the literature is replete with researchers bemoaning the fact that co-teachers tend to mainly implement a one teach, one support model of co-instruction (e.g., Brawand & King-Sears, 2017; Murawski & Lochner, 2011), these findings support optimism that whatever co-teachers are doing nonetheless actively engages students in their learning more than does solo teaching.

Limitations of the Study

Most of the counties in West Virginia were already using the IPI and co-teaching as school turnaround strategies. Participants' previous experiences with being observed may have skewed the data, in that all teachers had received IPI training (and co-teaching training for those who were co-teaching), but professional development sessions were not observed or analyzed. It would be helpful in the future to have more demographic information on the individual teachers, as well as on the training they had received.

More demographic data on teachers and students would help future researchers assess in more depth the impact co-teaching has on particular individuals and teams. In this study knowing more about the participants themselves was difficult given that the data were part of an ongoing turnaround strategy in all classes. In addition, researchers could delve deeper into specific actions being taken to engage learners, by whom, and how.

Another potential limitation was the use of multiple observers. In this study four individuals collected data. While all had been trained and received a reliability score of 80% when tested on using the various observation tools, they may have a different lens when completing observations. However, while this may complicate the data, it is actually in alignment with what would occur in schools. It would be unreasonable to think that only one individual would be doing all of the observations at one school; thus, though it adds variability to the results, we determined that the level of variability

was acceptable because this was a natural school environment and not a lab setting.

Recommendations for Action

Extrapolating from results of this study, district leaders, building administrators, instructional coaches, and teachers should consider several specific actions. First, the data validated that co-teaching is an instructional delivery model with the capacity for providing an engaging instructional environment, offering students multiple opportunities to participate in instruction at higher levels of cognitive engagement. Thus, including students with disabilities in the general education classroom increases their opportunity to have access to the general education curriculum in an engaging learning environment. It should be communicated to all stakeholders that inclusive classrooms have the capacity for the necessary rigor for learning, whereby both students with disabilities and their nondisabled peers benefit from the instructional environment. Districts should provide co-taught classrooms as part of the spectrum of service delivery options to meet the ongoing requirements of the LRE. To the extent possible, students with disabilities should be provided instruction in co-taught classrooms with necessary supports.

Second, all avenues of professional preparation, development, and ongoing learning should incorporate co-teaching training. Teacher preparation programs in colleges and universities need to provide teacher preparation courses on co-teaching, along with the core competencies necessary (Murawski & Lochner, 2017). It would be prudent for colleges and universities to embed the co-teaching core competencies in their state professional teaching standards and professional learning standards.

Third, districts should consider providing ongoing professional learning opportunities through multiple avenues. Teachers who work in rural areas are often limited in the teacher preparation programs offered. Specific professional development on topics and strategies related to co-teaching as identified in the competencies could be offered through synchronous or asynchronous classes, webinars, and book studies. Schools can

create professional learning communities and communities of practice around co-teaching. Co-teaching teams can be videotaped to share ideas and strategies with other co-teaching teams in a professional collegial spirit. Administrators should collect regular observation data to consistently monitor the quality of co-teaching in district classrooms (Murawski & Lochner, 2017) so that co-teaching may be adequately supported.

Teachers would also benefit from professional development in the importance of student engagement as a result of having, or not having, an engaging learning environment. Based on Valentine's (2009) research, just fifteen more minutes a day in higher-order thinking can generate a 20% gain on students' test scores. The ability of teachers to influence outcomes for students with and without disabilities by providing time in higher order thinking activities is an imperative of the research.

Recommendations for Future Study

Because of the promising results of this study, additional related studies should be conducted. Leaders in the field of special education will benefit most from the ongoing research around co-teaching as it becomes a popular delivery model for student who have IEPs. This is the first study to use the IPI to examine co-teaching, so it is necessary to replicate this study to learn if students in co-taught classes experience high engagement with teams at different grade levels and in different states. Individuals working with students who are English learners may want to replicate the study as well, as co-teaching is a service delivery model increasingly used in that field (Dove & Honigsfeld, 2017).

Additional research questions emerged from this study that should be investigated. Specifically, future research should consider co-teaching quality and the degree to which co-teaching is implemented with fidelity. The current literature suggested the use of the co-teaching core competencies to evaluate the implementation of co-planning, co-instructing, and co-assessing (Murawski & Lochner, 2017). Observing co-teaching teams using the competencies outlined by Murawski and Lochner (2011) may reveal variability in co-teaching quality and may be combined with the IPI rating tool to

consider the relationship between co-teaching quality and student engagement. Addressing these issues in future research may reveal more specific targets for professional development, policy, and practice in rural school districts.

References

Bachelor, R., Vaughn, P., & Wall, C. (2012). *Exploring the effects of active learning on retaining essential concepts in secondary and junior high classrooms* (Master of arts action research project). St. Xavier University, Chicago, IL. (ERIC Document Reproduction Service No. ED 531 546)

Baker, A. D. (2017). *How master teachers conceptualize student engagement: A comparison of theoretical and practitioner perspectives* (Doctoral dissertation). Retrieved from http://scholarscompass.vcu.edu/etd/4742

Bakken, J. (2016). General and special education inclusion in an age of change: An introduction. *Advances in Special Education, 31*, 1–12. https://doi.org/10.1108/S0270-401320160000031001

Beninghof, A. M. (2012). *Co-teaching that works: Structures and strategies.* San Francisco, CA: Jossey-Bass.

Biddle, C., & Azano, A. (2016). Constructing and reconstructing the "rural school problem": A century of rural education research. *Review of Research in Education, 40*, 298–325. https://doi.org/10.3102/0091732X16667700

Brawand, A., & King-Sears, M. E. (2017) Maximizing pedagogy for secondary co-teachers. *Support for Learning, 32*(3), 216–230. https://doi.org/10.1111/1467-9604.12166

Chaipichit, D., Jantharajit, N., & Chookhampaeng, S. (2015). Development of learning management model based on constructivist theory and reasoning strategies for enhancing the critical thinking of secondary students. *Educational Research and Reviews, 10*(16), 2324–2330. https://doi.org/10.5897/ERR2015.2193

Christenson, S. L., Reschly, A. L., Appleton, J. J., Berman-Young, S., Spangers, D., & Varro, P. (2008). Best practices in fostering student engagement. In A. Thomas & J. Grimes (Eds.), *Best practices in school psychology* (pp. 1099–1120). Washington, DC: National Association of School Psychologists.

Collins, J., & Valentine, J. (2011, April 10). *The Instructional Practices Inventory in rural settings: Testing the student engagement-standardized test performance relationship.* Paper presented at the American Educational Research Association annual conference, New Orleans, LA.

Cook, L., & Friend, M. (1995). Co-teaching: Guidelines for creating effective practices. *Focus on Exceptional Children, 28*(3), 1–12. https://doi.org/10.17161/fec.v28i3.6852

Council for Exceptional Children. (2008). *What every special educator must know: Ethics, standards, and guidelines* (6th ed.). Arlington, VA: Author.

Dove, M., & Honigsfeld, A., (2017). *Co-teaching for English learners: A guide to collaborative planning, instruction, assessment and reflection.* Thousand Oaks, CA: Corwin.

Dowson, M., & McInerney, D. M. (2001). Psychological parameters of students' social and work avoidance goals: A qualitative investigation. *Journal of Educational Psychology, 93,* 35–42. https://doi.org/10.1037/0022-0663.93.1.35

Education for All Handicapped Children Act of 1975, Pub. L. No. 94-142.

Every Student Succeeds Act of 2015, Pub. L. 114-95, 114 Stat. 1177.

Finn, J. D., & Zimmer, K. S. (2012). Student engagement: What is it? Why does it matter? In S. L. Christenson, A. L. Reschly, & C. Wylie (Eds.), *Handbook of research on student engagement* (pp. 97–131). New York, NY: Springer. https://doi.org/10.1007/978-1-4614-2018-7_5

Fontana, K. C. (2005). The effects of co-teaching on the achievement of eighth-grade students with learning disabilities. *Journal of At-Risk Issues, 11*(2), 17–23.

Fredericks, J., Blumenfeld, P., & Paris, A. (2004). School engagement: Potential of the concept, state of the evidence. *Review of Educational Research, 74*(1), 59–109. https://doi.org/10.3102/00346543074001059

Freeman, S., Eddy, S., McDonough, M., Smith, M., Okoroafor, N., Jordt, H., & Wenderoth, M. (2014). Active learning increases student performance in science, engineering, and mathematics. *Proceedings of the National Academy of the United States of America, 111*(23), 8410–8415. https://doi.org/10.1073/pnas.1319030111

Friend, M. (2016). Welcome to co-teaching 2.0. *Educational Leadership, 73*(4), 9–14.

Garwood, J. E. (2013). *One-to-one iPads in the elementary classroom: Measuring the impact on student engagement, instructional practices, and teacher perception* (Doctoral dissertation). (UMI Number: 3608079)

Gauen, K. E. (2009). *The impact of the instructional practices inventory at an Illinois middle school* (Doctoral dissertation). Retrieved from https://pqdtopen.proquest.com/doc/305080596.html?FMT=AI (UMI No. 3380428)

Individuals with Disabilities Education Improvement Act of 2004, Pub. L. No. 108-446.

Kamil, M. L. (2003). *Adolescents and literacy: Reading for the 21st century.* Washington, DC: Alliance for Education.

Karin, H., Ellen, V. A., Evelien, C., Mieke, H., & Katja, P. (2012). Don't pull me out!? Preliminary findings of a systematic review of qualitative evidence on experiences of pupils with special educational needs in inclusive education. *Procedia: Social and Behavioral Sciences, 69*, 1709–1713. https://doi.org/10.1016/j.sbspro.2012.12.118

Khoury, C. (2014). *The effect of co-teaching on the academic achievement outcomes of students with disabilities: A meta-analytic synthesis* (Doctoral dissertation). Retrieved from https://pdfs.semanticscholar.org/e91f/42ff40e702fafc87795c70389ddaf39d574d.pdf

King, B. M., & Minium, E.W. (2008). *Statistical reasoning in the behavioral sciences.* Hoboken, NJ: Wiley.

Mirza, M. S., & Iqbal, M. Z. (2014). Impact of collaborative teaching (CT) on mathematics students' achievement in Pakistan. *Journal of Research and Reflections in Education, 8*(1), 13–21.

Murawski, W. W. (2003). School collaboration research: Successes and difficulties. *Academic Exchange Quarterly, 7*(3), 104–108.

Murawski, W. W., & Bernhardt, P. (2015, December). An administrator's guide to co-teaching. *Educational Leadership, 73*(4), 30–34.

Murawski, W. W., & Lochner, W. W. (2011). Observing co-teaching: What to ask for, look for, and listen for. *Intervention in School and Clinic, 46*(3), 174–183. https://doi.org/10.1177/1053451210378165

Murawski, W. W., & Lochner, W. W. (2017). *Beyond co-teaching basics: A data-driven, no-fail model for continuous improvement.* Alexandria, VA: ASCD

Murawski, W. W., & Spencer, S. A. (2011). *Collaborate, communicate, and differentiate! How to increase student learning in today's diverse schools.* Thousand Oaks, CA: Corwin.

Murawski, W. W., & Swanson, H. L. (2001). A meta-analysis of co-teaching research: Where are the data? *Remedial and Special Education, 22*(5), 258–267. https://doi.org/10.1177/074193250102200501

National Assessment of Educational Performance. (2017). 2017 NAEP mathematics and reading assessments: Highlighted results at grades 4 and 8 for the nation, states, and districts. Retrieved from https://www.nationsreportcard.gov/reading_math_2017_highlights/

National Center for Education Statistics (2019). Rural Education in America. Tables Archives. Retrieved from https://nces.ed.gov/surveys/ruraled/

National Rural Education Association. (n.d.). *National Rural Education Association (NREA) research agenda—2016–2021: Ten research priorities.* Retrieved May 26, 2019, from https://drive.google.com/file/d/0B6jy-_ymJ6lPcEhlbmxPZU5XLTg/view

No Child Left Behind Act of 2001, Pub. L. No. 107-110.

Schulte, A. C., & Stevens, J. J. (2015). Once, sometimes, or always in special education: Mathematics growth and achievement gaps. *Exceptional Children, 81*(3), 370–

387. https://doi.org/10.1177/001440291456369 5

Schulte, A. C., Stevens, J. J., Elliott, S. N., Tindal, G., & Nese, J. F. T. (2016). Achievement gaps for students with disabilities: Stable, widening, or narrowing on a state-wide reading comprehension test? *Journal of Educational Psychology, 108*(7), 925–942. https://doi.org/10.1037/edu0000107

Scruggs, T. E., Mastropieri, M. A., & McDuffie, K. A. (2007). Co-teaching in inclusive classrooms: A meta-synthesis of qualitative research. *Exceptional Children, 73*(4), 392–416. https://doi.org/10.1177/001440290707300401

Snyder, T. D., de Brey, C., & Dillow, S. A. (2018). *Digest of education statistics 2016* (NCES 2017-094). Washington, DC: National Center for Education Statistics. (ERIC Document Reproduction Service No. ED 580 954)

Tremblay, P. (2013). Comparative outcomes for two instructional models for students with learning disabilities: Inclusion with co-teaching and solo-taught special education. *Journal of Research in Special Educational Needs, 13*(4), 251–258. https://doi.org/10.1111/j.1471-3802.2012.01270.x

Trowler, V., & Trowler, P. (2010). *Student engagement evidence summary*. Helsington, UK: Advance HE. Retrieved from http://www.heacademy.ac.uk/resources/detail/ evidencenet/Student_engagement_evidence_s ummary

Valentine, J. (2005). *Statistical differences for the percentages of student engagement as measured by IPI categories between very successful and very unsuccessful middle schools*. Columbia, MO: Middle Level Leadership Center, University of Missouri.

Valentine, J. (2009, December 8). *The Instructional Practices Inventory: Using a student learning assessment to foster organizational learning.*

Paper presented at the National Staff Development Council annual convention, St. Louis, MO.

Valentine, J. (2015). *IPI Research summary B: Strategies for effective implementation of the IPI process.* Retrieved from https://ipistudentengagement.com/papers-presentations/ipi-research-summaries

Valentine, J., & Collins, J. (2009, March). *Improving instruction by profiling student engaged learning and creating collaborative teacher learning conversations.* Paper presented at the concurrent session at the meeting of the National Association of Secondary School Principals, San Diego, CA.

Valentine, J., & Collins, J. (2011, April 11). *Student engagement and achievement on high-stakes tests: An HLM analysis across 68 middle schools.* Paper presented at the American Education Research Association annual meeting, New Orleans, LA.

Van de Bogart, W. G. (2009, August 30). *Active learning pedagogy: A new teaching methodology for a new generation of teachers.* Retrieved from http://www.southeastasianreview.com/Active% 20learning%20Pedagogy.pdf

West Virginia Department of Education. (2017). *Regulations for the education of students with exceptionalities* (Policy 2419). Charleston, WV: Office of Special Education. https://wvde.state.wv.us/osp/policy2419_Aug_ 2017.pdf

Witcher, M., & Feng, J. (2010, November 3–4). *Co-teaching vs solo teaching: Comparative effects on fifth graders' math achievement*. Paper presented at the Mid-South Educational Research Association annual conference, Mobile, AL. (ERIC Document Reproduction Service No. ED 533 754)

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