



Updated Perspectives on Educational Diagnosticians’ Understanding of Reading Assessments

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Abstract:

Chappell, Stephens, Kinnison, and Pettigrew (2009) conducted a study investigating educational diagnosticians knowledge of early reading development. Our study replicated the work of Chappell et al. through a mixed methods design that investigated educational diagnosticians’ perceptions and knowledge of early reading development. Additionally, our study sought to gain a better understanding of how educational diagnosticians selected assessment instruments. Our findings suggested that educational diagnosticians may lack understanding of the early developmental processes of reading and that there may be limited use of diagnostic assessment instruments when evaluating students who are struggling to read.

Keywords: educational diagnosticians, reading assessments, learning disabilities, instrument selection, reading disorders, phonological awareness, phonemic awareness, reading fluency, prosody, mixed methods

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Early identification and remediation of children at risk for reading disabilities (RD) is critical for long-term academic success and can prevent approximately 70% of later-identified RD (Lovett, Barron, & Frijters, 2013). It is far easier to prevent reading failure in children who are at-risk than to remediate older children who are diagnosed with RD (Cunningham & Stanovich, 1997). Moreover, it is very difficult to make up the large amounts of reading practice that children with RD have missed if interventions and early identification is postponed (Schatschneider & Torgensen, 2004).

Kavale and Forness (2000) reported that approximately 90% of all children identified as learning disabled were referred for special education services due to reading difficulties. Bramlett, Murphy, Johnson, Wallingsford, and Hall (2002) found that reading problems constitute 57% of the total referrals to school psychologists. Furthermore, Nelson and Macheck (2007) opined that early identification of reading failure is perhaps the most important area in which assessment personnel are able to impact the lives of children.

Reading Development

Phonemic awareness and phonics instruction are aspects of the overarching construct of *phonological awareness*, “an oral language skill [that] refers to the knowledge that spoken words are made up of phonemes...the ability to manipulate words into its component sounds (i.e. phonemes, syllables, rime, and onset)” (Siegel & Mazabel, 2013, p. 192). Robust evidence suggests phonological awareness plays a critical role in reading development, reading disorders, and the core deficit in students with RD (National Reading Panel [NRP], 2000; Torgesen, 2002).

A narrow aspect of phonological awareness is *phonemic awareness* focusing on the phoneme level (Mather & Wendling, 2012). Phonemes are sounds represented by letters and letter combinations (Siegel & Mazabel, 2013). For example, the word *run* has three phonemes /r/ /u/ /n/. Phonemic awareness is predictive of accurate word acquisition and fluent word reading skills (Schatschneider & Torgensen, 2004) and is critical in the acquisition of the alphabetic principle (Lyon, Shaywitz, & Shaywitz, 2003). Assessment of phonemic awareness typically includes rhyming, blending, segmenting, and phoneme manipulation (Ehri et al., 2001; Mather & Wendling, 2012). Although there are variations in sequencing and development of phonemic awareness steps (Ehri et al., 2001; Hempenstall, 2003), there is consistency among what is measured (e.g., rhyming, blending, etc.).

Pikulski and Chard (2005) described reading fluency as the bridge from decoding to comprehension of text. Reading fluency is an essential aspect of reading and was identified as one of the key areas of reading by the National Reading Panel. Reading fluency is “the ability to read text quickly, accurately, and with proper expression” (NRP, 2000, p. 3) Reading rate comprises the ability to recall words quickly and the speed and fluidity with which an individual reads text (Hudson, Lane, & Pullen, 2005). Children who are poor readers are typically slow and laborious while reading, struggle with school, fail to complete work, lose interest in school, and rarely read for pleasure (Moats, 2001). The second element of reading fluency is accuracy, the ability to recognize or decode words. Children who have poor word-reading accuracy are unlikely to understand the author’s message leading to misunderstanding of the text (Hudson et al., 2005). Prosody is the third area of reading fluency, the rhythmic and tonal features of speech demonstrated through expressive reading (Dowhower, 1991). Struggling readers often read in a monotone voice lacking expression or with inappropriate phrasing (Hudson et al., 2005).

The assessment of reading fluency includes: measures of accuracy, rate, and prosody (Hudson et al., 2005; Mather & Wendling, 2012). One of the most effective methods of measuring reading fluency is through oral reading. In order to assess reading fluency and to make decisions about children’s progress in reading, teachers and assessment personnel play a vital role by providing feedback to students regarding areas that may need improvement, and providing praise, encouragement, and directions for students to read with expression (Mitchell, Rearden, & Stacy, 2011).

Responsibilities of Educational Diagnosticians

Selecting, administering, and interpreting assessment results are critical responsibilities educational diagnosticians perform. Moreover, educational diagnosticians are critical components of the multidisciplinary teams and assist in making decisions regarding placement, programming, and services of students with disabilities. When conducting diagnostic reading assessments educational diagnosticians must pinpoint strengths and weaknesses and specifically identify areas in which the child is struggling to read. Moreover, a diagnostic reading assessment should provide possible reading intervention strategies and assist the individualized education program (IEP) team in determining if the child meets eligibility criteria for special education

services (Chappell et al., 2009; Individuals with Disabilities Education Act, 2004). Therefore, educational diagnosticians must possess skills necessary to interpret the results and convey its meaning to key stakeholders. Thus, it is extremely important that educational diagnosticians are knowledgeable in a variety of assessment instruments that can be used in evaluation of reading and the reading skills that these instruments measure. Further, it is important that educational diagnosticians select appropriate instruments that fully answer the referral question (Sattler, 2008). Standard 1.6 of the Council for Exceptional Children (CEC) (2011) Special Education Professional Practice Standards provides direction for educational diagnosticians selecting instruments to be used in the assessment process.

Purpose of the Study

Students who are struggling to read are consistently referred for special education evaluation (Nelson & Machek, 2007). To ensure that educational diagnosticians can effectively select, administer, and interpret evaluations and make appropriate evidence-based recommendations, it is important they have specific knowledge in the areas of early reading development, (i.e. phonological awareness, phonemic awareness, and reading fluency). In addition, educational diagnosticians must select appropriate instruments when evaluating students at-risk for reading failure.

The primary purpose of this study was to obtain information about educational diagnosticians' knowledge of early reading development specifically in the areas of phonological awareness, phonemic awareness, and reading fluency. The areas of focus in this study, as in the original study, were on early developmental reading skills rather than on language-comprehension tasks such as vocabulary and reading comprehension. The secondary purpose of this study was to gain understanding of the instruments educational diagnosticians select when evaluating students who are at-risk for RD.

The current research study is a follow-up and extension of the Chappell et al. (2009) study. While early identification of students who are at risk for reading disorders is critical for long-term academic success (Lovett et al., 2013), another important consideration is the noted absence of change in assessment practices (Ysseldyke, 2005). Therefore, the research team sought to examine whether changes have been made during the previous five years by replicating and extending Chappell et al. (2009) study.

The following research questions guided the study: (a) to what extent do educational diagnosticians have knowledge in the processes of learning to read? (b) to what extent do educational diagnosticians have knowledge about which assessment tools are most appropriate to measure phonological awareness, phonemic awareness, and reading fluency?

Methodology

In this study, a mixed-methods research approach was utilized that combined both quantitative and qualitative data collected (Creswell & Clark, 2010). As Chappell et al. (2009) obtained a quantitative analysis of educational diagnosticians' knowledge and usage of phonological awareness, phonemic awareness, reading fluency and the assessments aiding the identification of students struggling with these concepts, our study sought to strengthen the results from Chappell et al. (2009) by replicating their methods. In addition, to supplement and complement the quantitative data, we added semi-structured follow-up interviews to provide educational diagnosticians with a better understanding of the essence of diagnosing reading difficulties. Johnson and Onwuegbuzie (2004) advised a mixed methods approach is when researchers combine the strengths of each methodology; therefore, we combined the strength of both quantitative and qualitative methods to help us gain insight into the real-world practice of

educational diagnosticians. Before beginning the research, the Institutional Review Board (IRB) approved the study and informed consent was obtained from all participants.

Data Collection

The population for this study consisted of educational diagnosticians in Texas. The accessible population consisted of those who were contacted via electronic mail. The research team initially sent emails with a link to the survey, through Qualtrics (Qualtrics.com), to special education directors in Texas soliciting assistance in disseminating our survey to active educational diagnosticians (see Appendix A). Special education directors' names and contact information were obtained via the Texas Council of Administrators of Special Education (TCASE) Directory. Special education directors were asked to forward the email containing a link to the survey to all educational diagnosticians employed in their districts. To increase participation rates, a drawing for four \$50 gift cards were offered for completed responses. The survey remained available for three months.

At the end of the survey, participants were asked to volunteer for the qualitative portion of this two-phased mixed methods study. Thirty individuals responded "yes" to being interested in the qualitative phase but only eight provided specific contact information. Of the eight that provided information, four were purposively selected for inclusion in the qualitative phase (Lincoln & Guba, 1985). The selection criteria included two factors: (1) years of experience and (2) geographical location. In selecting these two factors, the research team sought to include individuals with varying years of experience and who were from different geographical locations in Texas.

Two hundred twelve educational diagnosticians accessed and submitted their survey. Seventy-seven (36%) of these educational diagnosticians fully completed the survey with one not providing demographic information. The research team purposively sampled four educational diagnosticians for interviews.

Interviewed participants. Four educational diagnosticians participated in the interview phase of this research study. The following paragraphs highlight the participants' educational experiences and background pertinent to this study. Descriptions about the participants are consistent with the university IRB protection of human subjects by using pseudonyms and providing broad geographical locations.

Susan taught for four years as a humanities teacher in a secondary setting. During the past three years, she has been employed as an educational diagnostician in the Southern region. The second participant, Evelyn, taught for thirteen years in an elementary classroom and has been an educational diagnostician for the past 20 years in the Eastern region. She has the most experience of the four individuals that we interviewed. Mary had eight years of experience as a classroom teacher and six as an educational diagnostician in the Eastern region. The final interviewed participant, Barbara had the most experience in education. With 30 plus years of experience, Barbara has taught as a classroom teacher, a bilingual educator, and a bilingual educational diagnostician for the last six years in the northern region.

This purposeful sample provided us with three of the four broad regions of Texas. Moreover, the sample provided two veteran educators, Evelyn and Barbara, and two relatively new educators, Susan and Mary. The two veteran educators had contrasting levels of experience with Barbara having the majority of her career as a teacher and Evelyn spending most of her career as an educational diagnostician.

Surveyed participants. The surveyed participants were primarily female (95%) with 86% being Caucasian, 9% African American, 3% Hispanic, and 1% other. All of the participants

were over the age of 25, with over half of the participants 46 years of age or older. Table 1 illustrates the distribution for years of experience in both teaching and being an educational diagnostician for participants in the Chappell et al. (2009) study and ours.

Table 1
Years of Educational Experience

Years of Experience	Teaching		Educational Diagnostician	
	Chappell*	Current	Chappell*	Current
0-5	8 (19%)	24 (31%)	29 (69%)	19 (25%)
6-10	18 (43%)	25 (32%)	5 (12%)	19 (25%)
11-15	7 (17%)	11 (14%)	3 (7%)	23 (30%)
16-20	5 (12%)	6 (8%)	2 (5%)	7 (9%)
21-25	2 (5%)	4 (5%)	2 (5%)	1 (1%)
26+	2 (5%)	6 (8%)	1 (2%)	7 (9%)

*Frequency data obtained from Chappell et al. (2009).

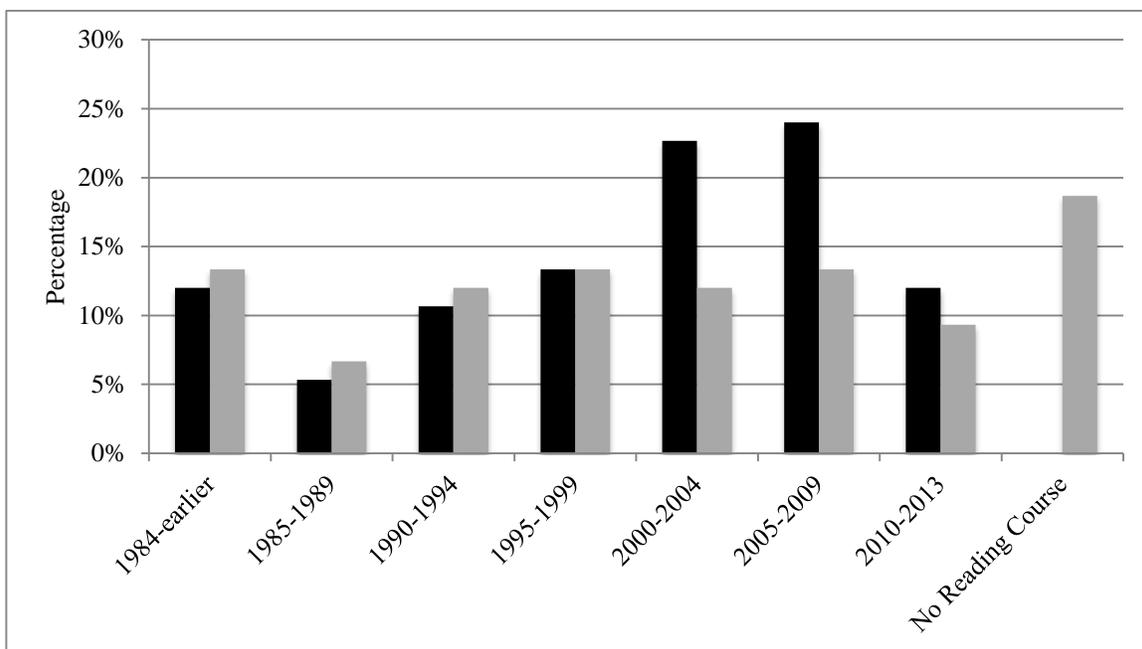


Figure 1. The relationship between Educational Diagnostician Training and Reading Course Completion changes after the year 2000.

An overwhelming majority of the participant educational diagnosticians in this study were trained through a university program (91%). All but two of the participants provided the year they completed their educational diagnostician training. Of these 75 participants, 20% were trained within the previous five years and 43% within the previous ten years of this study. When asked the year each educational diagnostician last took a reading course, all but two participants provided a response. Of these 75 participants, 14 (19%) have not had a reading course. Of the

remaining 61 participants, 15% completed a reading course within the previous five years and 34% completed a reading course within the previous 10 years of this study. Figure 1 illustrates the distribution of participants completing their educational diagnostician training and reading coursework organized within mainly five-year intervals. An important observation of these data indicated a strong relationship between educational diagnostician training and reading coursework prior to the year 2000 and a stark difference between the two frequencies after the year 2000.

The participant educational diagnosticians had assignments in preschool (37%), elementary (78%), middle/junior high school (51%), high school (38%), bilingual assessment (11%), and vocational assessment (5%). Twenty-seven percent of the educational diagnosticians had only one assignment, 23% had two assignments, 18% had three assignments, 17% had four assignments, 3% had five assignments, 6% had assignments in all six categories, and the remaining 5% had single assignments in PK-12 and Life Skills, assessment supervisor, college/post high school, or Licensed Specialist in School Psychology (percentages do not add to 100% because of rounding).

Instrumentation

The Chappell et al. (2009) survey instrument was adapted and used in this replication study with permission (see Appendix B). The Chappell et al. (2009) survey consisted of 19 items while our survey had 26. Our survey had five additional demographic questions and two additional concluding items requesting participation in the qualitative portion of our study. We made two changes to the content items of the Chappell et al. (2009) study to obtain a greater understanding of the educational diagnosticians' frequency of use and knowledge of diagnostic assessments. We required the participants to indicate the frequency of each assessment's usage instead of ranking the assessments based on usage, and our survey had participants indicate whether or not an assessment measures phonological awareness, phonemic awareness, and fluency instead of stating whether or not they are aware of any assessments and then listing them. Our final survey consisted of 47 individual assessment items. Chappell et al. (2009) found an internal consistency of 0.63 with their survey, and our Cronbach's alpha was 0.75.

Another adaptation we made to the survey was the omission of automaticity from the list of possible choices for elements that measure reading fluency. Automaticity is the automatic recall of words (Kuhn & Stahl, 2003). A critical component of automaticity concerns an individual's speed of reading or more specifically his/her oral reading rate (Hudson et al., 2005).

Data Analysis

All quantitative data analysis was conducted using SPSS 20 (www.spss.com). All qualitative interview data was analyzed utilizing NVivo 10 (www.qsrinternational.com). For data analysis, the semi-structured interviews were audio recorded and transcripts created. Subsequently, the written transcripts were uploaded into the qualitative data analysis platform, NVivo 10, and the platform was used for *unitizing* (examining each segment of data), *coding* and *categorizing* (Lincoln & Guba, 1985). This process was done independently by a team of researchers; then together, the researchers developed broad themes from the data. Utilizing a team of researchers enhances the trustworthiness of the findings (Lincoln & Guba, 1985).

Trustworthiness refers to the merit of qualitative inquiry and results from rigorous scholarship that authentically reflects meanings as described by study participants (Lincoln & Guba, 1985). Strategies utilized by the research team that promoted trustworthiness included in-depth semi-structured interviews, field notes, research memos, reflective journals, triangulation, member checking, and audit trails (Lincoln & Guba, 1985). The use of a research team

comprised of trained researchers in quantitative and qualitative methodologies can enhance the trustworthiness of the interpretation of the results (Lincoln & Guba, 1985). By discussing the findings of this study as a research team, the team verified their interpretation of the results.

In-depth semi-structured interviews were used as one strategy to promote trustworthiness (Merriam, 2009). In-depth interviews allowed the participants to describe their unique experiences regarding the evaluation and diagnoses of students with reading difficulties. Each interview was audio-recorded and later transcribed. The duration of each interview was approximately 60 to 90 minutes.

Another strategy that was used to promote trustworthiness was the use of handwritten field notes (Merriam, 2009). Field notes were taken during the interview as a backup to audio recordings and initial impressions of the interview. Moreover, field notes added to the analysis of the data collected and were used to verify and validate themes (Lincoln & Guba, 1985) generated within NVivo software. Additionally, research memos and reflective journals were created and added to the authenticity of the field notes and interviews (Merriam, 2009). Research memos were written as the data emerged and notes were taken between ideas and concepts and their potential relationship. These memos and journal reflections provided a record of meaning that was derived from the data and utilized in the triangulation of data.

The triangulation of data consisted of aligning and identifying themes that emerged from survey results, field notes, research memos, reflective journals, and interview transcripts. Triangulation is the use of multiple sources to verify the results of the study and build integrity and increase confidence in the results (Merriam, 2009). Member checking was also used as a strategy to promote trustworthiness (Merriam, 2009). Initial themes were generated and interviewed participants were asked to provide input and feedback. The feedback assisted in refining themes and making inferences from the data.

Audit trails were used throughout the study to verify and track data collected in the study (Merriam, 2009). These trails provided evidence of the steps that were taken from the beginning of the research study to the reporting of the findings. These audit trails helped to ensure the validity of our methods and the reliability of the results.

Results

The primary purpose of this study was to obtain information about educational diagnosticians' knowledge of early reading development specifically in the areas of phonological awareness, phonemic awareness, and reading fluency. The secondary purpose of this study was to gain understanding of the instruments educational diagnosticians select when evaluating students who are at-risk for RD. The following research questions guided the study: (a) to what extent do educational diagnosticians have knowledge in the processes of learning to read? (b) to what extent do educational diagnosticians have knowledge about which assessment tools are most appropriate to measure phonological awareness, phonemic awareness, and reading fluency? **Educational Diagnosticians' Knowledge in the Processes of Learning to Read**

Quantitative replication. Chappell et al. (2009) reported percentages of their participants correctly defining phonological (52%) and phonemic (62%) awareness, and 76% knew that phonological awareness was a predictor of reading success. We found less positive results in that our participants defined phonological and phonemic awareness with 44% and 49% accuracy respectively. However, our participants were more aware of the fact that phonological awareness was a predictor of reading success with 94% correctly identifying this fact.

Despite our research team's extensive review of Chappell et al. (2009), automaticity was not a listed item in our question asking what elements of reading fluency are measured. We

provided an option for our participant educational diagnosticians to add any elements not listed, but none provided any element. We did however assess the participant knowledge of oral reading rate, which is a strong predictor of reading fluency and one of the characteristics of automaticity (Hudson et al., 2005).

We found a similar percentage of our participants (29%, $n = 22$) correctly identified prosody as an element of reading fluency when compared to the Chappell et al. (2009) study (31%). We found a greater rate when identifying accuracy with 68 (88%) of our participants identifying accuracy compared to 74% of the Chappell et al. (2009) participants. Specific frequency of Chappell et al. (2009) participants identifying oral reading rate was not available, we found 84% ($n = 65$) of our educational diagnosticians successfully identified this element while 67% of participants in Chappell et al. (2009) correctly identified automaticity. Chappell et al. (2009) reported that “[a]pproximately 80% ($n = 34$) of respondents identified the correct components of reading fluency” (p. 28). We assumed these percentages were obtained by the count of respondents who chose prosody, automaticity, or accuracy and ignored whether or not the respondents selected all three together or any of the incorrect elements listed in the survey.

Table 2
Percentage of Educational Diagnosticians Who Correctly Ranked Each Stage within One Rank above or below the Correct Place

	1 st	2 nd	3 rd	4 th	5 th	6 th	7 th	8 th
Recognition that sentences are made of words	25% (19%)							
Recognition that words can rhyme	68% (57%)							
Recognition that words can begin with the same word, end with the same sounds, or have the same medial sound		39% (57%)						
Recognition that words can be broken down into syllables			48% (45%)					
Recognition that words can be broken down into onsets and rimes				49% (40%)				
Recognition that words can be broken down into individual phonemes					40% (29%)			
Recognition that sounds can be deleted from words to make new words						55% (48%)		
Ability to blend sounds to make words							14% (17%)	

Note. Percentages in italics are from the Chappell et al. (2009) study

This assumption was substantiated by the percentages of selecting each individual element in isolation where only 74% selected accuracy making it impossible for 80% to have chosen all three. Replicating this method, we found that 96% ($n = 74$) of respondents chose prosody, accuracy, or oral reading rate. However, we found that 34% ($n = 26$) of our respondents chose at least one of our elements (prosody, accuracy, or oral reading rate) without selecting any of the incorrect elements of (retell fluency, silent reading rate, and comprehension). We additionally found that only seven (9%) of our participants were able to select all three of our reading fluency elements without selecting any of the incorrect elements. These results illustrated that although a sizeable percentage of the participant educational diagnosticians

identified the correct components of reading fluency, a large percentage made these selections in conjunction with incorrect selections of non-elements in reading fluency illustrating less of an understanding of reading fluency.

The final comparison of the results of the Chappell et al. (2009) study to ours is the knowledge of reading processes whereby participants' ability to accurately sequence stages of phonemic awareness was studied. That only one participant correctly ordered these stages is extremely low and discouraging, yet better than zero of the respondents in the Chappell et al. (2009) study. Chappell et al. (2009) found their participants' general understanding of these stages was 57% knew "recognizing words can rhyme" comes early in the reading process. We assessed our participants' ability to rank each stage within one stage at, above, or below the correct stage. Table 2 shows the percentages of our respondents compared to those of Chappell et al. (2009) who ranked each stage within one level of the correct order. We additionally found that 81% ($n = 62$) disappointedly ranked four or fewer of the eight stages within one of their correct order.

Qualitative extension. Our qualitative extension sought to gain a deeper insight of educational diagnosticians' knowledge of early reading development. Knowledge regarding the processes of learning to read emerged as a theme.

One of the key processes of learning to read shared by three of the interviewed participants was that children must understand the alphabetic principle. Mary stated, "..... that basically the child when they're trying to learn to read—to begin even to code—they need to have a good understanding of the letters, and of the sounds, mainly." Barbara illustrated the importance of phonological awareness by commenting that, "If [phonological awareness is] typically developing, [the student is] okay. If it's not typically developing, then [we in education are] looking at a reading disorder." These qualitative findings corroborate the descriptive results of 94% of participants knowing that phonological awareness is a predictor of reading success.

Further, only three of the four individuals interviewed recognized that manipulating sounds are important components in the processes of learning to read. Mary described student difficulties with "the sounds to identify that this is a letter and this is the sound that goes with it." Mary further stated that students being diagnosed have difficulty with phonemic awareness: "So, what I run into mostly are the kids that just cannot blend." Blending is one of the key skills used in reading and spelling and is necessary for decoding unfamiliar words (Mather & Wendling, 2012). However, only 49% of the participants in our study recognized the correct definition of phonemic awareness.

Emphasized less by the interviewees regarding the processes of learning to read was reading fluency. Mary and Barbara mentioned that reading fluency was a component of their evaluations but it was discussed in terms of the specific instruments or subtests that they used for evaluation purposes. For example, Mary stated, "I always use the GORT to test fluency." Further, when questioned about fluency, Evelyn described the reading fluency subtest on the *Woodcock-Johnson III Tests of Achievement* (WJ-III ACH) (Woodcock, McGrew, & Mather, 2001a), This lack of data related to reading fluency correlates well with the survey data showing only 9% of participants could accurately identify all of the elements of reading fluency.

Educational Diagnosticians' Knowledge and Use of Measurement Tools

Quantitative replication. Chappell et al. (2009) asked participants to rank each of ten assessments in order of the participants' frequency in use. We adapted this method to ask participants to provide a level of frequency they use each of these assessments (Never, Not Frequently, Frequently, Very Frequently). Chappell et al.'s (2009) method of ranking the

frequency of usage was unclear to our research team. They reported their top four administered assessments but vaguely described how this ranking was obtained. We found their method to be both a function of the assessments' frequency within the top 3-4 ranks and a function of the frequency of the assessment not being used. From this dual method for ranking the frequency of assessment administration, we ranked Chappell et al. (2009) participants' results in conjunction with our participants ranking each assessment as being frequently or very frequently administered (see Table 3).

Table 3
Educational Diagnostician Frequency of Using the Instruments

	Frequency	Chappell Ranking	Very Frequently	Frequently	Not Frequently	Never
WJ-III ACH	79%	1 st	61%	18%	21%	0%
WIAT--III	47%	2 nd	23%	23%	42%	12%
KTEA II	43%	3 rd	16%	27%	39%	18%
GORT-5	42%	6 th	9%	32%	32%	26%
IRI	25%	5 th	8%	17%	32%	43%
CBM	13%	4 th	3%	10%	21%	66%
WRMT-III	12%	7 th	4%	8%	31%	57%
TOSWRF	10%	8 th	6%	4%	21%	69%
PIAT-R	3%	10 th	3%	0%	13%	84%
TERA-3	3%	9 th	1%	1%	22%	75%

Note. Editions of instruments were updated in current study to reflect existing practices.

Just as Chappell et al. (2009) found, our participants' 1st, 2nd, and 3rd most frequently administered measurement tools were the WJ-III ACH (Woodcock et al., 2001a), the *Wechsler Individual Achievement Test – Third Edition* (WIAT-III) (Wechsler, 2009), and the *Kaufman Test of Educational Achievement – Second Edition* (KTEA-II) (Kaufman & Kaufman, 2004b) respectively. Our next three ranks were not identical to Chappell et al. (2009) but contained the same assessments of *Gray Oral Reading Tests – 5th Edition* (GORT-5) (Wiederholt & Bryant, 2012), *Informal Reading Inventory* (IRI), and Curriculum-Based Measurement (CBM) (i.e. DIBELS). Additionally, the remaining four assessments, *Woodcock Reading Mastery Test – III* (WRMT-III) (Woodcock, 2011), *Tests of Silent Word Reading Fluency* (TOSWRF) (Mather, Hammill, Allen, & Roberts, 2004), *Peabody Individual Achievement Test – Revised* (PIAT-R) (Markwardt, 1997), and *Tests of Early Reading Ability – 3rd Edition* (TERA-3) (Reid, Hresko, & Hammill, 2001), were ranked as the least frequently used by participants. Overall, the participants in our study used the assessments with relatively the same frequency. With respect to their knowledge of these assessments, we also obtained very similar results to those of Chappell et al. (2009).

We adapted the Chappell et al. (2009) survey questions pertaining to the participants' knowledge of the assessment tools to not only indicate if they were aware of an instrument that assessed phonological awareness, phonemic awareness, or reading fluency, but they also indicated their knowledge of whether or not each of the research assessments specifically measured these three reading elements. We were pleased to find our participants knew that the WJ-III ACH assessed phonological awareness (81%) phonemic awareness (71%) and reading fluency (75%) in addition to knowing the GORT-5 assessed reading fluency (77%). We were conversely alarmed to find only 38% of our participants knew the KTEA-II assessed components

of reading fluency and 23%-31% of the participants believed the GORT-5 and TERA-3 assessed phonological and phonemic awareness, which they do not.

Our replication of Chappell et al.'s (2009) analysis continued by determining if there were any differences in educational diagnosticians' assessment knowledge and content knowledge of phonological awareness, phonemic awareness, and reading fluency. Chappell et al. (2009) ran non-parametric tests finding no differences in their educational diagnosticians' assessment awareness and content knowledge. Because our adaptation of the Chappell et al. (2009) survey provided us with more data, we established continuous outcomes of participant performance when illustrating their competency in assessment measurement of phonological/phonemic awareness and reading fluency as well as competency in content knowledge of phonological/phonemic awareness and reading fluency. Our continuous data allowed for deeper analysis in determining differences in assessment knowledge and content knowledge.

We found no relationship ($r = 0.082$, $p = 0.447$) between participants' knowledge of which assessments measure phonological and phonemic awareness ($\mu = 0.66$) and their content knowledge of phonological and phonemic awareness ($\mu = 0.48$). We did not find any relationship ($r = -0.032$, $p = 0.781$) between our participants' assessment ($\mu = 0.60$) and content ($\mu = 0.69$) knowledge related to reading fluency. However, we determined significant differences between assessment and content knowledge for both phonological/phonemic awareness ($t = 7.123$, $p < 0.001$) and reading fluency ($t = -2.927$, $p < 0.01$). These data indicated the participants had a greater knowledge of what assessments measured phonological/phonemic awareness than what phonological/phonemic awareness was. In contrast, our participants had a greater content knowledge of reading fluency than which assessments measured fluency.

Because of the distributions observed in Figure 1, participants were grouped based on when they last completed a reading course: 1. before the year 2000 ($n = 34$), 2. after the year 2000 ($n = 27$), and 3. never taken a reading course ($n = 14$). The intent of this grouping was to determine if having taken a reading course or the time at which the last reading course was taken affected educational diagnostician knowledge. A multiple analysis of variance (MANOVA) of four dependent outcomes of phonological/phonemic awareness assessment and content knowledge as well as reading fluency assessment content knowledge yielded no differences ($F(8, 140) = 1.005$, $p = 0.435$).

Qualitative extension. The interview data revealed instrument selection is a complex undertaking and that there are a multitude of reasons why educational diagnosticians select instruments for the children they evaluate. Within the theme of instrument selection, two subthemes emerged: (1) district decisions and (2) diagnostic reading instruments.

Evelyn indicated that she selected instruments based on which ones the district purchased (i.e. availability). She commented that she typically administers the *Woodcock-Johnson III Tests of Cognitive Abilities* (WJ-III COG) (Woodcock, McGrew, & Mather, 2001b) and the corresponding WJ-III ACH, but when she first began her career as an educational diagnostician, she administered the *Wechsler Intelligence Scales* (Wechsler, 2003) and the corresponding *Wechsler Achievement Tests* (WIAT). Moreover, she reported that when she evaluates young children (i.e. early childhood) she uses instruments such as the *Developmental Assessment of Young Children, Second Edition* (DAYC-2) (Voress & Maddox, 2013) that has been specifically designed for this population of children.

Barbara indicated that instruments should be ideally selected based on the needs of the child. She stated, "Well, your different instruments fit your different kids." Conversely, when

asked about which instruments she selected, she reported that she was using the WJ III COG and WJ III-ACH exclusively “because it fits the easiest into the cross battery model.” Moreover, she indicated that her decision to use a certain assessment was whatever the district required her to use by stating, “Whatever they tell me, I have to do.” Further, because Barbara is a bilingual educational diagnostician she described instrument selection for second language learners as significantly more limited. She stated there is not a robust quantity of instruments for children who are not native English speakers. She further elaborated that if given the choice she would select the WJ III COG and the *Batería III Woodcock-Muñoz* (Woodcock, Muñoz-Sandoval, McGrew, & Mather, 2007) for children who have literacy in Spanish, due to the limited availability of instruments, and the *Kaufman Assessment Battery for Children-Second Edition* (KABC-II) (Kaufman & Kaufman, 2004a) and KTEA-II for children who do not possess literacy in Spanish.

The most informative result from these interviews aided discovering why so few of the surveyed participants used or knew about diagnostic reading instruments like the *Comprehensive Tests of Phonological Processing, Second Edition* (CTOPP-2) (Wagner, Torgesen, Rashotte & Pearson, 2013), GORT-5, and WRMT -III. Only one of the four participants used diagnostic reading instruments as part of their comprehensive reading evaluations. Susan, Evelyn, and Barbara reported that they do not use diagnostic reading instruments. Susan reported that she knows she should but that she does not. Evelyn reported that it was an issue of availability. Barbara reported it was due to district specific guidelines that the district endorses.

Only one participant of the four, Mary, reported that diagnostic reading instruments were part of the assessment process. Specifically, in this district, all children prior to being referred to special education for reading assessments undergo dyslexia evaluations. During this process, the counselor, along with assistance from Mary, administers the CTOPP-2, GORT-5, WRMT-III, and a brief intelligence scale.

Overall, the qualitative extension provided evidence of existing barriers that minimize the use and knowledge of specific assessment tools. District decisions and limited knowledge of instruments add to the reasons why our participants reported using certain assessments more frequently than others.

Discussion

Our results parallel the Chappell et al. (2009) findings that indicate educational diagnosticians are not sufficiently trained in the developmental processes of reading or in the stages of phonemic awareness. Although 94% of our participants were aware that phonological awareness was a key predictor of reading success, only 44% identified the correct definition of phonological awareness and only 49% identified the correct definition of phonemic awareness. These findings indicate a significant lack of preparation of educational diagnosticians and are in line with literature from the area of school psychology. Nelson and Macheck (2007) found that over 90% of their participants reported that more training in reading assessment and intervention would be beneficial for them as practitioners.

Data from the survey phase of the study indicated that 81% ranked four or fewer of the stages of phonemic awareness in the correct order. These data suggests that there may be a lack of understanding regarding the stages that children go through in learning to read. Conversely, information obtained from the participants in the qualitative phase revealed that there might be more understanding than reported in the quantitative phase. More specifically, participants in the qualitative phase revealed that the alphabetic principle was critical to the developmental stages of reading and that manipulating sounds are important in developing appropriate reading skills.

Moreover, Evelyn, Mary, and Barbara discussed the importance of blending as a developmental process of reading.

In the area of reading fluency, only 26 individuals (36%) selected at least one of the elements (prosody, accuracy, or oral reading rate) without selecting any incorrect elements (retell fluency, silent reading rate, and comprehension). Moreover, individuals who were interviewed did not discuss assessment of fluency in detail rather they discussed fluency in terms of the actual subtests on norm-referenced instruments. The inferential analysis revealed participants knew more about reading fluency than they did about the assessments that measure this reading process. These data suggests that educational diagnosticians do not understand the actual components of reading fluency, but are instead relying on assessment publishers' perspectives.

As in the Chappell et al. (2009) study, our participants experienced difficulty identifying instruments that measured phonological awareness, phonemic awareness, and reading fluency. Up to 31% of our participants believed that the GORT-5 and TERA-3 assessed phonological awareness, but these instruments do not. Moreover, only 38% of our participants indicated that the KTEA-II measured components of reading fluency. Our participants may have an understanding of some assessments, but these results show their overall knowledge of what assessments measure is lacking indicating a need for training programs to provide specific emphasis on instrumentation,

Most disturbing were the results that suggested educational diagnosticians do not administer diagnostic reading instruments such as the GORT-5, CTOPP-2, or WRMT-III rather they are administering the broader norm-referenced assessments that contain measures of reading (e.g. WJ III-ACH, KTEA-II, WIAT-III). Mary was the only individual interviewed who reported that diagnostic reading assessments were used as part of the evaluation process. These findings indicated that educational diagnosticians are identifying RD from general measures of achievement rather than using specific diagnostic instruments that are purposely designed to pinpoint specific weaknesses in the development of reading. Further, our results suggest that district mandates may limit educational diagnosticians' understanding and use of diagnostic assessment instruments to identify children with reading disabilities.

Limitations

The results of this study should be viewed within the context of the following limitations. Generalizability of the study should be considered in relation to the sample size and response rate of the survey. Although our returns were consistent with literature from studies involving educational diagnosticians and school psychologists, a larger sample size that is more diverse and higher return rate would generate a greater degree of confidence and reliability in the results. Moreover, findings were based on a sample of educational diagnosticians who received and read the emailed survey via their special education director. It is possible that not all educational diagnosticians who were employed in public school settings in Texas were forwarded the link and/or read the email.

Limitations related to the survey methodology should also be considered. For the purposes of the quantitative phase, we made the following adaptations to the original instrument. Two changes were made to the content items of the Chappell et al. (2009) study. We required the participants to indicate the frequency of each assessments' usage and our survey had participants indicate whether or not a given assessment instrument measures phonological awareness, phonemic awareness, and fluency. The second adaption was the omission of automaticity as a response item in our question asking what elements of reading fluency are measured. It is not known if individual responses would have changed if these adaptations were not made.

Results of the quantitative phase of the study are based on participants' self-reports. The accuracy of these reports is unknown. However, findings from the quantitative phase have been corroborated with information obtained from interviews that were conducted as part of the study.

Further research into the knowledge and use of assessment tools and the reading processes that govern these tools is imperative. A greater number of content questions in the area of reading should be added. These items should include areas of phonics and the alphabetic principle. Additional assessment related questions should also be added to the survey. Moreover, future reiterations of the instrument may want to eliminate the ordering of the stages of phonological awareness development and focus instead on performance of phonological awareness tasks such as "tapping out the number of sounds, reversing the order of sounds in a word, and putting together sounds presented in isolation to form a word" (Wagner & Torgesen, 1987, p. 192). Despite the improved internal consistency alpha of 0.74 with this adaptation, the survey should continue to be improved to increase this measure and assure that future results from this type of research can better aid in the improved practice of educational diagnosticians.

Conclusions and Implications for Practice

The findings of this study can be used to inform current educational diagnostician preparation programs regarding the immediate need to include training in specific reading assessment instruments in order to properly diagnose RD and to provide strategic recommendations for classroom instruction. Like Chappell et al. (2009) we requested our participants to rate their level of agreement to various statements related to training and personal confidence in their skills. Despite the 74% of our participants who believed they had the needed skills to effectively interpret assessments and make recommendations, our findings show they lack necessary knowledge to interpret and recommend strategies and interventions. Professional development opportunities are needed through school districts, universities, and other state training facilities to strengthen assessment personnel's knowledge of the processes of reading and training in administering assessment instruments specifically targeted to measure the critical components of reading acquisition.

It is critical that there is more understanding of which assessment instruments districts make available and the degree of use of these instruments by educational diagnosticians. Our results suggest that district mandates may limit educational diagnosticians' understanding and use of diagnostic assessment. This may result in inadequate and/or incorrect identification, placement, and programming for students who are struggling to read.

Finally, results obtained from assessments should provide teachers with information that they can use in their classrooms. If educational diagnosticians are utilizing general achievement measures for identification purposes, information about specific areas of weaknesses may be lacking. This lack of specific information may result in insufficient recommendations for classroom teachers.

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