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The Effects of Holistic Diagnostic Feedback Intervention on Improving Struggling Readers' Reading Skills

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Abstract

The present study examined ways in which young readers respond to customized diagnostic feedback interventions. Individualized feedback and intervention support were provided to six junior elementary students whose profiles were developed based on multiple data sources which considered students' interests, learning preferences, and reading readiness levels. A multiple case study approach was applied to examine how each of the students uniquely responded to the diagnostic feedback intervention. The study findings show that providing students with individualized feedback that is skill-based and provides strategies to target chosen areas gives them a far greater understanding of their strengths and weaknesses and how to best target these areas over simply providing an achievement level. Assessment which informs students' current skills of reading comprehension can support students' learning. Intervention that moves between teacher and student allows for the adjustment of students' cognitive and metacognitive processes. Providing students with skills and strategies through feedback allows them to increase their self-regulation and motivation to learn.

Introduction

The purpose of the present study was to investigate junior elementary school students' reading skill profiles through cognitive diagnostic assessment and further to examine the potential of diagnostic feedback intervention for struggling readers. We focused on junior elementary school students because it is during this pivotal period that students have moved from learning to read to reading to learn (Best, Floyd, & McNamara, 2008; Jitendra, Burgess, & Gajria, 2011). More importantly, academic achievement gaps among students begin to grow during this period whereas their level of literacy engagement tends to decline (Eccles, 1993; Pressley, 2002). There is an

increasing need to identify students who struggle with reading comprehension skills and provide them with a more targeted intervention.

Understanding individual students' strengths and weaknesses in reading comprehension skills requires detailed diagnostic information beyond interpretations based on aggregated total test scores. Cognitive diagnostic assessment (CDA) aims to fill this gap by combining the cognitive psychology of learning with advanced statistical scoring methods to provide dependable diagnostic skill profiles (Embretson, 1998; Jang, 2005, 2007; Leighton & Gierl, 2007a, 2007b; Nichols, 1994; Pellegrino & Chudowsky, 2003). Research shows that when students are given feedback, they become motivated (Black & Wiliam, 1998); however, little research offers insight into how students with different profiles respond to diagnostic feedback intervention.

The present study was the second phase of large-scale research project. The first phase of this study looked at how cognitive diagnosis modeling could be used to characterize the literacy skill mastery profiles of over 120,000 Grade 6 students in Ontario public schools (Jang, Dunlop, Wagner, Kim, & Gu, 2013). The purpose of the second phase was to examine ways in which students respond to diagnostic feedback generated from their reading skills profiles and further the extent to which their psychological attributes (e.g., goal orientation, perceived ability) mediate their responses to the feedback (see Jang, Dunlop, Park, & van der Boom, 2015). The present paper pays attention to six struggling readers who received seven diagnostic feedback intervention sessions over eight weeks. Specifically, by taking a multiple case study approach, this paper is intended to provide thick descriptions about how individual struggling readers uniquely respond to diagnostic feedback intervention. The present study was guided by the following research questions:

1. How does diagnostic feedback inform students in setting and monitoring learning goals?
2. How does intervention bring about changes in ways in which students' approach learning tasks?
3. How does the use of diagnostic feedback together with intervention direct students to self-assess their own reading ability?

Literature Review

Reading Struggles in Junior Elementary School Years

Successful academic performance relies heavily on a student's ability to not only decode but to be able to comprehend what they are reading (Eason & Cutting, 2009). As students progress to higher grades in school, some students face challenges in comprehending increasingly complex academic text with abstract vocabulary (Cirino et al., 2013). Reading comprehension is a multifaceted undertaking that requires one to use many different cognitive processes that are both automatic and strategic (Cain, Oakhill, & Bryant, 2004). For example, readers may operate multiple cognitive skills, such as finding the main idea, identifying important supporting details, making predictions, drawing inferences, and summarizing information (Jitendra et al., 2011).

Since students who struggle with reading comprehension may or may not have difficulty with all of these skills, it is important to understand what kind of challenges they experience and what kind of support they need (van den Broek, White, Kendeou, & Carlson, 2009). Besides the ability to decode words, reading requires the continuous monitoring of comprehension of increasingly complex academic text, and self-regulation of reading strategies to meet the reading goals set out (Alexander & Jetton, 2000).

Effective reading comprehension for young adolescents also requires the development of the metacognitive ability to monitor and self-regulate their comprehension processes (Pazzaglia, De Beni, & Cacciò, 1999). The monitoring of reading comprehension is essential for the reader to be able to both plan and evaluate the information that is available to them such that they can make sense of what they are reading (Kolić-Vehovec & Bajšanski, 2006). Young readers tend to have difficulty self-identifying inconsistencies in their text comprehension (Kolić-Vehovec & Bajšanski, 2006) and yet regardless, less proficient young readers tend to overestimate their reading ability (Anderson & Beal, 1995; Jang et al., 2016; Zabrucky & Ratner, 1986). During adolescence years the correlation between students perceived use of reading strategies and their actual comprehension increases (Kolić-Vehovec & Bajšanski, 2006).

Goal Orientation

Along with students' metacognitive ability to self-regulate their own reading comprehension processes, their orientations to learning and reading influence how they approach reading text. According to Dweck's (1986) goal orientation theory, learners with a *mastery* goal orientation tend to enjoy tasks that are challenging and strive to enhance their knowledge and skills with a focus on understanding. These learners are interested in improving their own knowledge and skills and tend to compare their achievement with their own prior achievement. They are open to constructive feedback that helps them make gains in their learning. When reading tasks fail to challenge mastery-oriented readers, these students may lose interest in the tasks. On the other hand, learners with a *performance-prove* goal orientation focus on how they demonstrate their ability compared to others. They like to demonstrate their competence to others and tend to use others to compare themselves to. These performance-prove readers can be academically as successful as mastery-oriented students; however, when tasks have high stakes and are too challenging, they may not persist as well as expected. Meanwhile, learners with a *performance-avoid* orientation avoid learning tasks due to their concern about failure. These students tend to mask their emotional anxiety and frustration resulting from reading difficult text with boredom and disengagement. Students of each orientation may share equal ability, but they show significant differences in response to challenging reading tasks and diagnostic interventions. Effective diagnostic interventions require a deep understanding of individual students' orientations to reading as well as their cognitive and metacognitive capabilities.

Diagnostic Feedback-Mediated Interventions

Feedback is described by Winne and Butler (1994) as "information with which a learner can confirm, add to, and overwrite, tune, or restructure information in memory, whether that

information is domain knowledge, meta-cognitive knowledge, beliefs about self and tasks, or cognitive tactics and strategies" (p. 5740). Previous research on feedback has been predominantly focused on feedback type and feedback delivery mode (Jang, 2014). Further, feedback also tended to be treated as a fixed stimulus to which learners respond uniformly (Ferris, 2003). Evaluative feedback in the form of a mark, comment, or object (e.g., 'good,' 'perfect,' stickers, smiley face) is still commonly found in students' workbooks despite their detrimental effects on the development of students' intrinsic motivation (Black & Wiliam, 1998; Chappuis & Stiggins, 2002). The purpose of feedback needs to focus on having students become more committed, responsible and effective learners by engaging in metacognitive strategies that support self-regulated learning such as goal setting, monitoring, and reflection (Afflerbach, 2016; Black & Jones, 2006).

Dialogue between teacher and student needs to include "questioning, answering, adjusting, listening, demonstrating, observing, imitating, criticizing—all are chained together so that one intervention or response can trigger or build on another" (Schön, 1987, p. 114). Feedback that offers scaffolding through mediated interventions provides a student with the answers of the how or why of learning (Clark, 2012). This notion of mediation, which is well recognized by dynamic assessment (Kozulin & Garb, 2004; Lantolf & Poehner, 2004), stresses the importance of interactions between an assessor and a learner. Wang (2011) notes that "with consolidated teaching activities and assessment, learners can achieve better learning by interacting with teachers. During dynamic assessment, teachers can help learners improve learning effectiveness by providing them with support" (p. 1063).

Dynamically-mediated assessment through diagnostic feedback may well serve the needs of struggling readers, as its main feature is the emergence of cognitive functions through collaborative interaction (Kozulin & Garb, 2004; Lantolf & Poehner, 2004). Teachers can help learners improve learning effectiveness by providing them with support (Wang, 2011). Student-teacher reading conferences are shown to elicit more authentic student responses, address student needs better, and provide deeper conversation about what has been read (Porath, 2014). Furthermore, Kletxien and Bednar (1990) report that oral feedback in dynamic assessment can benefit struggling readers as it helps them become more confident and responsible for their own learning. Zimmerman (2000) identifies three phases of self-regulated learning (SRL): the first is the planning phase in which learners analyze tasks, set goals, and plan behaviors; the second phase is the performance phase in which learners control and monitor their behaviors, emotions, and motivation; and the third phase is the evaluation phase in which learners self-reflect based on feedback, which can further support students to use self-regulatory strategies to internalize external feedback (Bandura, 1986; Black & Wiliam, 2009; Irving, 2007). Diagnostic feedback delivered through mediated interventions may help learners focus their efforts on goal-driven learning (Ames, 1992). To our knowledge, there is little research on how young readers struggling with reading comprehension respond to diagnostic feedback mediated through interventions. The present study was intended to fill in this gap by seeking rich accounts of young readers' responses to diagnostic feedback.

Method

Measures

Reading achievement assessment. The reading achievement assessment included 32 multiple-choice reading questions based on five separate passages. The measure had been used in a larger-scale study (Jang, Dunlop, Wagner, Kim, & Gu, 2013) that profiled over 120,000 Grade 6 students in Ontario schools. The following six literacy skills were identified and used to develop diagnostic feedback student reports: (a) comprehending the details of the text, (b) understanding the purpose of the text, (c) making predictions, (d) using English grammar properly, (e) using vocabulary properly, and (f) summarizing. Reading skill profiles were developed based on the conjunctive *Reparameterized Unified Model* (Jang, 2005; Roussos et al., 2007) which was retro-fit to the Ontario provincial literacy assessment data in Phase 1. Forty-four students, including six intervention participants, received holistic diagnostic reading profile reports.

Diagnostic reading profile report. A report was created for each individual student. As shown in Figure 1, the mastery status of each skill was presented using a bar graph for each of the six literacy skills assessed. There was no numerical score in the students' reports. A walking man figure was used to indicate the level of skill mastery determined through the application of CDA, and a smiling face figure was used to indicate the student's self-assessment of the same skill. The blue portion of the bars indicated how much of the Grade 6 curriculum the student had learned. The red portion of the bar indicated how much Grade 6 curriculum they still needed to learn. Below each graph, students were given a list of things they would be able to do if they had fully mastered this skill. Students were given the opportunity to provide a written reflection of what they thought about this information. The report also included information about students' goal orientations as well as a learning contract that prompted them to plan for future learning.

Self-assessment questionnaire. The self-assessment questionnaire asked students to self-assess the mastery of six reading skills measured in the reading achievement assessment. The questionnaire was comprised of 12 items (2 items per skill) with a 5-point Likert scale (1=*not at all true*, 5=*very true*). The questionnaire was administered twice, before and after the intervention.

Goal orientation questionnaire. A goal orientation questionnaire was constructed based on three factors: *performance-prove*, *performance-avoid*, and *mastery* (Dweck, 1986; Midgley et al., 2000). Our goal orientation (GO) questionnaire surveyed students' orientations as well as their perceptions about their parents' and teacher's goal orientations. We modified subscales from Midgley et al.'s (2000) Pattern of Adaptive Learning Scales (PALS) so that the GO items were appropriate for young children. The questionnaire had a total of 29 items measuring students' own goal orientations and their perceived parents' and teachers' goal orientations.

Data Collection

Forty-four students in the second phase of the study completed all the measures listed above. They also received diagnostic reading profile reports. The students' reading skill profiles were constructed based on the application of a cognitive diagnostic model to provincial reading

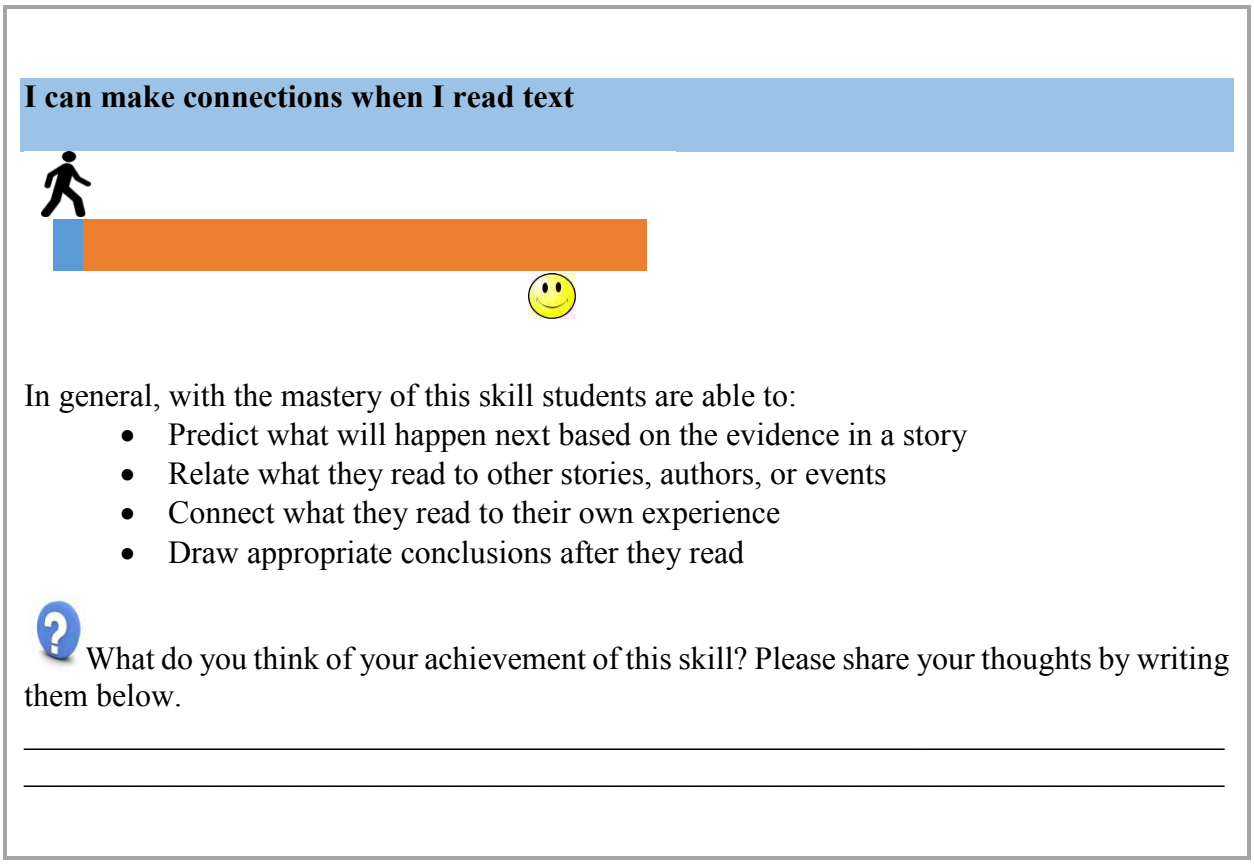

Figure 1: A sample section from the reading skill mastery report.

assessment data. Each individual student's reading skill profile contained the posterior probability of mastery (PPM) for each of the six skills. We also created students' perceived ability profiles from their responses to the self-assessment questionnaire. Discrepancy scores were calculated by subtracting the perceived skill mastery score from its PPM estimate. The profiles also included students' goal orientation profiles based on their responses to the goal orientation questionnaire. Factor scores associated with mastery, performance-prove and performance-avoid orientations from the application of exploratory factor analysis to a larger data set that included an additional group of Grade 6 students (n=92). Based on composite profiles that included skill mastery, perceived ability, and goal orientations, we recruited six students whose profiles showed weak skill mastery levels, performance orientations, and tendency to overestimate own ability.

Study Participants

Six students were selected from the group of 44 students who participated in phase two of the study based on the results of the literacy assessment, self-assessed ability level, and mastery skill profile. As shown in Table 1, students selected for intervention tended to not master any of

the six skills, overestimated their skill proficiency, and had a mastery and performance-prove goal orientation. Pseudonyms have been used to represent each student.

Table 1
Students' Pre-Intervention Profiles

Student	Skill mastery	Estimation of skill proficiencies	Goal orientation
Erik	no skills mastered	overestimated	mastery
Ken	no skills mastered	overestimated	performance-prove
Raymond	no skills mastered	overestimated	performance-prove and mastery
Rose	no skills mastered	overestimated	mastery
Seth	mastered implicit understanding	overestimated	performance-prove
Stewart	mastered explicit understanding, implicit understanding, making inferences, and grammar	underestimated	mastery and performance-avoid

These students were withdrawn from class for approximately half an hour for a total of seven sessions. The researcher for these sessions had 28 years of experience teaching in both the regular classroom and in special education settings. Each session provided an opportunity for students to consider their learning profile, set learning goals, choose and practice reading strategies meant to help them meet their goals, and then reflect on their learning. Throughout the sessions, mediation was provided for students to work on specific reading skills they identified as goals, monitor their progress by revisiting their goals, and self-assess their reading skills. We created a pool of graded reading passages and a set of reading comprehension questions associated with each passage for the intervention. Each student chose a passage of interest and worked on the text and the associated questions over two sessions. All sessions were audio-taped and later transcribed for further analysis.

Data Analysis

A multiple case study approach was applied to examine how each of the students uniquely responded to the diagnostic feedback intervention. Qualitative data analysis was done by reading

through the transcribed audio recordings of each session. Each transcript was analyzed, and common themes were identified. Specifically, research questions were considered for each participant and results shared through narratives of individual students' unique responses to the intervention.

Results

How Does Diagnostic Feedback Inform Students in Setting and Monitoring Learning Goals?

The connections that the students made with the diagnostic reports proved to be essential in this study. The reports provided individualized information about each students' strengths and areas of need such that the students set appropriate goals that they could successfully achieve. Although the reading reports given to students focused on achievement of skills and not marks, some students focused on the marks rather than the skills. For example, when given the diagnostic report, Erik commented that he was surprised by his marks in explicit understanding, implicit understanding, inferencing, and grammar. He expressed that they did not reflect his ability. However, his low achievement in vocabulary and summarizing were not surprising to him as he confirmed that he struggled with these skills. Other students focused on the next steps in their learning as they focused on the skills they needed to improve. Rose for example, often commented how she appreciated the feedback in the report as it helped her know what to focus on in the upcoming year.

Overall, the responses given by students about their reports were ones of surprise. For the most part, students were surprised at how poorly they had done in their achievement of each skill. Specifying skills that are needed for reading comprehension made them more aware of what to focus on when setting learning goals for themselves. In response to the diagnostic report, students were also asked to comment on their goal orientation and what skills they wanted to work on in the upcoming weeks. All students were in agreement with their goal orientation as stated in their reports. They acknowledged that they enjoyed learning. When asked which skills they wanted to work on in the next few weeks, all students identified summarizing, vocabulary, and/or grammar.

Students found success in meeting their goals and they gained confidence in their abilities.

During the final intervention session, students were asked if setting goals based on their report was helpful. Their responses indicated that they used the goals to improve their skills and thereby achieve the goals they set out for themselves. For example, Erik shared, "ummm, well I used those goals to achieve it, and…umm…I was working through it and I got better at them." Rose expressed her growth in the area of grammar and using paragraphs:

> Well, when I said proper grammar and now I am like you know, learning better even though we are not doing grammar at the moment in our classes but when we have to do assignments so I am looking over my work for grammar. Umm, well also now when I am doing assignments, I know when to put paragraphs. When subject changes you need to put a new paragraph.

Ken said that seeing his goals during the school day helped him stay focused on working towards them. He shared that he kept his goals at the front of his binder where he would see them throughout the day. This visual encouraged him to work towards the goals he had set out for himself. Seth expressed that creating goals for himself helped him become a better learner. He shared, "I wrote the goals that I want to work on and I became better in what I want to do. They were helpful." Seth also talked about asking his mom to help him meet his goals when he was working at home: "and then like when I after that I go home like I try to put goals in about what I understand in class and then like my mom could help me do action plans."

After completing the literacy assessment, it was the feedback, through the use of the reading skill profiles, that provided learners with positive aspects and areas of improvement in their understanding of performance. The reading skill profiles generated from cognitive diagnostic modeling served as feedback to provide learners with information that helped them reflect on their learning in order to create learning goals and take action to meet those goals.

How Does Intervention Bring About Changes in Ways in Which Students' Approach Learning Tasks?

The study results showed differing degrees of growth among all the students who participated. Overall, students expressed more confidence in the tasks at hand as they implemented learning strategies that they had found effective. Students became more aware of how their efforts positively led to their learning outcomes. Seth, who had a performance goal orientation commented that the intervention sessions helped him listen more carefully in class: "I didn't like quite like listen a lot in class but now I do so most of the time." When asked if he was worried about getting the right answer during intervention sessions, he showed mastery goal orientation tendencies when he commented that he would have learned from the process of looking for the correct answer. Ken showed signs of moving from a performance goal orientation to a mastery goal orientation during intervention sessions but continued to work with the performance goal orientation in his classroom. He worried about getting the correct answer but noticed during the intervention sessions that that was not the focus of the sessions. When asked if he was concerned about getting answers correct in class he responded, "I kind of do because it kind of counts for my mark and they could maybe hold me back another year…so I try to, I try to do it, I try really hard to get the right answers." During the intervention sessions Ken felt that he could focus on learning and not worry about getting good marks.

The intervention brought about some changes in how students approach learning tasks. At the end of the intervention sessions there were signs of a mastery goal orientation from some of the students. Stewart shared: "because I know that I am just learning, it's okay to make mistakes." However, there were also signs of students who continued to focus on a performance orientation. For example, Erik shared: "I want to get a good mark." Rose's remarks showed that it was confidence that helped her move from a performance orientation to a mastery orientation.

Researcher: When we did the questions and read those stories together were you ever worried about getting the wrong answer?
Rose: Yeah. (giggle)
Researcher: Tell me about that.
Rose: I didn't know, like if there was a right or wrong answer, and I like maybe wanted to get good mark. Yeah.
Researcher: Okay, so you were concerned about the mark. And did you continue to worry about getting the answers right or wrong as we worked together?
Rose: No.
Researcher: Okay, what changed?
Rose: Umm, I got better and better and I felt more confident.

Overall, the findings in this study showed that students with a performance-prove goal orientation became more confident in their skills and became more mastery goal-orientated in this study. Students with a mastery goal orientation, sustained their orientation throughout the intervention sessions. The students who had mastery goal orientations commented that they got better at the skills they were working on and were more confident as learners.

How Does the Use of Diagnostic Feedback Together with Intervention Direct Students to Self-Regulate Their Own Reading Ability?

As part of our cognitive feedback interventions, students were encouraged to think about their own engagement and effort during learning sessions. Students were reminded to use learning strategies (e.g., rereading sections of the passage, clarifying what the question was asking, etc.) throughout the sessions. Providing students with a regular opportunity to practice reflecting on their own learning encouraged them to better understand their own strengths and areas of need and ideally lead them to become better learners.

The study results further indicate the improvement of students' self-regulating ability. The students commented that they were reading the questions more carefully. For example, Stewart shared that he was using the strategies he was taught to read more carefully.

Researcher: Do you think you are a better learner now than you were when we first started working together?
Stewart: Mmm, yeah, I think I am.
Researcher: Why? How so?
Stewart: Well because I have been using…umm, like some of the strategies. I have been…umm, I have been reading the ans…the questions more carefully.

Erik also commented that he was able to understand passages easier because he was reading more carefully.

Some students found it helpful to work together in a small group and described the experience as fun. They felt it was useful to hear others' perspectives during the session. For example, Raymond shared: "if I work with a lot of people it would be also good for me to get more

ideas how…uh other people think beside me." Seth felt that it moved things along faster and more interesting.

Towards the end of the intervention sessions, students were asked to redo the self-assessment questionnaire that they had filled out during the initial assessment period. Their scores showed that they had changed their view of themselves as learners over the 6 months that had passed since they first filled out this questionnaire. This can be understood as evidence of their attention to their own ability with more care. The intervention sessions helped students to better self-regulate their literacy skills in terms of both their strengths and areas of weakness. Students' self-assessment scores prior to the intervention session and after the intervention session differed for each student. For example, Erik showed greater variance showing that he was putting more thought into assessing his skills (see Figure 2).

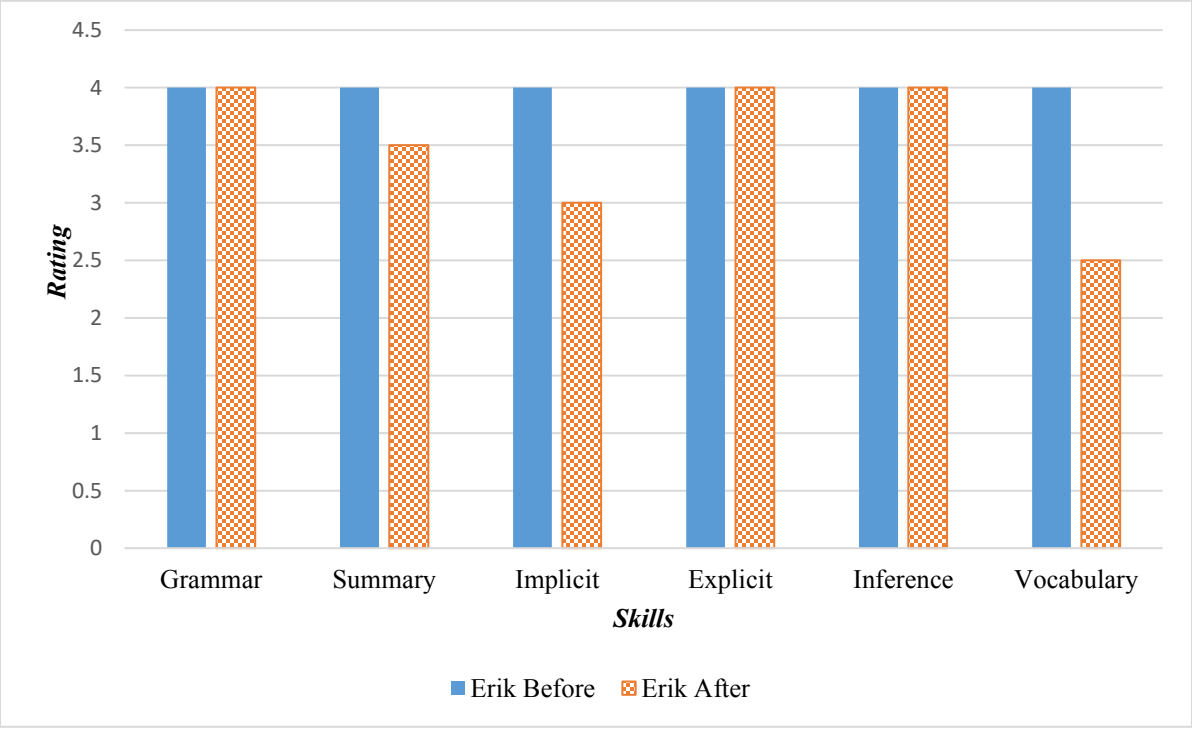

Figure 2: Erik's self-assessment of skills before and after intervention sessions.

Ken and Raymond were more accurate with their scores, as they felt comfortable giving themselves lower scores in areas that they continued to struggle with and higher scores in areas that they felt they had made progress in. Stewart rated himself as "not having thought about it" for his inferencing skills in the pre-assessment. In the post-assessment, he scored himself in each category and gained significantly more confidence in his vocabulary skills. Seth and Rose showed more confidence in a number of skill areas, but saw that inferencing was more challenging still. These study results illustrate that reading skill profiles provided specific guidance to learners for further improvement and facilitated students' self-regulation skills as it prompted them to create

learning goals that were focused on correcting conceptual errors and cognitive gaps. In this way, learners were not simply responding to external feedback, but that they could filter the external feedback given through the perceptions of their own abilities and learning orientations. Students became more independent in their focus of the goals they set for themselves and the learning strategies they were taught and were encouraged to use.

Discussion

Research on assessment claims that the information gathered from students' assessment performance can do more than just demonstrate student learning for accountability; it can actually assist students improve their learning (Nichols, Meyers, & Burling, 2009). The main goal of traditional education tests, however, is to compare an individual's general ability to that of others in the same normative group (Brown & Hudson, 2002). These types of tests lack the diagnostic information that is necessary to inform students of both strengths and areas for improvement within a specific academic area (Nichols, 1994). For assessment to be formative, it must produce evidence of a gap between one's actual and desired level of performance and should suggest steps needed to close that gap (Wiliam & Black, 1996). There is a need to attend to struggling readers' cognitive and metacognitive strategy use. The purpose of this study was to examine how students respond to mediated interventions when given diagnostic feedback.

Research has shown that diagnostic feedback has the potential to be more effective when it gives students information about the progress they have made towards the goals they have set for themselves (Jang & Wagner, 2014). "Diagnostic feedback provides learners with information that can help them reflect on their learning in order to take remedial action" (Jang & Wagner, 2014, p. 2). When students work towards goals that are both personally challenging and meaningful, they are motivated be self-regulated learners (Butler & Winne, 1995; Hattie & Timperley, 2007). This study provided students with an opportunity to set goals based on the diagnostic feedback they received, apply effective learning strategies, and make gains in both their learning and skills as a learner.

Diagnostic feedback was designed to support teaching and learning on a continuous basis through student researcher collaboration. Students were encouraged to think about and monitor their own learning as a means to improve their reading skills. When students were provided with diagnostic feedback, they were better equipped to regulate metacognition, which in turn helped them persist in learning tasks (Zimmerman, 2000; Black & Wiliam, 2009). Stiggins (2002) states that "students come to understand what it means to be in charge of their own learning—to monitor their own success and make decisions that bring greater success. This is the foundation of lifelong learning" (p. 764).

In the present study, students were provided with diagnostic feedback that directs students' attention to their reading skill mastery levels as well as goal orientations. Subsequent interventions focused on supporting students' ability to plan, monitor, and self-reflect on their learning through one-to-one interactions. The present study results indicate that students can benefit from interventions targeting not only literacy knowledge and skills but also metacognition and self-

regulation (Harrison, Bunford, Evans, & Owens, 2013). Systematic diagnostic assessment can provide detailed profiles of individual students' strengths and weaknesses, which needs to be subsequently used to provide customized interventions for students who struggle not only with reading abilities but also who lack metacognitive and self-regulating abilities. Such diagnostic profiles can guide teachers to offer individualized instructional strategies with different scaffolding approaches (Stanford, Crowe, & Flice, 2010).

Conclusion

The importance of assessment that informs not only the teacher but also the learner is significant to student engagement and learning (Black & Wiliam, 2009, 2011; Wiliam, 2011; Stiggins, 2007). Based on the diagnostic intervention provided in this study, implications and recommendations are proposed. It was found that diagnostic feedback intervention can be beneficial for students who struggle with reading comprehension. While current assessment practice tends to measure a student's overall reading ability, it does not provide specific information about the skills needed for reading comprehension. This information is not helpful from a pedagogical stand point. Providing students with individualized feedback that is skill-based and provides strategies to target chosen areas gives students a far greater understanding of their strengths and areas of need and how to best target these areas.

Assessment should cognitively engage students. By giving students the opportunity to implement learning strategies through individualized feedback and intervention, students can experience increased self-regulation and motivation to learn. Assessment also needs to provide a clear understanding of a student's current skills and then adapt the intervention to best support student's learning progress. Assessment needs to constantly negotiate the intensity of intervention while factoring in metacognitive traits to guide students in becoming self-regulated learners. Finally, intervention must be dynamic, adjusting to student's cognitive and metacognitive processes. It should not be static but rather move between teacher and student and continuously negotiate the scaffolding strategies needed to support student's learning.

The paper reports a study that involved a small number of students. Further, the length of intervention (20 minutes per session with a total of seven sessions) may not have been sufficient for all students to achieve their desired levels of achievement. Although the length of intervention is relatively short, however, this 20-minute intervention is similar to what teachers would spend to work with a small group of students or an individual student on specific skills. Although changes in their learning were observed in this study, more intervention sessions would have made the results of this study more significant. Lastly, post-intervention assessments (immediate and delayed assessments) would have provided empirical evidence for evaluating the effects of the intervention on students' target skills and other psychological traits. We call for more research that involves a larger group of students whose profiles represent unique challenges and tracks their growth over time longitudinally.

In order to better understand the effect of diagnostic feedback, it is important to recognize how students interact with it. The way students think about learning and their part in it through

goal orientation and SRL are factors that play a part in understanding how they process diagnostic feedback. However, as shown in this study, the use of diagnostic feedback in intervention benefits all. Empowering students through intervention encourages them to take ownership of their own learning and work towards goals that will carry them forward in life.

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