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A Synthesis of Professional Development on the Implementation of Literacy Strategies for Middle School Content Area Teachers

Deborah K. Reed

The University of Texas at Austin
Austin, TX

Abstract

This paper synthesized studies of professional development for middle school content area teachers and the teachers' subsequent implementation of literacy strategies. Four studies were identified as having a majority of participants teaching English/reading, mathematics, science, and social studies in grades 6 through 8. Articles meeting the criteria included two qualitative studies of the impact of professional development on implementation of literacy strategies, one ethnographic study of the characteristics of content area teachers with strong implementation of literacy strategies, and one quasi-experimental study of the impact of professional development on student reading performance. Findings indicate that ongoing schoolwide initiatives that are responsive to teachers' perceived needs hold promise for increasing literacy instruction across the curriculum and improving some student reading skills.

Introduction

An increasing concern about the literacy needs of adolescents and the instructional practices of secondary teachers in support of reading across the curriculum is well documented (Biancarosa & Snow, 2004; Kamil, 2003; Sturtevant, 2003). While literacy demands in the workplace, military, college, and citizenship have been increasing, the materials and instruction afforded students in secondary schools have seemingly not kept pace (Williamson, 2006). Recently reported gains on the eighth-grade National Assessment of Educational Progress (NAEP) reading test remained appreciably different from the peak performance of students in 2002 (Lee, Grigg, & Donahue, 2007). In addition, eighth graders from low income families experienced no average performance gain, and the gaps between the scores of white students and their black and Hispanic counterparts did not significantly narrow. Nationally, only 31% of

eighth graders without disabilities and a mere 7% of students with disabilities scored at the proficient or advanced levels, where *proficient* means that students:

> … should be able to show an overall understanding of the text, including inferential as well as literal information. When reading text appropriate to eighth grade, they should be able to extend the ideas in the text by making clear inferences from it, by drawing conclusions, and by making connections to their own experiences—including other reading experiences. *Proficient* eighth-graders should be able to identify some of the devices authors use in composing text. (Lee, Grigg, & Donahue, p. 38)

Undoubtedly, the skills required of a proficient reader are those that most middle school teachers acknowledge as essential to success in the content areas. Yet, researchers such as Pressley (2002) have lamented that little classroom attention is being devoted to teaching students how to process text. Researchers have documented more rehearsing and testing of comprehension skills than actual teaching of the strategies and how to apply them (Duffy, 1993; Durkin, 1978–1979; Ness, 2007; Pressley, 1998; Reutzel & Cooter, 1988).

Reading strategies, or cognitive strategies as termed by the National Reading Panel (National Institute of Child Health and Human Development, 2000), are defined as the "specific procedures that guide students to become aware of how well they are comprehending as they attempt to read and write" (p. 4–40). Research has identified particular cross-curricular strategies for supporting the literacy needs of adolescents, including those with reading disabilities (Mastropieri, Scruggs, & Graetz, 2003; Scammacca et al., 2007), but few middle school teachers have had formal or meaningful training in providing reading instruction within the context of their subject areas (Heller & Greenleaf, 2007). Consequently, most do not have command of scientifically based reading research practices, and many show resistance to incorporating reading strategies (Kamil, 2003; Ness, 2007). Given that secondary teachers are less likely to feel efficacious as compared to elementary teachers (Fuller & Izu, 1986; Guskey, 1981; Marachi, Gheen, & Midgley, 2002; Midgley, Feldlaufer, & Eccles, 1988; Roeser, Marachi, & Gehlbach, 2002), efforts to alter instructional practice at the middle level and above must be designed to build teachers' "judgment of [their] capabilities to bring about desired outcomes of student engagement and learning, even among those students who may be difficult or unmotivated" (Tschannen-Moran & Hoy, 2001, p. 783).

Rationale and Research Questions

According to correlation studies on teacher quality (Darling-Hammond, 2000; Darling Hammond et al., 2003), higher levels of student achievement are associated with educators who are certified in their fields and who participate in sustained professional development grounded in content-specific pedagogy. Yet, there are few scientifically based studies establishing causal connections between high-quality professional development and improved student achievement. In a review of 1,300 studies (Yoon, Duncan, Lee, Scarloss, & Shapley, 2007), only nine were found to meet the evidence standards delineated by the *What Works Clearinghouse* (Institute of Education Sciences, 2006). These rigorous quality indicators help ensure that the field can have confidence in the reliability and validity of the findings. Although the results of the few studies identified by Yoon and colleagues were promising with an average 21-percentage point increase among students whose teachers participated in workshops or summer institutes lasting more than 14 hours, none included teachers above the fifth grade.

Given the NAEP data indicating persistent and rather intractable reading difficulties among students in grade 8, it seems particularly important to identify avenues of research for strengthening middle school literacy instruction. Ameliorating the reading gaps of adolescents, however, requires a significant commitment of direct instructional time (Fielding, Kerr, & Rosier, 2007) that will likely require the coordinated efforts of all core academic teachers—not just designated reading or English/language arts instructors (Deshler et al., 2001; Kamil, 2003). Working across the content areas has theoretical appeal as a means to increase instructional time, practice opportunities, and the likelihood of transfer; however, not much is known about how to accomplish an effective cross-curricular approach to reading beyond the elementary school level. Despite anecdotal and descriptive reports of such schoolwide efforts, there has been no systematic review of the extant literature to codify the patterns emerging in high-quality studies targeting teachers of the middle grades.

The purpose of this paper was to synthesize the findings of studies on professional development for middle school content area teachers and the teachers'

subsequent implementation of literacy strategies. The research questions addressed included:

- What professional development practices influence the implementation of reading strategies in middle school mathematics, science, social studies, and English/language arts classes?
- What contextual factors are associated with the implementation of reading strategies in middle school mathematics, science, social studies, and English/language arts classes?
- To what extent does professional development for middle school teachers of mathematics, science, social studies, and English/language arts impact student outcomes on one or more measures of reading?

Methods

To identify relevant studies, the researcher searched PsycINFO and ERIC electronic databases using various combinations of the following descriptors: middle school, literacy, reading, content area, and professional development. In addition, an ancestral search of the reference lists in articles on content area literacy or professional development in middle schools were examined for studies that may not have appeared in the computerized search. Because the professional development studies included in Yoon and colleagues' (2007) review dated back to 1986, no restrictions were placed upon the year of publication in performing these searches so that the largest number of articles possible would be captured. The 87 abstracts identified were evaluated based on the following criteria:

1. The article must have appeared in a peer-reviewed journal.

2. The article must report a research study, not merely present a description of a program (Deshler et al., 2001).

3. The research must have employed a rigorous qualitative, quasi-experimental, or experimental design. "Rigorous" qualitative studies were defined by their adherence to the quality indicators delineated by Brantlinger, Jimenez, Klingner, Pugach, & Richardson (2005). "Rigorous" quasi-experimental and experimental studies were defined by their adherence to the *What Works Clearinghouse Evidence Standards for Reviewing Studies* (Institute of Education Sciences, 2006) or the quality indicators presented by Gersten and associates (2005).

4. The majority of the participants must have been teachers and/or students in grades 6 through 8 in U.S. schools.

5. The strategies implemented must have specifically included a focus on students' reading or literacy performance. Studies were omitted if they focused only on general study skills, such as homework completion (Hughes, Ruhl, Schumaker, & Deshler, 2002) or remembering subject-matter content (Bulgren, Deshler, Schumaker, & Lenz, 2000).

6. The authors must have sufficiently described the participants to enable a determination that math, science, and/or social studies teachers were included in addition to ELA/reading teachers. Studies were excluded if they did not unambiguously state that math, science, and/or social studies teachers were involved (e.g., Parris & Block, 2007; Shippen, Houchens, Calhoon, Furlow, & Sartor, 2006).

All 87 abstracts were sorted into three groups representing those that clearly violated one or more of the delimiters, those that seemed to meet all criteria, and those that needed further evaluation. Then, the 18 articles of the latter two groups were read in their entirety. Only four studies were judged to meet all criteria for inclusion in the synthesis. Therefore, a manual search was conducted on the tables of contents of two journals determined in the electronic and ancestral searches to publish recent studies related to improving teacher practice in secondary classrooms serving students with diverse abilities: *Learning Disability Quarterly* and *Learning Disability Research & Practice.* Reviewing publications from the last six years did not net any new articles meeting all criteria. Although less restrictive standards may have yielded more studies, it would have reduced the confidence that findings were attributable to the professional development of interest to this review or generalizable within the context of the middle grades.

Data Analysis

The articles included two qualitative studies of the impact of professional development on implementation of literacy strategies, one ethnographic study of the characteristics and beliefs of content area teachers with strong implementation of literacy strategies, and one quasi-experimental study of the impact of professional development on student reading performance. Because the studies meeting the criteria employed mixed methods and purposes, a hybrid of procedures was used to analyze the data.

Coding procedures. In the first phase, studies were coded using a detailed code sheet developed with elements from previous qualitative (Scruggs, Mastropieri, & McDuffie, 2007; Swanson, 2008) and quantitative (Kim, Vaughn, Wanzek, & Wei, 2004) syntheses. The code sheet incorporated quality indicators specified by Brantlinger and colleagues (2005), Gersten and associates (2005), and by the Institute of Education Sciences (2006). These indicators provide a framework for organizing study components and considering the research design. They are a means by which the educational community can evaluate the credibility and trustworthiness of the research. Other information recorded on the code sheets included descriptions of the participants (e.g., number, grade level, content area), study design (e.g., conditions, assignment to conditions, fidelity of treatment check, observer reliability establishment, data sources, measures employed), descriptions of conditions or the professional development (e.g., duration, length of sessions, strategies used), and reported results (e.g., measures, measurement type, statistical information, themes).

Information from all the code sheets was organized in a table to summarize the studies. Table 1 provides each study's design, participant information, data sources, and quality indicators.

Table 1
Study Characteristics

Study	Participants[a]	Subject Areas	Grade Level(s)	Duration of Prof Dev	Data Sources[b]	Quality Indicators[c]
1. Bryant, Linan-Thompson, Ugel, Hamff, & Hougen (2001)[1] *Qualitative*	10 teachers	2 Eng/language arts 2 Mathematics 2 Science 2 Social studies 2 Special education	6	4 months (3 full-day workshops, in-class modeling, 1-hour support meetings every 2 weeks)	Pre-/Post-int, inservice evaluations, IVCs, checklist of barriers	Tri, collab, audit trail, prolonged f.e., sys
2. Bryant, Vaughn, Linan-Thompson, Ugel, Heamff, & Hougen (2000)[1] *Quasi-experimental* *Treatment fidelity: Yes*	10 teachers 60 students (29 AVE, 17 LA, and 14 RD)	2 Eng/language arts 2 Mathematics 2 Science 2 Social studies 2 Special education	6	4 months (3 full-day workshops, in-class modeling, 1-hour support meetings every 2 weeks)	Word ID test, WISVPC, TORF, read comp test, IVCs	Separating data by ability group, fidelity checks, standardized instrument, no attrition
3. Nichols, Young, & Rickelman (2007) *Qualitative*	69 teachers (students below grade level in reading)	16 Eng/language arts 17 Mathematics 11 Science 11 Social studies 14 Other	Not specified (middle school)	1 academic year (planning period once per month)	RLAIFQ, teacher records, IDSC, obs	Tri, collab, audit trail, prolonged f.e., sys
4. Sturtevant & Linek (2003) *Ethnographic*	9 teachers	2 Eng/language arts 1 Mathematics 1 Science 3 Social studies 1 ESL 1 Elective	6–12 (several teachers taught multiple grade levels)	None provided by researchers	Int, obs, video, emails, artifacts	Tri, collab, audit on cross-case analysis, audit trail, external auditor, sys, reanal

[1] Note: Although studies 1 and 2 are based upon professional development provided to the same set of teachers, the articles are treated as separate studies for the purposes of this synthesis since the analyses and results focus upon different research questions and participants. Study 1 was concerned with teacher outcomes; whereas, study 2 examined student outcomes.

[a] Abbreviations: AVE = average achieving in reading; LA = low achieving in reading; RD = students with reading disabilities

[b] Abbreviations: int = interviews; IVCs = Intervention Validity Checklists; WISVPC = Word Identification Strategy Verbal Practice Checklist; TORF = Test of Oral Reading Fluency; read comp test = reading comprehension test; RLAIFQ = Reading Language Arts Instructional Features Questionnaire; IDSC = Instructional Design and Strategy Checklist; obs = observations.

[c] Abbreviations: tri = triangulation of data; collab = collaborative work; prolonged f.e. = prolonged field engagement; sys = systematic data collection and analysis; reanal = reanalysis of primary and secondary data for consistency.

The second phase of coding primarily concerned the qualitative and ethnographic studies and involved a line-by-line analysis of the documents (Strauss & Corbin, 1998). The articles were re-read for the purposes of highlighting those portions of text relevant to the research questions. All the highlighted segments, or phenomena, were recopied verbatim in list fashion. The list was cut apart and the items were grouped according to themes developed by the researcher. This was a recursive process involving theoretical sampling (Strauss & Corbin). Grouping decisions were informed by returning to the original text and were revisited as comparisons were made between and among phenomena. In different iterations of the open coding, segments were recombined and categories were renamed. For example, several highlighted portions of text were originally conceptualized as *teacher characteristics* because they appeared in the ethnographic study (Sturtevant & Linek, 2003) examining the qualities and beliefs of teachers who were strong implementers of literacy strategies. After returning to the study and considering coded segments from other studies, the phenomena were classified into two categories: *contextual factors* and *implementation/fidelity issues*.

The dynamic process of open coding ultimately resulted in four superordinate categories:

- Professional development practices that influence implementation of literacy strategies
- Contextual factors affecting implementation of literacy strategies
- Issues associated with teachers' implementation of or fidelity to literacy strategies
- Teacher and student outcomes of professional development in literacy strategies

Axial coding helped to elucidate the relationships among these superordinate categories and their subcategories (Strauss & Corbin, 1998). For example, the category *implementation/fidelity issues* included phenomena related to a lack of literacy strategy implementation or low fidelity of implementation. Several coded segments from the studies pertained to teachers picking and choosing among strategies or parts of strategies to which they were introduced in professional development. However, these phenomena seemed commonly to occur within the context of teacher judgments about what was feasible and relevant to particular subject areas.

Given the small number of studies, the tallying of identified factors and phenomena did not contribute to the analysis beyond identifying unique or disconfirming evidence. In other words, an actuarial approach was used simply to ensure that categories were not formed based on phenomena reported in only one study or one instance. Rather, those solitary phenomena were compared to other data to check for discrepant or negative cases (Royse, Thyer, Padgett, & Logan, 2006) or to identify areas needing further research.

Effect size calculation. Only one study (Bryant, Vaughn, et al., 2000), examined student outcomes; however, it did not contain statistical information suitable for confirming the calculation of effect sizes. As the study drew upon intact classrooms and all student participants received the literacy strategy intervention, there was no comparison group against which to determine the effect of the treatment. The authors reported effect sizes for all students using eta-squared from their analysis of covariance where .01 indicates a small effect, .06 a medium effect, and .14 a large effect. Effect sizes for students with reading disabilities were expressed as the difference between the means in standard deviation units where .20 represents a small effect, .50 a medium effect, and .80 a large effect. In all, six effect sizes ranging from .01 to .67 were appropriate for addressing the third research question of this synthesis. Table 2 describes the literacy strategies employed and records the effect size on each dependent measure for all students and, separately, for students identified as reading disabled.

Results

Study Features

Although no restrictions were placed upon the date of publication, all four studies meeting the criteria were published in the last seven years. As opposed to the findings of Yoon and colleagues (2007), professional development studies specific to the middle school level appear to be a more recent undertaking. The specifics of each study's design are displayed in Table 1; however, the information is summarized in the following sections to provide further explanation.

Sample characteristics. A total of 88 teachers and 60 students were identified as participants in the studies. Dividing the teachers into subject areas revealed that 20 English/language arts, 20 mathematics, 14 science, 16 social studies, and 16 others (combination of special education, ESL, and electives) were included. Three of the studies (Bryant, Linan-Thompson, Ugel, Hamff, & Hougen, 2001; Bryant, Vaughn, et al., 2000; Sturtevant & Linek, 2003) involved 9

Table 2
Reading Outcomes

Intervention	Measure	Findings/Results[a]
Bryant, Vaughn, Linan-Thompson, Ugel, Hamff, & Hougen (2000) • *Treatment:* Teachers were trained to implement 3 reading strategies in content area classes: Word identification (DISSECT strategy for breaking an unfamiliar word into its constituent parts), fluency (Partner Reading or peer-mediated repeated readings), and comprehension (Collaborative Strategic Reading strategies for prediction, vocabulary, main idea, and summarization). One teacher on each interdisciplinary team took responsibility for describing and modeling the strategy. The other teachers on the team then had students practice applying the strategy with their content. Each strategy was implemented two to three times a week for 16 weeks.	Word ID test *(intervention specific)*	*All students* ES = .12* ($p < .01$) *Students with RD* ES = .64* ($p < .05$)
	Test of Oral Reading Fluency *(standardized)*	*All students* ES = .27* ($p < .001$) *Students with RD* ES = .67* ($p < .05$)
	Reading comprehension test *(intervention specific)*	*All students* ES = .01 (ns) *Students with RD* ES = .22 (ns)

[a] Abbreviations: ES = effect size measures: η^2 for all students and Cohen's *d* for students with RD; RD = students with reading disabilities; ns = not significant

or 10 teachers. The study with the largest number of teachers ($N = 69$) took place in a Title 1 middle school serving students who were all below grade-level in reading (Nichols, Young, & Rickelman, 2007). Notably, all studies represented diverse student populations in terms of language, ethnicity, urbanicity, and socioeconomic status.

Study design. Two qualitative studies focused on the impact of professional development on implementation of literacy strategies (Bryant, Linan-Thompson, et al., 2001; Nichols et al., 2007), one ethnographic study focused on the characteristics of content area teachers with strong implementation of literacy strategies (Sturtevant & Linek, 2003), and one quasi-experimental study examined the impact of professional development on student reading performance (Bryant, Vaughn, et al., 2000). None employed treatment/comparison designs or random assignment. The qualitative studies maintained credibility standards through the triangulation of data, collaborative work, audit trails, prolonged field engagement, and systematic data collection and analysis procedures. The quasi-experimental study reported separating outcomes by ability groups, checking implementation fidelity, and employing standardized measures of student outcomes. In addition, there was no attrition during the study and only one missing test score, which was not included in the analysis.

Coding Results

This synthesis of studies on professional development for middle school teachers sought to determine whether certain elements of the training and of the school environment influenced the implementation of literacy strategies in content area classes. In addition, this study examined the extent to which professional development in literacy strategies affected student outcomes on one or more measures of reading. Results of the data analysis are presented according to the superordinate categories identified in the coding process.

Professional development practices that influence implementation of literacy strategies. Despite the different approaches taken in each study, all four articles presented consistent data on the professional development practices that seemed successful at fostering change among middle school teachers. For example, the content of inservice sessions and workshops was selected to meet teachers' perceived needs. In studies where the researchers provided the professional development (Bryant, Linan-Thompson, et al., 2001; Bryant, Vaughn, et al., 2000; Nichols et al., 2007), the strategies introduced were determined on the basis of a needs assessment conducted by interview or survey. The study that explored teachers' beliefs and behaviors (Sturtevant & Linek, 2003) noted that individuals, those considered to be strong implementers of literacy strategies were involved in multiple activities beyond minimum requirements and

were "savvy consumers of professional development, utilizing those that were helpful and avoiding those they considered a 'waste of time'" (p. 84).

Professional development was not only relevant to the teachers, but was ongoing and, frequently, job-embedded. Where researchers provided training, literacy strategies were introduced incrementally over the length of the study and utilized grade level (Nichols et al., 2007) or grade level and interdisciplinary (Bryant, Linan-Thompson, et al., 2001; Bryant, Vaughn, et al., 2000) team meetings. When teachers were describing their self-directed efforts at professional learning (Sturtevant & Linek, 2003), they commented, "To be a teacher is to constantly accept learning, and I want to be the best teacher I can be for my students" (p. 83); and "Every day I'm reading articles and research" (p. 85). Bryant and colleagues (2001) also included in-class modeling in the design of their professional development, but noted that teachers wanted even more demonstrations where "you could actually see what should take place" (p. 257).

All studies referenced time allotted to teachers for preparation of lessons, self-reflection, additional support (including in-class coaching), and/or gaining confidence in using new strategies as a potential barrier to implementation. As with in-class coaching, there was often an expressed need for more time. Educators commented that their practices "didn't dramatically change overnight," (Sturtevant & Linek, 2003, p. 85), and researchers stressed that substantive professional growth required that middle school teachers had "opportunities to assess and critically think about their instructional practices" (Nichols et al., 2007, p. 112). After a semester-long structure with over 30 hours of professional development, Bryant, Vaughn, and colleagues (2000) recommended reading strategy instruction "be implemented and studied on a year-long basis to allow teachers and students more time to learn and apply the strategies" (p. 250).

Contextual factors affecting implementation of literacy strategies. Beyond the design of professional development, there are conditions within middle schools that seem to help or hinder content area teachers as they attempt to integrate literacy strategies into their instruction. Two studies (Bryant, Linan-Thompson, et al., 2001; Sturtevant & Linek, 2003) made specific mention of teachers being "overwhelmed" by addressing issues in students' backgrounds (e.g., native language, poverty, limited vocabulary or conceptual knowledge, learning disabilities) while attempting to meet the requirements of high-stakes assessments. These issues seemed to be mitigated somewhat by collaborative efforts among colleagues at both the campus and district levels. Teachers expressed an appreciation for opportunities to share responsibilities and to apply cognitive strategies in linking instruction across subject areas. These collaborative efforts were seen as beneficial to teachers: "I think teaming is the way to go. Teachers who aren't teaming and have no time to plan together are going to be hard pressed to figure out who's going to do what" (Bryant, Linan-Thompson, et al., 2001, p. 258) as well as to students:

> "I think that in technology, kids can do problem solving, and they can use a lot that they've learned in some of the core subjects … it's an area where they can put a lot of things together." (Sturtevant & Linek, 2003, p. 81)

Internal collaboration was often fostered by the infusion of some external expertise. In the studies that provided professional development (Bryant, Linan-Thompson, et al., 2001; Bryant, Vaughn, et al., 2000; Nichols et al., 2007), university-based researchers came to the campus to provide training in literacy strategies and facilitate team meetings. Where teachers independently self-selected professional learning activities (Sturtevant & Linek, 2003), they could cite specific courses that sparked their own growth, but did not mention sharing the knowledge or practices with colleagues. In other words, in the absence of a schoolwide initiative to implement literacy strategies, there was no mechanism to "promote a common strategy 'language' and cohesion of strategy use across the content area classes" (Bryant, Linan-Thompson, et al., p. 260).

Finally, all studies noted two factors that seemed to act as barriers to implementing literacy strategies in middle school content area courses: (1) time to prepare and instruct students, and (2) access to instructional materials appropriate for diverse student needs. These were loosely connected to perceptions of administrative support:

> We believe that a project of this magnitude could not have occurred without this level of support … Building- and district-level personnel must support the teachers who are responsible for teaching their content materials as well as who are being asked to integrate reading strategies. (Bryant, Linan-Thompson, et al., 2001, pp. 258–259)

Issues associated with teachers' implementation of or fidelity to literacy strategies. All four studies reported some degree of teachers selectively implementing strategies and components of strategies to which they were exposed. On the surface, it appeared that middle school teachers did not put into practice much of what professional development resources were dedicated to cultivating. However, the strategies and parts of strategies teachers ultimately chose to implement were often framed by their judgments of curricular needs and of whether or not a strategy was a good "fit" for their subject. Upon examining self-report and observational data of teachers' choices from a list of 62 strategies, Nichols and colleagues (2007) found that each content area relied more heavily on a different strategy. Moreover, there were unique selections made by every department:

> English teachers were the only group to select the Writing Process and Free Writes as their top strategies. While the math teachers were the only ones to select Reciprocal Teaching, the science teachers were the only ones to select Concept Maps and Venn Diagrams, the social studies teachers were the only ones to utilize Underlining and Word Walls. (p. 110)

Even when teachers were implementing research-based literacy strategies, they reportedly did so with limited fidelity, which was partially attributed to the difficulty of balancing content and strategy instruction at the same time (Bryant, Linan-Thompson, et al., 2001; Bryant, Vaughn, et al., 2000). Similarly, Nichols and colleagues (2007) found teachers generally did not design their instruction to foster student engagement or active involvement since directed whole-class instruction and demonstration were the most common practices. The exception to these data came from the study of teachers already considered by their supervisors to be strong implementers of literacy strategies (Sturtevant & Linek, 2003):

> Despite differences in personal characteristics, region, content area, and grade level taught, all of the teachers described good teachers as strongly concerned about student needs and lifelong learning, and as implementers of instruction that engaged students in thinking, problem solving, and discussion. (p. 85)

Teacher and student outcomes of professional development in literacy strategies. Content area teachers at the middle school level who participated in professional development reported feeling knowledgeable about and prepared to implement literacy strategies in support of students with diverse reading abilities (Bryant, Linan-Thompson, et al., 2001; Bryant, Vaughn, et al., 2000; Nichols et al., 2007). Moreover, teachers who were experienced at integrating literacy and content instruction felt strongly that their practices could improve outcomes for their adolescent students (Sturtevant & Linek, 2003).

Available student data provided limited confirmation that improvements could be realized for students of varying ability levels. The one study that addressed the impact of professional development in literacy strategies on middle school students' reading (Bryant, Vaughn, et al., 2000) found a medium but significant effect size ($\eta^2 = .12$) for all students, as well as for students with reading disabilities ($d = .64$), on intervention-specific word identification tasks. On a standardized measure of fluency, the effect size reported for all students was large and significant ($\eta^2 = .27$), and a medium effect size was reported for students with reading disabilities ($d = .67$). The results of the reading comprehension measure, however, did not achieve statistical significance. As this was an intervention-specific test, larger significant effects would have been expected.

Discussion

The purpose of this paper was to synthesize the findings of studies on professional development for middle school content area teachers and the teachers' subsequent implementation of literacy strategies. As a systematic review of existing research, it was not expected that new or novel practices would be identified. Rather, the intent was to increase the credibility and trustworthiness of descriptive patterns and to increase the level of confidence in otherwise disassociated findings from studies in the middle grades. Results indicate that effective professional development can be designed to meet the needs of teachers and to increase their confidence in instructing students of diverse reading abilities. However, there are elements related to the general school context and the particular subject area curricula that must be addressed to achieve strong and widespread implementation. Because the extant literature contains few high-quality studies and no experimental research, much more work needs to be done to identify clearly the critical components of professional development at the middle school level and to establish causal connections with student outcomes on measures of reading.

Summary and Implications for Professional Development

Findings from the qualitative, ethnographic, and quasi-experimental studies suggest there are four overarching categories when considering the research on and design of professional development in literacy strategies for middle school content area teachers. First, the training provided should be based upon teachers' perceived needs and should help teachers build their knowledge and skills over time. A more comprehensive review of effective professional development (Yoon et al., 2007) found that over 14 hours of distributed training was necessary to realize significant effects on student achievement. The studies included in this synthesis offered semester- (Bryant, Linan-Thompson, et al., 2001; Bryant, Vaughn, et al., 2000) and year-long professional development (Nichols et al., 2007), but still recommended that more time, opportunities for reflection, and in-class coaching be devoted to improving teacher practice. This confirms other research supporting intensive, sustained professional development efforts (Deshler et al., 2001; Garet, Porter, Desimone, Birman, & Yoon, 2001; Wilson & Berne, 1999) as well as calls for literacy coaches at the secondary level (Kamil, 2003; Ness, 2007; Poglinco et al., 2003; Sturtevant, 2003).

Apart from the structure of the professional development, a second category that emerged from the analysis concerned the contextual factors that seemed to affect implementation of literacy strategies in content area classrooms. The teacher participants in the studies taught students of diverse languages, cultures, socioeconomic statuses, and reading abilities. Some reported being overwhelmed by the responsibilities of addressing students' needs and meeting the requirements of high-stakes assessments (Bryant, Linan-Thompson, et al., 2001; Sturtevant & Linek, 2003). Hence, developing teachers' knowledge and skills to provide literacy strategy instruction is only a part of successfully achieving implementation. Campus- and district-level administrative support must accompany professional development efforts and should ensure teachers have access to materials, time to plan and deliver instruction, and structured opportunities to collaborate with colleagues (Deshler et al., 2001).

Collaboration, particularly with a focus on integrating content, was viewed as beneficial to both teachers (Bryant, Linan-Thompson, et al., 2001) and students (Sturtevant & Linek, 2003). However, in confirmation of other research (Reed & Groth, 2009), collaborative efforts to implement literacy strategy instruction did not seem to occur without external expertise and facilitation, despite the existence of interdisciplinary teaming in the middle schools. Data from this synthesis (Bryant, Linan-Thompson, et al.; Bryant, Vaughn, et al., 2000; Nichols et al., 2007) and from other sources (Fisher & Frey, 2007; Torgesen, Houston, & Rissman, 2007) suggest that the most supportive context for fostering collaboration and the implementation of literacy strategies across content areas is a schoolwide approach. In this way, teachers can share the burden of initially teaching the strategies and, more important, can reinforce a common set of strategies that allow educators and students alike to "focus more on the content than [the] process" of instruction (Fisher & Frey, p. 210).

Adopting a school wide model of literacy instruction may also assist with the third overarching category in the synthesis: Teachers' fidelity of implementation. Educators in the four studies selectively chose strategies and parts of strategies they felt were appropriate for their content areas. As other research has shown, teachers of diverse student populations often resist implementing validated instructional strategies they view as not feasible (Schumm & Vaughn, 1991) or as approaches that "would not work with [their] students" (Abrami, Poulsen, & Chambers, 2004, p. 207). However, results indicate that teachers with more support and experience were able to successfully integrate both literacy strategies and effective instructional designs into the content of their curricula (Sturtevant & Linek, 2003)—even when they originally thought the strategies were inappropriate for their grade-level or students (Bryant, Linan-Thompson, et al., 2001). Certainly, the strategies uniquely identified by teachers of certain departments in Nichols and colleagues' (2007) study are more broadly applicable. Extended professional development efforts, therefore, might better target the relevance of research-based literacy strategies to all content areas.

The final category of consideration is the limited evidence supporting improved teacher and student outcomes as a result of professional development efforts targeting literacy strategies. Although observations and self-report data left questions about teachers' fidelity of implementation, the educators reportedly expressed greater knowledge, skill, and confidence in their ability to use literacy strategies to support the needs of students with diverse reading abilities. This type of increase in self-efficacy, particularly the collective efficacy of a team of teachers, has previously been linked to substantive changes in instructional practices (Roeser, Marachi,

& Gehlbach, 2002; Rosenholtz, 1989), as well as improvements in student achievement (Goddard, Hoy, & Hoy, 2000). Hence, as noted in all four studies, it may simply take more time before more dramatic outcomes of professional development in literacy strategies are realized for either teachers or students.

The only evidence of student outcomes included in this synthesis (Bryant, Vaughn, et al., 2000) showed promise for improving students' word identification (medium effect sizes for all students and for students with reading disabilities) and fluency (large effect sizes for all students, and medium effect sizes for students with reading disabilities). However, the results of an intervention-specific measure of reading comprehension did not achieve statistical significance. Hence, it is not yet possible to link with confidence teachers' professional development and the reading achievement of middle school students. Given the extremely small number of studies identified with rather broad search criteria, the results presented here are best interpreted as guidance in the avenues for future research aimed at overcoming the serious limitations of the extant literature.

Limitations and Implications for Future Research

As noted earlier, none of the studies randomly assigned participants to conditions or employed an experimental design. Only one study (Bryant, Vaughn, et al., 2000) administered at least one standardized measure of student reading outcomes, but the researchers did not assess the performance of a comparison group. Therefore, causal inferences should not be made from the results presented in this paper. As Yoon and colleagues (2007) found, there is scant scientifically based evidence documenting the impact of professional development on either teacher practice or student achievement.

Future research that meets the *What Works Clearinghouse* standards (Institute of Education Sciences, 2006) is needed to establish best practices in professional development at the middle school level. This research should examine the length of time and the degree of intensity needed for professional development to strengthen content area teachers' implementation of literacy strategies. In addition, studies should identify means to build a middle school's internal capacity for collaborating and for sustaining schoolwide literacy initiatives. Finally, further research is warranted to establish a causal connection between improved teacher practice and student achievement. The intuitive appeal of extending instructional time and practice opportunities by suffusing literacy instruction across the curriculum must be solidly substantiated to justify the investment that content area teachers are being asked to make while also attempting to meet the demands of their own subject areas. General education teachers may continue to exhibit resistance to implementing the strategies if they do not see the practices as beneficial for students with and, particularly, *without* reading difficulties (Schumm & Vaughn, 1991; Scruggs & Mastropieri, 1996).

The extant literature indicates that ongoing schoolwide professional development initiatives that are responsive to teachers' perceived needs hold promise for increasing literacy instruction across the curriculum and improving some student reading skills. However, research that is more rigorous is needed before sweeping recommendations can be made regarding "best practice" in this area.

References

Abrami, P. C., Poulsen, C., & Chambers, B. (2004). Teacher motivation to implement an educational innovation: Factors differentiating users and non-users of cooperative learning. *Educational Psychology, 24*(2), 201–216.

Biancarosa, G., & Snow, C. E. (2004). *Reading next—A vision for action and research in middle and high school literacy: A report to Carnegie Corporation of New York.* Washington, DC: Alliance for Excellent Education.

Brantlinger, E., Jimenez, R., Klingner, J., Pugach, M., & Richardson, V. (2005). Qualitative studies in special education. *Exceptional Children, 71*(2), 195–207.

*Bryant, D. P., Linan-Thompson, S., Ugel, N., Hamff, A., & Hougen, M. (2001). The effects of professional development for middle school general and special education teachers on implementation of reading strategies in inclusive content area classes. *Learning Disability Quarterly, 24*(4), 251–264.

*Bryant, D. P., Vaughn, S., Linan-Thompson, S., Ugel, N., Hamff, A., & Hougen, M. (2000). Reading outcomes for students with and without reading disabilities in general education middle-school content area classes. *Learning Disability Quarterly, 23*(4), 238–252.

Bulgren, J. A., Deshler, D. D., Schumaker, J. B., & Lenz, B. K. (2000). The use and effectiveness of analogical instruction in diverse secondary content classrooms. *Journal of Educational Psychology, 92*(3), 426–441.

Darling-Hammond, L. (2000). Teacher quality and student achievement: A review of state policy evidence. *Education Policy Analysis Archives, 8*(1), ISSN 1068–2341.

Darling-Hammond, L., Hightower, A. M., Husbands, J. L., LaFors, J. R., Young, V. M., & Christopher, C. (2003). *Building instructional quality: "Inside-out" and "outside-in" perspective's on San Diego's school reform.* Seattle, WA: University of Washington Center for the Study of Teaching and Policy, Document R-03-3.

Deshler, D. D., Schumaker, J. B., Lenz, B. K., Bulgren, J. A., Hock, M. F., Knight, J., et al. (2001). Ensuring content-area learning by secondary students with learning disabilities. *Learning Disability Research & Practice, 16*(2), 96–108.

Duffy, G. G. (1993). Rethinking strategy instruction: Four teachers' development and their low achievers' understandings. *Elementary School Journal, 93*(3), 231–247.

Durkin, D. (1978–1979). What classroom observations reveal about reading comprehension instruction. *Reading Research Quarterly, 14*(4), 481–533.

Fielding, L., Kerr, N., & Rosier, P. (2007). *Annual growth for all students, catch-up growth for those who are behind.* Kennewick, WA: New Foundation Press.

Fisher, D., & Frey, N. (2007). A tale of two middle schools: The differences in structure and instruction. *Journal of Adolescent and Adult Literacy, 51*(3), 204–211.

Fuller, B., & Izu, J. A. (1986). Explaining school cohesion: What shapes the organizational beliefs of teachers? *American Journal of Education, 94*, 501–535.

Garet, M., Porter, A. C., Desimone, L. M., Birman, B. F., & Yoon, K. S. (2001). What makes professional development effective? Results from a national sample of teachers. *American Educational Research Journal, 38*(4), 915–945.

Gersten, R., Fuchs, L. S., Compton, D., Coyne, M., Greenwood, C., & Innocenti, M. S. (2005). Quality indicators for group experimental and quasi-experimental research in special education. *Exceptional Children, 71*(2), 149–164.

Goddard, R. D., Hoy, W. K., & Hoy, A. W. (2000). Collective teacher efficacy: Its meaning, measure, and impact on student achievement. *American Educational Research Journal, 37*(2), 479–507.

Guskey, T. R. (1981). Measurement of the responsibility teachers assume for academic successes and failures in the classroom. *Journal of Teacher Education, 32*, 44–51.

Heller, R., & Greenleaf, C. L. (2007). *Literacy instruction in the content areas: Getting to the core of middle and high school improvement.* Washington, DC: Alliance for Excellent Education.

Hughes, C. A., Ruhl, K.L., Schumaker, J. B., & Deshler, D. D. (2002). Effects of instruction in assignment completion strategy on the homework performance of students with learning disabilities in general education classes. *Learning Disabilities Research & Practice, 17*(1), 1–18.

Institute of Education Sciences. (2006). What Works Clearinghouse evidence standards for reviewing studies. Retrieved November 7, 2007, from What Works Clearinghouse Web site: http://ies.ed.gov/ncee/wwc/pdf/study_standards_final.pdf

Kamil, M. L. (2003). *Adolescents and literacy: Reading for the 21st century.* Washington, DC: Alliance for Excellent Education. Retrieved March 30, 2005, from www.all4ed.org

Kim, A., Vaughn, S., Wanzek, J., & Wei, S. (2004). Graphic organizers and their effects on the reading comprehension of students with learning disabilities. *Journal of Learning Disabilities, 37*, 105–118.

Lee, J., Grigg, W., & Donahue, P. (2007). *The Nation's Report Card: Reading 2007* (NCES 2007–496). Washington, DC: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics.

Marachi, R., Gheen, M., & Midgley, C. (2002, April). *Comparisons of elementary, middle, and high school teachers' beliefs and approaches to instruction using a goal orientation framework.* Paper presented at the annual meeting of the American Educational Research Association, New Orleans, LA.

Mastropieri, M. A., Scruggs, T. E., & Graetz, J. E. (2003). Reading comprehension instruction for secondary students: Challenges for struggling students and teachers. *Learning Disability Quarterly, 26*(2), 103–116.

Midgley, C., Feldlaufer, H., & Eccles, J. S. (1988). The transition to junior high school: Beliefs of pre- and post-transition teachers. *Journal of Youth and Adolescence, 17*, 543–562.

National Institute of Child Health and Human Development. (2000). *Report of the National Reading Panel. Teaching children to read: an evidence-based assessment of the scientific research literature on reading and its implications for reading instruction: Reports of the subgroups* (NIH Publication No. 00–4754). Washington, DC: U.S. Government Printing Office.

Ness, M. (2007). Reading comprehension strategies in secondary content-area classrooms. *Phi Delta Kappan, 89*(3), 229–231.

*Nichols, W. D., Young, C. A., & Rickelman, R. J. (2007). Improving middle school professional development by examining middle school teachers' application of literacy strategies and instructional design. *Reading Psychology, 28*(1), 97–130.

Parris, S. R., & Block, C. C. (2007). The expertise of adolescent literacy teachers. *Journal of Adolescent & Adult Literacy, 50*(7), 582–596.

Poglinco, S. M., Back, A. J., Hovde, K., Rosenblum, S., Saunders, M., & Supovitz, J. A. (2003). *The heart of the matter: The coaching model in America's Choice schools.* Philadelphia: Consortium for Policy and Research in Education.

Pressley, M. (1998). *Reading instruction that works: The case for balanced teaching.* New York: Guilford Press.

Pressley, M. (2002). Comprehension strategies instruction: A turn-of-the-century status report. In C. C. Block & M. Pressley (Eds.), *Comprehension instruction: Research-based best practices* (pp. 11–27). New York: Guilford Press.

Reed, D. K., & Groth, C. (2009). Academic teams promote cross-curricular applications that improve learning outcomes. *Middle School Journal, 40*(3), 12–19.

Reutzel, D. R., & Cooter, R. B., Jr. (1988). Research implications for improving basal skill instruction. *Reading Horizons, 28*(3), 208–215.

Roeser, R. W., Marachi, R., & Gehlbach, H. (2002). A goal theory perspective on teachers' professional identities and the contexts of teaching. In C. Midgley (Ed.), *Goals, goal structures, and patterns of adaptive learning* (pp. 205–241). Mahwah, NJ: Erlbaum.

Rosenholtz, S. (1989). *Teacher's workplace: The social organization of schools.* New York: Longman.

Royse, D., Thyer, B. A., Padgett, D. K., & Logan, T. K. (2006). *Program evaluation: An introduction* (4th ed.). Belmont, CA: Thomson Brooks/Cole.

Scammacca, N., Roberts, G., Vaughn, S., Edmonds, M., Wexler, J., Reutebuch, C., & Torgesen, J. (2007). *Interventions for adolescent struggling readers: A meta-analysis with implications for practice.* Portsmouth, NH: RMC Research Corporation, Center on Instruction.

Schumm, J. S., & Vaughn, S. (1991). Making adaptations for mainstreamed students: General classroom teachers' perspectives. *Remedial and Special Education, 12*(2), 18–27.

Scruggs, T. E., & Mastropieri, M. A. (1996). Teacher perceptions of mainstreaming/inclusion, 1958–1995: A research synthesis. *Exceptional Children, 63*(1), 59–75.

Scruggs, T. E., Mastropieri, M. A., & McDuffie, K. A. (2007). Co-teaching in inclusive classrooms: A metasynthesis of qualitative research. *Exceptional Children, 73*(4), 392–416.

Shippen, M. E., Houchens, D. E., Calhoon, M. B., Furlow, C. F., & Sartor, D. L. (2006). The effects of comprehensive school reform models in reading for urban middle school students with disabilities. *Remedial and Special Education, 27*(6), 322–328.

Strauss, A., & Corbin, J. (1998). *Basics of qualitative research: Techniques and procedures for developing grounded theory* (2nd ed.). Thousand Oaks, CA: Sage

Sturtevant, E. G. (2003). *The literacy coach: A key to improving teaching and learning in secondary schools.* Washington, DC: Alliance for Excellent Education.

*Sturtevant, E. G., & Linek, W. M. (2003). The instructional beliefs and decisions of middle and secondary teachers who successfully blend literacy and content. *Reading Research and Instruction, 43*(1), 74–90.

Swanson, E. A. (2008). Observing reading instruction for students with learning disabilities: A synthesis. *Learning Disability Quarterly, 31*(3), 115–133.

Torgesen, J., Houston, D., & Rissman, L. (2007). *Improving literacy instruction in middle and high schools: A guide for principals.* Portsmouth, NH: RMC Research Corporation, Center on Instruction.

Tschannen-Moran, M., & Hoy, A. W. (2001). Teacher efficacy: Capturing an elusive construct. *Teaching and Teacher Education, 17*(7), 783–805(723).

Williamson, G. L. (2006). *Student readiness for postsecondary endeavors.* Paper presented at the Annual Meeting of the American Educational Research Association, San Francisco, CA.

Wilson, S. M., & Berne, J. (1999). Teacher learning and the acquisition of professional knowledge: an examination of research on contemporary professional development. *Review of Research in Education, 24*, 173–209.

Yoon, K. S., Duncan, T., Lee, S. W.-Y., Scarloss, B., & Shapley, K. (2007). *Reviewing the evidence on how teacher professional development affects student achievement* (Issues & Answers Report, REL 2007–No. 033). Washington, DC: U.S. Department of Education, Institute of Education Sciences, National Center for Education Evaluation and Regional Assistance, Regional Educational Laboratory Southwest. Available at: http://ies.ed.gov/ncee/edlabs

* The asterisk indicates articles synthesized in this paper.