



**NeMTSS**  
FRAMEWORK



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## **NeMTSS Research Brief**

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### **Professional Development and Student Achievement**

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CHILDREN, YOUTH, FAMILIES & SCHOOLS**

# Professional Development and Student Achievement: An NeMTSS Research Brief

## Key Points:

- Empirical evidence supports the professional development of teachers to promote student achievement (Yoon et al., 2007; Basma et al., 2017). A recent meta-analysis concluded that optimal professional development prioritizes high-quality instruction over sheer number of hours (Basma, et al., 2017).
- High-quality professional development includes fidelity checks, continuous support/follow up sessions, purposeful activities, and highly structured delivery models with skilled trainers.

## The Impact

Yoon et al. (2007) completed a report detailing how teachers' professional development affects student achievement. After a review of scientific studies, they concluded that teachers who receive an average of 49 hours of professional development can increase their students' achievement by approximately 21 percentile points. This result was based on an average effect size of .54 calculated by the authors of the report. An effect size of .54 corresponds to a percentile gain of 21 points as detailed by Lipsey et al. (2001). Meaning a student scoring at the 50th percentile would then score at the 71st percentile. The review analyzed nine studies that focused on elementary students in grades K-5 during the years of 1986 and 2003. Student achievement in the areas of math, reading, English/language arts, and science were included in the report.

While the optimal level of professional development is reported to be 49 hours, a deeper look at the results shows that the studies who reported more than 14 hours of professional development showed a positive and significant effect on student achievement. Three studies that reported less than 14 hours did not have a statistically significant effect on achievement. The studies included in the review all employed workshops or summer institutes as part of their development. All but one had some sort of follow up session to support the main development events except for one study that conducted a four-week summer workshop. The professional development was provided by the authors of the studies or affiliated researchers. All studies used in the report had an experimental or quasi-experimental design.

The report mentions a few important limitations. The authors state that they followed review procedures outlined by What Works Clearinghouse, which do not include guidelines used in a traditional meta-analysis. They state that because they did not use some of the traditional meta-analysis guidelines, their report cannot be called a traditional meta-analysis. According to the report, a traditional meta-analysis would weight the studies to account for differences in numbers of effects in each study and the variability in sample size across studies. The differential weighting would afford greater power and precision. Additionally, the report does not conduct a test of statistical significance on the average effect size, as would be done in a traditional meta-analysis.

Despite its limitations this report provides strong support for the development of teachers for the purpose of bolstering student achievement. However, a more recent meta-analysis has shown that the 49 hours Yoon et al. (2007) reported may not paint the full picture. Basma et al. (2017) critiqued the 2007 article and offered an updated account on professional development and student achievement.

Basma et al. (2017) conducted a review and meta-analysis on the effect of professional development on student literacy growth. In their review, they built on the work of Yoon et al. (2007) but unlike Yoon et al. (2007), they opted to look at literacy specifically instead of various categories of educational attainment (e.g. literacy, math, and science) because of an “untested assumption that professional development is comparably effective across these distinct domains of attainment” (Basma et al., 2017).

## Quality Over Quantity

After analyzing 17 studies that met criteria for inclusion, Basma et al (2017) found the overall effect size of professional development on literacy growth to be 0.23, which would be associated with an approximate 9-point percentile gain (Lipsey et al., 2012). The authors analyzed the data further to explore the extent to which length and quality of professional development impacted student literacy gains. Because Guskey and Yoon (2009) later argued that 30 hours of professional development produces significant positive effects on student achievement, Basma et al. (2017) ran an analysis of their own looking at effect sizes in studies with less than 30 (10-28 h) hours and 30 or more hours (30-70 h) of professional development. They found that fewer hours of professional development (i.e. less than 30 hours) had a significant and larger effect size than 30 hours or more (effect sizes: .37 vs .09).

The authors then assessed the quality of the studies used according to CONSORT (The Consolidated Standards for Reporting Trials) and the EPPI Centre guidelines. The studies were rated overall “high,” “medium,” or “low” based on the Weight of Evidence (WOE) method adopted by (Cordingley et al., 2007) (See Basma et al., 2017 for details on criteria). The results indicated that the quality of the professional development intervention in the study was more of an influence than the length of it. The Weight of Evidence showed that high quality professional development, which was generally shorter in duration, produced a larger effect size of .35, while studies with generally longer hours in which they were of medium quality reported no significant effects (effect size= .08). Overall, this meta-analysis suggests that shorter, high quality professional development likely has a greater impact on student literacy achievement than time spent on professional development alone. Guskey and Yoon (2009) also support this suggestion.

## What Professional Development Looks Like

The studies used in the quality analysis in Basma et al. (2017) incorporated professional development that ranged from structured talk among teachers, to formal instruction facilitated by trainers. For example, Amendum (2014) utilized the Early Diagnostic Reading Intervention through Coaching program (ENRICH) that was designed for primary grade teachers to receive ongoing embedded professional development and coaching around an instructional framework of diagnostic strategies designed to promote struggling students’ accelerated reading progress. Duffy et al. (1986) trained teachers to use explicit instruction strategies, and Fine and Kossack (2002) facilitated professional learning conversations among teachers that utilized rubric-focused coaching to enhance trust in professional exchanges and professional leadership. Klinger et al. (2004) implemented a full day’s worth of instruction aimed at teaching educators how to implement a reading comprehension strategy and supplemented it with ongoing follow up support through observation and feedback. Gersten et al. (2010) used a professional development model (Teacher Study Group) in which teachers met twice a month to discuss research-based reading interventions, develop plans to implement reading-focused instructional strategies, and evaluate the utility of different interventions. These studies were all identified as high-quality studies, and all provided between 10-30 hours of professional development which

produced effect sizes ranging from .07 - .95 (corresponding to percentile gains of approximately 2 to 33). Other studies not included in the Basma et al (2017) quality analysis utilized similar professional development opportunities. See Table 1 below for a summary of recent studies detailing the nature of the studies, the results, and academic subjects of the professional development implemented.

**Table 1.** Professional Development Studies

Author(s)	Academic Area	PD Hours	Content	Result
Gess-Newsome et al. (2016)	Biology	<b>250+ hours</b> over the course of two years	Researchers facilitated workshops and summer training to increase academic content knowledge and instruction strategies.	<b>B = .30:</b> Reflects the increase in average student post-test score for every one percentage point increase in teachers' content knowledge score.
Shaha, et al. (2016)	Reading and Math	Unspecified number of hours over the course of one year.	52 schools implemented a combination of seminars and online, on-demand, internet delivered professional development opportunities geared toward building instructional strategies.	<b>Reading = 19.96%</b> growth rate: one student of every five who was previously low performing achieved a proficient or advanced performance level post-program implementation.  <b>Math = 24.41%</b> growth rate: one student of every five who was previously low performing achieved a proficient or advanced performance level post-program implementation.
Meissel et al. (2015)	Reading and Math	Program facilitators visited schools once every two weeks Over the course of two years. No specific contact hours were reported.	Facilitators implemented a professional development program in 195 schools. While they worked with teachers directly to provide education and feedback, they also worked with a school leader and trained them to upskill teachers.	<b>Reading effect size = .09</b> (cohort one) and <b>.17</b> (cohort two))  <b>Writing effect size = .38</b> (Cohort one) and <b>.51</b> (cohort two)
Andersson and Palm (2017)	Math	<b>144 hours</b> over the course of one term (6 hr/week)	22 teachers received instruction on formative assessments and participated in activities to encourage the use of them in their classrooms.	<b>Effect Size = .66:</b> compared to the control group. The classes that were taught by teachers who received the PD program significantly enhanced their math achievement score over one year of formative classroom practice.
Desimone et al. (2013)	Math	On average, teachers received <b>20.27 hours</b> of math related PD (range = 0-40h)	Researchers analyzed the math-based professional development of 457 teachers in 71 schools and related it to student achievement.	<b>Effect Size = .147:</b> teachers who participated in professional development with a focus on math were significantly more likely to increase their focus on advanced topics in their classrooms, which was associated with greater achievement.

Overall, the literature supports the use of professional development to promote student achievement. However, while Yoon et al. (2007) suggests that 49 hours is optimal for student gains, a more recent meta-analysis concluded that optimal professional development is shorter (i.e., under 30 hours) and of high-quality (Basma, et al., 2017). Key features in the high-quality studies included fidelity checks, continuous support/follow up sessions, purposeful activities, and highly structured delivery models with skilled trainers. Guskey and Yoon (2009) have also identified elements similar or identical to these in their report on What Works in Professional Development.

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